THE

NEW YORK

COACH-MAKER'S MAGAZINE,

DEVOTED TO THE

LITERARY, SOCIAL AND MECHANICAL INTERESTS OF THE CRAFT.

EDITED BY E. M. STRATTON.

VOLUME SIX,

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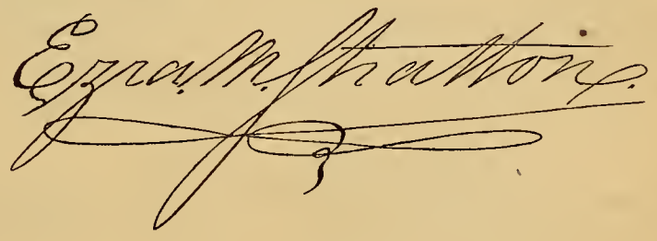
MDCCCLXV.

PREFACE.

Once more we come before our readers, with another volume of The New York Coach-maker's Magazine—the sixth of the series. During the past year we have had some difficulties to contend with—the unprecedented rise in the price of paper, and a corresponding expense in printing, both of which, although we have increased the price of subscriptions, have had the effect to deprive us of any income from our labor. Indeed, we had about concluded to suspend its publication, when over the wires flashed the glad news that Richmond is ours, that Lee has surrendered, and Davis' bogus confederacy collapsed. With the probability that the Federal flag will soon "wave" over every foot of our country comes the encouraging thought that our Magazine will soon again receive the patronage of an undivided people, and remunerate us for our outlay of capital.

There are some features in the present volume that give it a value over all the preceding ones. Excellent as friends have pronounced them, in our judgment this excels them all, in both its practical and literary matter. Good judges, both at home and abroad, have complimented us in the progress we have shown in designing the drafts. This is owing (we say it diffidently) to the fact that we have had this chiefly done in our own office, much of it by our own hand. We intend to try and excel even these in the forthcoming volume. That we may be succeesful in making this work still more useful, we invite the continued assistance of an enlightened public as contributors and agents in giving it a more extended circulation. We know of a few who would rejoice to have *us* silenced—we are glad to know that they have not the power to do it, and that they will *rage* in vain. That we may have the continued smiles of all honorable men is our ardent desire, while we subscribe ourself,

Your faithful friend,



New York, *April* 12, 1865.

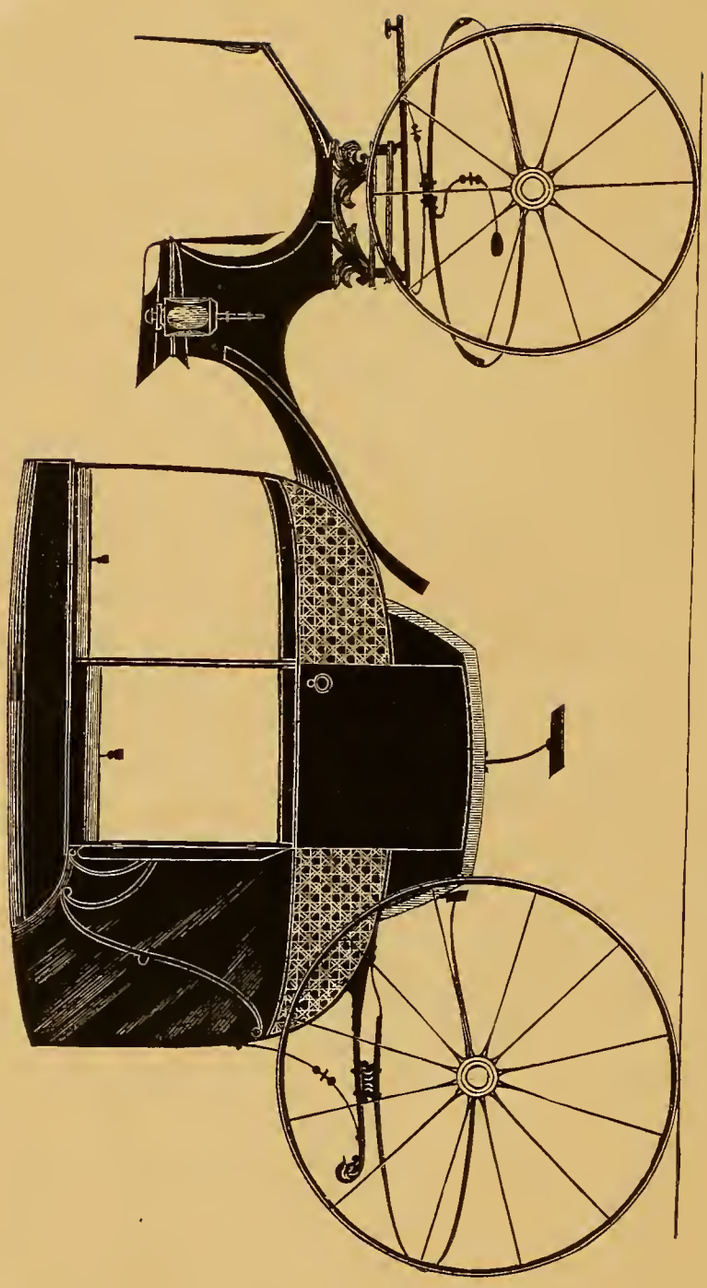
INDEX TO PLATES IN VOLUME SIX.

DIRECTIONS TO THE BINDER.—The Portrait of Henry Harper, Esq., to face the title-page. All the remaining Plates should be placed at the back end of the volume, in the order they are numbered. Advertisements (when bound in) should follow after the Plates.

INDEX TO ILLUSTRATIONS.

INDEX TO VOLUME SIX.

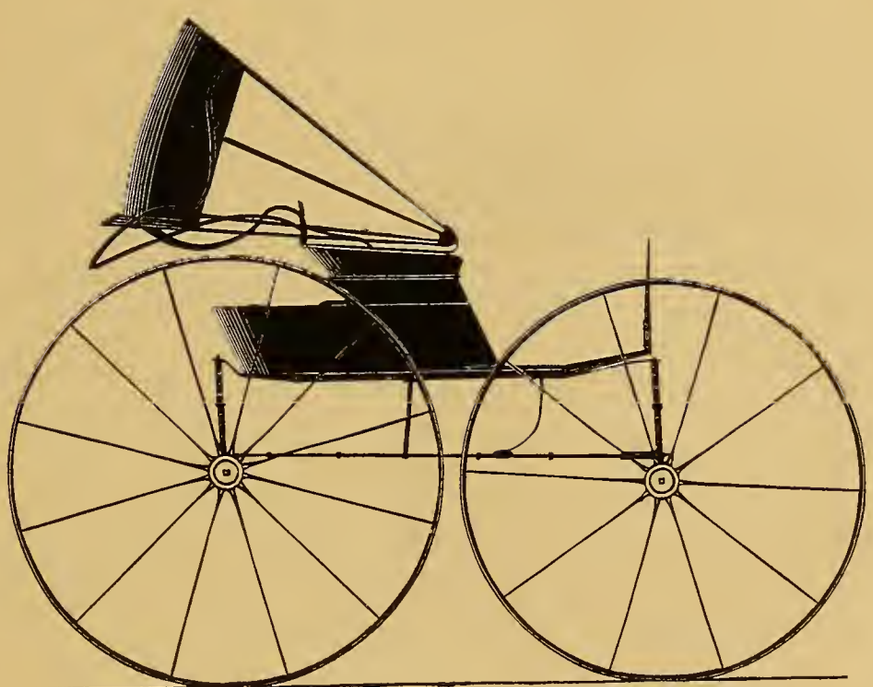
To the Reader.—Under the head of "The Home Circle" will be found, in alphabetical order, all matter pertaining to that department. The same disposition is made of that under the head of "Sparks from the Anvil," "Paint Room," "Trimming Room," and "Editor's Work-bench."



FULL CALECHÉ.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

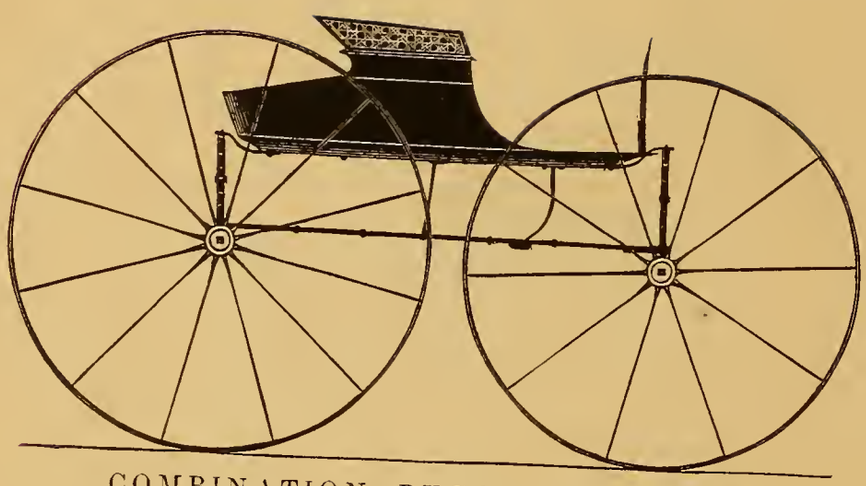
Explained on page 8.



GENTLEMAN'S TOP BUGGY.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 8.



COMBINATION BUGGY.—½ IN. SCALE.

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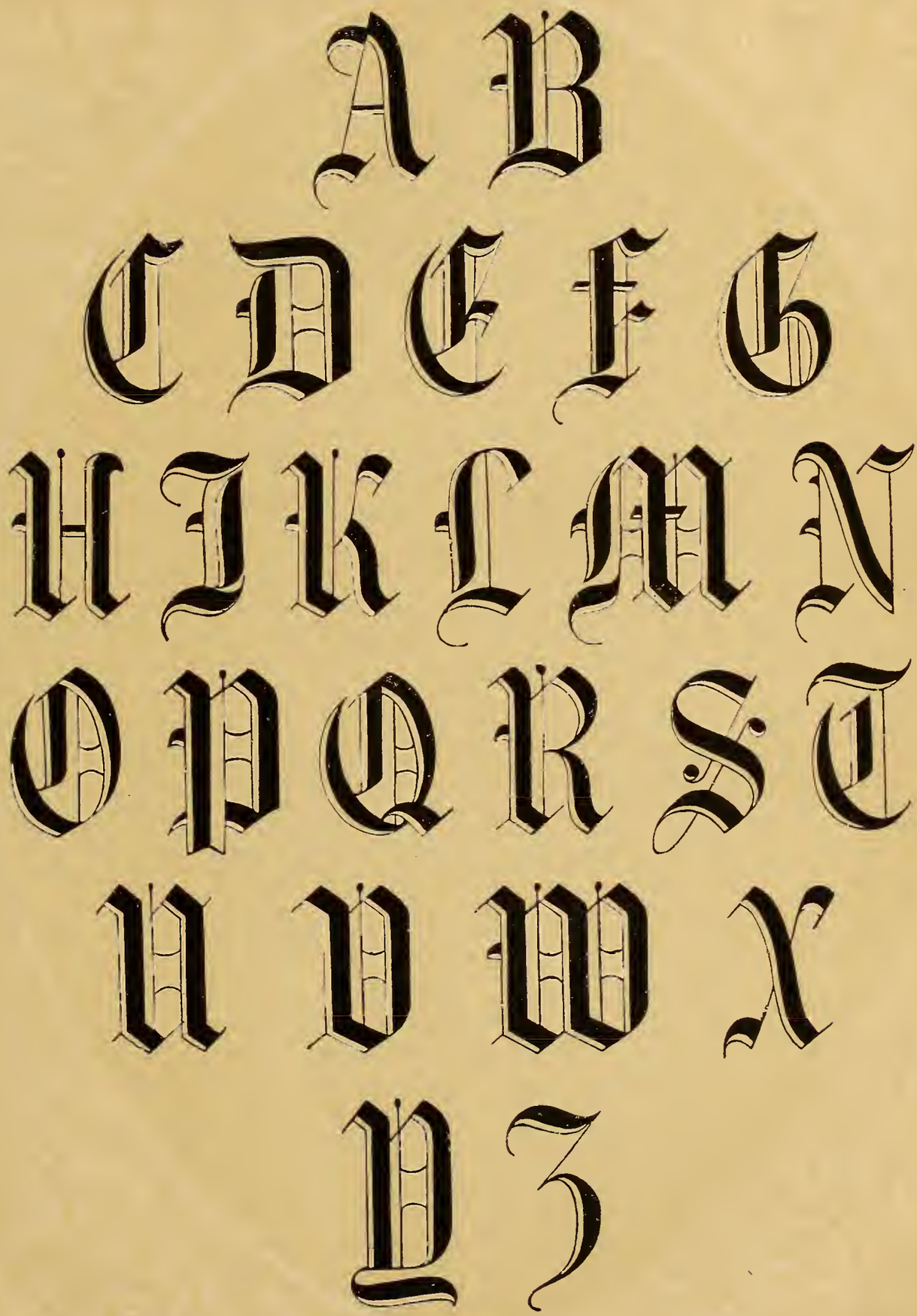


OLD ENGLISH TEXT.

Designed for the use of Painters on the Panels of Carriages.—Noticed on page 11.

THE NEW YORK
WAGON-MAKER'S MAGAZINE

DEVOTED TO THE LITERARY, SOCIAL, AND MECHANICAL INTERESTS OF THE CRAFT.

Vol. VI. NEW YORK, JUNE, 1864. No. 1.

Mechanical Literature.

WHY WHEELS ARE DISHED.

BY O. E. MILES.

Upon reading Mr. Harper's article upon this subject (page 177, Volume V.), I can see no reason for replying to it, unless it may be to make plain to your readers his very obscure way of admitting the correctness of my positions.

He seems to assume, in the outset, that I have taken the field to advocate wheels without dish, or straight on the outside and convex on the other. Be it here understood, that I am in favor of dishing wheels considerably, enough to insure the impossibility of their becoming straightened. I differ from him in believing that the dish of the spokes gives them no additional strength; but that the strength they possess, when dished, is much more durable by reason of their elasticity. He contends that the dishing form gives the wheel a positive additional power to resist strain, but makes as bad work of telling how it is done, as I should make were I to attempt to tell *how* a plaster strengthens a weak back. Faith, I imagine, is the mainstay in both cases.

After admitting the truth of my first statement, that he had attributed force and resistance to wrong agencies, he remarks that all the difference consists in his having called resistance force, while I called force resistance, when both terms express the same idea. Now, I expect him to have the last word, but would respectfully suggest, before leaving it, that the difference between us in this respect is more properly this: he has placed the force in the place of the resisting medium, leaving entirely out of the question the force at the same time being exerted by the axle upon the hub of the wheel. It is thus that he has ingeniously made out a case in such a way that few would see, at first glance, how it is done. I explained the proposition by placing this force where it belongs, and called the resistance to this force by its right name, and I must deny him, or rather philosophy denies him, the privilege of using active force and passive resistance as synonymous terms in the demonstration of any proposition.

Mr. H. admits, again, all that is of any importance as bearing upon this subject in my next position, namely, that the axle exerts a lever power upon the hub of the wheel, but denies that the ground acts as a fulcrum to that lever; and betters the matter amazingly, by asserting that the fulcrum to the axle, when acting thus as a lever, is a part of the axle itself, either the extreme end thereof or some intermediate point! I imagine there are few school boys who would not smile at this item of intelligence. Let our readers refer once more to fig. 2, page 162, volume V. When the force is applied at *a*, pushing the hub outward toward *b*, it is plain the bearing of the axle is upward against the outer end of the axle-box, and downward upon the inner end of the same. This downward bearing is resisted, as I said, by the ground at *c*. This resistance, which we call a fulcrum, is communicated to the axle through the medium of the spoke, *d*, together with the inner end of the box aforesaid, which objects, taken collectively, might with more propriety be called the fulcrum; but to say that the fulcrum to a lever is any part of the lever itself, is the climax of absurdity. His admission, that my representation of a broken wheel is a very common one, virtually admits all that I contend against in a dished wheel, and the reason why the leverage in question, upon a straight wheel (I mean here a wheel convex on both sides), is resisted by the tire, while in a dished wheel it is not, is clearly set forth by fig. 2, and the explanation on page 162. In the name of common sense, I ask, what becomes of the arch principle when we press downward upon one side of the keystone to an arch, and pull upward on the opposite side with an equal force? I answer, it is nowhere, and I hope Mr. Harper's arch theory, as applied to a wagon wheel, is now disposed of to his entire satisfaction.

I will quote here one paragraph from my first article on this subject: "If the resistance to this forcing outward of the hub were offered to the whole rim simultaneously, instead of, as it invariably is, to the lower edge only, it would have, as Mr. H. says, only a tendency to stretch the tire, or force the spokes endwise into the hub; in fact, it would have the same effect that pressure would upon any other arch; but we have seen that the case is very different." After quoting this paragraph in Mr. H.'s reply, he says, I must have left out a paragraph here which I meant to have inserted, for there is no other allusion to this other case in my article. I would here call

his attention to a previous paragraph in the same article, which he also quoted, so it could not have escaped his notice: "The resistance of the ground against the lower edge of the wheel causes the axle to act the part of a lever upon the hub of the wheel, &c.," thus demonstrating, it would seem to me clearly, that the case is very different from simple pressure upon an arch; but because I did not adopt his style of expressing my ideas in as many words as possible, and then multiply them (the words) by 10, he thinks I must have left out a very long paragraph. Read again, Brother Harper; you will see my whole idea expressed there as briefly as possible, consistent with clearness—a habit I have contracted since paper went up.

Mr. H. can see no advantage arising from elasticity in a carriage wheel, nor can he comprehend how elasticity is secured by dish. If he is unable, after reading my article, to see these points, I must confess my inability to reach his understanding, and pass on to his next and last declaration, which is, that he has no confidence in any wheel made convex on both sides. If he read my article attentively, he must have seen that I have no confidence in it myself, nor shall I have any confidence in the durability of a wheel made thus, until we make wheels of a material which will shrink and expand from the same causes, and to the same amount as the tire, thus constantly retaining its support; and I will here record my conviction, that the time is very near at hand when a steel carriage wheel will be made a practical experiment. The great improvements recently made in the manufacture of steel have made this almost, if not quite, possible now, and I predict again, that wooden wheels and the dishing shape will go out of date together.

I cannot leave Mr. Harper without offering a very few remarks upon his four-and-a-half-page article to prove that wagon wheels "talk" too much. The only way he has found it possible to get up so long and labored an argument is to ignore the only reason why a wagon should talk, and say he has looked in vain for it, and proceeds very sagely to attribute this talking sound to the wrong positions of the axle-arms! Now, I suppose there is hardly a wagon-maker in this country, and very few of those who use wagons, who are not familiar with the fact that the absence of this talk is proof conclusive that the axle-arms are out of shape. Is Mr. Harper right and everybody else wrong? In reasoning upon this subject, he seems to lose sight of the main great difference between a wheeled vehicle and all other machines, which is, that when in use its motions are all irregular, caused by the uneven surfaces over which it moves, while nearly every other machine in existence rests, while in use, upon a dead level. Ninety-nine hundredths of the time the journels of wheeled vehicles are out of level, when of course gravitation causes the wagon gearing, with its load, to slide against the collars and nuts, which are the highest. A dozen times in traveling a road may this relation be changed from one side of the vehicle to the other, and with every change comes a click of the collars of one side and the nuts of the other against the ends of the boxes. Is it possible that Mr. H. can be ignorant of the cause of this simple phenomenon? or, again, knowing it, is it possible he can have any motive for making a great case out of nothing?

The drawback occasioned by the gather of axles is very great. Mr. H. gives the loss occasioned by it in actual figures, and I have no reason to doubt their correctness, and I must say I was sorry to see him kick it all over by attributing the talking of the wheels to this cause; and I believe if his wheels could talk English, they would vociferously protest against any such vicious construction of their innocent prattle. I somewhat expect him, in his next article, to attribute the rattle of the neck-yoke ring to the same cause, but I hope we shall hear no more of his wholesale comparisons of wagons to stationary machinery, as I have shown, to the satisfaction of any one, that the cause of the talking of a wagon wheel does not exist in any other machine. Of that class of thinking mechanics, whom he says have of late years discarded the old notion of gathering axles, I have never had the fortune to meet one, nor do I believe one can be found in this part of the country. So long as we have tapering axles, we will have to choose between the talk he complains of and a constant tendency to grind against the nuts. Which is the least evil? Which is the most desirable? that we have the extra friction, produced by tapering axle arms, on the ground, or on the outer ends of the boxes? One thing, I contend, cannot be produced, namely: a wagon with the ordinary tapering axle-arms, without gather, with the wheels resting on a plain spoke, and those wheels have an equal tendency towards the collars and nuts. There are causes inseparable from the present mode of constructing wagon wheels and axles, which have far more to do with their strength, durability and efficiency, than any or all the causes of which Mr. Harper has yet spoken. Upon these causes and their remedies you may hear from me again.

WEAR ON AXLES.

BY HENRY HARPER.

Those who wish to make improvements in the most important part of carriage-building—that is, the ease of draught—cannot find more positive proof of the right and wrong way, than by examining how such and sueh construction operates on the wear of the axle-arm and box. This proof, when properly considered, amounts to a mathematical certainty that eannot be controverted.

The part of the axle which wears most, all will admit, has received the greatest amount of friction, and, as a general thing, that friction has been created by a superior weight. There are but very few exceptions to this rule—perhaps the only ones are an exposure to the effects of sand or other grit and a want of lubricating matter between the two substances of iron coming in contact. Either of these two difficulties may be avoided by ordinary ingenuity. But, to completely preserve an equality of bearing on the extremities of the axles, seems to be a point that few attain, and still fewer are willing to admit their deficiencies in this respect. The wear of the axle and box, which time only will show, detects the false pretensions which so many make. It has been done so often, that it is thought by some that, as a matter of necessity, axles must wear out. Until such notions are completely exploded by facts properly presented, there will always be a screen for incompetent workmen to throw over their incompetency.

I here present a map of the under-side of a thimble-skein axle, which may be said at first sight to be singularly worn; yet, notwithstanding the singularity of the thing, the same result, under like circumstances, would be

repeated as often as two multiplied by two would produce four. Nothing is singular in the operation of mechanical laws. There is something singular in men's application of them sometimes, as this map will show.

The axle under consideration was set by one of our best mechanics, who gave it a very little gather, as most other wagon-makers do. He got the bearings as near equal as he could by good guessing, which was about as good as any light he could procure on the subject at that time. Since, he has procured a geometrical instrument which will tell him as near the pitch that an axle-arm should have, as his rule will the length of the axle. The wagon has been used for an express wagon, and driven on a continuous road about seventy miles. The road is sandy and considerably traveled. The wagon was worn about one-half out in the other parts, when the axles and boxes became so bad that they had to be replaced with new ones. From the cast-off axles I have taken the map (figure 1), which shows exactly where the wear occurred.

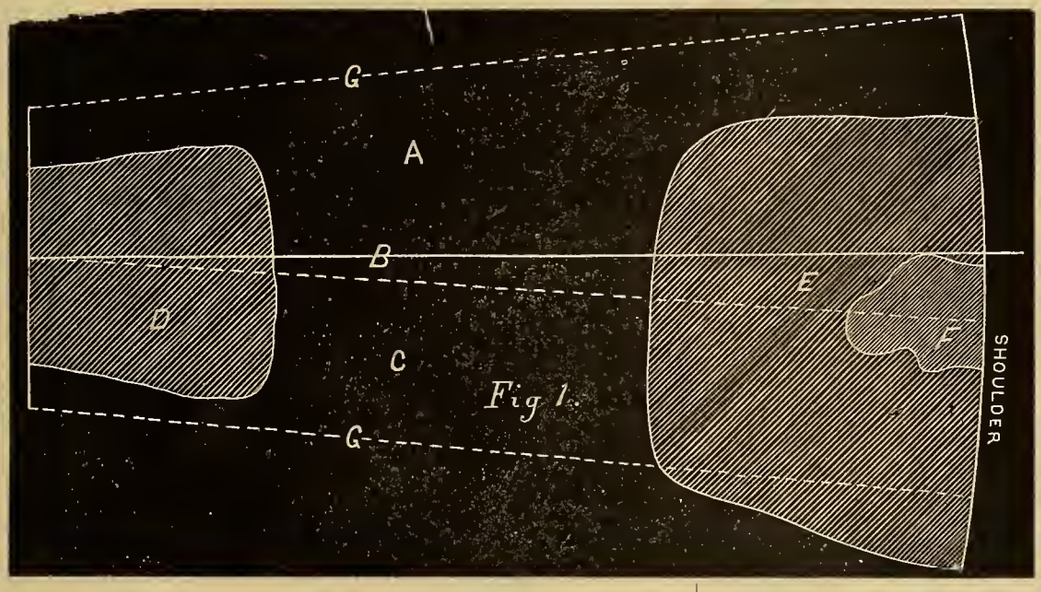


Fig 1.

B, represents the center of the under side of the axle-arm. A, represents the under side of the axle forward of the centre, and C, back of the centre. GG, are lines that bound the under half of the circumference of the axle. D, shows the wear on the point, and E, on the butt of the axle. F, shows a hole worn through the thimble at the butt. The wear created by the inequality of the bearings does not appear to be more than about one-fourth as much on the point of the axle as on the butt. What took my attention as singular at first, about the wear of this axle was, that the most of the wear was back of the center line, B, instead of forward. It would seem that as the axle was drawn forward against the side of the box, to propel the wheel, the part forward of the centre line, B, would get the most pressure, and of course the most wear; but here it is the reverse. The reason for its doing so is very plain on reflection, and proves, beyond the shadow of a doubt, the great loss sustained by the old stupid notion of gathering the axles. This old notion, stupid as it is, to any reflecting mechanic, is yet practiced by a very large majority of the craft at this day. Such is the tenacity of mind to old theories, that it will take ages to remove it when once fixed.

Fig 2.

The road over which this wagon traveled being sandy, the wheels had formed ruts in the ground in parallel lines, and it was necessary to keep them within these tracks or grooves to avoid the loose sand. In figure 2, the lines, BB, represent these grooves; the dotted lines, *cc*, represent the wheels that are gathered, and DD, the axle-boxes. Now, if we attempt to draw the wheels toward BB, they will fall into the track which former wheels have made in the ground. That track holds the rim in parallel position, contrary to the inclination; the gather of the axle holds them in. The only way this state of things can accommodate itself to, is for the axle to lay partly cross-wise of the axle-box. This would bring the butt of the box against the axle-arm, A, on the hind-side and the point of the box against the forward side of the axle. This diagram represents the exact condition of the road—allowing the B lines to be parallel grooves—which the tread of the wheels have made in the ground. The gather in the wheels, of course, is exaggerated, to show the principle on which it would act. The wheels can in no way be kept within the parallel tracks, BB, without making the axle-box crowd on the hind-side of the axle-arm at the butt end and the forward side at the point. This pressure on the sides of the axle does not in the least sustain the load, but is entirely a superfluous and *unnecessary* appendage, requiring a greater amount of extra motive-power to perform the same labor than the wagon originally cost in money.

The extra expense of two sets of axle-arms and boxes to one wagon, together with the expense and trouble of an unnecessary repair, when one set of axles and boxes are sufficient to wear out the other parts of two wagons, without this trouble of repair, is considerable of an item; and yet it is nothing in comparison with the waste of motive-power. The proof of this wear, and consequent loss of motive-power attributed to the gather given to the axles, is irresistible. Had the wear not been unnecessarily expended on the hind-side of the axle, from the nature of the roads holding the wheels in that position, the same loss of motive-power would have been occasioned by the wheels crowding against the shoulders of the axle.

Hundreds of unanimous witnesses to one fact would not more positively establish the truth, than this silent witness of the actual wear presents. It is an easy matter to say, such and such a wagon "runs like a top;" or for certain wagon-makers to say they can beat everybody

else in making wagons run easy, as long as there is no way of measuring the amount of draught to different wagons, any nearer than to observe how much the team is worried. But if we have the cause reduced to simply a lever-power, then the *wear of the axle* will show how much friction has been overcome in keeping that lever in operation. It is easy, as well as mathematically certain, for one who understands the nature of the power required to move a wagon, to determine whether the wagon has run easy or not, by the wear that it shows on the axles, compared with the wear on the tire and other parts of the wagon. No amount of verbal testimony should weigh any more against this, than it should against the results of a correctly worked mathematical problem. The owner of the wagon under consideration has two others, the axles of which are set what I should call perfect; so that the bearings are equally distributed at the shoulder and point without a gather. I have known the facts as to the construction of these wagons from the beginning, and have made frequent inquiries of the owner about their running qualities. The axle represented by this map had been rather fulsomly praised. After the axles had been worn out and replaced with new ones, I asked him how it happened that this easy running wagon wore out the axles, while the hard running ones did not show any signs of wear, the proofs being before our eyes. This was asking more than he was prepared to answer, and of course I did not get a satisfactory reason for it.

There is an important leason to be learned from the above circumstance, which is, that the craft should have something more reliable to depend upon for reputation, as mechanics, than the praise of interested individuals. In this case, the owner from interested motives was praising that which he wished to dispose of, and disparaging that which he intended to keep. If we are obliged to depend upon such testimony as to the mechanical results of certain constructions, it is no wonder that we have so many different and contradictory ways which the craft so persistently cling to. Circumstances seem to have surrounded us with an atmosphere of deception. The only way that we can disengage ourselves from these entanglements is to promulgate philosophical principles, established on scientific facts that can not be contradicted. We have drifted along in the business of carriage-building with scarcely any reliable chart, until such unmechanical notions as giving axles a gather is at this day more popular than making the wheels run straight ahead, which certainly would appear a common-sense idea.

It is a degrading notion many indulge in, to think that art is going to be stolen from them, or that they by some hook or crook are going to steal from others. It is no more liable to be taken from us dishonestly than the principles of Natural Philosophy or any other science; and as long as mechanics show such an over-anxious desire to confine the light to themselves alone, they will be a disgrace to the craft.

I most heartily congratulate the readers of THE NEW YORK COACH-MAKER'S MAGAZINE, that the work is to be continued. It is an event that has been watched, hoped and prayed for, with the deepest solicitude by many members of the "craft," as a much-needed benefit, to not only the mechanical branch, but to civilization generally. Our indefatigable Friend Stratton deserves the thanks of every friend to progression, for the part he has sustained in keeping this Magazine up under the greatest pressure that circumstances will probably ever bring against it again, and of placing upon record important truths to civilization, which otherwise would have been a dead letter for years to come to that part of the craft speaking the English language.

To those who have advocated and acted on the know-nothing, pay-nothing, stand-still principle, we would say that mechanical art has been going ahead, although you have not. Do not deceive yourselves, you have only put distance betwixt yourselves and progression. Every year this distance becomes more apparent. Although you do not observe it, those who have traveled on do, and know full well that you have got to travel the same road, with what is called "a double quick," or ever remain in the rear. Every now-and-then something turns up to show the fallacy of some old time-honored notions. Those notions would have long since vanished had an organ been established for the craft as in other science and art. Taking the matter into full consideration, it is not strange that our garden needs considerable weeding.

EFFECTS OF WHEEL-CARRIAGES ON ROADS AND HORSES.

CHAPTER IX.

(*Continued from page* 165, *volume V.*)

1. Springs, their use explained—How they operate to the ease of the rider.—2 Richard Lovell Edgeworth's Experiment on Springs.

1. IT is agreed by philosophers that there is in all matter a tendency to continue in the state in which it is, whether of motion or of rest. It requires more power to move a coach or other body from a state of rest than is afterwards required to keep it in motion. Thus we see that horses always exert much more power to *start* a carriage, whether a wagon or a coach, than is afterwards required to continue it in motion; and, when in motion, a considerable effort is frequently necessary to stop it.

When a coach is going with very great speed along a straight road, and suddenly turns a corner, such is its tendency to continue its course, that coaches have often been overturned from this cause alone.

This principle applies to every variety of motion to which a carriage is liable in traveling. But if a carriage be furnished with springs, although they may be bent, equal to the pressure of the simple weight of the load, it is found, by experience, that the load, rather than alter its course, by suddenly rising over a stone, will bend the springs still further; whereby, in passing over a stone four inches high, the load may not perhaps rise more than one inch, the springs in this case giving way an extra three inches; and I think I have shown the springs of a stage-coach, loaded with about a ton, when passing quickly through a gully or water-course, across a turnpike-road, by first descending suddenly into the gully, and then as suddenly rising out of it, to bend equal to a dead pressure of three tons, and in proportion as it is more easy for the springs to bend than for the weight to vary from its course, in that proportion is the labor of the horses lessened by the use of them.

To the above-mentioned principle it is that we are indebted for the ease with which we ride on springs. By how much the springs give way to all the little stones and other inequalities of the road, by *so much* do we pass on in an even or horizontal line, more than we otherwise should. For if our roads were perfect mathematical

circles, springs would be useless appendages to any carriage, as they could in no degree add to the ease of the traveler, nor could they lessen the labor of the horses.

2. Richard Lovell Edgeworth details some curious experiments on the subject of springs; the result of which is, that the advantage from the use of springs, when a carriage is going on a *rough* road, at the rate of $3\frac{3}{4}$ miles per hour, is, compared with a carriage without springs, as 12 is to 8. When going at the rate of $5\frac{1}{2}$ miles per hour, the advantage is double, or as 12 is to 6.

From which results some very important considerations arise. If, as I have above stated, springs could be of no use, provided the roads were perfect mathematical planes, and provided wheels were as perfect circles; and if it be also true, as I have stated (chap. I., § 8), that although a wheel may be carried over a stone by the momentum of the carriage, yet that the momentum thereby lost must be restored by extra exertions of the horses; and that this is true is evident, otherwise a carriage, traveling with great speed, would require no more power to draw it on a rough road than on a smooth one; and if it be also true that a carriage without springs going on a *rough* road, at the rate of $5\frac{1}{2}$ miles per hour, requires double the labor that it would require if constructed with springs; and as a very great proportion of all carriages have no springs [this was in England, 1820], how important is it that our roads should be brought as nearly as possible to the state of mathematical planes! and in order that they may be preserved in this order, that all carriages should be so constructed as to cause the least possible wear and tear upon them.

CHAPTER X.

1. Suggestions respecting the Tax on Stage-Coaches.—2. Private Carriages, Taxed Carts.

I HAVE already hinted that I think it unreasonable and barbarous, that persons who cannot afford to pay the highest price for conveyance by stage-coaches should, because they are poor, be necessarily exposed to the severity of the weather; and that, therefore, every public carriage ought to be so constructed as to afford shelter for every passenger; but as the law now stands, the proprietors of stage-coaches are *compelled*, if they carry more than the inside of the coach will hold, to carry the rest on the *outside*. I therefore think that the license, instead of being granted to carry, say, six inside and twelve outside, should be general; that is to say, to carry eighteen passengers; for which the coach-master should pay the same tax as he now does.

2. Then as regards private carriages, coaches, chariots, and one-horse chaises, I take the liberty respectfully to suggest to those in authority, that the tax ought not to be so imposed as to limit the number of wheels, for two reasons: the first is to be founded in the principle I have endeavored to establish, viz., that the greater the number of wheels, on which any given weight is laid, the better for the road. Now, although this consideration may be trifling, as regards carriages calculated to carry only two or three persons each, yet it is a consideration, and it ought ever to be kept in view. The second reason is the consideration of danger attendant on two-wheel carriages, which is so great and so obvious, and which is so frequently confirmed by the most frightful accidents, that it is needless to enlarge upon it. I therefore think that, as the tax on all these vehicles is imposed, as on articles of luxury, the tax ought to be laid on in proportion to the luxury, which is certainly to be estimated by the number of horses drawing, and not by the number of wheels on which a carriage stands; in the following manner: say,

	l.	s.	d.
For every carriage having steel springs and drawn by only one horse.....			
Drawn by two or more horses.....			
For every carriage constructed without lining or ornament, or steel springs, (but without limitation of number of wheels, or of cost.....			

I do think that, on the ground of humanity, in the case of this last-mentioned vehicle, neither wooden springs, nor cushions, nor head, nor apron, ought to be prescribed. It is not likely that many persons, who can afford a better, would submit to so humble a carriage as must necessarily be made under these limitations, and it should be remembered that many females, in slender circumstances, are quite as tender as some who are blessed with affluence, and who, consequently, can afford an easy and luxurious coach. Having myself occasionally been exposed to the necessity of riding in a taxed cart *without any springs*, I can say the sensation was dreadful. I therefore think that the use either of wooden springs, or of cushions, or of shelter from the weather, ought neither to be forbidden to any fellow-creature, nor, which is the same thing, to be put out of his reach by the operation of a severe tax.

THE COACHES' OVERTHROW.

SEVERAL passages in the previously published volumes of this Magazine have made known to the reader the strong opposition attending the first introduction of coaches into England, in the Seventeenth Century. On page 24, volume IV., will be found two stanzas of a poem copied from a cotemporary. The entire production has lately fallen in our way. It will be found in Collier's Roxburghe Ballads, and we now take an early opportunity to introduce it to our readers.

Mr. Collier, as introductory to the Ballad, says: "As early as 1601, coaches in London had become such a nuisance that the Legislature found it necessary to interpose, 'to restrain the excessive' use of them; not long afterwards, we are told that not fewer than 6,000 were constantly crowding the narrow streets. About 1,630 sedans also came into general request, and they are alluded to by R. Brome and other dramatists of the time. In 1631, the inhabitants of Blackfriars petitioned the Privy Council against the number of coaches bringing auditors to the theaters there (Hist. of Engl. Dramatic Poetry and the Stage, II., 31; III., 408); and John Taylor's 'World runnes on Wheels,' was written to ridicule the increasing fashion. (See vol. III., p. 105, of this Magazine.) In 1636, was printed a ludicrous discussion between a coach and a sedan (extracts from which we have given on page 26, vol II., of this work); and to about this period the following song, which contemplates the suppression of hackney-coaches, seems to belong.* It is called, in the

* A hostile view of the subject seems to have been taken a few years earlier, by Master Stephen Gosson, in a work entitled "Quippes for upstart new-fangled Gentlewomen," published in 1596, 4to., in thus alluding to coaches:

"To carrie all this pelfe and trash,—
Because their bodies are unfit,—
Our wantons now in coaches dash,
From house to house, from street to street.
Were they of state, or were they lame,
To ride in coach they need not shame."

undated broadside, 'The Coaches' Overthrow, or a Jovial Exaltation of divers tradesmen and others, for the Suppression of troublesome Hackney-Coaches.' For 'exaltation' we ought doubtless to read *exultation;* but we have never met with more than one copy, which was 'Printed by Francis Grove.' Other obvious misprints occur, which it is not worth while to point out, and in one place a line has been nearly cut off; we have supplied the deficiency by conjecture."

THE COACHES' OVERTHROW.

To the tune of "Old King Harry."

As I passed bye, the other day,
where sack and claret spring,
I heard a mad crew by the way,
that loud did laugh and sing;
Heigh downe, dery, dery downe,
with the hackney coaches downe!
They cried aloud;
They make such a crowde,
Men cannot passe the towne.

The boyes that brew strong ale, and care
not how the world doth swing,
So bonny, blithe, and joviall are,
their lives are drink and sing:
Heigh downe, dery, dery downe,
with the hackney-coaches downe!
To make them roome,
They may freely come—
And liquor the thirsty towne.

The collier, he's a sack of mirth,
and though as black as soote,
Yet still he turns and whistles forth,
and this is all the note:
Heigh downe, dery, dery downe!
They long made fooles,
Of poor* carry-coales,
But now must leave the towne.

The carriers of every shire
are, as from cares immune;
So joviall is this packe horse quire,
and this is all their tune:
Hey downe, dery, dery downe,
with the hackney-coaches downe!
Farewell, adew,
To the jumping crew,
For they must leave the towne.

Although a carman had a cold,
he strained his March-bird voice,
And with the best a part did hold,
to sing and to rejoyce:
Heigh downe, dery, dery downe,
with the hackney-coaches downe!
The carman's cars,
And the merchant's wares,
May passe along the towne.

The very slugs did pipe for joy,
that coachmen hence should hye;
And that the coaches must away—
a mellowing up to lye:
Hey downe, dery, dery downe!
Passe they their scope,
As round as a rope,—
Wee'l jogge them forth of the towne.

Promoters, and the informers,
that oft offences hatch;
In all our times the money-wormes,
and they are for to catch:
Heigh downe, dery, dery downe,
with the hackney-coaches downe!
For their restraints,
Will, with complaints,
Fill all [the noisy towne.

The world no more shall run on wheels,
with coach-men, as 't has done;
But they must take them to their heeles,
and try how they can run:
Heigh downe, dery, dery downe,
with the hackney-coaches downe!
We thought they'd burst
Their pride, since first
Swell'd so within the towne.

The sedan does (like Atlas) hope
to carry heaven pick-pack;
And likewise, since he has such scope,
to beare the towne at 's back;
Heigh downe, dery, dery downe,
with the hackney-coachmen downe!
Arise, Sedan,
Thou shalt be the man,
To beare us about the towne.

I love sedans, cause they doe plod
and amble every where;
Which pranceers are with leather shod,
and ne'er disturbe the eare:
Heigh downe, dery, dery downe,
with the hackney-coaches downe!
Their jumpings make
The pavement shake;
Their noyse doth mad the towne.

The elder brother shall take place—
the youngest brother rise;
The middle brother's out of grace—
and every tradesman cryes:
Heigh downe, dery, dery downe,
with the hackney-coaches downe!
'Twould save much hurt,
Spare dust and durt,
Were they cleane out of towne.

The sick, the weake, the lame also,
a coach, for ease, might beg;
When they on foote might lightly goe,
that are as right 's leg:
Heigh downe, dery, dery downe,
with the hackney-coaches downe!
Let's foot it out,
Ere the yeare come about—
'Twill save us many a crowne.

In an old poem, *temp.* Eliz., called "Christmas Lamentations," we are told that:

"Madam, forsooth, in her coach must wheele;
Although she wear her hose out at the heele!
Welladay!"

*The author of "Mock-beggar's Hall," with his situation in the spacious country called anywhere, written about 1636, says:

"Methinks it is a great reproach,
To those that are nobly descended,
When for their pleasure they cannot have a coach,
Wherewith they might be attended.

But every beggarly Jack and Jill,
That eat scarce a meal in twenty,
Must through the streets be jaunted still—
While Mock-beggar's Hall stands empty.

There's some are rattled through the streets,
Probatum est, I tell it,
Whose names are wrapt in parchment sheets,—
It grieves their hearts to spell it.
They are not able two men to keep;
With a coachman they must content be—
Which, at play-house drove, in 's box lies asleep,
While Mock-beggar's Hall stands empty"

Much more in the same strain might be produced, as evidence that coaches were frowned upon when first introduced, but these extracts are sufficient for our purpose, and must suffice.

What though we trip on boots and shoes,
'twill ease the price of leather;
We shall get twice what once we loose,
when they doe fall togcther:
Heigh downe, dery, dery downe,
with the hackney-coaches downe!
Though one trade fall,
Yet in generall,
'Tis a good to all the towne.

'Tis an undoing unto none,
that a profession use;
'Tis good for all—not hurt to one—
considering the abuse:
Then heigh downe, dery, dery downe,
with the hackney-coaches downe!
'Tis so decreed,
By a royall deed,
To make it a happy towne.

Coach-makers may use many trades,
and yet enough of meanes;
And coachmen may turne off their jades,
and helpe to draine the fens:
Heigh downe, dery, dery downe,
with the hackney-coaches downe!
The scythe and flail,
Cart and plow tayle,
Doe want them out of towne.

But to conclude, 'tis true I heare,
they'l soone be out of fashion;
'Tis thought they very likely are
to have a long vacation:
Heigh downe, dery, dery downe!
Their terme's neare done,
And shall be begun,
No more in London towne.

THE LEVERAGE OF TOOLS.

In answer to the question as to the power obtained from the increased length of screw-drivers and similar instruments, I think that the principle rests on that of the wheel and axle, and depends upon the amount of lateral motion obtainable from the instrument. The relation sought to be obtained, is that existing between the diameters of the two circles, both described about the axis produced of the screw or hole, and the radii of which are the distance of the centre of the force from this line, and half the distance between the extreme biting points of the blade of the instrument.

Thus in a driver, let the width of the blade $= 2b$, and the length of the handle $= c$; then if the radius of the circle described by the force $= x$, the relation desired will be, $\frac{b}{x}$. Let the axis of the driver with the axis of the screw $= a$; then $x = c$ Sin. a, and the above relation will become $\frac{b}{c \, Sin \, a}$. If in this equation $a = 90°$, the result becomes $\frac{b}{c}$, which is a case of the ordinary lever.

From the above, it is evident that, in the case of any instrument which has no power of lateral deviation, an increase of length will make no corresponding increase in the amount of power developed,—a result apparent from a simple inspection of the proposition.—*The Builder.*

LONDON VEHICLES.

The changes in the manner and appearance of the carriage traffic of the metropolis, during the last quarter of a century, is very marked; and amongst these changes the most important, perhaps, was the introduction of the Hansom Cab; the swift-running Pickford's Vans; the heavy covered vans which convey merchandise, &c., from the docks to the city warehouses; the Parcel's Delivery Company's Carts; and more recently, the improved and enlarged style of omnibuses drawn by three horses. Mr. Shillibeer, who started the first omnibus in the metropolis, has a painting of this public carriage; it has three horses, and is large, and very much of the same appearance as those which have been only recently introduced, except that there is no accommodation for passengers in front. At present there seems to be a retrogression to close boxes of the very narrowest caliber. The other day we saw several of the steam fire-engines turning out, and rattling along the streets—a striking picture—with their steam and smoke, brightly polished steel-work, firemen and horses. The last and most important of these changes is being accomplished by the advance of railways into the heart of the population and the busiest neighborhoods. Now the locomotive has made its way to Pimlico and Charing Cross and soon its noise and whistle will be mingled with the notes of the bells of St. Paul's.

Home Circle.

COMING HOME.

BY ANNIE M. BEACH.

The two that have been so long away
Are coming back to their homes, to-day,—
And both, in the battle, were brave, they say.

O, eyes of hazel and eyes of blue,
That have waited long for the loved and true,—
Do you know they are coming back to you?

And each shall be in the war garb dressed,
The same as he was when his love he pressed
So tenderly last to his patriot breast.

O, blue-eyed girl, there's a wealth of bliss
For thee, in thy coming lover's kiss;
Thou shalt drink from the fountain of happiness.

The bloom of the orange he brings to twine
In a bridal wreath for those curls of thine,—
He will claim thee his at the holy shrine.

But thou, sweet one of the hazel eye!
Dost see where the cold, dark shadows lie?
Where the hope stars fade from thy young life's sky?

He comes, and the laurel is on his brow!
But the heart he pledged thee is pulseless now—
His life may not murmur the plighted vow!

But oh! though the sweet earth trust is riven!
Still cherish each token the past has given;
For love goes up with the soul to Heaven.

LESSONS FROM NATURE.

BY SARAH J. YOUNG.

Night's sable veil was rent and rosy light triumphant rode forth, but her steeds lost their starry ornaments as they galloped on, and the crescent on their forcheads disappeared, but more beautiful than these was that which they drew behind them.

With the first blush of the morning sky, and while only her right cheek was tinted with the rosy coloring, I wandered forth, with my thoughts for companions, over a high hill seldom visited even by the most romantic. As I strayed on, a little purple flower caught my eye, and I turned back to look at it, while it almost seemed to smile beneath its jewels of shining dew. And now my companions were destined to become inquisitive enough, and I thought, as I gazed at the flower, of what use are you here? What good will your existence be to any one or anything? and thoughts came fast while leaning over the purple letter on God's page, which looked so simple, that it seemed as if a child might read it. As I looked, it seemed to teach me a lesson of cheerfulness and contentment, for now it was smiling in the cool morning, as if the sun would not make it droop and fade, and at last cause its shining petals to fall.

I might have learned many other lessons from that flower, but I passed on until I came to a ledge of rocks whose weather-beaten appearance showed that the storms of ages had spent their fury upon their defenceless tops. But still they stand memorials of a time, the events of which are not recorded in the archives of nations or histories of men; but, we must learn their story from the strange alphabet inscribed upon their surface.

Ancient, indeed, is this volume, the last page of which was nearly finished before the creation of him who was to read its wonderful pages. They tell us of the "earth when it was without form and void, and darkness was upon the face of the deep;" and, "passing strange" is their witness of a world of floods, fires and winds, when the elements seemed to have been let loose without aught to control their violence. But each atom knew its law, and in time found its place, where it remained for ages fixed in obedience to that mandate, "Let the dry land appear!" Soon after this, our volume is illustrated with leaves, plants and trees, rising gradually from the simple blade to the most complex flower, until, at last, the animal, with life and power to move, appears.

Deep in the recesses of these rocks may be seen the picture alphabet that tells their story. They existed thousands of years ago, and differed from any now on the earth. O, good old rock! at the same time a sepulchre and a tablet for the myriads of animals that once inhabited this earth! But why, I ask, this perfecting of animal life and organization? and who is the perfection of the plan? Revelation and rock all answer, "It is man, reasoning, ruling man." For him this long preparation of the earth —for him are laid away in its bosom the precious and useful metals, the brilliant stone, and more especially the comfort-giving coal-mine—and for whom, if not for him, do its valleys and hills yield their stores of fruit and grain? Surely here is a subject that should awaken a voice of gratitude in all who are capable of feeling that they are the children for whom so great and glorious a work has been accomplished.

But the present order of things was established by One, who, while providing for the happiness of his creatures, made everything worthy of their study; therefore, these rocky columns standing majestically before us, are not the only subjects for reflection, and so I found it in the woods, where the grass was warm and pleasant, and the sunlight flickered through the colored leaves overhead, lighting up the dim aisles of the forest with a softened splendor. A huge grey rock, crested with moss and draped with vines, frowned above me; while, from a crevice at its foot, a stream of water fell into a mossy bowl; but farther from me, it joined its sister streams, and together they flowed until they reached the ocean.

On the surface of this little stream now glides a leaf. Not able to resist its fate, it seems to bid "good-bye" to old friends; but not alone was it to go, for, looking up, I saw another following its mate, and notwithstanding the wind wafted it along as it fell, it sank lower and still lower, until it rested on the rippling surface of the stream. "Thus," whispered the little leaves still clinging to the branches, "must we fall," "and thus," whispered an echoing voice, "must thou, too, fall, O man!"

This is the great lesson which, to learn aright and improve, is the sum of all that nature teaches and all that the Creator requires. Yes, thou too, O man! must fall, but not to sink in oblivion dark. If thou wilt, thou mayest soar to a mansion prepared for those that love the Lord.

Pen Illustrations of the Drafts.

FULL CALECHÉ.

Illustrated on Plate I.

We believe this is the first full Caleché we have ever published. The design embraces every feature of improvement lately made in this style of vehicle; light side, with a deep door panel; paneled front, wing dusters, changeable top, &c. The great advantage this possesses over other carriages, is, it can be made open for summer use and close for winter. At the present time it is worth about $1,800 to build a carriage of this kind.

GENTLEMAN'S TOP BUGGY.

Illustrated on Plate II.

As we have elsewhere intimated, this kind of buggy is very much sought after this season, finding a very ready sale at from $400 to $425, nicely finished. Cherry, ¾ inches thick, is best suited for making the seat. The prevailing color for painting is black, without striping; the variation, when any is made, being generally a maroon, striped red in fine line. Indeed, where striping is at all called for, red predominates. Blue cloth is almost universally used in trimming.

COMBINATION BUGGY.

Illustrated on Plate III.

We designate this a combination buggy, because the body is partly yacht, and partly the coal-box. It is something we have never seen built, but we have no doubt it will make a *taking* buggy with some customers. The caned seat will be found a relief to its otherwise clumsy appearance. Homogeneous steel, or compound-tire iron, $\frac{1}{8}+\frac{7}{8}$, are the best suited for tires of these light buggies. Some of our readers do not appear to understand the difference in the two metals. The steel is very hard, and

does not stand the effects of the frost as well as the compound iron; this latter being a kind of compromise between the old-fashioned tire, and homogeneous steel; but being much softer than steel, it wears out sooner. Steel requires great care in welding, and the plentiful use of borax. If heated too much, it is entirely ruined. For this reason, unskillful hands make bad work in welding it. Steel is certainly a great protection to very light rims, in fact, this may be mentioned as one of its highest recommendations.

Sparks from the Anvil.

IRON AND STEEL.

Although the principle of steel-making may be broadly reasoned down to a general law, there are many modes whereby steel may be produced—many more than are known in iron-making. Dr. Percy, therefore, in treating of steel, in his new book, finds scope for much variety of description. He first describes the production of steel by the addition of carbon to malleable iron, a mode of production which includes the ordinary converting process. The other modes under this head are the making of steel direct from iron ores at one operation (by the Catalan process, and reduction in crucibles, and in converting furnaces) the carbonization of pulverulent iron, carbonization by gaseous compounds of carbon, and, finally, the Hindoo process of making wootz, and the like process now adopted of making homogeneous metal, so called. Then come the various processes employed in the production of steel by the partial decarbonization of cast-iron. These processes include several practiced abroad for producing raw-steel, the puddling processes for steel, the Uchatius process, and the production of malleable cast-iron (a form of steel, and capable of hardening) by cementation. Then come a third class of processes for making steel by the fusion of pig-iron with malleable iron, a class in which the Bessmer process, as now practiced, is included.

Among the processes for the direct reduction of iron ores at one operation, one was patented by Samuel Lucas in 1791. He melted the rich hermatite ores of Cumberland and Lancashire along with carbonaceous matters. David Winshet patented a like process in 1800, and one Hawkins also in 1836. The process has since been patented in different forms. Mr. Riley, while engaged at the Dowlais Works, a few years ago, made steel direct from the ore, and this steel occasionally proved of excellent quality. It could not, however, be depended upon for uniformity. Chenot's process of making steel from the "metallic sponge," produced by his mode of making, is not one of which much is likely to be heard in this country, but it affords an opportunity for that kind of comment in which Dr. Percy habitually indulges with reference to metallurgical doctrines which he does not happen to believe. In connection with the ordinary process of cementation (which was ably investigated by Raumer as early as 1722), we may mention Macintosh's process of steel making by suspending iron bars in chambers heated to a high heat, and into which coal gas was admitted. The difficulty in this case was, as might have been expected, in keeping the chambers air-tight.

For the last few years much has been heard of "homogeneous metal," and a patent in 1856 has been relied upon to secure the monopoly of the manufacture of this metal to a Sheffield maker. The specification of the patent is so meager, however, that the invention could not be held under it. The so-called "Homogeneous Metal" is made by melting together malleable iron, with carbonaceous matter. The process requires a high heat, and is very destructive to the melting pots. This process is that employed by the natives of India in making "wootz," and was described in 1807 in Dr. Buchanan's work on India. It was, moreover, the subject of a patent granted in 1800 to David Mushet, and for which a Sheffield firm is said to have paid £3,000. It was re-patented, also, in 1839, by William Vickers. Puddled steel has been made on the Continent since 1835, and the mode by which it might be produced was pointed out by a French author as long ago as 1824. An English patent was obtained here in 1856 for puddling cast-iron into steel, but the specification was defective. Mr. Clay has said that he first produced puddled steel with that specification only as his guide, but he must have departed from it considerably at some stage of the process. There is so much uncertainty in the result of steel puddling that it can never be expected to open a very wide market for steel so made. Everything depends, as the best practical authorities admit, in maintaining a particular temperature in the steel puddling process, and a few degrees either way makes all the difference between a useful and a useless product.

The Uchatius process, of which much was said eight years ago, consists in melting oxyd of iron along with cast-iron, previously reduced to small grains or shot; this process of granulation being performed by first melting the iron, and then running it upon a wheel revolving in water. Where the exact constituents of iron and oxyd were previously known, and the two properly apportioned to each other, good steel has been made by the Uchatius process. According to the late Mr. Mushet, however, steel was made at Cyfarthia in the last century, and one Wood had a patent for it rather more than a century ago.

Since Dr. Percy read his paper lately at the Royal Institution, something has been said of a want of originality on Mr. Bessmer's part with respect to his process of steel making. In Dr. Percy's book, however, there is nothing which affects Mr. Bessmer's *status* as an inventor or patentee. Martien's specifications are given in full, or nearly so, and Dr. Percy shows, in much the same terms as we long ago adopted, that it has no bearing on the Bessmer process. Mr. Bessmer's first patent is dated October 17, 1855, and it appears that "in October or November, 1855," Mr. Parry attempted the experiment of blowing air under the surface of melted iron in a puddling furnace, and with the effect of blowing the charge into the road. Dr. Percy makes much of the alleged obligations of Mr. Bessmer to Mr. Mushet, who has so often written in our columns, of his "triple compound" of iron, carbon and maganese, as supplied in spiegeleisen. But, to say nothing of the fact that Mr. Mushet allowed his patent for this compound to lapse, it could not, in any case, have prevented others from using spiegeleisen in preference to other irons, nor could it have

prevented them from adding a portion of this or any kind of iron, after the melted charge had been "blown." —*London Engineer.*

CASE-HARDENED MALLEABLE BOXES FOR CASE-HARDENED AXLES.

THIS is an invention of, and has been patented by, Alfred E. Smith, of Bronxville, N. Y. These boxes are said to possess many desirable advantages over all others; they are not as clumsy, and can be used in the smaller hubs; are not as liable to break as cast-iron, although case-hardened, and are just suited to the wants of first-class carriage-makers. With these recommendations, they ought to find favor with the public, especially as Mr. Smith has the reputation of making axles of the best kind.

Paint Room.

COLOR: ITS APPLICATION, ETC.

(*Continued from volume IV. page* 99.)

CHAPTER III.

A DUE balance of power is said to be necessary to the preservation of peace among nations; in the economy of man the same applies; in fact, the same system obtains throughout nature. No wonder then that it should be found so strictly defined as a law of numbers in the theory of color.

In music or sound, which is but the color which the brain receives the sensation of through the ear instead of the eye, one particular sound does as it were double duty. This sound is known as the dominant sound, and has to maintain the balance of power in both the component harmonies of a key or musical scale. So is it with the color *blue*, which does the like double duty in regard to the other two colors, and its value, numerically calculated, therefore, amounts to just as much as the two other colors added together.

The value of red is set down as		5
That of yellow	" "	3
That of blue	" "	8
		16

It must be remarked that when we speak of red we do not mean vermillion, nor do we mean purple lake, nor do we, of course, mean any degraded or subdued red, as Venetian red, or Indian red. The nearest approach to the red of the rainbow, that is to say, the center or unaffected part of its stripe, is perhaps the color which, as a pigment, we call carmine in a very pure state, neither approaching orangeness as vermillion does, on the one hand, nor purplencss as lake does on the other. And so also of the other two colors, they must be strictly and merely yellow, and positively blue, or the just proportion does not exist.

Let us now, on the same system, calculate the secondaries.

Orange, composed of	Red.....	5	....	8
	Yellow.....	3		
Green, "	Yellow.....	3	....	11
	Blue.....	8		
Purple, "	Blue.....	8	....	13
	Red.....	5		
				32

And the tertiaries in like manner.

Yellow Grey composed of	Orange	8	....	19
	Green	11		
Blue Grey "	Green	11	....	24
	Purple	13		
Red Grey "	Purple	13	....	21
	Orange	8		
				64

It will be evident by these tables that the true proportions will be necessary to the perfection of the secondaries and to the tertiaries in order to just balance; but it does not follow that deviations may not be made from these proportions, and differences therefore be produced; but it *does* follow that for complete harmony the amounts of difference should be balanced by certain amounts of difference in the other or complementary hues; so, for instance, if a red grey be mixed with a somewhat overcharge of red, then the other greys must have less of red in them, or the compensation may be allowed in one of them only.

Then, again, as in music, certain discords are introduced to give greater effect to the concords, so, in color, certain discordances may be admitted, or may indeed be necessary in avoidance of insipidity, and by way of stimulus to the eye, as we have heard coachmen say, a little bit of hill road stimulates the horse who has traveled many miles of monotonous flat road.

These, however, are the points which must be left to the artist's feeling, and which, in many respects, make the difference between the good and the indifferent colorist, be the subject of his work what it may, the rest being in a great degree simply calculable.

We have called the tertiary colors *greys*, considering their basis as pure grey, but that certain modifications have slightly changed their hues. There are certain colors called browns, but which browns, in all their varieties, are in fact greys, and belong to the tertiary system; in their composition a smaller proportion of the element blue exists, and this accident and nothing else has made a presumed distinction.

As we have taken pure grey, therefore, as the basis of our tertiary hues, let us explain what we mean by pure grey. To begin with, we will presume a surface of pure white: now, such white surface, it must be remembered, is *white*, because, having received all the colored rays which belong to light, simultaneously and *united*, it sends back to the eye or to the brain *through* the eye, the effect of such combination, the sensation or impression of whiteness, or of no color.

The fact of whiteness, therefore, is the approach to perfection in the mingling of the colored rays, dependent upon the adaptability of the surface to receive them all in force. Now let this power be reduced, or, in other words, let the power of reflecting these combined rays be weaker, and we have greys darker in proportion to the

want of power, until the non-existence of such power produces black.

Now, let us suppose the surface to be such as that the reduced rays, if equally reduced, would give us pure grey, reduced blackness, such as in the pigments black and white would make, and then let us suppose a little change in this state of things, and that the reduced rays were *un*equally balanced, that one or other were a little in excess or a little wanting, then we should have, according to such differences, the varieties of grey hues called tertiaries.

(*To be continued.*)

ARSENICAL COLORS.

Among the prizes awarded by the Academy of Sciences in Paris, at the close of 1863, was one bestowed upon M. Bouffé, for a new green color which he calls *vert nature*—the green nature, and which is produced by the mixture, it is said, of picric acid and the chrome green (i. e., hydrous oxyd of chrome) of M. de Guignet. This green pigment is considered suited to replace all the arsenical greens, such as the *Schweinfurth*, the poisonous properties of the dust from which, detached from surfaces so colored, have proved, in many instances, so deleterious.

It is said that this new green is as suitable to the artificial florist as the arsenical green now in use; and that the magnificent beauty and brilliancy of the *vert nature*, especially when contrasted with bright red flowers, &c., are quite as great as in the case of the arsenic greens, which are unwholesome to the wearers and fatal to the makers of artificial flowers.

OLD ENGLISH TEXT.

Illustrated on Plate IV.

We gave our readers an alphabet of Ornamented German Text in the Magazine for April. That we may still further "make ourselves generally useful," we herewith devote another plate to the production of a set of Old English, believing from experience, that it will be found useful in the workshop at this time, when so many calls are made by customers upon us to have their initials painted on the side panels and doors of their vehicles. It will be found very useful hung up in the Paint Room.

Trimming Room.

CARRIAGE TRIMMINGS.

Very little change has been made in the material used in lining carriages during the past year, although the prices have advanced nearly fifty per cent. over those paid one year ago. The market is nearly bare of some description of goods, and likely to become still more so in consequence of the lately increased tariff on foreign importations and the unsettled state of finance. Importers are waiting in the hope that the price of gold will come down, and a more favorable rate of exchange transpire. This, however, is not very likely to happen. We know of but one circumstance likely to arrest the upward tendency to high prices, and that is, the formation of a "Ladies' Patriotic Association," pledged to abstain from wearing foreign-made fabrics by any of its members during the war. We shall see, however.

In trimming buggies, blue cloth is that most commonly used, although we see that occasionally leather is still used in open vehicles. This is particularly the case in trimming open four-seated phaetons and dickey seats, very much exposed to the effects of the weather. For headlings to the less expensive class of work, the finer description of blue damask answers a very good purpose, and looks tolerably well. For phaetons and some peculiar styles of buggies we observe that corduroy is occasionally used; but looking into the matter as one of taste, we are glad to find it going into disuse.

The attention of our readers who are desirous of practicing economy in the use of thread for the sewing machine, is called to Marshall & Co.'s machine thread, quoted in our Prices Current. It is made from flax, is much cheaper than silk, and looks quite as well in a job, indeed, some trimmers prefer it. That most commonly called for is No. 432, which is sold in half pound balls, both black and white, at about $3.85 per pound.

As a precautionary measure we would advise those who would avoid trouble and consequent loss of custom, that they must be careful in buying their cloths, as the high prices asked for a first-rate article will have the effect of bringing in an inferior fabric, made from cotton and wool and dyed with log-wood. The inferior cloth will readily show itself on an inspection of the cut edges, these showing white; and the genuine indigo blue, tested by nitric acid, will change to orange. An ounce of caution very often saves a pound of trouble.

Editor's Work-bench.

THE EDITOR TO HIS READERS.

With this number we enter upon the sixth volume of The New York Coach-maker's Magazine, the publication of which has already extended through six years, and lived longer than any other of its class yet printed in the English language. How many changes have taken place both in the political and business *status* of the world since we made our first visit to the craft in 1858! How many of our first readers have sickened and died, or are now facing the rebellious enemies of our country!—yes, sad to relate, are now, some of them, associates of these very enemies. But these mutations are too melancholy to contemplate; we, therefore, turn from them to a different subject, for relief.

As before intimated, we have now appeared before the public six years, and have seen in that period extraordinary advancement made in the arts, as applied to carriage making, in this country. And this improvement too, strange as it may seem to some, is due in a great measure to the rupture in the condition of the nation. Before the war, the larger proportion of the craft, particularly in the eastern sections of the land, were engaged in making what has been properly denominated cheap work for the Southern market, distinguished alike for gew-gaw finish, and miserable workmanship; in short,

"*made to sell,*" more than for any other purpose. With the rebellion these customers fell off, not, however, without leaving a sorry set of old friends to mourn over abused confidence and protested notes. In this condition we found ourselves three years ago, with so little to do, that many—a great many—of our most skillful mechanics either enlisted in the army or turned their attention to other business for a livelihood for themselves and families. This is the evident reason why now, since all kinds of business has so remarkably revived, we find it so extremely difficult to obtain operatives sufficient to fill our orders, particularly skilled ones.

But, amid all these discouragements, there is one satisfactory consolation to every lover of good taste among carriage-makers. A better class of work is now almost universally in demand. Indeed, a carriage can hardly be finished too richly, although offered at what, under other circumstances, would be deemed exorbitant prices. We fear that, in many things, we are drifting into the aristocratic notions of the old world; that we are too frequently found searching for "coats of arms" to display, which, in our opinion, is strangely and widely at variance with our professed republican institutions. In addition to this, we notice that some of our millionaires are making a great display with liveried attendants in our Central Park and up-town thoroughfares. Where all this will end we know not, but it is very offensive to our ideas of democracy and American culture.

How much our humble efforts have done for the promotion of carriage making, is a matter we leave with our readers. Aside from the circumstance that a properly conducted journal has a tendency to elevate the coach-making business in the estimation of others, the convenience of having the latest styles of carriages to spread before customers, and the opinions of experienced workmen in the construction to consult, is very great. If we had done nothing more than to publish the series we have given in "Carriage Architecture," we had done something for art, but, with the additional articles on Drafting Carriages; Painting and the Nature of Paints; with remarks upon almost every topic connected with the business, to whose interests it is devoted, we think we may be pardoned in claiming that we have done something at least, in promoting this improvement in art.

A few words more and we have done. We intend, as heretofore, to make our periodical, in the best sense, "an illustrated, original, and practical journal, devoted to the literary, social, and mechanical interests of the craft," defending it against unprincipled men, even though they may undertake to rob under the pretence of legal show, and place them in their proper position before the public —knaves as these *lazy* itinerants are, who, like their instigator, "go about seeking whom they may devour."

We are compelled, from the force of circumstances, as we stated last month, to raise the price of the Magazine to $5 for single subscriptions to this volume, but intend to again reduce the price of the next should the times favor it. Five dollars is not as high for the work now, as Three dollars was in 1858. If any one thinks differently, let him forward us three dollars in gold, we will gladly receive it in *lieu* of the V in greenbacks, and thank him besides. A little sacrifice and forbearance on the part of our friends, will enable us to maintain our position until peace shall once more return and business again flow on in its natural channel. That such may soon be the state of affairs, is our earnest wishes.

REVISED INTERNAL REVENUE TAX BILL.

THE following features in the new bill are such as mostly affect the carriage trade:

When goods, wares, and merchandise are sold by the manufacturer or producer, or agent thereof, having charge of the business, the following deductions only may be allowed:—*First.* Freight from place of deposit at time of sale, to place of delivery. *Second.* The actual commission paid, but not exceeding three per centum, and no commission shall be deducted when the sale is made at the place of manufacture or production; on spirits of turpentine, 20 cents per gallon; on white lead, a duty of 35 cents per 100 pounds; on all painters' colors, either ground in oil or dry, a duty of 35 cents per 100 pounds; gold leaf 18 cents per pack, containing not more than twenty books of twenty-five leaves each; all repairs to carriages, when such repairs increase the value of the article repaired 10 per cent. or over, 3 per cent. on such increased value; on patent enameled, japanned, and other leathers, 5 per cent. ad valorem; cloths, 5 per cent. ad valorem; on iron, such as we use, $3 per ton; on steel, $5, $10, and $12.50 per ton, according to valuation.

A government agent lately paid us a visit, stating that the tax law, as it stood under the act passed in 1863, made it obligatory on every carriage-maker to pay a tax of 3 per cent. where he puts a *new* pole or a *new* top to an *old* wagon, notwithstanding the Commissioner's decision that no tax was chargeable on "repairing." We "can't see it" in that light. A distinction may be granted in cases where the carriage never had a pole or a top; but where such are supplied to replace others, an interpretation of this kind, from a non-professional carriage-maker, will fail to convince any member of the craft that such does not come under the head of repairing. Such being the case, we see no necessity for the carriage-maker including such work in his regularly made monthly returns.

Already the cost of production has doubled the price of all kinds of vehicles, and, doubtless, the new law, if it

passes, will still further increase the expenses. We find, from observation, that the high prices now charged prevent many from purchasing new, and drives many to having their old carriages repaired, and some to purchasing second-handed, if such can be found. This state of things gives an impetus to the "old wagon trade," very *interesting* to such as have any for sale. Some of these have been *compound sales*—the wagon and the customer both being "sold" at the same time.

CARRIAGES FOR THE DEAD.

From an early period in the world's history to the present, among the more civilized nations, great respect has always been paid to the memory of departed friends. This is clearly manifest in the manner in which the remains have been embalmed and borne to the tomb, and in the amount of expense lavished to erect monuments over them. No reader of the sacred pages can forget the care and expense Abraham used to secure a place for resting the remains of his beloved Sarah, nor yet the long and showy procession organized by Joseph, a lineal descendant, in transporting the remains of his patriarchal father, Jacob, from Egypt to the same burial ground, in the land of Canaan, "which Abraham bought with the field, for a possession of a burying-place, of Ephron the Hittite, before Mamre." (Gen. 50, 13.) "And there went up with him [Joseph] both chariots and horsemen; and it was a very great company." (Gen. 50, 10.) Those who are curious to learn all the details of an Egyptian funeral are referred to the accounts given of them by Heroditus and Diodorus Siculus. Our intention in this article is more particularly *to show the carriages* used among the ancients in conveying the dead to the tomb.

The accompanying illustrations are probably correct representations of the primitive hearse, and are taken from the monumental remains of Egypt. The first (Fig. 1) must have been a very *showy* affair, rivaling many of

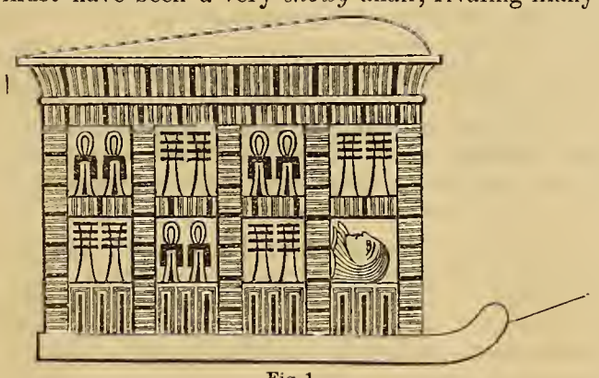


Fig. 1.

those of more modern times. It is difficult to say why these were placed on runners instead of wheels, as in the case of chariots, unless, as we surmise, that wheels were too noisy and *rough* for the proper respect due to the defunct relative or friend of an Egyptian. In this example the head only of the mummy case, inclosing the dead is exposed through an open panel. The sarcophagus, as will be seen, has painted thereon the emblems of stability and security alternately. A plainer and more simple hearse will be found illustrated on page 87 of our first volume, in which example the entire mummy case is exposed to view, and, for more careful conveyance, steadied by two attendants. Simply remarking that this sledge-hearse, drawn, as it would seem to be, over a slushed way, for additional care in the conveyance of the body, we would refer the reader, for details, to our volume before mentioned, as to follow them out here would swell this article to a greater length than we had purposed to do.

Among the ancient Greeks much ceremony was used in suitably disposing of their dead, especially where the individual was one of distinction. If the deceased was of advanced military rank, his horses, chariot, arms, and even in some cases his captive slaves, were, with his body, consumed on the same funeral pile, the body being borne thither on a bier, the ashes afterwards being placed in an urn. These biers were of different forms, some covered and others uncovered, simply a wooden floor with handles, or woven in wicker-work. When some great man was slain in battle, frequently his body was put into a carriage, and taken to the place of his nativity, or, if burnt, the ashes were conveyed in a carriage in an urn through the streets of the city, preceded by trumpets, claiming the respectful honors of the public.

The hearses and mourning carriages were of various design, according to the taste of the builder, but suited to the requirements of customers, and let out by an undertaker, who also furnished the singers, bearers of wood, oil, &c., when the corpse was to be burned on the pile, at a certain fixed price. There was some difference between the ceremony at the pile and that at a burial; but the vehicles were the same in each case—a cypress coffin containing the corpse for interment. The display appears to have corresponded in a great degree with the wealth or standing of the deceased. We will close this article with an abridged description of the hearse and ceremonies used at the funeral of Alexander, as told by Diodorus Siculus.

The body of the great Alexander was taken from Babylon, after his decease, to Alexandria, in Egypt, in a vehicle of which we give an engraving (Fig. 2). The body rested on two axles, on which revolved four richly carved wheels, the spokes and felloes of which were gilded and bound by tires. On the ends of each axle, covering the linch-pins, was a cap, in the form of a lion's head, holding in the mouth an arrow. The peristyles, or columns, were gold, with Ionic capitals, on which rested an arched roof of gold, wrought and bound together in the form of scales, and set with precious stones. Outside the arch,

on the edge, were fringes of wrought gold, in the form of a net, from which were suspended large bells, which, when the carriage was in motion, could be heard at a consider-

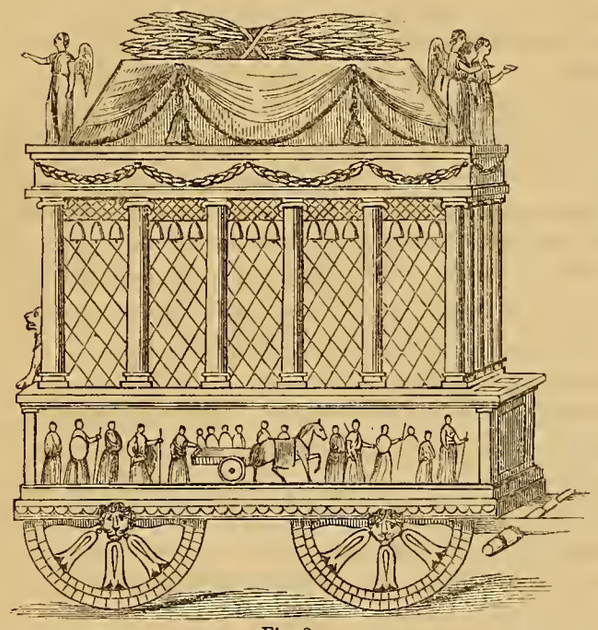


Fig. 2.

able distance. On each corner of this arch stood figures of victory, holding trophies in their hands. A golden acanthus was trailed around each pillar to the capital; upon the center of the arch, on the outside, was thrown a purple tapestry, on which was laid an olive wreath of gold, which, reflecting in the sun, was seen at a great distance. At the entrance to this carriage stood two golden lions, as if to guard the passage. Under the arch, nearly the length of the floor, was placed a four-cornered golden throne, ornamented with chiseled buck's heads, from which hung wide golden rings, to which wreaths, splendid in colors, were attached. In the peristyle was a gold net of a finger's thickness, furnished with four tablets, represented in bas-relief, and duplicated on the outside. On the first, Alexander was seen with a scepter in his hand, and sitting on his armor; on one side his Macedonian body-guard, also in armor; on the other the Persian Melophoxes (apple-carriers, so termed because they carried large golden buttons on their lances), and behind these armor bearers.

On the second were elephants carrying the Macedonian body-guard, with Indian drivers. On the third were squadrons of horse in evolution. On the fourth, a fleet getting ready for action.

On the throne was placed the golden coffin, of wonderful workmanship, covered with a lid of gold, and a pall of purple color, worked in gold, on which was laid the armor of the dead. The remaining description refers mainly to the manner in which the sixty-four mules were yoked to the hearse, and is omitted, as uninteresting. There is one thing noteworthy here. The historian tells us that, to prevent any violent movement in turning or passing over uneven ground, the maker put a perch-bolt in the under carriage, that the body might, under all circumstances, preserve a proper position, and not upset. The maker (Hieronymus) established his fame in the construction of this hearse, and numbers from great distances came to see it and the gorgeous funeral procession.

EDITORIAL CHIPS AND SHAVINGS.

It has been ascertained that 700,000 persons daily enter the city of London (exclusive of those entering the West-end and other parts). The city police, in the month of May, 1860, found that an average of 535,000 proceeded on foot and 171,000 in vehicles, making a total of 706,000 persons. The number of vehicles ascertained at the same time to enter the city every twenty-four hours was 57,765, which, if drawn up close in line, would occupy a length of about 260 miles, reaching from London to York, and extending more than 50 miles beyond the latter place. The closeness with which the vehicles follow each other in the streets may be inferred from the fact that, between ten and eleven A. M., on Wednesday, the 19th of November, 1862, it was ascertained that the total number passing Bow Church, in both directions, was 1,255, of which 348 were omnibuses, 584 cabs, and 282 carts, drays, vans and wagons, besides 41 trucks and barrows. The numbers and proportions of vehicles passing the same place between four and five P. M. on the same day were ascertained to be as nearly as possible the same.

An Indian Inventor.—At Karia, a carpenter some time ago invented a machine on the principle of the velocipede, which he proposed adapting for passenger traffic on a tramway. "The inventor," says the *Times of India*, "had the honor to submit his locomotive for the inspection of his Excellency the Governor, who was so much pleased with the mechanical ingenuity displayed in its construction, that besides giving the man a substantial reward, he sent him a very rich turban."

English Patent Office Returns.—The Patent Office vote shows that there were in the past year 3,400 provisional and complete specifications brought in (but only 50 of the latter description), and the fees of the law officers of the Crown in England were £10,363. The fees on patents for the current year are estimated at £105,000, and the expenses at £51,000, so that there will be a surplus of about £54,000. Of these, 20 were for "brakes, drags and retarding apparatus, 20 for axle-trees and axle-boxes, and 30 to wheel-carriages."

Carriage to Run without Horses.—A wag some years ago advertised a carriage to run without horses, with only one wheel, and invited the curious in mechanics to see it. Many of the members of the Society of Arts attended, and in the ardor of expectation they were shown a wheelbarrow.

The Tumble of a "Rumble."—Some of our American readers scarcely know what a rumble is. They will find one attached to the back part of the drawing sent us by a London builder, and engraved on Plate 40, volume III. of this Magazine. The *tumble* part is told by a London correspondent. In giving an account of the late en-

trance of the Italian patriot into London, he says: "So great was the pressure that when the *cortege* was in the neighborhood of the Houses of Parliament, the 'rumble' of the carriage in which Garibaldi rode, came to the ground with a crash, with the two footmen in it. The carriage belonged to the Duchess Dowager, and it is said that her grace intends it to remain in its shattered condition, as a relic of this extraordinary ovation."

LITERARY NOTICES.

We have received *The New England Historical and Genealogical Register and Antiquarian Journal*, for April. It is a very interesting quarterly, published by J. Munsell, Albany, N. Y., at the low price of $2 a year. The leading article in this number is "The Old Church at Quincy," Mass., with an illustration, followed by several others, among which are, The Annual Address of the President of the N. E. Historic-Genealogical Society; Abstracts from Early Wills; Statements of some Persons taken Captive by the Indians in 1689; Notes on the Winthrop Family, &c., &c. Every descendant of the Pilgrims ought to take the work and study its historical records.

We also find on our table, our old favorite, *The Atlantic Monthly*, for May, as fresh and vigorous as usual. Among all our exchanges there are none we more highly prize than this. We have been specially pleased with Ik Marvel's "Wet Weather Work," "The Reaper's Dream," "The Early Life of an Old Bachelor," "Life on the Sea Islands," and House and Home Papers. There are sixteen articles in the number, any one of which is very valuable to all lovers of good reading. Published at $3 a year, and the postage is prepaid.

FOREIGN IMPROVEMENTS IN CARRIAGES.

July 30, 1863. Improvements in Four-wheeled Vehicles.—T. Apps, Lower Norwood: According to these improvements, the patentee dispenses with the usual driving seat and boot in the front of the body of the carriage, and disposes in that situation a small platform with a dash-board or iron in front of it. This platform he utilizes in the carrying of luggage, and it may be further furnished with a hinged or other movable seat on which outside passengers may be carried when not occupied by luggage. The driver's seat he mounts at the back part of the body, and it may be fixed thereto, and further supported and stayed from the springs. The driving seat is mounted at a sufficient elevation for the driver to see properly over the carriage, which being in front of him is easy to guide, and is thoroughly under his control. The top of the cab may be also adapted to receive luggage, the reins being carried over a guide if necessary.

August 5, 1863. Machinery for Propelling Carriages and Vessels.—N. Hodson, Hull: This invention is carried out as follows: In the center of the carriage frame is fixed an elevated cross-bar, which stands in two brackets, one on each of the carriage-frames; on the cross-bar are fixed two or more swing-bars, which hang in a perpendicular direction, and work backwards and forwards with the feet, like the motion of a pendulum. At the bottom of the swing-bar are fixed pattens or bearings for the feet to rest upon. From the pendulum are attached connecting rods, which connecting rods are attached to the cranks fixed on the propelling wheels, and also to the hand-levers. The hand-levers are connected to the swing-bars, and all work in one motion. The steering apparatus is worked from the front wheels, and goes to the man's hands and body, thus allowing him to use both hands and feet in the propulsion when required. Boats and vessels are propelled on the same principle, using as many brackets, cross-bars, connecting rods, and pendulums as may be required for the number of workers. The levers are made to take off in two halves. The hand-levers may also be worked as compound levers, also with an elongated motion. The seats are made to take off to allow the passengers to get in and out, and move either backwards or forwards on the carriage-frame.

Sept. 14, 1863. Facilitating the Quick Detachment of Horses, or Draught Animals from Carriages or Vehicles.—G. F. Millin, Oxford. This the inventor proposes to effect by having a strong steel bolt receiving the pole or shafts in a socket, and passing through rings at the ends of outside traces, this bolt being drawn up a few inches by a lever, lifted by the coachman or driver, so as to allow the shafts to be drawn from the socket, and at the same time have the outside traces thus detaching the horses. The brake may be a sliding piece of tough iron, which passes under a projection on the inner side of the rim of the wheel, thereby totally stopping the wheel; or, it might, if requisite, be applied to both wheels. *Not proceeded with.*

AMERICAN PATENTED INVENTIONS.

Feb, 15. Elastic Carriage-Wheel.—E. L. Pratt & John B. Thompson, Boston, Mass.: We claim the application of the rubber or elastic cushion, *e*, to the outer surface of the metalic tire or hoop, *d* (which surrounds and keeps in place the fellies), when such cushion is surmounted by a metalic protector or band, *f*, as set forth.

Axle-Box.—William Stechschult, Glandorf, O.: I claim, the employment of the spreading noses, *ee*, in combination with the linchpins, CC*, projections, *dd**, groove, *b*, and axle, B, all in the manner herein shown and described, so that the grease or lubricating material will be caught and spread over the surface of the axle, as set forth.

Concealed Hinge.—Frederick Wood, Bridgeport, Conn.: I claim the enlarged opening, O', in combination with the free hinge-pin, *f*, constructed and operating in manner as described, or in any other manner substantially the same.

22. Saddlers' Stitching-Horse.—John H. Pietzel, of Three Rivers, Mich.: I claim, *First*, the combination of fixed and pivoted jaws, C D, with the toggle joints, JJ, treadle, N, and strap connection, S, constructed and operating substantially as described. *Second*, hinging the movable jaw, D, to a jaw, C, which has an extension arm, C', in combination with toggle levers constructed and operating substantially as described. *Third*, providing for attaching the two jaws, C D, to the seat by a single fastening, substantially as described. *Fourth*, the two extended arms of jaws, C D, in combination with the toggles, JJ, strap connection, S, treadle, N, toothed-plate, *m*, catch-plate, *j*, and spring, L, all operating substantially as described.

March 9. Machine for Boring Wagon Hubs.—Ezra Caswell, Newport, Mich.: I claim the screw rod, C, provided with the adjustable and removable cutters, IJ, in connection with the rings, EG, provided with the set screws, FF, and connected respectively by means of the arms, *cc*, nut, D, and the arms, *ff*, and collar, *g*, with the rod, C, substantially as and for the purpose herein set forth.

Army or Train Wagon.—Arthur Little (assignor to Busby, Little & Co.), Wheeling, West Va.: I claim the combination of adjustable racks with a wagon, arranged and applied to operate substantially in the manner as and for the purpose herein set forth.

CURRENT PRICES FOR CARRIAGE MATERIALS.

NEW YORK, May 20th, 1864.

Apron hooks and rings, per gross, $1.25.
Axle-clips, according to length, per dozen, 75c. *a* $1.25
Axles, common (long stock), per lb, 11½c.
Axles, plain taper, from ⅞ to 1 in., $6; 1⅛ in., $6.50; 1¼ in., $7.
Do. Swelled taper, 1 in. and under, $6; 1⅛ in., $7; 1¼ in., $8.50; 1⅜ in., $10; 1½ in., $12.
☞ These are a superior axle, and more frequently called for than any others.
Do. case-hardened, half-patent, 1 in., $9.50; 1⅛ in., $11; 1¼ in., $12.25; 1⅜ in., $14.00; 1½in., $16.
☞ These are prices for first-class axles. Makers of less repute, cheaper.
Bands, plated rim, under 3 in., $2; over 3 in., $2.50.
Do. Mail patent, $2.50 *a* $3.75.
Do. galvanized, 3½ in. and under, $1; larger, $1 *a* $2.
Basket wood imitations, per foot, $1.
☞ When sent by express, $2 for a lining board to a panel of 12 ft.
Bent poles, each $1.25.
Do. rims, under 1⅛ in., $2.25 per set; extra hickory, $2.50 *a* 3.50.
Do. seat rails, 44c. each, or $4.50 per doz.
Do. shafts, $6. *a* $7.
Bows, per set, light, 90c.; heavy, $1.25.
Bolts, Philadelphia, at new list.
Do. T, per 100, $3 *a* $3.50.
Do. tire, $1.25 *a* $1.80 *a* $2.40, according to size.
Buckram, per yard, 30c. to 35c.
Buckles, per gross, 88c. *a* $1.25.
Burlap, per yard, 25c.
Buttons, japanned, per paper, 25c.; per large gross, $2.75.
Carriage-parts, buggy, carved, $4 *a* $5.50.
Carpets, Brussels, per yard, $2; velvet, $3.50 *a* $4 50; oil-cloth, 70c. *a* 90c.
Castings, malleable iron, per lb, 15e.
Clip-kingbolts, each, 35c.
Cloths, body, $4.50 *a* $7; lining, $3 *a* $4.25. (See *Enameled.*)
☞ A Union cloth, made expressly for carriages, and warranted not to fade, can be furnished for $2.28 *a* $2.50 per yard.
Cord, seaming, per lb, 35c.; netting, per yard, 5c.
Cotelines, per yard, $6 *a* $10.
Curtain frames, per dozen, $1 *a* $1.50.
Do. rollers, each, $1 *a* $1.25.
Dashes, buggy, $1.75.
Door-handles, stiff, 50c. *a* 63c.; coach drop, per pair, $2 *a* $3.50.
Drugget, felt, $1.62.
Enameled cloth, 5 qrs., 75c.; 50 in., $1.55.
Enameled cloth ranges from 80c. to $1.55, according to width and quality.
Enameled linen duck, 4 qrs., 55c.; 5 qrs., 75c.; 52 in., 90c. Colored, 15c. higher per yard.
Felloe plates, wrought, per lb, all sizes, 20c.
Fifth-wheels wrought, $1.38 *a* $2.
Fringes, festoon, per piece, $2; narrow, per yard, 18c.
☞ For a buggy top two pieces are required, and sometimes three.
Do. silk bullion, per yard, 35c. *a* 75c.
Do. worsted bullion, 4 in. deep, 35c.
Do. worsted carpet, per yard, 6c. *a* 10c.
Frogs, 50c. per pair, or $1.63 per dozen.
Glue, per lb, 25c.
Hair, picked, per lb, 30c. *a* 60c.
Hubs, light, morticed, $1; unmorticed, 75c—coach, morticed, $1.50
Japan, per gallon, $4.75.
Knobs, English, $1.75 *a* $2.
Laces, broad, silk, per yard, 85c. *a* $1; narrow, 12c. to 15c.
Do. broad, worsted, per yard, 37½c.
Lamps, coach, $14 *a* 18.
Lazy-backs, $9 per doz.
Leather, collar, dash, 34c.; split do., 18c. *a* 31c.; enameled top, 34c.; English Trimming, 32c.; harness, per lb, 56e.; flap, per foot, 25c. *a* 30c.
Linen, heavy, a new article for roofs of coaches, 60c. *a* 90c. per yard.
Moquet, 1½ yards wide, yer yard, $7.
Moss, per bale, 10c.
Mouldings, plated, per foot, 12c. *a* 15c.; lead, door, per piece, 30c.
Nails, lining, silver, per paper, 8c.; ivory, per gross, 31c.
Name-plates.
☞ See advertisement under this head on 3d page of cover.
Oils, boiled, per gallon, $2.75.
Paints. White lead, extra, per 25 lb $3.95; Eng. pat. black, 31c.
Pekin cloth, per yard, $4.50.
☞ A very good article for inside coach linings.
Plushes, per yard, $2 *a* $3.
Pole-crabs, silver, $5 *a* $6; tips, $1.25.
Pole-eyes, (S) No. 1, $2.50; No. 2, $2.65; No. 3, $2.90; No. 4, $1, per pr.
Sand paper, per ream, $4.50 *a* $5.50.
Screws, gimlet.
☞ Add to manufacturer's printed lists 20 per ct.
Do. ivory headed, per dozen, 38c. per gross, $4.
Scrims (for canvassing), 23c. *a* 25c.
Seats, buggy, pieced rails, $1.75; solid rails, $2.50.
Shaft-jacks (M. S. & S.'s), $2.62; light, $3.00; heavy, $3.30. *a* $4.50.
Shaft jacks, common, $1.12½ *a* $1.30 per pair.
Do. tips, extra plated, per pair, 35c *a* 50.
Silk, curtain, per yard, $1 *a* $3.
Slat-irons, wrought, per pair, 75c.
Slides, ivory, white and black, per doz., $12; bone, per doz., $1 50; No. 18, $1.75 per doz.
Speaking tubes, each, $6.50.
Spindles, seat, per 100, $1 *a* $1.25.
Spring-bars, carved, per pair, $1.75.
Springs, best temp. Swedes, per lb, 29c. *a* 32c.; black, 25c.; bright, 26c.; best tempered, 30c.
☞ Two springs for a buggy weigh about 28 lbs. If both 4 plate, 34 to 40 lbs.
Spokes, buggy, per set, $4.20, or about 7c. each for all under 1½ in.
☞ For extra hickory the charges are 8c. each.
Steel, Compound tire, from $10 to $10.50, according to thickness.
Stump-joints, per dozen, $1.25 *a* $1.75.
Tacks, 6c. and upwards per paper.
Tassels, holder, per pair, 63c. *a* $1; inside, per dozen, $3; acorn trigger, per dozen, $1.25 *a* $1.50.
Terry, per yard, $7 *a* $10.
Top-props, Thos. pat., per set, 56c.; plain, com., 35c.
☞ The patent props, with silver-plated nuts, per set, $1 40.
Tufts, ball, per gross, 80c.; common worsted, 12c. *a* 25c.
Thread, Marshall & Co.'s Machine, No. 432, $3. 85 per lb; No. 532, $4.44 do.; No. 632, $5.22 do.
Turpentine, per gallon, $4.
Twine, tufting, per ball, 31c.
Varnishes(Amer.), crown coach-body, $5 *a* $5.50; hard drying, $6; nonpareil, $6.50.
Do. English, $7.00 in gold, or equivalent in currency on the day of purchase.
Do. American imitation of English, $7.
Webbing, per piece, 56c.
Whiffle-trees, coach, turned, each, 35e.; per dozen, $3.50.
Whiffle-tree spring hooks, $3 per doz.
Whip-sockets, rubber, per dozen, $7 *a* $9; pat. leather, stitched, $3.50.
Window lifter plates, per dozen, $1.50.
Yokes, pole, each, 35c., per doz, $3.50.
Yoke-tips, $1,00 *a* $1.50 per pr.

TO CORRESPONDENTS.

M. F., ST. LOUIS, Mo.—Nothing would give us greater pleasure than to give our Western friends "more light, plain buggies and four-seats," were we certain that such a course would satisfy the majority of our subscribers. We fear that many manufacturers lose sight of the fact that we are caterers for the general public, and expected to give variety to each number as far as possible. If, however, good designs are sent us from the West we will try and find room for them.

S. E. F., DANVILLE, KY.—We cannot make anything by the purchase of English varnish (the Agent not allowing any commissions) where the money is not sent with the order. For instance, the price to-day, for the best body, is $12.10 (it rises and falls daily with the prices of gold), and suppose a customer, from some whim or capriee, should refuse to pay the bill on delivery by express, and the same should be returned, where would be our remedy?

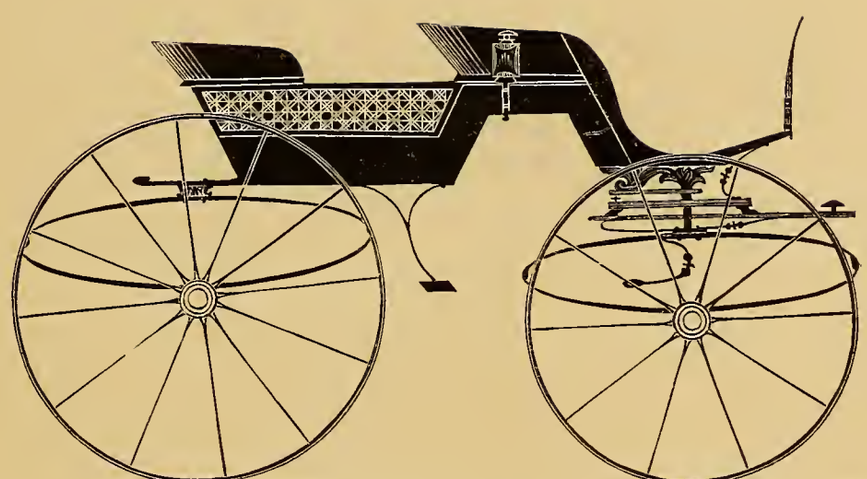
J. W., MILWAUKIE, ILL.—Steel-tire cannot be bought in smaller quantities than bundles, weighing from 100 to 110 pounds, and then only by paying cash down. Other correspondents will please note this, and send with their orders the purchase money.

J. T., MASS.—The pretended patentee you refer to has been defeated in every case where he has let a suit go to trial. We can't see why the public will submit to being fleeced by these "lazy, good-for-nothing" robbers.

SOCIABLE.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

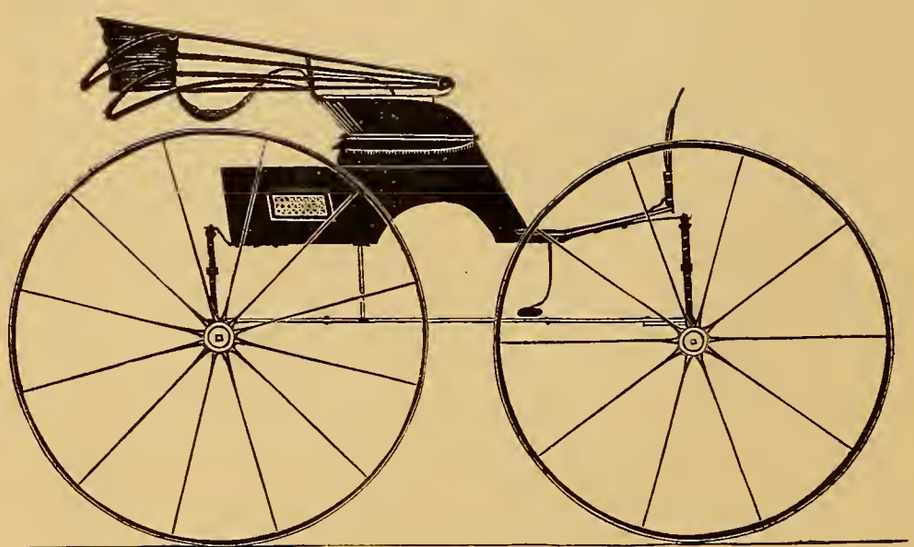
Explained on page 25.



ROAD PHAETON.—$\frac{1}{2}$ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

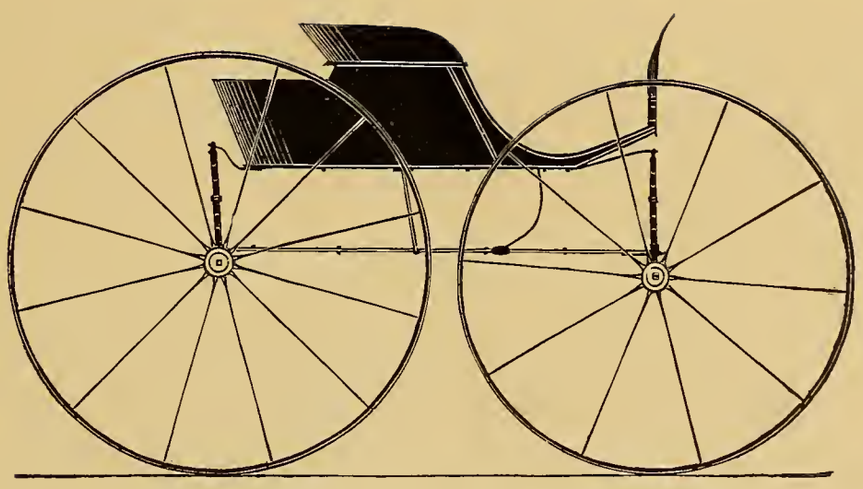
Explained on page 25.



CUT-UNDER COAL-BOX BUGGY.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 25.



PILLARED BUGGY.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 25.

THE NEW YORK
CARRIAGE-MAKER'S MAGAZINE

DEVOTED TO THE LITERARY, SOCIAL, AND MECHANICAL INTERESTS OF THE CRAFT.

Vol. VI. NEW YORK, JULY, 1864. No. 2.

Mechanical Literature.

CARRIAGE WHEELS—THEIR MECHANICAL CONSTRUCTION AND USE CONSIDERED.

BY HENRY HARPER.

(*Continued from page* 167, *volume V.*)

AXLE-BOXES AND SETTING AXLES.—We can hardly expect an immediate and radical reformation from bad practices long accumulating, although the necessary means may be placed in the hands of every one who will receive it. There is an old saying that "bought wit is best, if you do not pay too much for it," and it seems that wagon and carriage-makers desire to have the "best wit," even at the risk of "paying too much for it." They have for a long time deceived the purchasers of their work by telling them that they had a certain principle of setting axles, *perfect and reliable, when in fact they have not had any such thing.* The consumer has no opportunities for controverting the wagon-maker's assertion, and can only say that there is a difference in the draught of wagons and in the wear of axles that cannot be accounted for on any other hypothesis than a difference in the set of the axle. The question is now so well settled by geometrical accuracy that there need be no difference in results. If the mechanic does not adopt it, he can try the old principle of deception, until his fellow-craftsmen have monopolized his business, when I think it will be no exaggeration to say that he has paid too much for *his* wit. It is not using too strong language to call it deception. It would be extreme impudence and bad policy in me to use such language to members of the craft, were it not founded in truth. On the other hand, it is equally bad policy for members of the craft to fortify themselves against a truth, for the truth must prevail.

Wagon and carriage-makers ought to know that every axle-arm, to make it perfect, must have a certain pitch, corresponding with the dish to the wheel, and taper to the axle-box. They should know that different wheels on the same wagon have, sooner or later, a difference in the dish. Before the charge of impudence is brought against me by any individual, let him ask himself the following questions: Have I known how to make calculation on every wheel to a wagon, so as to make the pitch of the axle-arm correspond with the dish to the different wheels, and if so, have I done it? Have I not set the arms of the axles on the same pitch, without regard to the difference of the dish in the wheels? Have I not set the axles before the tire was set on the wheels, not knowing what the dish to the wheels would be? If you cannot give a satisfactory answer to every one of these questions you may rely on it, that you are not guiltless. Perhaps we have not known how much we have wronged purchasers of wagons and carriages by this little deception; but the naked truth stares us in the face, that it has been from *one to ten times the price charged for the wagon.* Knowing these facts, the party who continues his old practice, at the expense of the community, deserves a stronger appellation than that of a deceiver.

It is a bad excuse to say that we could have done it correctly had we tried; although I know of many who deceive themselves on this point. There are a number of ways that have been supposed by wagon-makers mathematically correct; but those who have understood these, do not think it worth while to reduce their knowledge to practice, but instead of doing so, set their axle-arms all alike to a certain pitch, which they have determined by guess was the nearest right. What would be thought of the accountant who said that he could mathematically determine the interest on his accounts by a process of figures, and after all should guess at it in his practice. Would it not show that he placed but little reliance on his mathematical science? The fact of a wagon maker thinking that he knows how to calculate the proper pitch of an axle, and yet not attempting to do it, when it is so imperatively demanded, will have a tendency to make others doubt his ability. There is no doubt but that we can calculate, mathematically, the length necessary to make an axle for any given track, and there is no one who will attempt to do it without the aid of mathematics. Why not guess at it the same as at the pitch of the axle-arm? The latter is certainly of more importance. The plain and simple answer is this: the former has long since been reduced to a mathematical certainty; *the latter has not;* and all boasting about our skill in the matter, or the skill of such and such a workman does not amount to anything. If the question is reduced to a certainty, what becomes of the individual skill in setting axles any more than in measuring the length of them?

I am aware that many members of the craft suppose that to determine the exact length of the axle is the first step towards determining the pitch to the axle-arm; that after getting the exact length of the axle, if they can set the arms so that the tread of the wheel comes into a certain track, it is all right. To perform this operation on an iron axle, they first set the axle, by guess, then put the wheels on the axle-arms, and measure from the collar of the axle to the rim of the wheel, on the side that is to be under when the wagon is put up. They say that if they measure crosswise from the opposite collars to the opposite rim of the wheels, and find the distances alike, and then measure from one wheel to the other, and find the tread of the wheels far enough apart for the track, it is all right. But should one of these three measures not be exactly right, they would have to take the axle and guess at another pitch, then measure again. If they are wrong, they can guess again and again until the thing comes right. What is most singular, expert workmen tell me that they seldom have to measure more than once, but get it right the first time. I have studied the principles involved in this assertion, and know how they think they get it right the first time. The wheels have a little play, so that they can move the tread backwards and forwards laterally from one-fourth to two inches. In the first case, if they get it within one-half inch of being right, the wheels can be crowded laterally, so that it is all right (as they say) the first time. In the latter case, if they get the wheels within four inches of right, they could bring all right in the same way. This is a fair statement of the case just as it is; also it is a fair sample of the various ways that have been adopted to determine the right pitch to axles. Guessing is far better than this kind of mummery. *At best it would not be correct in its application.*

As we have said, a geometrical instrument has been invented that is warranted mathematically correct, simple in its application, facilitating the operation of setting axles, so that alone would pay for using it. If it does not give the operator complete control of the wagon wheel, so that he can place it in any given position required in setting the axle-arm, the proprietor agrees to forfeit the amount paid for it. He will also forfeit the pay for a shop-right to any one who shows any other way for setting axles, practiced previous to this invention, *that is, mathematically correct and reliable, under all circumstances*, or any other way that does not involve the patent principle of his invention, that is mathematically correct. It seems strange that men should still cling to the old way of setting axles, so proverbially a failure, when we cannot get two wagons or carriages built of the same material and same heft, where the axles will wear alike. Even the wear in different axles on the same wagon varies. The old ways have lived long enough to condemn themselves, as a large majority of the wagons and carriages now made will verify.

(*To be continued.*)

SCOTTISH INDUSTRY. — According to the Edinburgh *Daily Review*, there are in Scotland 1,549 males and 1 female engaged in the carriage business; 1,857 males and 7 females in making harness; while 44,869 males and 131 females are workers or dealers in iron and steel. The same paper defines "a gentleman" as being "a man who drives a gig," we suppose of his own.

EFFECTS OF WHEEL-CARRIAGES ON ROADS AND HORSES.

CHAPTER XI.

1. Mechanical action of wheels on the materials of roads explained. 2. Narrow roads, why so frequently in bad condition. Deep ditches and sudden falls of the ground close to the sides of roads productive of ruts. 3. Convex roads never wear well, and why. 4. Materials for roads; laying on of materials. 5. Whether a thick or thin covering at one time. 6. Whether the whole breadth of a road or only half of it should be covered at one time.

ALTHOUGH it was my intention, when I took up my pen, to confine myself solely to the subject of wheel carriages, yet, having had great opportunities of making observations on roads, I am induced to add a few remarks thereon.

1. It would have been proper, when treating on the form and construction of wheels, to have explained the mechanical operation of wheels on the materials of roads. The action of wheels on the materials of roads is twofold, viz., *pressing* and *grinding*. The *first* is where a wheel passes over any material without any *twist*, or drag, or slide, as would be the case with wheels made perfectly cylindrical and standing upright. *Grinding* may, I believe, in every case, be defined to be the effect produced on any substance interposed between two bodies, one of which has a sliding motion; yet so firmly confined or pressed between them that the moving body cannot slide over the interposed substance; but, in consequence of the pressure, the interposed substance, adhering firmly both to the fixed and moving body, is necessarily lacerated or torn assunder and reduced to atoms. This is the process in corn mills, in drug mills, in barilla mills, and in every other mill, properly so called.*

But, although the ingenious author I have before cited, has very aptly compared broad conical wheels to drug mills, he was not aware how the destructive effects of them are produced.† I remember frequently, when a boy, to have trodden with one heel on a soft brick, or of dry old mortar, which was firm enough to bear the weight of my body uninjured; but, on giving my body a swing round with my other foot, I have instantly reduced it to powder. The action in this case is very obvious; the weight of my body confined the piece of brick firmly to the ground; my heel was also pressed by the same weight firmly upon the brick; one part of the brick therefore remaining confined to the ground, and the other part being carried round by my heel, the brick of course was torn assunder and reduced to powder; but were I to try the same experiment with a piece of limestone, I should find that the friction of my foot would not overcome the attraction of cohesion in this material; but my body might swing round, my heel sliding upon the stone, without injuring it. A similar operation would, however, produce a like destructive effect on the limestone, provided the moving body were pressed with such a weight that, rather than slide upon it, the attraction of cohesion in the stone would give way. In other words, the harder the substance is, the heavier and more powerful must the mill be to grind it; and, consequently, the heavier and more powerful is the mill, and the heavier and more powerful is the cart wheel, the more efficacious in the work of destruction

* Steel mills for grinding pepper, coffee, &c., have very little of this lacerating principle in them. They divide substances by the action of sharp edges one against another, like so many pairs of scissors: they are rather *cutting machines* than mills. AUTHOR'S NOTE.

† "We do not know with much precision why the twisting or spiral motion here alluded to, tends to overcome the attraction of cohesion, but we know, with certainty, that the fact is so." EDGEWORTH *on wheel carriages.*

will they necessarily be. This, I conceive, is a simple elucidation of the difference between *pressing* and *grinding*, and this is the difference of the effects on the materials of our roads, produced by the use of upright cylindrical wheels, which act only by *pressure*, and by the use of conical wheels, which, by their constant twist, act also *grinding*. (See Chap. II., § 1.)

2. I have observed that narrow roads are almost always in bad condition, which is to be accounted for from the circumstance of every carriage being obliged to go in the same ruts; and, as each rut is generally only six inches wide, *one foot* of the road only is worn by the wheels instead of the whole breadth of it, which would be the case if the road were of a proper width and if it were well constructed. If a road be laid out, from twenty to thirty feet wide, so flat as that a carriage may stand nearly upright on every part of it, and if moderate care be taken by the surveyor to prevent the *first formation* of ruts, such a road will be worn by the wheels nearly alike on every part of it; provided also that the ground on each side, for at least four or five feet, be moderately flat, so as not to excite fear in the drivers of carriages; but if there be deep ditches close to the sides of the road, or if the circumjacent land fall off very abruptly to the depth of two or three feet, whereby fear of approaching the edges would operate on the minds of the drivers, every driver will *instinctively* avoid the danger on either hand; and a road so circumstanced will, in spite of any care of the surveyor, inevitably be worn into ruts in the middle. There is a remarkable instance of this kind in a piece of road on Dwidham-Down, near Bristol. This road is a causeway over a piece of soft ground, and although it is from twenty to twenty-five feet wide, yet, as the ground falls away abruptly on both sides of it, it has been found impossible, for more than twenty years past, to my knowledge, to prevent deep ruts being formed along the middle of it, notwithstanding the Down itself consists of hard limestone, and the other roads upon the Down are as fine and even as any roads in England. Were this piece of road widened out on each side, in an easy slope, about five feet, by rubbish of any kind, and by the scrapings of the road itself, whereby the instinctive operation of fear of approaching the sides of the present road would be obviated, that piece of road would be found to wear as fairly as the other roads on the same Down.

3. If a road be high and convex in the middle, no care of the surveyor can prevent the formation of a pair of ruts along the ridge of the road; this, too, from an instinctive operation of fear: every driver will take this track, as being the *only* part of the road where his carriage can stand *upright;* and even if it be not so convex as to excite fear, yet the inconvenience of traveling on a sloping road will always produce the same effect.

4. In the use of materials for roads there is seldom much choice; but trustees are obliged to use such as the country affords; I have, however, unanimously observed, in various parts of England, that where limestone is used the roads are the best, and this superiority is not, in my opinion, owing merely to the hardness of this substance, but also to its *adhesive* or cementing property: how, otherwise, are we to account for the firmness and solidity of these roads? The roads around Bristol that are made of white limestone, which burns into a white lime, are so firm and compact that they are never affected by the most severe frosts, which proves that they are quite *impervious to water*. Chalk, being also a limestone, possesses the same cementing quality, and, although much softer than the Bristol stone, it may be a good substitute to mix with harder materials. I was pleased the last time I went through Marlborough Forest, at seeing the admirable effect of the union of chalk and flints; the flints being all reduced to a size, scarcely exceeding four ounces in weight each, and a quantity of chalk being mixed with them, the road was as smooth, and, as it appeared to me, as hard and compact as the roads on Dwidham-Down. I am, however, informed, that these roads are affected by frost, because frost is very absorbent of water; this, however, I am persuaded, is owing to the chalk being used too abundantly. If used with the broken flints, in the proportion of only one to ten, just enough to form a cementing bed for the flints, I cannot conceive that the quantity of water absorbed would be productive of injury from the effects of frost.

That ground limestone does possess an adhesive or cementing quality, is proved by the fact that the scrapings of limestone roads are frequently used without any admixture, as mortar, not only for building boundary walls, but also for building houses, for which purpose it is found to answer tolerably well. It therefore becomes a question, whether the practice of scraping the roads previous to the laying of fresh materials, is or is not the best mode of proceeding. It is certain that clean dry stones *cannot* combine until, by the trituration produced by the action of wheels and horses shoes passing over them, there is a sufficient quantity of small particles broken off to form a *bed of mortar* for the remainder; and that this is the process, is clear to me from a fact I have often observed, which is, that when broken stones are laid on any part of a road in dry weather, so long as the weather continues dry these stones will continue loose, however much they may be pulverized by wear during the dry weather; but immediately after a storm of rain the whole that has been much worn becomes firm and solid in a day or two. In other words, the powdered stone, which during the dry season was dust, now becomes *mortar*, and the whole is cemented or combined together. Hence, I am satisfied, that when fresh stones are laid upon a road, if a quantity, and not a very small quantity, of the road dirt were thrown back, and distributed evenly over the surface, they would *immediately become firmly imbedded together;* that they would last much longer, owing to the trituration of them, one against another, in their rough and dry state, being prevented by their being protected from the direct action of wheels and the shoes of horses; besides which, they would not be so likely to wear into ruts.

This is not, however, mere theory; for, having twice served the office of surveyor on parochial highways, I have proved the beneficial effects of this practice, and this too with an ordinary red sandstone. How far, consistently with my theory, it might be advantageous to lay new materials on unscraped roads, I have not proved.

5. As the wheels of carriages act upon the materials of roads like drug mills, it may be well to take a lesson from the actual practice of these machines. Having many years ago occasionally worked at a mill of this description, which was used for pulverizing the residuum of caput mortum of the nitrous acid manufactories, which is a hard saline substance, I always found that when I overcharged the mill it would not grind, but the salt formed in a mass, and the runner passed over it, producing but little comparative effect; but when I threw in *small quan-*

tities on the bed of the mill at a time, so that each piece might come in contact both with the bed of the mill and with the runner, the work proceeded with dispatch; each piece then shared the fate of the piece of brick under my destructive foot, and by precisely a similar process. The same effects I have observed in the laying on of materials on the roads. A covering from four to five inches thick forms a bed or mass which is proof against the severe crush of heavy wheels; while in the case of a very thin covering, the stones lying bare upon a hard road, and receiving, in this unprotected state, the stroke of every wheel that passes over them, like the thin covering on my mill-bed, they are quickly reduced to powder, and disappear.

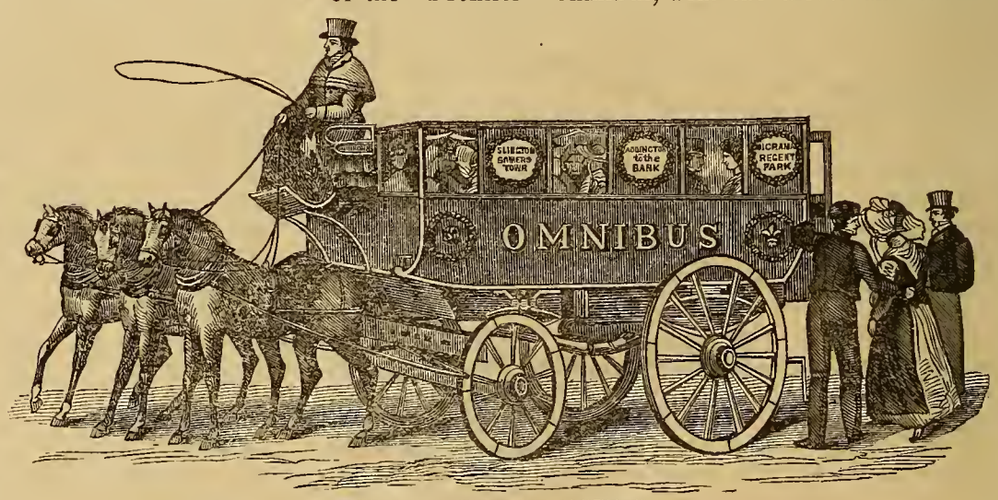
On recurring to my juvenile experiment, it must be evident that, had I tried to grind to powder with the twist of my heel a piece of soft brick that was firmly imbedded in the earth, I should have tried in vain; because, in this case, I must have twisted or loosened the body of earth with which it was surrounded, which I could not have done; therefore the only effect I could have produced would have been a slight trituration of its surface. This is also the case with heavy wheels; stones in a thick bed are protected from the immediate destructive grind, while stones that are thinly laid on are instantly reduced to powder.

6. I have generally observed, that when a piece of road is covered entirely across with new stones, every carriage follows the track of the first, until a pair of ruts be formed; and this can be prevented only by the vigilance of the surveyor, in causing the ruts to be filled up by the use of iron rakes; and the labor in drawing heavy carriages over such fresh laid materials is *excessive*, particularly up hills. Whether or not, by the plan I have suggested, of spreading dirt over the new stones, the tendency of ruts would be *entirely* prevented, I am not certain; but it is certain that the labor of the horses would be very much reduced in passing over them; and it is also certain that the stones would not be *so* liable, nor, I believe, in any degree liable to be displaced by the pressure of the wheels and by the straining of the horses.

It was formerly the custom, on some of the Bristol roads, to lay off *one half* of the road at a time. This was, in my opinion, an excellent practice; because, as every driver, of course, took the old road, the newly laid road was gradually worn by the wheels on *one side* of every carriage, while the horses traveled on the old; and, as the old grew worse, every carriage would gradually draw further and further upon the new stones, until the whole was imperceptibly rendered firm and compact; after which, if necessary, a similar process might take place on the other side. By this practice the horses were never obliged to go upon the new stones unless when the carriages passed each other; the new stones were very little deranged by the wheels and the horses feet; ruts were never formed, and the roads were always in good condition. I therefore see no reason why such practice should not generally be adopted.

LONDON OMNIBUSES.

IN July, 1829, amid the jeers and howls of the hackney-coachmen, the first omnibus was started in the metropolis. Mr. Shillibeer, who had lived some time in Paris, as a coach-builder, having noticed the success of this system of conveyance, inaugurated by M. Lafitte, in 1819, and having, indeed, constructed omnibuses for this eminent banker, conceived that they would be as great a hit in London; and he accordingly sold his business and went over there, determined to revolutionize their method of conveyance. The route chosen was from the Yorkshire Stingo to the Bank, the charge being one shilling the whole way, with a half-fare from or to King's Cross. Contrasted with the "short stagers," as the coaches running between different parts of town and the suburbs were termed, these omnibuses were perfection. There was no stopping for the usual half-hour at the Angel, the journey being done in about the same time as at present. The original 'buses were far handsomer than any that have been on the road since, being very roomy, beautifully fitted up in the inside, and affording excellent accommodation for twenty-two passengers. There were no outside seats in those days—not even a box-seat beside the driver. This driver and the conductor were dressed in a smart uniform, and the whole turn-out was first-rate. The size of these 'buses obliged the employment of three horses abreast. In fact, excepting the outside seats, these candidates for public favor were very similar to the Manchester omnibuses at present being worked by the General Omnibus Company—the original design, after a lapse of thirty-three years, coming once more into fashion. We have thought it worth while to reproduce a drawing of the "Premier" omnibus, with the driver and cad in full costume, and with the passengers in the fashionable attire of the period. The conductor's dress being similar to those used by the French cads, the notion arose that Mr. Shillibeer, the originator, was himself a Frenchman. This gentleman is, however, a true Briton, having been born within the sound of Bow Bells, and having served in his youth as a midshipman, and seen service in that capacity.



THE FIRST ENGLISH OMNIBUS.

When these vehicles first started, their success was complete. Mr. Shillibeer tells us that, for the first two weeks, they gave him a clear profit of a hundred pounds a week. The stage-coaches attempted to forbid his run-

ning, under the terms of their Act, and the hackney-coaches, feeling a reforming wind beginning to blow in their line of business, threw every difficulty they could in the way. Still, the public would crowd to ride in them, and had he had a score, they would all have filled. But Mr. Shillibeer speedily found that, although the public patronized him fairly, his receipts fell off; and he discovered that he was being robbed to the extent of twenty pounds a week. He invented a patent step, to register the number of passengers who entered, and for a time it worked well; but one night the contrivance was smashed all to pieces; and, other 'buses being put on the road to compete with him, by the old stage-coach proprietors, he was ultimately driven out of the trade altogether. His idea, however, held its ground and flourished, and, year by year, the omnibus system became more firmly established in the metropolis. In the year 1849, the omnibus proprietors made a feeble attempt to give outside accommodation, by establishing what "*Punch*" christened the "knife-board"—a narrow slip of wood, which ran along the middle of the roof, to mount which there were no steps whatever; the adventurous climber making the best use he could of the door-step and the window-ledge. Most of us can remember the knife-board, and the difficulty passengers had to keep their equilibrium when perched upon it. Indeed, it was quite equal to a performance upon the "low rope," and as to cooking an omelette upon it, we doubt if even Blondin could have accomplished such a feat. But even this accommodation was grudged to the British public, or, perhaps, Sir Richard Mayne considering the performance dangerous, attempted to suppress it altogether; but in this he or the public failed; and slowly, very slowly, for we are not quick in such matters, the present outside seats were built up, and speedily became the best filling parts of the omnibus, for no thorough Englishman will ride inside one of these vehicles if the weather be tolerable.

Up to the year 1857, the omnibus system of London was carried on by individual proprietors, some, indeed, working as many as fifty omnibuses each, but the great majority only possessing half a dozen, and many working a single 'bus, or, at most, a couple. In this year, however, a company was formed in Paris, to buy up, if possible, the whole number of 'buses then running, together with their different "times." In this endeavor they did not entirely succeed, but they became possessed of 600 out of the 810 then running in the metropolitan district. It will, perhaps, be necessary to explain what is the meaning of an omnibus "time." By agreement among the various associations, companies, and individual proprietors, it has long been settled that certain 'buses shall have the right of working at certain times in the day. The hours are, in fact, portioned out in some cases into three-minute divisions, that is, a certain line of omnibuses pass the timekeeper every three minutes, at certain times of the day. Of course this is only an usage, as no person has a legal right to monopolize the road; but it is an usage which practically amounts to a prohibition of any new comer, and annihilates all opposition. Now and then some enterprising proprietor tries to cut into the established "times" of another proprietor, but the consequence is, that a system of what is termed "nursing" forthwith ensues. Immediately the new comer starts, he finds he is "waited upon" by an opposition omnibus, which keeps steadily ahead of him, whilst another follows close in his wake, and sometimes a third runs beside him; by this contrivance it is impossible that the new enterprise can pay, inasmuch as the passengers, who are never in excess of the ordinary omnibus service, have now to be divided among three or four. We are all familiar with the racing that takes place on such occasions, and with the incessant bullying and chaffing which is directed against the unfortunate interloper. It reminds one of the manner in which an unlucky bird is pecked at and persecuted, who unwittingly intrudes among a flight of rooks. Strangely enough, the authorities seem to be powerless against this system, which is an offence against the public of the deepest dye, and which is in direct opposition to the spirit of free trade. Magistrates are hard enough upon poor omnibus-drivers, for very trifling offences, but they never endeavor to touch the real culprits, the proprietors, under whose orders they conduct this intolerable nursing system.

The General Omnibus Company having purchased the "times" of the great majority of the old proprietors, have matters very much in their own hands, as it is much easier for them, with their large capital, to crush an opponent than it would have been of old for an individual proprietor or small company. We must, in justice say, however, that the company has not abused its great power overmuch, and there has been less complaint of nursing lately than there used to be. The great majority of their omnibuses run upon the Middlesex side of the river, the Surrey side being the stronghold of the individual proprietors and smaller associations.

The General Omnibus Company possesses, without doubt, the largest carriage business in the world. It could mount the whole of the British cavalry from the stud it possesses in the metropolis, and it could, at any given moment, transport an army of 13,200 troops from one part of the metropolis to another within the hour. To keep such an extensive establishment in full work, it is obliged to employ a little army of its own, and to work in the most economical manner. Were it not for this, the cost of its directing staff would put it under a great disadvantage in competing with individual proprietors, who not only do their work for themselves, but who necessarily keep a sharper look-out for their own interests than delegated servants could be expected to do. An examination into the economy of this public company (for of late it has passed from its French proprietorship, and has been constituted as an English association on the limited liability principle) gives a very fair insight into the working of the omnibus system in London. As we have before said, they own a vast majority of the omnibuses running in the metropolis, working 600 out of the 810 running in the winter season. In the summer an increased number is put on, the returns of the Inland Revenue giving a total of 1,100. Out of this number, however, must be deducted the small number of stage-coaches now running between London and the country. We are told that the profit on the conveyance of passengers is made chiefly in the summer months of the year, when the outside as well as the inside of the 'bus is pretty generally full. It will, perhaps, be the most convenient plan to consider the working of a single omnibus, before entering into the working of the company as a whole.

Each omnibus is worked by a driver, a conductor, and a complement of horses, differing in number according to the line of traffic. The driver, although the higher paid, and generally the more respectable man of the two, is

wholly subordinate to the conductor as to the speed of the 'bus and the time of stopping and going on. As a rule, the slamming of the door is the signal, which both horses and driver understand, but a whistle is getting into use. The wages of the driver are two guineas a week, but out of this he has to pay something to his horse-keeper and his carriage-washer, and is responsible for all damage done to his 'bus; and, moreover, he has now and then to pay fines for loitering; altogether at least six shillings a week goes in this way. The conductor gets eight-and-twenty shillings a week without deductions; but then, as a driver once said to us, he has the privilege of helping himself; the significance of which statement we shall mention hereafter. They are both daily servants, the conductor being allowed to take his own and the driver's wages from his day's receipts. The duties of the former to the public are well known, but besides those he is living in constant antagonism with other 'buses running on the same route. Readers must have observed that they are constantly telegraphing their respective drivers, especially when another 'bus is in view. It is the interest of every conductor to take as much money as he can, for the simple reason that the earnings of each 'bus is contrasted with those of others running on the same road; and the conductor knows full well that if he does not do as well as the others, he is sure to get discharged, and what is worse, he gets no reason for it, the only reply being, "We don't want you any longer," which practically amounts to a loss of character, for persons are not very likely to engage a person who can give no other reason for the loss of his place. Such being the case, the different conductors are in active antagonism with each other. Their constant view is to fill their 'bus at the expense of those 'buses running before and coming after them. This, in fact, is the main reason of the irregularities in their time, which they indulge in to the detriment of the public, as long as they are without sight of the time-keeper; it is also the cause of that nagging row that is constantly kept up between driver and conductor, the object of the former being to drive on steadily, and of the latter to dodge, pull up, and go on, so as to secure the greatest number of passengers in his own time, and on the borders of those going before and coming after him. These dodgings and sudden pullings up invariably irritate the coachman, as much as they strain the horses and pull their mouths about, and the consequence is, that rich volume of abuse directed every now and then over the driver's shoulder, which the cad well knows how to return. This mutual "ruff" is very disadvantageous to the company, and they are continually shifting the conductors to get rid of it. The conductor pays his money once a day at least, at one of the receiving houses on his route; he also makes out a route-bill every journey, with which his money must tally. The average earnings per day of each omnibus are £2 15s. 10d., but in the summer they often amount to £4. When there is any great variation from this average in the wrong direction, the "check" is put on to find out if any roguery is taking place on the part of the conductor; whether, in fact, he is "helping himself," as the driver observed. The check is in faet, a female spy, generally a well-dressed woman, who rides the long journey—for all omnibus routes are now divided into two or three short routes and one long one—and her duty is to take count of the number of long and short riders, which is then privately compared with the conductor's own route-paper or way-bill. If his payment falls short of the real number carried, he is "not required any more," the company never troubling themselves about prosecuting him.

(*To be concluded in the next number.*)

THE TIREVILLE MISCELLANY;

BEING SELECTIONS FROM THE PRIVATE JOURNAL OF JOHN STILWAGEN, ESQ.

BY THE EDITOR.

(*Continued from page* 117, *vol. V.*)

Many readers having expressed themselves much pleased with the extracts from Stilwagen's journal, as published in our last volume, for their further gratification we are induced to continue them in this. These "natural pictures" of a former age must impress the mind of the practical carriage-maker with an idea that the vexations and troubles experienced by his ancient brother vary but little from those he is called upon to undergo in these latter days.

Nov. 10, 18—. Having taken an order to build a coupé for a gentleman, willing to pay a good price for a good vehicle, and not having in my shop a workman accustomed to such work, I advertised for one in *The Tireville Avalanche*, with what success will hereafter be seen. In answer to the advertisement, singular as it may appear, very few practical workmen presented themselves in answer to the call. Such as called, for various reasons, were rejected one after another, until finally a full grown German "mit a pig peard," introduced himself as fully competent to make coöpay podies," having made more than fifty in the old country, where such were very fashionable. The self-confidence with which he introduced himself, and the ready manner in which he spoke, led me to conclude that perhaps the fellow did "know something if not more."

Having agreed upon the wages—two dollars per day—he promised to be on hand early the next morning, with his chest of tools. The next morning came and went, but no body-maker made his appearance. Another morning dawned, and yet no man or tools, until late in the afternoon, when the Teuton showed himself, promising to certainly begin work early the following day. To shorten a long story, it may be as well to say, that it was four days longer before he brought his "kit" to the shop, and two days after that when the journeyman got ready to go to work. As the man did not appear to be intemperate, it was a mystery to my mind as to what he might be doing in this long interval. The promise and its non-fulfillment thus far was a great trial to my patience (of which I never had a large stock), and can only be understood by such carriage-manufacturers as have battled with the complainings of disappointed customers, and the unreasonableness of inexperienced men.

Nine days had flittered away, as I have previously shown, before the German was ready to commence work, by making his patterns, and preparing a working draft of the body. This took him four days, notwithstanding that he was shown a coupé after which to build. The manner

in which he went at his work (for I watched him closely) very soon awakened fears in my mind that he had promised more than he was able to fulfill, in anything like a skillful manner; and these fears were not in the least degree abated by the impression that he was, besides, a very slow workman.

After spoiling several pieces of "stuff," by making his mortices too wide for his tenons, and for other reasons having laid aside different portions, all at my cost, he finally succeeded in getting his body framed—but such a frame!—it would creak and rattle when touched, enough to make a good mechanic shudder at the idea. But the crowning act of all was an attempt on his part to put in the back panel. That brought on a storm which had been some days threatening. The coupé was intended to be what is termed a contracted front, and should have had the pillars dressed up accordingly; but with that lack of forethought peculiar to all unskillful mechanics, he had framed his body as though designed for a square one. This when framed together gave to the grooves a bad position—an angular direction—with the panel. The result of this was that, whenever the time came for inserting the ends of the panel in these grooves, it required at least a six-man-power to keep them in. In the present instance the difficulty was increased by the misfortune that he had not only cut his panel much too short, but had likewise shaven the ends thereof too thin to properly fill the grooves in the pillars. To make a long story shorter—just as this "botch" was *laboring* to get in his panel, I entered the body-shop, and how I felt on seeing such "butchery," those who have had some experience in such matters only can imagine. On examination I discovered that the Dutchman, with considerable trouble, had inserted another "dutchman" nearly the whole length of one of the grooves, to fill out the space, vacant from bad management. This new trial of my patience added fuel to the flame, and in the midst of the *excitement* thereby created, I condemned the whole job, and "kicked" the man out of my shop, to the tune of a loss of one hundred dollars in spoiled stock and wages paid to him. This is another of the beauties of carriage-making, and not a rare one either.

After he had gone, it came out that during the nine days he had kept me in suspense, he had been making the tour of other shops and the livery stables, to pick up some knowledge of how coupés were built, he very probably having never undertaken such a task as building one before.

Not many days after this I engaged a carriage-trimmer, who, when he came to begin work the next morning, objected because, as he said, he could not work in the rear part of the building, as he "wanted to be where he could look out into the street, and see the ladies pass by." On my telling him that I had hired him to attend to trimming carriages at a certain price, and not for spending the time in his own way, he got into a *fever*, seized his tool-box, and left the premises in disgust. Such is life—in a carriage-shop.

(*To be continued.*)

EMPLOYERS AND WAGES IN ENGLAND A CENTURY AGO. In the July number of the *Universal Museum and Complete Magazine of Knowledge and Pleasure*, published in 1769, occurs the following: "On Thursday three eminent master tailors at the west end the town [London] were committed from the public office in Bow Street, for fourteen days, to Tothilfields Bridewell, for giving greater wages than is allowed by law."

Home Circle.

OUR COUNTRY'S CALL.

BY WILLIAM CULLEN BRYANT.

Lay down the ax, fling by the spade;
Leave in its track the toiling plow;
The rifle and the bayonet blade
For arms like yours were fitter now;
And let the hands that ply the pen
Quit the light task, and learn to wield
The horsemen's crooked brand, and rein
The charger on the battle field.

Our country calls; away! away!
To where the blood-stream blots the green.
Strike to defend the gentlest sway
That Time in all his course has seen.
See, from a thousand coverts—see
Spring the armed foes that haunt her track;
They rush to smite her down, and we
Must beat the banded traitors back.

Ho! sturdy as the oaks ye cleave,
And moved as soon to fear and flight,
Men of the glade and forest! leave
Your woodcraft for the field of fight.
The arms that wield the ax must pour
An iron tempest on the foe;
His serried ranks shall reel before
The arm that lays the panther low.

And ye who breast the mountain storm
By grassy steep or highland lake,
Come, for the land ye love to form
A bulwark that no foe can break.
Stand, like your own gray cliffs that mock
The whirlwind, stand in her defense;
The blast as soon shall remove the rock
As rushing squadrons bear ye thence.

And ye, whose homes are by her grand
Swift rivers, rising far away,
Come from the depth of her green land
As mighty in your march as they;
As terrible as when the rains
Have swelled them over bank and bourne,
With sudden floods to drown the plains
And sweep along the woods uptorn.

And ye who throng, beside the deep,
Her ports and hamlets of the strand,
In number like the waves that leap
On his long murmuring marge of sand,
Come, like that deep, when, o'er his brim,
He rises, all his floods to pour,
And flings the proudest barks that swim,
A helpless wreck against the shore.

Few, few were they whose swords, of old,
Won the fair land in which we dwell;
But we are many, we who hold
The grim resolve to guard it well.
Strike for that broad and goodly land,
Blow after blow, till men shall see
That Might and Right move hand in hand,
And glorious must their triumph be.

A BOARDING SCHOOL ROMANCE.

BY ANNIE M. BEACH.

It was Saturday afternoon, and the misses of Silver Bay Boarding-school were at leisure. Everything wore an air of quiet, and as Emma Benson closed the door of the study-room, and walked down the broad hall, she said to herself, "Why should I not be happy? Am I not?" There are times when we promise ourselves the luxury of an hour of solitude, in which to wander back to the dim past, or on to the fickle future, and at such times it is a sore trial to find ourselves disappointed. Such a season of solitude Emma Benson had promised herself that sweet May afternoon. But the spell was broken by a ring of clear silvery laughter, and a burst of song as fresh and free as that of a Spring bird, telling that two of "her girls" had tarried at home. And when they came to her, each with a warm kiss, asking her to sit with them that afternoon, much as she wished it, how could she beg to be excused.

"Susie has a cold you know, and so we thought we would both stay." Then, as if she saw the slight shade of disappointment on her teacher's face, Janet Weldon added, "They are going to take me away from here before long, Miss Benson; Judge Porter has had a letter from that uncle of mine who has been so long away, and he is coming for me himself. Only think what an event it will be in our quiet lives. He was ready to leave London when he wrote." And so Janet jabbered on, while quiet Susie laughed and listened, in turn chiming in a word now and then, and Miss Benson's thoughts wandered far away to her New England home, and the days of her own merry maidenhood. She was almost thirty now; but, in her pure, noble goodness, Emma Benson did not grow old. As the strokes of a perfect painter's brush make even a finished picture more beautiful, so did the touches of time add to her calm face new sweetness.

Janet Weldon was a wild little fairy, but she had a warm heart. She was a ward of Judge Porter's, the richest man in the village over the bay—an orphan girl; for three years had she been under Miss Benson's care, and had won a place very near that lady's heart.

At last Susie went and put her sketch-book up, and then she and Janet came out and sat with Miss Benson on the door-steps, and made bouquets for her room out of hyacinths, and violets, and myrtles, weaving in here and there fresh grass blades and sprays of bristling asparagus for want of something else. "How I wish that uncle of mine would marry, so that I might have a home of my own," Janet said; "some one like Miss Benson, here." "Oh, would'nt it be grand?" and she cast a sly glance up from her work. In school hours she would not have ventured so much liberty; but this was a holiday; beside Emma Benson was never formal with her scholars. Few have the happy facility of combining familiarity with dignity; but this was the secret of her success.

"Mr. and Mrs. Albert James—oh, splendid! only think of it, Miss Benson."

"Why did her face look so white when she went to her room? Susie you and I have tired Miss Benson out with our talking," Janet said—"I am so sorry."

It was a subject of much query among the school girls, why Miss Benson did not marry. She did not teach from necessity, they knew. As to offers, they felt sure there was no lack on that score. Paul Clifford, Judge Porter's law student, was younger than Miss Benson, but where did those fresh bouquets come from last Winter, if not from the splendid plants he kept at the office? Then there was the handsome pastor of Grace Church, up the bay, a man of real worth and talent. All the girls were dying of love for him; Janet knew something about that. Going to her room once on a time she had picked up an open note in the hall. How could she know it was Miss Benson who dropped it? Of course, after promising to keep the secret, she was forgiven. Judge Porter even, a widower for more than ten years, had more than once sent up his card to their pretty teacher, while he waited in the parlor below; and Janet declared she could never see those handsome greys prancing up the lane, but, with Maud Muller, her heart sighed out,

"Would that I the judge's bride might be."

It was late that night ere Emma Benson slept. Pulling back the white window curtain, the moon kisses stole in. She strove to look heavenward, but the sound of the waves, washing the shore, lured her back to earth, so much their murmur seemed like the low sobbing of stricken hearts. And so she turned over the pages of her life-book, to read the history of dear days she had striven hard to forget. Albert James! it was long since she had heard that name linked with hers before, though once

"Her trust in his love was a woman's faith,
Perfect, and fearing no change but death."

She was scarce eighteen when first he became a guest at her father's house. Noble, and good, and true, he had won her first pure heart-offering, and plighted to her his troth. Thus they parted. He to battle with difficulties she might never know; she to still bask in the sunshine of home-love and luxury; dreaming of her heart idol ever as she builded her hope-castles of the future. Three years the letters came and went, prized how highly those can only tell who have waited for like messages; till, at last, hard toiling against the adverse waves of fortune, weary and sick of the battle of life, over his mood there stole a coldness she could not read in other light than waning love, and so questioned of his constancy. Grieved that she should doubt his truth, yet too proud to own the cause of his coldness, his answer gave her little satisfaction; and so, believing that the sweet song of their love was lost to be learned no more, Emma Benson had choked down the swelling heart throbs, and told him he was free.

Albert James sailed for Australia, rumor said, and then there came tidings of a ship gone down at sea, with his name among the lost.

Of the weeks that followed she knew nothing, but they told her that her feet had pressed close to the verge of the dark river. They did not speak of Albert James. At last the roses of health were wooed back again, and God gave her that perfect peace which He alone bestows on those whose minds are stayed on Him. She had been six years at Silver Bay, and had found quiet happiness in discharging the duties of teacher and friend. Could it be the Albert James of her early love whose name she had heard that day? If so, how strange it would seem to meet, and both remember the past, yet be as strangers. Kneeling in the stillness of her room, Emma Benson prayed fervently, and God gave her strength.

The freshness of May had merged into June's blushing bloom. It was Saturday afternoon again, and this time Emma Benson found herself quite alone. Something made her feel very peaceful and happy that sweet day; and, as she sat down under the shadow of the great chestnut tree, just in hearing of the wave murmurs of the bay, it seemed she could almost feel the touchings of her guardian angel's wings; it may be that she did. Glancing up, she met the earnest eyes of Albert James.

The words that well up from true loving hearts at such meetings are not for us to hear; angels listen and record them above. Enough that the dark places in those gone years were all made light, and the blighted flowers of confidence bloomed anew in the sweet tenderness of old. Albert James had struggled hard in the battle of life, but fortune had smiled at last, and, after long absence, he had returned to his native land with wealth and position, and, better than aught else, with the firm principles of youth untarnished.

Janet Weldon is very happy in the home her uncle gives her, and insists that the match was all of her own planning. The society of Mr. and Mrs. Albert James is much sought; but not alone to the gifted and the gay are their doors opened. They that drink from the cup of sorrow, and battle for truth against the darkness, seek not their sympathy in vain.

Pen Illustrations of the Drafts.

SOCIABLE.

Illustrated on Plate V.

Our artist has here introduced to our friends a very pretty design for a vis-a-vis, or sociable, both light and airy, two very desirable properties in a summer carriage. This skill has obviated our entering into a long explanation, when the draft so well tells its own story, and we therefore desist from any further remarks.

ROAD PHÆTON.

Illustrated on Plate VI.

Phætons of this kind have become very fashionable with a certain class of pleasure-takers in this locality. No doubt this has been promoted, in some degree, by the high price now ruling for vehicles with tops. The otherwise heavy looking design, in this example, is happily relieved by sham-caning some portions of the side and back panels. In conformity with the prevailing style, the corners of the seats and the back of the body are all round-cornered. Those of our readers not yet accustomed to making round-cornered work, will find some useful directions on this subject on page 3, volume V.

CUT-UNDER COAL-BOX BUGGY.

Illustrated on Plate VII.

We give here another variation of the coal-box buggy, being better adapted to short turning than when not cut-under, and consequently more convenient for business purposes. Of course it will be necessary to plate the side, to render this kind of body strong enough for ordinary uses. The price of such a buggy as this is now from $400 to $425.

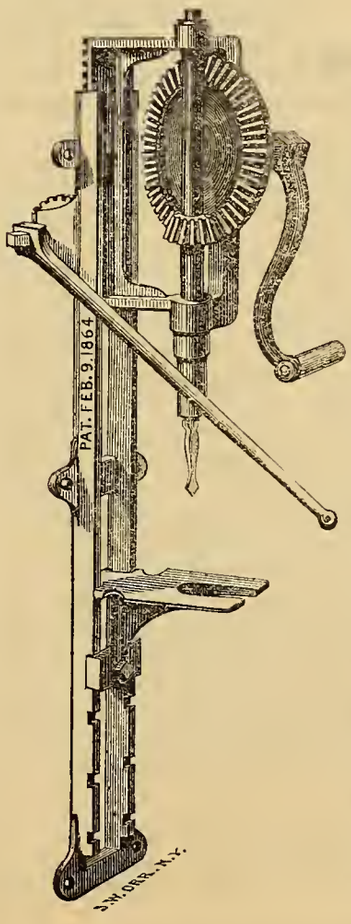
PILLARED BUGGY.

Illustrated on Plate VIII.

Instead of a description, we give a few of the dimensions of the body: the seat 14½ inches wide; side panel under the seat, 14½ inches high, and 10½ inches in the narrower part, back; the back end to flair 3½ inches; the whole length of the bottom side to be 3 feet 11 inches, of which length 9½ inches are included in the bracket. In this job an attempt is made to combine the features of the tilbury with the coal-box, which peculiarity a certain manufacturer of this city, with a branch in the country, seems to delight in, and not unfrequently passes off on the confiding public as something original. We have the pleasure of forestalling the manufacturer in this instance, and introduce it to our readers in advance of him.

Sparks from the Anvil.

STIVER'S HAND-DRILLING MACHINE.



There is nothing more necessary in the smiths' shop, and yet we are inclined to believe that, in most of the smaller carriage factories in this country, nothing is more difficult to be found than a drill suitable for the business. Hitherto these have been too expensive for ordinary capitalists, and therefore beyond the reach of the great mass of the craft. This difficulty has been overcome, and we now have the pleasure of introducing to our readers an enlarged engraving of the neatest and most practically useful hand-drill yet invented. This drill, of which we give a fine engraving, was patented by our friend William Stivers, of New York city, very recently, and is indisputably the cheapest, most suitable and durable drill, for a carriage shop, anywhere to be found. Being entirely made of iron, it is very easily put up, taking

very little room, a desideratum of much importance in shops where rent is high, as in some of our cities.

As to the effectiveness of this drill—we have seen a hole put through a bar of iron half an inch in thickness in eight seconds, by hand power alone, a feat, we venture to say, very seldom done by machinery, and three times as quick as was ever before done by a hand-drill. In the language of an admirer, we admit "they strike a man's common sense right away;" and when the value of this machine becomes known, very few will think they can afford to be without one any longer, especially as they cost but $15, all complete. The inventor's advertisement will be found on the third page of the cover to this work, who keeps a stock on hand for sale, ready made, and they may likewise be had through our agency, at the manufacturer's prices. We can cheerfully and fully recommend them as being just the thing, in cheapness, effectiveness and durability.

NOVELTIES FOR THE SMITH.

Our very ingenious correspondent, Mr. A. S. Crossley, of Muncy, Pa., has furnished us, for publication, with the following useful novelties: The first is a very handy instrument, or

MACHINE FOR BENDING SHAFT-JACKS.

Having properly formed the handle part of the tool, made from a bar of iron, 2½ inches square, we next bend the end at a right angle, similar to that of the heel of a horse-shoe, which, when done, will assume a similar shape to that depicted in the first engraving, this being what we may term an obverse view, and showing the hole drilled in the end, close up to the stock or handle part, for receiving one leg of the jack, as seen in the second illustration reversely.

When the jack—or shaft-shackle, as some term it—is made ready for bending, place the lower leg or tang in the hole, after properly heating; and having screwed it with the tool into a vice, bend it to the desired shape at a single heat. By this operation the jacks will all be made of a uniform shape and size, in what may be called a self-centering, or regulating machine. This tool is intended for making the common shaft-jack, and, therefore, of very little use to those who use the patent anti-rattling ones.

If we correctly understand the matter, Mr. C. consenting, we would suggest that a hole be made in the tool to correspond with the "ears" of the shackle when turned, so as to be punched for the reception of the shaft bolt, while in the vice, or, at least, so that the workmen will be enabled conveniently to "work-up" and true the holes for the bolt. The next is an

EXTEMPORIZED SCREW-PLATE FOR CUTTING AXLE CLIPS.

In preparing this very useful screw-plate for re-cutting old clips more particularly, take an old file, and bend it the proper shape, as shown in the engraving; afterwards drilling a hole in the center, as indicated by the dot, and cutting a thread therein to operate as the die, then tempering it. With this instrument clips, clip king-bolts, &c., may be threaded without bending (which is now done, spoiling the paint, &c.), or even taking the clip off the axle. Our engraver, as will be seen, has not bent the instrument to the most proper or desirable shape; but the mechanic will readily adapt the form to his purpose, in conformity with his judgment.

Mr. C. adds, "I send these for the benefit of the craft." Have we not other friends ready to lend a helping hand in this praiseworthy manner, to benefit the craft?

CASE-HARDENING IRON.

In case-hardening iron, first heat it to redness and sprinkle it with ferro-prussiate of potasse; and when the salt has fused, plunge the metal into cold water. Another mode is, to enclose the article in a box, and surround it with animal horns, hoofs, bones, or skins, being previously charred and powdered; closing the box-lid, heat it strongly in a furnace, and let it cool. On removing the iron it will be found hardened on the surface, being superficially converted into steel. When required to be hard, but not brittle, the article should be plunged while hot into whale oil.

Paint Room.

COLOR: ITS APPLICATION, ETC.

CHAPTER IV.

In calculating the powers of certain colors, it must be borne in mind that, in the system, there are preponderances of certain colors over others: thus, in the general economy of color, blue has the lion's share, occupying as much space or as much value as the other two taken conjointly, and that yellow is the least powerful of the three, both in quantity and intensity.

Of the quality of red—in reference to its power as dark or light, it will at once be seen to hold a middle place. That it may be used darker or lighter at pleasure, is at once accorded; but for its integrity, *as red*, it must be middle tint. If you would deepen it, it can be done by adding some other color, and thus degrading it. If you would make it lighter in any considerable degree, you do so by subtracting some of its power; it is no longer red, but pink, or flesh color.

Yellow—in its very nature—gives the impression of *light*. Deepen it, even to an approach towards half tint, and it is no longer yellow; but make it as tender as you please, it will yet be yellow; lighter and lighter, but still it is yellow; until it becomes absorbed in its parent, light or white.

Blue, on the contrary, has the power of dark: deepen it into indigo, it is still blue, and will tell us the focus of depth. But, as in numerical power, so has it additional properties, which give it a value possessed by each of the other two colors, of half tint and of light. In its integrity

as blue, it may indeed be taken as half tint: in its upward course into light, it is still blue, and, as already stated, it is blue downward into its intensity of depth.

Blue, then, may be said to possess a triple power—of dark, of light, and of half tint.

The powers or intensities of the secondaries and tertiaries might be calculated, if need were, according to those, severally, of their components.

Colors, whether primary, secondary, or tertiary, may be said to have their representatives in all the various pigments in common use; and, through their means, we have the power of transmitting the same pleasurable sensations to others that we have ourselves experienced.

Why certain pigments or paints maintain certain hues, or express them to the general eye *as* certain hues, vermillion, for instance, as a certain quality of red, is already explained in the fact of fitness in its nature to receive or reject certain colored rays. If we mix two pigments together, say, for instance, a blue and a yellow, we produce a green, that is to say, the effect on the optic nerve of what we call green; but the material which receives and transmits the yellow ray in the unmixed state is still receiving and transmitting only yellow, while the blue pigment is still giving only its sensation of blue, and the two ideas received simultaneously produce to the imagination an idea of the hue we call green.

Now this mixture, so to call it, of blue and yellow atoms is nothing more than the distribution of these blue and yellow atoms side by side, or in immediate contiguity each to the other; and it is this distribution, this contiguity, that produces, through what is called simultaneous contrast, the effect, to our eye, of the secondary hue, *green*.

Were the mixture of the colors less completely carried out, the effect would be only partial: thus, for instance, were we to take blue and yellow powders, and instead of into water, or any thin liquid, we were to cast them into some thick, unctuous fluid, we should, by stirring them about, produce, not green, but a marbled streakiness of blue and yellow; here and there, perhaps, more or less green, as the particles of powder had become more or less juxtaposed in closer affinity.

Were the same two colors laid alternately in fine strokes, *very close together* on a ground of white, the effect would be a general green tint, corresponding to the circumstance of their mixture together; but were the strokes of blue and yellow to be disposed wider apart, or were they thicker, broader strokes, then the effect would be that of the incompletely mixed powders, merely a streakiness of the two colors.

This fact brings us, therefore, at once to the consideration of the effects brought about by simultaneous contrast in the placing of colors, at our discretion, in certain positions and quantities, with reference to each other, and the pleasurable sensations derived, in proportion to the pose, of few or many hues; or the contrary, where chance only, arising out of the want of the necessary knowledge, had disposed them injudiciously.

It is evident, then, that colors alter in their quality and power, according to their relative positions, with reference to each other. They must either gain or lose by position.

As the brightest light and the intensest dark are the most opposed to each other, so do white and black, notwithstanding their affinity, form the most complete contrast. A stripe of white will appear purest when painted on a black ground, as, in like manner, a stripe of black will be deepest on a white ground; provided, in both cases, the pigment employed shall be thick enough and opaque enough to preclude the possibility of the ground being seen, in the slightest degree, through it. The harmony will be the completest under such conditions.

So, also, it will be evident that a stripe of white will be *lighter* on a ground of any dark color, but *not purer*, for the color of the ground will have the effect of imparting to the white stripe somewhat of the hue most antagonistic to its own color.

We have already shown—in a diagramic form—the colors, primary, secondary and tertiary, and their complementaries or contrasting hues: red having its complementary in green, and *vice versa;* blue in orange; yellow in purple or violet. In like manner, on the reduced or degraded scale, orange has its legitimate contrast, or complementary in blue grey; green in red grey; purple in yellow grey.

Thus would a streak of white on a green ground be found to appear as if tinged with red grey, which is its complementary, and its character, as white, sullied. A streak or line of white on a purple ground, would, by the same law, appear to be tinged with yellow grey. And so of a line of white on an orange ground, a blueness would obtain in the streak.

Now, according to the intensity of the ground, so will the line of white be affected, lighter or greyer. That for instance on the orange ground will appear as a deeper blue grey in proportion to the luminousness of the orange which it is opposed to.

Trimming Room.

LININGS FOR CARRIAGES.

There can be no doubt that the most durable lining for carriages, setting aside leather, is cloth. Of cloths, the best imported are unquestionably of English manufacture, the colors as well as texture being more perfect. The French and German, although some of them present a very fair surface, are very apt to fade in a short time. The German fabric is the least desirable of any, as it not only fades, but is very liable to shrink on exposure to wet. If not shrunk before it is put into a top, it will draw the leather covering into rolls at the edges, and make a distressed looking job. Although German cloths are sold at a lower price, yet the shrinkage is so great that in the end they prove the dearest of any.

Setting aside the question of durability, every other consideration recommends coteline as the most desirable for the better class of carriages. This is of two kinds, the one made at Tours and the other at Lyons, both in France. The best is made at Tours, the quality and color being superior. Cotelines have this advantage over cloths, they do not harbor moths. Thus it will be seen that where elegance is the chief consideration, coteline is preferable; but where durability and economy are consulted, cloths should be used. The above suggestions are made in conformity with modern experience. That our readers may know what was the opinion prevalent 75 years ago, we add the following from Felton's Treatise on Wheel-carriages, page 140, volume 1:

"The lining the inside of a body requires some attention to give it those advantages necessary for a gentleman's carriage. A richness in its ornaments is the most material thing; and the difference of the expense, which is principally in the lace, is so trifling when compared to its ornamental advantages, that it would never have been considered an object, had it been fully known.

"Those generally used for close carriages are light-colored cloths; those for open carriages are of dark, or mixtures. The cloths should always be of the very best second, if not superfine; but second is what is mostly used. The quilting of the cloth with small ornaments, called tufts, also gives a richness to the lining; those should match the colors used in the trimmings; and the trimmings should be of such colors as are used in the liveries, but of any fancy pattern. The crest or arms lace has a noble appearance; but if the width of it exceed three inches and a half, it looks heavy. A fullness of cloth to the seat-falls should always be allowed, and a lace of two inches and a half breadth for the holders used on the plainest occasions; that for binding the falls, pockets, &c., two inches; but as the value of different trimmings can only be known by a separate description of the ornaments used, a reference to them will be found very necessary."

Editor's Work-bench.

REPORT OF THE COMMISSIONER OF PATENTS.

THE Commissioner of Patents, at Washington, has very kindly favored us with a copy of his Introductory Report for 1863, "printed in advance of the descriptions and engravings of patents, to be issued hereafter in two volumes." The Commissioner will please accept our thanks for this kind expression of regard toward us. We embrace this opportunity to present our readers with such facts as we find therein of interest to them.

During the past year, 6,014 applications for patents were made, and 4,170 of these were granted, and 787 caveats were filed. The applications for extensions were 40, and 48 were granted. The expirations of patents were 698. Of the entire number of patents granted in 1863, 4,048 were to citizens of the United States, 58 to subjects of Great Britain, 37 to Frenchmen, and 27 to subjects of other foreign governments. The amount received into the treasury from all sources amounted to $195,573 29, and the expenditures to $189,414 14.

Much of the introductory matter in this document is devoted to a review of the patent laws, as operating in England, which, for want of room, we are obliged to omit. Next follows a justification of our system as compared with those of other nations, showing that granting patents without a previous examination, as formerly practised in England, led to the granting of patents for the same thing to several individuals, a matter in which we fear our own office is not particular enough—taking perch-couplings for an example. In this Report it is clearly shown that the obtaining of patents is twenty times cheaper in this country than in England, which is certainly desirable, but which we apprehend is one reason why we see so many apparently worthless inventions patented among us. But we must not be too censorious.

We are told that "notwithstanding the various improvements heretofore made in land carriages, and the consequent perfection existing in that department, such have been the improvements during the year 1863, that much additional security and comfort have been gained. Particular attention is given to the matter of propelling carriages by means of steam upon common roads, and a wide field is here opened for the inventive genius of the people; and judging from the present state of this improvement, as well as the progress made in other branches of mechanics, it is not improbable that in a few years the talent now aroused to this important interest will perfect some mechanism, by means of which steam will be used upon common roads, as well as it is now upon railways."

Great improvements have been made in machinery and hand-tools for the manufacture of leather into harness, saddles, bridles, buckles, snap-hooks and other devices of that description; planing machines and lathes for turning wood into various forms, such as round, oval, nearly square, hexagonal, any number of sides or angles, and to almost any desired pattern, even to irregular forms; and in many lathes this is done nearly automatically. Wagon spikes are formed to a perfect shape, with square or round tenons cut on the ends; screw threads and spirals are also cut with great facility and exactness; a perfect sphere can be turned without placing the thing to be turned between points or centres at all, so perfect is the machinery now in use for that purpose. In tools for working wood into various forms, we excel all other nations. While many of the most important inventions may be said to owe their origin to the war, others of little less importance, such as machines for making nails, bolts, nuts, screws, horseshoes, sheet metal ware, as well as a great variety of tools and implements for working in metals, which can claim no special impulse, may very properly be attributed directly to wants growing out of and increasing with the general advancement of the nation.

The production of iron and steel has received much attention, and the attention of inventors seems to have been specially devoted to the improvement of their qualities,—in some cases to giving to iron something of the nature of steel. Several patents have been issued for making malleable iron on a large scale directly from the ore, instead of as in the old way, from pig-iron, or cast metal, and then burning out the carbon in it by puddling or other means. Three patents have been issued for making steel, by the combination of cast with wrought iron. One of these processes consists in heating in a crucible the wrought iron to a white heat, and then letting into the crucible pig or

cast iron directly from a blast furnace or cupola. Another inventor makes a kind of steely iron, by melting together, in proper proportions, particular kinds of cast and bar irons. This is done by heating the cast iron on the puddling hearth until it becomes granular and spongy, and then throwing it into water and reducing it to powder. This powder is then enclosed in a wrought iron box, which is subjected to a welding heat, and the box and its contents placed under the hammer.

Under the law of 1863, it is provided that a fee of $15 be paid on filing a patent, and that $20 should be paid six months afterwards, when the patent issued. This final fee is the most difficult to collect, the inventor being allowed six months to pay, when if not paid, the patent should be withheld, and the patent become public property. This law seems to operate badly, by reason of absence from the country, ignorance of the law, and some other causes. For these reasons, it is recommended that the law be so modified as to confine the forfeiture to the pending application, leaving it optional with applicants to complete their applications thereafter, and that these provisions apply to such as have, during the past year, already forfeited their claims.

The Commissioner finds cause for congratulation in the fact that, although our country has been engaged in a civil war of unprecedented severity, still the applications for patents have only been equaled in two former years, and then when ours was an undivided commonwealth. When once again ours is a united country, and "steam generally brought to work in harness," what may we not promise ourselves?

From a foot-note to the Report we learn that the library comprises 14,000 volumes of valuable scientific works on all subjects, among which, we are happy to state, is one on coach-making—The New York Coach-Maker's Magazine—a complete set from the commencement.

THE DRAMA, AND OUR PART IN IT.*

> This world's a stage,
> And all its men and women players.
>
> Shakspeare.

While I leave our part in the great drama of life, as men and American citizens, morally, socially and politically, to the appropriate expounders of these subjects, except so far as necessary for my present purpose, I wish to speak briefly of the sphere and its duties which it is our privilege to occupy as mechanics. Our country is at present the theatre of a tremendous struggle, the grand result of which is to be the utter overthrow of the mightiest and meanest aristocracy the world ever saw, and the disenthrallment of the vast multitude which has for many years involuntarily felt and supported it. Such a result on the one hand, and the accession of this oppressed race to the ranks of free labor, on the other, would seem to the intelligent philanthropist a consummation fit and sufficient to the great offering of blood and treasure we are laying down upon the fields of our beloved country.

While one-sided politicians and speculating philosophers are disposing of these unquestionable questions to jibe with their passions and pockets, and the priest is fitting them to his bedstead, we can see, from a mechanical standpoint, various evidences of permanent and lasting good resulting to humanity, in many ways, from the great struggle of the nation against its enemies.

We have always been a wonderful people. The marvels wrought by Yankee ingenuity have, for ages, been the by-word of all nations. A people, born of intolerance and oppression, grown to our present national greatness in a continual career of resistance to the enemies of self-government and self-culture, we furnish the strongest evidence the history of the race affords, of the design of the Almighty in the advancement and final perfection of the family of man, by permitting evils to exist which can only be overcome by the cultivation and use of those faculties, the manifestations of which we call genius, and which constitute the likeness of man to his Maker. From this exalted level we look down upon all animated nature beside, as well as upon the baser plane of our own being, upon which we enjoy, in common with the lower animals, the procreative, nutritive, preservative and defensive propensities.

The first aim, when a youth commences a mechanical pursuit, is a fulfillment of the first requirement of nature—the support of life by honorable employment. For every one who regards this as the stepping-stone to future achievements, and who makes use of the opportunity thus afforded for the development of something beyond and above the mere accumulation of material means, there are many who stop, as it were, in the granary of the intellect, and mistake it for the upper temple of the soul; many who replenish the material storehouse only to make use of the surplus so accumulated for useless and injurious luxuries, or with which to accumulate more. The different courses pursued by different mechanics and artisans, after having learned enough of mechanical laws to make money out of their application, is as varied as their faces. Very few, as before remarked, in pursuing a mechanical trade, have an idea beyond the service of the pocket, and from it the passions. Mistaken man! Would that every one who claims the name of mechanic could fully realize the force of the great truth uttered by Frank-

* As is customary with most editors, we were about to inflict a sort of July Oration on our readers in this place, when along came our patriotic friend, O. E. Miles, Esq., from the West, "just in time to be too late" for another department of the Magazine. Not wishing to keep an audience in suspense, nor to deprive our friends of the pleasure they will receive from listening to an able discourse on so important an occasion as the National Birthday, we have decided to take a seat with our shopmates, while the orator mounts the Editor's Workbench and proceeds.

lin, when he said, in his homely way, that "the Almighty was the greatest mechanic in the universe;" that we could realize that His machinery, the universe of matter, is construeted, moved and governed upon prineiples, a part of which we understand, and all of whieh are within our reaeh.

We have been in the habit of regarding the fields, woods and waters, their vegetable produetions, and the aninated creations which inhabit them, as *the* Book of Nature, of which the naturalist holds the key. Truly, theirs *is* a page of nature's book, of which the eye never tires of admiration, and which affords food for the study of a lifetime; but, turn over the leaf, we shall find this venerable volume to contain two pages, if not more. The beautiful page we have just left affords, after all, but a faint idea of the constructive intelligence of whieh Franklin spoke. The beams upon which all this varied and beautiful scenery rest, and the fountains from which it is watered, are not treated of there. Here, upon this page, Geology gives the wonderful nature and adaptation of these formations; and more, it traces their history with a certainty which puts to shame and confusion all traditions of these events. Yet upon this page we fail to diseover the maehinery which brings the foundations of the earth, with its myriad dependencies, beneath the necessary influences, in appointed periods, for the production of seasons of growth and activity, of seed time and harvest, again to be revivified by alternations of darkness and rest. We turn over again. Here astronomieal seience reveals this marvelous maehinery. O! what a page is here! We must admire the earth's varied surface, with its precious and beautiful burdens, and are deeply instructed by the study of its internal strata; but when we eonsider the planet we inhabit in the light of a *vehicle*, whieh bears us on through space thousands of miles every hour, giving us, at every turn upon its axis, the day for active duty and the night for rest, arriving for its happy millions to greet the new morning at the appointed moment, completing, in three hundred and sixty-five of these revolutions, its trip around the great source of light and heat—producing the four seasons, of bud and bloom, of ripening and repose—how is it possible for any passenger in this planetary car, and especially one devoted to a mechanical life, to be transported upon its bosom through the days and years of a half century, without stopping in his money-grasping eareer to study and adore the mechanical skill of the builder, and the masterly engineering whieh directs its movements? We go still further, by the aid of instruments which lengthen out our vision, and discover our planet to belong to a train of scores of apparently similar construetion, and the same evident adaptation to the wants of intelligent beings, eaeh upon a track of its own, or the same day and year produeing journeys. What a train! Have they all passengers? Conjecture only, for the present, must answer. All we can say is, that to conclude that the earth, one of the smallest of the vast retinue, is the only inhabited one, is a most incredible conclusion. On they travel, at velocities most frightful to contemplate, yet imperceptible to the senses, unsupported by iron rails, preceded by no steam locomotive, requiring no lubricator for the axles, no brakes to stop them! No; unlike all vehicles of human construction, they are propelled upon principles unknown to man. Their axes are set by a guage of immaculate truth, and, once adjusted, are eternally durable. Still again; aecording to the unanimous opinion of all eminent astronomers, this vast array of "rolling stock" is only one among millions of similar trains whieh traverse the trackless fields of immensity, which perform their eeaseless rounds about each of the millions of suns which the telescope reveals to mortal eye! What a sublime thought! What a feast to the truly edueated mechanic. What a loss to the poor devotee of Mammon, who cannot find time for its contemplation! Who set these vast trains in motion, and arranged their unerring time tables? What boundary, short of infinity, ean circumseribe the constructive skill and the engineering eapacity of the great Master Mechanie?

The study of God, in his meehanical charaeter, defines the highest privilege of the earthly artisan. Nothing short of this ennobling theme may bound his present ambition, or his hopes of the future. Mechanics should eultivate more the spirit of invention. The support of life, though the first object, is not the only advantage of a mechanical education. If this were the only objeet in view, this end may be subserved mueh more profitably, as well as agreeably, by the devotion of a portion of the time to a search for improvements. Many fortunes, small and great, have been amassed by the projectors of new ideas. Many, if not the majority of these are the result, not so mueh of well-directed thought upon a special object of improvement, as a successful ticket among the many constantly held by the habitual inventor. The scarcity of operatives in the various fields of industry, mechanical and otherwise, caused by the drain of men for the great struggle in whieh the country is engaged, offers many and great inducements to inventors of labor and material-saving devices. Any innovation upon an old plan, which possesses either of these qualifieations, is, at present, more than ordinarily sure to be appreciated and paid for. Thus, indirectly, as well as by a direct eall for improved implements of destruction, have the enemies of our country and of human rights unwittingly enlarged greatly the field of inventive talent, as well as permanently added vastly to the empire of genius. Surely the viper was not made in vain.

Our part in the great drama of life is plain. Let us

not stop with a partial use of the talent we have. Let us go on from the cultivation of mechanical skill as a means of support, to the feast of reason which awaits those who prove their love for their Master by studying His works. The promise has been recorded that, when our ties to this little planet are severed, a closer contact awaits us to those bright realms from which long distances now separate us; and the better we improve our stewardship here, the shorter those distances become. Once convinced of this, and "we are almost there."

EDITORIAL CHIPS AND SHAVINGS.

Postal Money Orders.—The postal money order system, which went into effect the first of this month, and which we advise our subscribers to avail themselves of as being preferable to registering their letters, provides that no money order shall be issued for any sum less than one, or more than thirty dollars; and all persons who receive money orders are required to pay therefor the following charges or fees, namely: For an order for one dollar, or for any larger sum, but not to exceed ten dollars, ten cents shall be charged, and exacted by the postmaster giving such order. For an order of not more than ten, and not exceeding twenty dollars, the charge shall be fifteen cents; and for every order exceeding twenty dollars, a fee of twenty cents.

Canadian Provincial Exhibition.—The Agricultural Exhibition for Upper Canada, this year, will be held in the city of Hamilton, from the 27th to the 30th of September. In the Arts and Manufactures Department, class 41, is the following prize list: wrought iron axle, 1st prize $4, 2d do., $2; half a dozen bent shafts, 1st prize $3, 2d do., $2; two sets of bows for carriage tops, 1st prize $3, 2d do., $2; double-seated buggy, 1st prize $10, 2d do., $6; single-seated buggy, 1st prize $8, 2d do., $5; trotting buggy, 1st prize $6, 2d do., $3; two-horse pleasure carriage, 1st prize $12, 2d do., $8; one-horse pleasure carriage, 1st prize $10, 2d do., $6; the best assortment of carriage-hubs, rims or felloes, and machine-made spokes, 1st prize $7, 2d do., $4; single-horse dog-cart, 1st prize $7, 2d do., $4; express wagon, 1st prize $7, 2d do., $4; two-horse pleasure sleigh, 1st prize $12, 2d do., $8; one-horse pleasure sleigh, 1st prize $10, 2d do., $6; trotting sulky, 1st prize $5, 2d do., $3; one set steel springs, 1st prize $5, 2d do., $3; one pair of unpainted carriage wheels, 1st prize $4, 2d do., $2.

Among the articles in class 52, we find: For a set of double harness, 1st prize $8, 2d do., $5; single do., 1st prize $7, 2d do., $4; set of team harness, 1st prize $5, 2d do., $3; one set express harness, 1st prize $6, 2d do., $4; best assortment of carriage or gig harness, 1st prize $5, 2d do., $3; best assortment of team or cart harness, 1st prize $5, 2d do., $3; two whole skins for carriage tops, 1st prize $4, 2d do., $3; two sides harness leather, 1st prize $4, 2d do., $3; twenty feet of patent leather for carriage or harness work, 1st prize $6, 2d do., $4. Foreign articles will be admitted for exhibition only; but certificates will be awarded to articles of worth or peculiar merit.

Burns and the Tax Surveyor.—In the late Sanitary Fair, held in New York, an original letter of the poet Burns was shown. We copy from it what purports to be "An answer to the mandate sent him by the surveyor of the windows, carriages, &c., ordering that a signed list of the horses, servants, wheeled carriages and other effects, be given." Burns answers in humorous doggerel:

"Wheel carriages I hae but few,
Three carts, and two are fechly new;
An auld wheel-barrow, mair for token,
Ae leg and baith the trams are broken.
I made a poker of the spindle,
And my auld mither burnt the brindle."

Crusty.—Some cold-hearted old bachelor declares that "generally, as soon as a man is supposed to have a little money, his wife gets too lame to walk, and must have a carriage."

The Coolest.—The coolest seat in an omnibus is the one nearest the pole.

AMERICAN PATENTED INVENTIONS.

April 5. Ambulance.—G. W. Arnold, Morgantown, West Virginia: I claim an ambulance provided with couches suspended on pins, *gg*, which are attached to slides, H, the latter being fitted on vertical rods, I, and resting on spiral springs, J, substantially as herein shown and described. I further claim attaching the side curtains, F, to rollers, G, substantially as described, to facilitate the raising and lowering of the curtains as may be required.

Carriage Circle Coupling.—George G. Larkin, West Amesbury, Mass.: I claim connecting the two side arcs, JJ, of the lower circle by means of the depressed arc, K, in combination with the stop, M, substantially as set forth and for the purpose described.

Steam Wagon.—Robert H. Lecky, McClure, Pa.: I claim, *First*, The use of the swivel bearings, *w*, or their equivalents with their axis placed central to the periphery of the wheels so that said wheels may be turned sideways without any back or forward motion, other than that imparted by the engines and driving gear, as herein described and set forth. *Second*, The arrangement of the wheels, *a*, 1, 2, 3, 4, 5 and 6, endless chains, 16, crank shafts, 8, spring bars, *b*, and elliptic springs, *o*, arranged and operating substantially as herein described, and for the purpose set forth. *Third*, The arrangement of the shaft, 18, furnished with drums, *n y*, and wheels, O; wheel, 17, swivel heads, Z, and tiller ropes, A B C D and E, when used in connection with the axles, *v*, swivel bearings, *w*, and wheels, *a*, arranged and operating substantially as herein described and for the purpose set forth.

Apparatus for Upsetting Tires.—Samuel Martin, Parshallville, Mich.: I claim the use of a fulcrum key, *c*, and one or more filling pieces, *ccc*, in combination with a cam or eccentric, for the purpose of graduating and limiting at pleasure, by a fixed scale, the movement of the cramping blocks or hold-fasts, A and B, of a tire-upsetting machine, substantially as herein set forth. I claim, also, the combination of a shaft, H, and eccentric, S, with the cramping blocks, A and B, of my improved tire-upsetting machine when said blocks, A and B, are made to operate conjointly by means of a coupling bar, D, constructed substantially in the manner and for the purpose herein set forth.

12th. Carriage Shaft.—James Hansen, Saugerties, N. Y.: I claim the combination of the spindle, D, having a strap, E, thereon, with the socket, F, and cross-bar, G, as hereinbefore described and for the purposes set forth.

26th. Mode of attaching Single-trees.—Peter Conover, Franklin, O.: I claim the combination of the lugs, GG, with the plates, DE, flanges, HH, shaft-bar, A, single-tree, B, and king-bolt, C, when the said parts are all constructed and arranged, and operate in the manner and for the purpose herein specified.

Self-acting Brake.—Willis Glare, Rochester, Ind.: I claim the combination of the hook, *h*, rods, M and K, projection, *f*, guides, *ee*, levers, L *cc*, shaft, J, chains, *gg*, and whiffle-trees, HH, all constructed and operating in the manner and for the purpose specified.

CURRENT PRICES FOR CARRIAGE MATERIALS.

New York, June 22d, 1864.

Apron hooks and rings, per gross, $1.25.
Axle-clips, according to length, per doz., 75c. *a* $1.25
Axles, common (long stock), per lb, 12½c.
Axles, plain taper, from ⅞ to 1 in., $6; 1⅛ in., $6.50; 1¼ in., $7.
Do. Swelled taper, 1 in. and under, $6; 1⅛ in., $7; 1¼ in., $8.50; 1⅜ in., $10; 1½ in., $12.
☞ These are a superior axle, and more frequently called for than any others.
Do. case-hardened, half-patent, 1 in., $9.50; 1⅛ in., $11; 1¼ in., $12.25; 1⅜ in., $14.00; 1½in., $16.
☞ These are prices for first-class axles. Makers of less repute, cheaper.
Bands, plated rim, under 3 in., $2; over 3 in., $2.50.
Do. Mail patent, $3.50 *a* $5.00.
Do. galvanized, 3½ in. and under, $1; larger, $1 *a* $2.
Basket wood imitations, per foot, $1.12.
☞ When sent by express, $2 for a lining board to a panel of 12 ft.
Bent poles, each $1.25.
Do. rims, under 1⅛ in., $2.25 per set; extra hickory, $2.50 *a* 3.50.
Do. seat rails, 44c. each, or $4.50 per doz.
Do. shafts, $6. *a* $7.
Bows, per set, light, 90c.; heavy, $1.25.
Bolts, Philadelphia, at new list.
Do. T, per 100, $3 *a* $3.50.
Do. tire, $1.25 *a* $1.80 *a* $2.40, according to size.
Buckram, per yard, 35c. to 40c.
Buckles, per gross, 88c. *a* $1.25.
Burlap, per yard, 25c.
Buttons, japanned, per paper, 25c.; per large gross, $2.75.
Carriage-parts, buggy, carved, $4 *a* $5.50.
Carpets, Brussels, per yard, $2; velvet, $3.75 *a* $5 40; oil-cloth, 70c. *a* 90c.
Castings, malleable iron, per lb, 20c.
Clip-kingbolts, each, 35c.
Cloths, body, $4.50 *a* $7; lining, $3 *a* $4.25. (See *Enameled.*)
☞ A Union cloth, made expressly for carriages, and warranted not to fade, can be furnished for $2.28 *a* $2.50 per yard.
Cord, seaming, per lb, 35c.; netting, per yard, 5c.
Cotelines, per yard, $6 *a* $10.
Curtain frames, per dozen, $1 *a* $1.50.
Do. rollers, each, $1 *a* $1.25.
Dashes, buggy, $1.75.
Door-handles, stiff, 50c. *a* 63c.; coach drop, per pair, $2 *a* $3.50.
Drugget, felt, $1.62.
Enameled cloth, 5 qrs., 75c.; 50 in., $1.55.
☞ Enameled cloth ranges from 80c to $1.55, according to width and quality.
Enameled linen duck, 4 qrs., 55c.; 5 qrs., 75c.; 52 in., 90c. Colored, 15c. higher per yard.
Felloe plates, wrought, per lb, all sizes, 25c.
Fifth-wheels wrought, $1.38 *a* $2.
Fringes, festoon, per piece, $2; narrow, per yard, 18c.
☞ For a buggy top two pieces are required, and sometimes three.
Do. silk bullion, per yard, 35c. *a* 75c.
Do. worsted bullion, 4 in. deep, 35c.
Do. worsted carpet, per yard, 6c. *a* 10c.
Frogs, 50c. per pair, or $1.63 per dozen.
Glue, per lb, 25c.
Hair, picked, per lb, 30c. *a* 60c.
Hubs, light, morticed, $1; unmorticed, 75c—coach, morticed, $1.50
Japan, per gallon, $4.75.
Knobs, English, $2 *a* $2.25.
Laces, broad, silk, per yard, 85c. *a* $1; narrow, 12c. to 15c.
Do. broad, worsted, per yard, 37½c.
Lamps, coach, $14 *a* 18.
Lazy-backs, $9 per doz.
Leather, collar, dash, 34c.; split do., 18c. *a* 31c.; enameled top, 34c.; enameled Trimming, 32c.; harness, per lb, 56c.; flap, per foot, 25c. *a* 30c.
Linen, heavy, a new article for roofs of coaches, 75c. *a* $1 per yard.
Moquet, 1½ yards wide, yer yard, $7.
Moss, per bale, 10c.
Mouldings, plated, per foot, 12c. *a* 15c.; lead, door, per piece, 30c.
Nails, lining, silver, per paper, 8c.; ivory, per gross, 31c.
Name-plates.
☞ See advertisement under this head on 3d page of cover.
Oils, boiled, per gallon, $2.75.
Paints. White lead, extra, per 25 lb $4.50; Eng. pat. black, 31c.
Pekin cloth, per yard, $5.
☞ A very good article for inside coach linings.
Plushes, per yard, $2 *a* $3.
Pole-crabs, silver, $5 *a* $6; tips, $1.25.
Pole-eyes, (S) No. 1, $2.50; No. 2, $2.65; No. 3, $2.90; No. 4, $4, per pr.
Sand paper, per ream, $4.50 *a* $5.50.
Screws, gimlet.
☞ Add to manufacturer's printed lists 20 per ct.
Do. ivory headed, per dozen, 38c. per gross, $4.
Scrims (for canvassing), 25c. *a* 35c.
Seats, buggy, pieced rails, $1.75; solid rails, $2.50.
Shaft-jacks (M. S. & S.'s), $2.62; light, $3.00; heavy, $3.30. *a* $4.50.
Shaft jacks, common, $1.12½ *a* $1.30 per pair.
Do. tips, extra plated, per pair, 35c *a* 50.
Silk, curtain, per yard, $1 *a* $3.
Slat-irons, wrought, per pair, 75c.
Slides, ivory, white and black, per doz., $12; bone, per doz., $1.50; No. 18, $1.75 per doz.
Speaking tubes, each, $6.50.
Spindles, seat, per 100, $1 *a* $1.25.
Spring-bars, carved, per pair, $1.75.
Springs, best temp. Swedes, per lb, 29c. *a* 32c.; black, 25c.; bright, 26c.; best tempered, 30c.
☞ Two springs for a buggy weigh about 28 lbs. If both 4 plate, 34 to 40 lbs.
Spokes, buggy, per set, $4.20, or about 7c. each for all under 1½ in.
☞ For extra hickory the charges are 8c. each.
Steel, Compound tire, from $10 to $10.50, according to thickness.
Stump-joints, per dozen, $1.25 *a* $1.75.
Tacks, 6c. and upwards per paper.
Tassels, holder, per pair, 63c. *a* $1; inside, per dozen, $3; acorn trigger, per dozen, $1.25 *a* $1.50.
Terry, per yard, $7 *a* $10.
Top-props, Thos. pat., per set, 56c.; plain, com., 35c.
☞ The patent props, with silver-plated nuts, per set, $1.40.
Tufts, ball, per gross, 80c.; common worsted, 12c. *a* 25c.
Thread, Marshall & Co.'s Machine, No. 432, $3.85 per lb; No. 532, $4.44 do.; No. 632, $5.22 do.
Turpentine, per gallon, $4.
Twine, tufting, per ball, 31c.
Varnishes (Amer.), crown coach-body, $5 *a* $5.50; hard drying, $6; nonpareil, $6.50.
Do. English, $7.00 in gold, or equivalent in currency on the day of purchase.
Do. American imitation of English, $7.
Webbing, per piece, 56c.
Whiffle-trees, coach, turned, each, 35c.; per dozen, $3.50.
Whiffle-tree spring hooks, $3 per doz.
Whip-sockets, rubber, per dozen, $7 *a* $9; pat. leather, stitched, $3.50.
Window lifter plates, per dozen, $1.50.
Yokes, pole, each, 35c., per doz, $3.50.
Yoke-tips, $1,00 *a* $1.50 per pr.

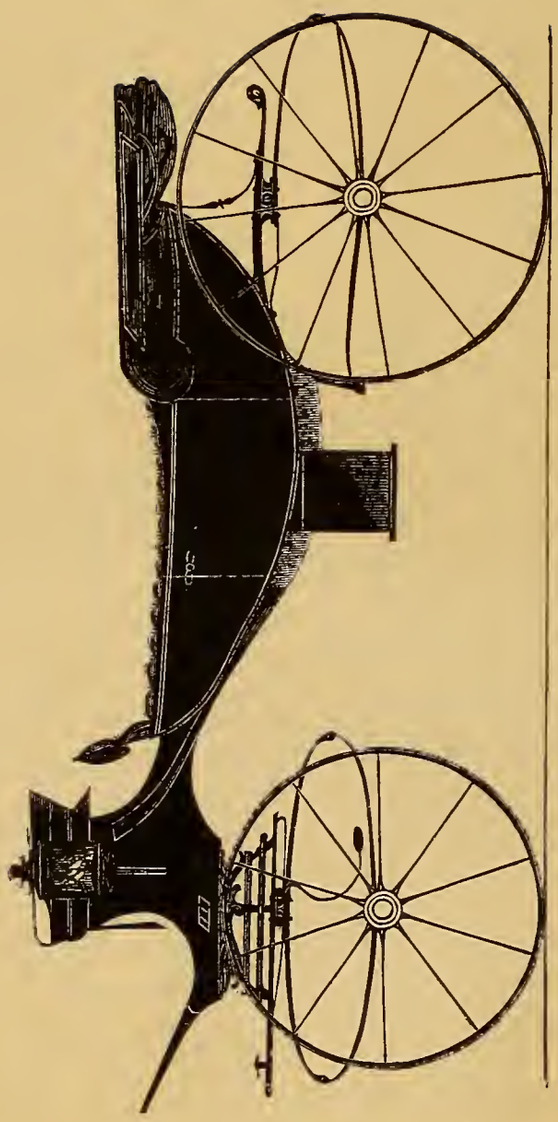
TO CORRESPONDENTS.

S. & I., Pa.—We wish it plainly understood that, hereafter, we shall make no purchases of goods, costing less than $10, for any non-subscriber to the Magazine. The reasons are, the commissions on small orders don't pay us for the trouble, and we can only do such favors and get paid where a favor is shown us by taking our journal.

R. S., N. Y.—We cannot afford to give away our back numbers. We think one containing the special draft you name is worth all we charge you; if you think otherwise, it is unfortunate for all parties.

J. H., Mich.—Is informed that we send out no sample charts until they are paid for at the prices advertised. "Money being *tight* with the craft," can plead no relaxation of our rule.

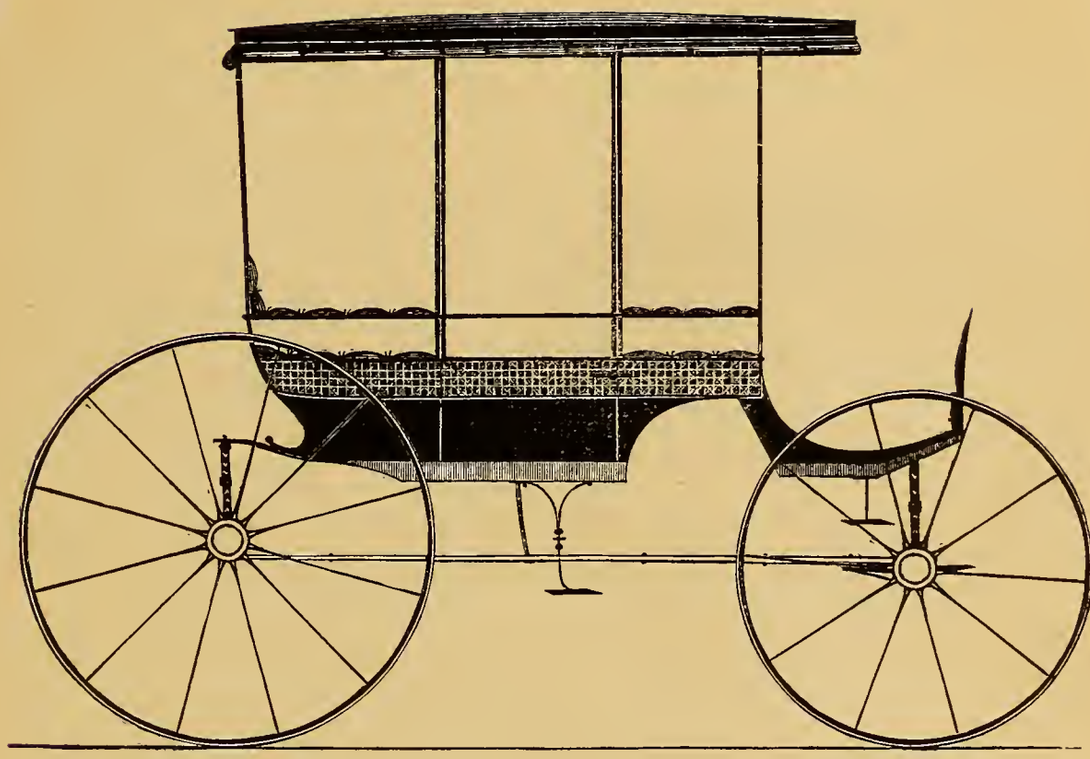
SPECIAL REQUEST.—Many of our friends have left with us a standing order for this Magazine, to be sent to their address, as long as we continued the publication, saying that when we wanted payment we must send them word. Others we know so well that we take it for certain they wish it continued. Both classes have now received the first and second numbers of the Sixth Volume. Our rule being PAY IN ADVANCE, these will now please mail us five dollars, on reception of which we will receipt in full by return mail.



CALECHÉ.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

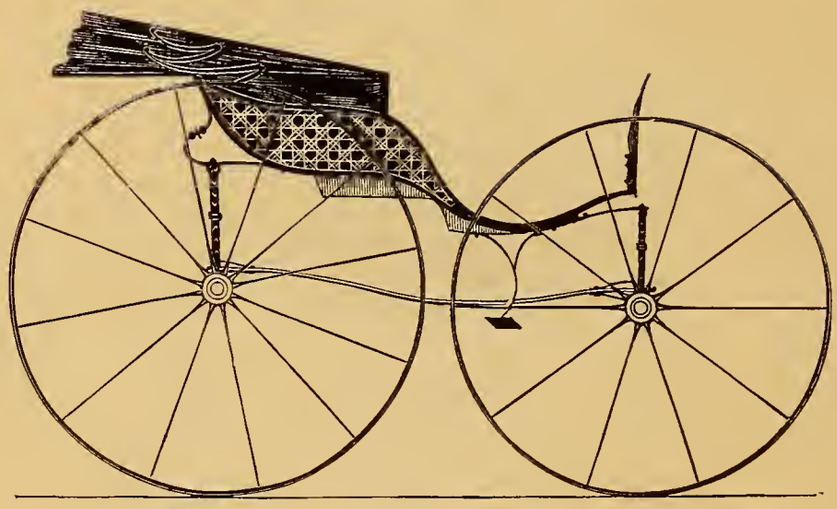
Explained on page 40.



GERMANTOWN ROCKAWAY.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

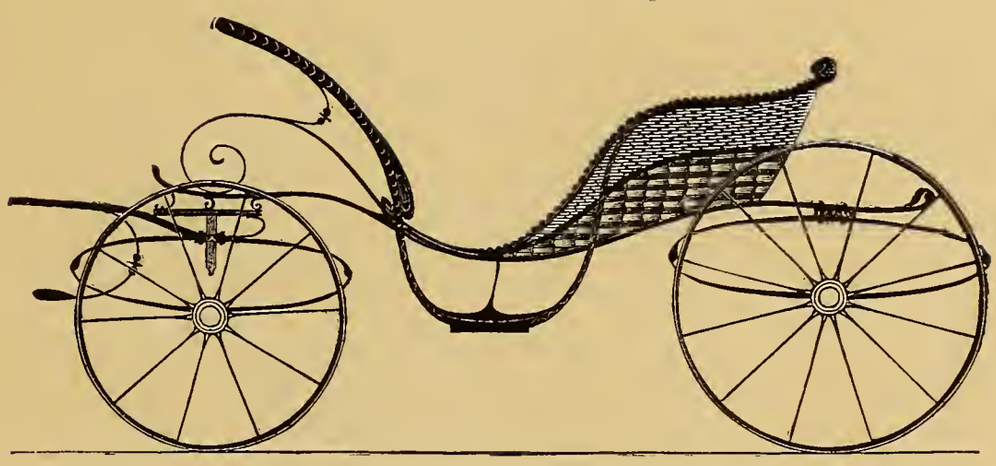
Explained on page 40.



AMERICAN PHAETON.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 41.



CANED PONY PHAETON.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 41.

DEVOTED TO THE LITERARY, SOCIAL, AND MECHANICAL INTERESTS OF THE CRAFT.

Vol. VI. NEW YORK, AUGUST, 1864. No. 3.

Mechanical Literature.

WHY WHEELS ARE DISHED.

MR. HARPER'S ANSWER TO MR. MILES.

On page 161 of the Fifth volume of The New York Coach-maker's Magazine, Mr. O. E. Miles takes occasion to differ with "your correspondent and much esteemed friend" (as he has it), concerning the advantages derived from the dish given to a wagon wheel. I answered it as respectfully as I knew how, using the same illustrations and arguments that I have on other occasions before, in this Magazine, on the same subject, which subject is of some importance, from the fact that the theory and practice, about making wheels dished, differ with many members of the craft. Mr. M. replies in the first number of the present volume [page 1], and says: "Upon reading Mr. Harper's article upon this subject (page 177, volume V.), I can see no reason for replying to it, unless it may be to make plain to your readers his very obscure way of admitting the correctness of my positions." He also adds: "I differ from him in believing that the dish of the spokes gives them no additional strength; but that the strength they possess when dished is much more durable by reason of their elasticity." Which of us, does he say, believes that the dish of the wheel gives it additional strength? The next paragraph tells by contradicting the former. So much for his clearness. I did not agree with him; but if I did, his attempted sarcasms are sadly misplaced.

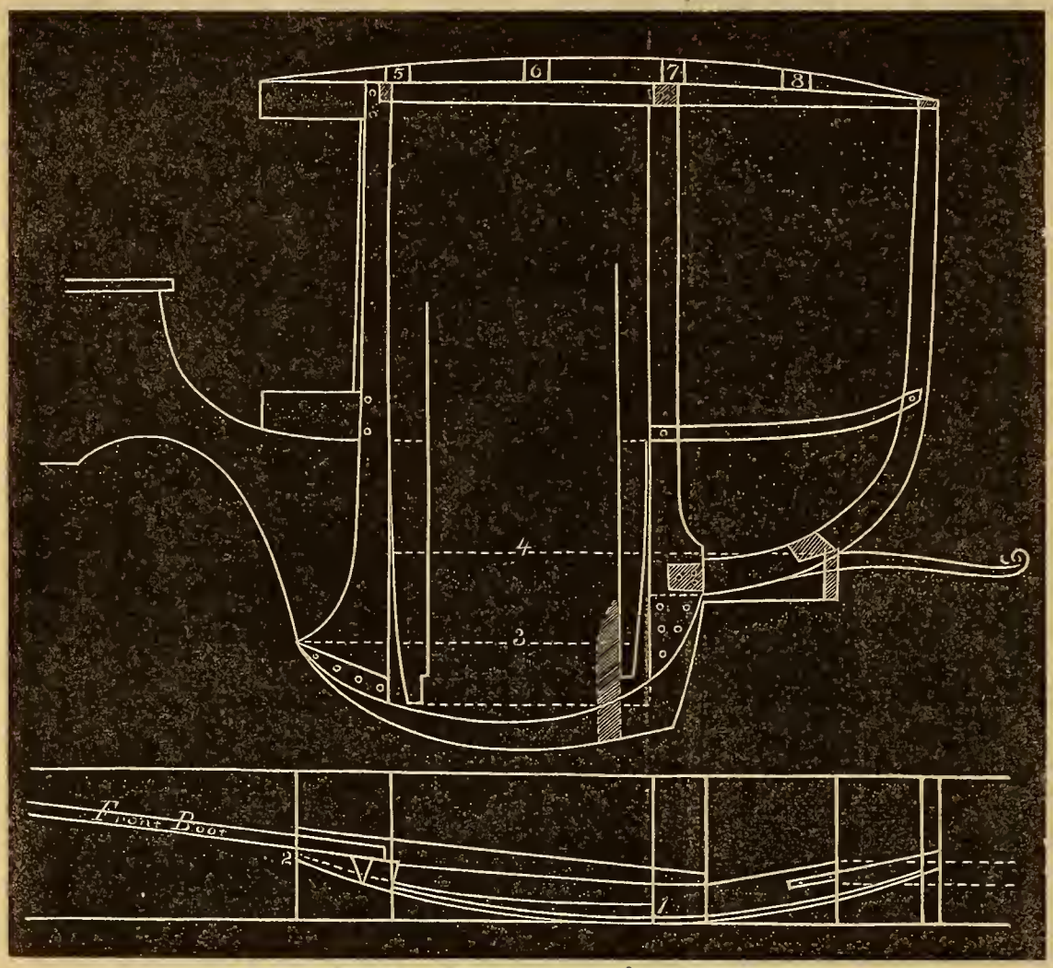
Mr. M. cannot give up without criticising and sneering at what "his esteemed friend" says; he therefore launches out on what he calls my "four-and-a-half-page article," to prove that wagon wheels "talk too much." He says everybody believes differently from me, and asks: "Is Mr. Harper right, and everybody else wrong?" If everybody thinks just as Mr. M. does, it is *barely possible* they may be wrong, as his reasoning, upon which he complacently relies, will show. He says: "In reasoning upon this subject, he (Harper) seems to lose sight of the main great difference between a wheeled vehicle and all other machines, which is, that when in use its motions are all irregular, caused by the uneven surface over which it moves, while nearly every other machine in existence rests while in use upon a dead level. Ninety-nine hundredths of the time the journals of wheeled vehicles are out of level, *when, of course, gravitation causes the wagon gearing, with its load, to slide against the collars and nuts which are the highest.* A dozen times in traveling a rod (misprinted "road") may this relation be changed from one side of the vehicle to the other, and with every change comes a click of the collars of one side, and the nuts of the other, against the ends of the boxes. Is it possible that Mr. H. can be ignorant of the cause of this simple phenomenon, or, again, knowing it, is it possible that he can have any motive for making a great case out of nothing?"

Had Mr. M. read and reflected on what was said, he would have saved himself from a big blunder, which, he supposed, is an argument. It is explained there, that bodies put in forward motion could not be diverted to an angular motion from the forward one without destroying the momentum of the forward motion. Consequently, if the wagon gearing and load slid sideways a dozen times in a rod, as he has it, it would lose its *momentum* just as many times in a rod. This would be a great loss to the motive-power; but it does not do so, neither can it do so. For instance, notice the large balance-wheel that once was commonly used in steamboats, and which sometimes was twenty feet in diameter, weighing five or six tons. The journals, when in motion, were more out of level than a wagon wheel, from the action of the waves, yet we never heard of its sliding on its journals or axles in the most violent storm, although, perhaps, the violence was such that tables, dishes, or any other loose appendages to the boat, would be tossed backwards and forwards from one side to the other. It was the momentum of the balance-wheel that prevented it from sliding on its journals. The wagon gearing and its load, when in motion, holds the greater part of the momentum equal, in proportion to its weight, within itself, and cannot slide at every rise or depression of the wheel, for the same cause that the balance-wheel would not slide laterally in the boat.

Again: if it did make the lateral movement (which, he intimates, every wagon maker, or person that uses a wagon, knows that it does) as often as a dozen times in one rod, would it not give the person riding on the load something of a jerk, so that he could not be mistaken in the matter? There can be no two opinions about the facts in the case.

Mr. M. runs another tilt against the idea of making wagon wheels run in the direction of parallel lines, and

says he has never met with the mechanic who did not believe that they should run inclined towards each other. He is mistaken. He does not know what all the mechanics think that he has met with. His individual belief should be taken for what it is worth, and no more, unless supported by plausible theory. I have no desire or right to occupy valuable space, by retorting upon Mr. M. for sneering at what I have said, but shall let it pass for what it is worth.



BROUGHAM, WITH CANT-BOARD, ¾ IN. SCALE.

ENGLISH CARRIAGE ARCHITECTURE—No. XIV.

The mode of drawing in this cant-board is different from that adopted in laying down Coaches, Landaus, &c., inasmuch as the side, when completed, forms an irregular turn-under.

Having drawn the perpendicular lines in the usual manner, and determined the turn-under of the standing pillar, then lay down Fig. 1. Next ascertain and mark the smallest possible size of the top of the front pillar, and then take the sweep and draw a line from 2 to 1. This will show the turn-under of the pillar at the dotted line, 3. The turn-under of the back pillar is obtained in the same manner. The dotted line, 4, explains the turn-under of the front and back pillars. Figs. 5, 6, 7 and 8 represent the roof curves, which are let into the rails in the usual manner. If all made of one sweep, the lengths will give the proper convexity to the roof. Compare this with those on pages 4 and 225, Volume III., of this Magazine.

A GLANCE AT IMPROVEMENTS.

BY S. EDWARDS TODD.

What changes have been wrought in the brief period of thirty or forty years, in almost every branch of science as well as in mechanics!! There is scarcely an article in the line of tools and implements, or among sliding and rolling vehicles, that has not been improved to such an extent, during the last thirty years, but that we may not truthfully say of it, that almost a revolution has taken place, by way of good improvement. Yankee skill and invention have been actively engaged in laudable efforts to outdo, or exceed, in improvement, what has been well done. And, when some genius has mounted the rostrum of perfectibility, and exultingly fancied that he had attained to a point in improvement beyond which there could be no possible advance, the toil-worn thinker has been grieved and chagrined to see some inferior journeyman snatch up the subject where it had been pronounced the end of perfection, and launch forth, unfolding, as he progressed, more complete and desirable improvements than had already been brought to view. Progress and improvement are evinced in every branch of carriage-making, as well as in other vocations; and there probably cannot be found in the wide world a greater variety of handsome, well-made, and convenient vehicles, for both pleasure and utility, than may now be seen in America, particularly in the free States.

We are not really aware, or at least we do not fully appreciate the excellent improvements that we are now in possession of, as a nation, in the line of wheeled vehicles. But, could we see the vehicles that were in use, for the most part, throughout the country, forty years ago, placed side by side with those that we now ride in, and perform our labor with, what thoughts of satisfaction would fill our minds!

Do we ask what has done this, and how such desirable improvements have been wrought out in so short a time? The answer is plain and philosophical. It has been accomplished by thought—by investigation—by studying the wants and necessities, the comforts and pleasures of an intelligent people.

Forty years ago, was there such a thing as a Coach-maker's Magazine, or journal devoted to the improvement of carriages and carriage-makers? Nothing of the kind. Where did we find the principles of wheel-carriages discussed? Nowhere. Improvement in wheel-carriages very little occupied the thoughts of carriage-makers, when compared with what we now see. What encouragement did a young apprentice meet with that was calculated to make him think of the laws of science in general? Little or nothing outside of his work-shop, or away from his bench. Consequently, his leisure hours were devoted to anything that his aspirations and cherished affections prompted him to seek after.

But, now, how changed! Let us review our short career of six years past, and see what a vast amount of useful information for young carriage-makers has been brought out in this Magazine! There is scarcely a subject that has not been thoroughly investigated, and ably discussed. And the young carriage-maker may here find a library of useful knowledge, which cannot be found in any of the vast libraries of science, mechanics, or literature, in either the old or new world.

Then, look at the original designs illustrated in every number, of every volume, of wheel-carriages and sliding vehicles, and compare their beauty, convenience, and utility, with those in use forty years ago, and we cannot fail to see that carriage-makers, both in the wood-work and other departments, are thinking and intelligent, as well as highly useful men, who cannot be looked upon as pieces of stupidity, or as such as have never performed a noble act in all their lives. The truth is, the man who, by study and investigation, brings out some little contrivance that is really useful to the world, is as much a benefactor of the human race as he who performs some deed of benevolence and mercy.

We cannot all be Dr. Franklins, to play with the thunderbolts of heaven. We cannot all be Sir Isaac Newtons, to disclose why our oceans, seas, and bodies of water may be turned bottom upwards without spilling the water all out; but each one may exert himself to be useful in some way; and if not able to make a single improvement in all his life, he may, by setting a proper estimate on the labors, investigations, and improvements that others have brought to light for the benefit of mankind, render such encouragement as may greatly facilitate the progress of scientific knowledge.

LONDON OMNIBUSES.

(*Concluded from page* 22.)

When we say that the estimated loss to the company through these petty daily peculations amounts to 25,000*l.* a year, we see the necessity of maintaining a summary power of dismissal, as well as of establishing a constant check upon the conductors, who are not always recruited from amongst the most respectable class of the working population. The company demand characters with them, but when a man can get a false character for a shilling, what faith can be put in this guarantee? Of late the company has opened up a new source of revenue, in the shape of the advertisements which are now neatly framed on the roof of the 'bus, and suspended on the outside against the foot rail. One firm in Covent Garden contracts for the advertisement space in the company's omnibuses, and pays for the privilege upwards of 3,500*l.* per annum. The company also carries parcels, but as it cannot well deliver out of its line, this department is not a great success.

The horsing of the 'buses is the principal expense. A change of horses takes place every journey; and as the omnibuses average four of these daily, about ten horses are required for each 'bus. The three-horse 'buses, of which there are fifty-six belonging to the company, require each thirteen horses. We are indebted to our Manchester friends for these very commodious and airy vehicles. They are a vast improvement on the smaller 'buses, in which the public have been so long and ruthlessly "cribb'd, cabin'd, and confin'd," but we fear it will be some time before they come wholly into use, as it is urged, with some appearance of truth, that they are only applicable to the much-frequented routes, which are divided into many short twopenny fares. They work on the principle of small profits and quick returns, and they would not answer on long journeys, when in the middle of the day they would often have to work comparatively empty, at a great loss on account of the extra horse-power. When it is remembered that these horses only do one journey a day of fourteen miles at farthest, it cannot be said that they are over-worked; they have to work hard whilst they are about it, but for twenty-one hours out of the twenty-four they are comfortably stabled; and no doubt in this respect the drivers and conductors envy them, as many of them have to work, with little intermission, fifteen hours every day. The company require between 400 and 500 stables to work the traffic, spotted over every conceivable part of the metropolis, some large and some small. The stables at Holloway are on a gigantic scale, affording accommodation for 700 horses. In these premises, also, the greater number of the company's omnibuses are built. The construction of one of these vehicles is a very elaborate matter, and, besides half-a-dozen different woods, copper, steel, and iron enter largely into their fabric. The round panels at the end of the 'bus, on each side of the door, are of rolled steel, whilst the lower corners, which are rounded off with a double curve, are of copper. We believe the whole carriage could be constructed of wrought steel, and would last much longer, and be much lighter and stronger than those now framed in wood; but it will require years before such an innovation as this is made. It is the great weight of the 'bus—one ton being a light weight—which kills the horses; and, until this is materially reduced, the public, we fear, will not get that room they have a right to demand. It is, we think, a radical error to divide the interior of a 'bus by a brass rod, as we find is done in many cases. These rods divide the interior into four equal divisions, but it may so happen that three fat passengers are obliged to squeeze into one of these limited spaces, instead of distributing their superabundant beam over the whole length of the seat.

When we visited the building shops we found omnibuses in every stage of progress,—from those just ready to start on their long and busy career, to others in the simple stage of framing, in which condition they look very like big boats turned upside down and about to be planked. The method of ventilation now employed is very simple. The air enters under the seat of the driver, and, passing up a hollow space at the end of the 'bus opposite the door, is passed out at the top, and flushes the foul air through the openings running along each side of the upper roof which forms the seat for the outside passengers. By this means the air is constantly being changed as the omnibus

progresses, without a draught being created. In the large three-horse 'buses no door is hung, and the opening runs right up to the roof, and in the hottest weather the temperature is cool, which it rarely is in the smaller sized vehicles. Every convenience for repairing as well as building omnibuses is provided in this yard. All the iron-work is forged and turned in spacious shops fitted with the best tool-machines. As far as practicable, the parts of the omnibuses likely to be damaged are made interchangeable. Thus, axles and wheels are all exactly alike; and lately the company have adopted the plan of painting the bed and wheels of all the 'buses alike, so that if an accident happens to one of the latter, its place can be supplied without delaying the 'bus longer than is necessary to fit it on. Little details of this kind give the company a great advantage over the small omnibus proprietors. The average life of an omnibus is ten years, but there are some in the service of the company which have run for fifteen years; and I was pointed out one in the yard, now past service, which had run for twenty years. The ordinary sized omnibuses cost 120*l.* building, and the large three-horse vehicles 180*l.*

In a spacious yard attached to this establishment are stored the old worn-out omnibuses—the vehicles that carried us in our youth. In the gloom of a dark and foggy February evening there they stood, paintless and rotten; some with sorely battered panels, some with broken windows,—all with mildewed, tattered interiors, looking the very picture of misery. Indeed, they seemed but the ghosts of the departed 'buses of old, waiting to take away to the unknown land the ghosts of the old coachmen and conductors. Who knows? perhaps they still take an airing by night down the City Road, drawn by skeleton horses, with skeleton cads, who cry out "Bank! Bank!" in ghostly and sepulchral voices, and chaff each other in the by-gone slang of other days.

There are two large "feeding depots" belonging to this company—one in Bell Lane, the other at Irongate Wharf, Paddington. Considering that the company have to provide for upwards of 6,800 horses, the economy with which their feeding process is carried on is of the last importance. Numbers in all cases give rise to civilization; and the horses of the General Omnibus Company may be said to be fed at the same time in the cheapest and most intelligent manner. To begin with, in the stabling no hay-racks are to be seen. It is the aim of the management to give their horses the utmost amount of rest: to allow them to stand and trifle for hours with a few mouthfuls of hay in a rack is only to give them unnecessary fatigue. Moreover it is extravagant, for the hay is always tumbling on the bedding, and being wasted. This may be a small matter where only one horse is concerned, but when multiplied 6,800 times, it becomes a serious item. To avoid unnecessary trouble to the animal, therefore, it is well mixed and bruised, and cut fine, and he then has only to bolt it and lie down to rest.

The machinery for preparing his food is well worth inspecting. It is all done by steam-power, in the most expeditious manner. The grain, straw, and hay are all brought to the door of the depot by canal-boats, and lifted at once to the top floor; here it is shot into various hoppers, which supply the cutting and bruising machines, on the floor immediately beneath. The grains used are oats, barley, and Indian corn, the company buying the former or the latter according to the condition of the markets. After the grain is bruised and the chaff is cut, it descends through shoots to the next floor. At the mouth of each shoot is a weighing machine, and in the centre of the floor is an oblong trough, with a bottom fitted with iron louvre boards, opening downwards. At the mouth of each shoot stands a man, whose duty it is to draw off into the scoop of the weighing machine a certain weight of chaff, oats, barley, and Indian corn, the proportion being for each horse 10 lbs. of chaff and 19 lbs. of corn per day. The scoops, when full, are then thrown by each man into the trough. Another man opens the louvres, by which the whole is thoroughly mixed; and this provender is passed down the cart-shoot into a lower room, where a man stands with a sack ready to receive it. When the sack is full it is bundled at once into a wagon on the ground floor, and off it goes to one of the four hundred stables scattered over the metropolis. This chopping, bruising, and weighing process is going on all day; and it may be said to be the gigantic grinding teeth of the establishment, for the horses have little to do but bolt their well-prepared and variously compounded food when it comes into their mouths. The price of horse-food is of the last importance to the shareholders, as upon it mainly depends the amount of dividend they may expect. When it is very low, the agents of the company buy in large quantities, and store for future use. The cost was unusually low in the half-year ending December 31, 1863, and the directors in their report say that to this item alone is mainly attributable the reduction of 20,584*l.* 10*s.* 10*d.*, which they were enabled to make in their expenditure account, as compared with the same period of 1862. The shareholders must therefore watch the state of the corn market with an anxious eye.

In so large a company even the smallest details possess an interest. Thus, the food of the horses in the half-year cost 97,638*l.* 2*s.* 8*d.*; and even the insignificant item of shoeing runs up to 7,103*l.* 12*s.* 6*d.*, or upwards of 14,000*l.* a year. We are informed that shoes wear out much more on the macadamized roads than on the stones, whilst the contrary is the case with the omnibuses and horses' legs,—the animals working the Paddington route, which is entirely upon the stones, not lasting so long by two or three years as those running on the Stoke Newington, Hackney, and Edmonton routes.

Although fares are much lower than they were some years ago, when the mileage duty on each 'bus was 4½*d.* per mile, they are still higher than is charged by the Paris omnibuses, and the reason for this is to be sought in the exemption from that and the turnpike charges, which fall so heavily upon the metropolitan conveyances—the annual mileage duty alone being 48,554*l.* 15*s.* 6*d.*, and the turnpike payments 17,500*l.*, making a total of payments from which the Parisian omnibus proprietors are exempt of 66,054*l.* 15*s.* 6*d.*, being upwards of 10,000*l.* more than the net annual profits made by the company. Next July the turnpikes on the northern side of the Thames will be abolished, and the company will thereby profit to the amount of their payments; but the public will also profit by this reform, as either some reduction will take place in the fares, or the omnibuses will run longer distances for the same money. The poor drivers and conductors will be the only sufferers. As it is, many of them are nailed to the omnibus for fifteen hours, with only rests of ten minutes three or four times a day. Holidays they have none. If they like to take a day, they must find an "odd man" to do their work, and pay him. These men may

be said to be in the world, but not of it. In the course of the year the drivers and the cads of the company run twelve million nine thousand four hundred and forty-four miles, and have come in contact with forty-one million one hundred and eighty-five thousand and eighty-eight passengers; and yet if you ask the latter any simple question of the day, or any question, in fact, not connected with his daily concerns, he can give you no reply. The driver, it is true, picks up topics of news from the box-seat passengers, but from other sources he knows nothing. Even matters that are occurring in the streets through which he passes many times a day he does not observe —both he and the conductor are, in fact, but human shuttles, which shoot at stated times across and athwart London, almost as unobservant as the wooden shuttle itself in the loom. These men are all members of a sick club, which provides for them in times of illness. Of the omnibuses which do not belong to the company we have no accurate knowledge, as their accounts are not public; but they work in pretty much the same manner as those belonging to the company, and are, we believe, equally successful.—*Once a Week.*

SUGGESTED REMEDIES FOR DEFECTS IN CARRIAGE BUILDING.

BY O. E. MILES.

As I promised in a former communication, I now proceed to consider some of the greatest drawbacks upon the draft and durability of wheel vehicles of the common modes of construction. Having, during an experience somewhat lengthy, had an eye mainly to the discovery and removal of some of the obstacles in the way of furnishing an article in all respects good and acceptable, and having, in my own opinion and that of many of my customers, made some important discoveries in this direction, and some needful improvements, I will give your readers the benefit of my investigations as far as developed, and if they add to the sum total of mechanical progress in the same ratio that they have emptied my pockets, I shall be satisfied.

I will first notice that which, of all parts of a wheel vehicle, should be correctly and durably adjusted, but which is most frequently found out of place, to wit: the axles. This subject has for some time past, been treated upon at length by another correspondent, who has very clearly and ably set forth the disadvantages resulting from the wrong adjustment of these important parts. I have used the instrument he offers to the craft for setting axles, and must say that, were I still in business, I would on no consideration be without it, at least until the present mode of securing the strength of the materials of which axles are made is abolished, as it must soon be, and as it has long since been by the builders of cars, bridges and other structures under conditions strictly analogous. An axle rests upon its supports, and receives its burden, precisely upon the principle of a bridge or a beam. An extra amount of timber in a bridge or a floor beam, involves an extra cost of construction, but imposes no extra burden upon man or beast. The same in an axle does both, is both costly and burdensome. Hence it is doubly desirable that axles shall be made as light as is consistent with sufficient strength.

A wagon is made with axles strong enough to sustain a load of 3,000 pounds, more or less. A buggy with one seat is supposed to carry two ordinary persons, without springing the axles to any appreciable extent. These vehicles, thus loaded, with careful driving, and no accident, get along very well; but let the farmer have 1,000 pounds extra load to take to market, he, instead of making an extra trip for it, puts it on in addition to the 3,000, and goes along. Let a third person get into the buggy designed for two only, and these vehicles, if carefully measured while under these loads, will be found to track considerably wider than when empty, showing that the axles have to spring under the pressure. They get home without breaking down, however, and, to the careless observer, as good as ever. When unloaded, the axles resume their former position, but not quite, and a great majority of iron axles, after six or twelve months' steady service, show a very considerable deviation from a correct bearing of the wheels and axles, caused by the axles having permanently sprung between the bearings. Let any one take notice of all the old vehicles he meets for a few days, and he will be surprised to see how very few of them stand upon plumb spokes.

It is well known when we bend a stick of timber, the fibers of the wood slip by each other, sometimes becoming detached entirely, dividing the stick into two or more parts. The same tendency exists in a bar of iron, when under a bending pressure. The fibers of the iron gradually become separated, thus losing their mutual support, and springing is the result. It is also well known that an axle that has been reset after being sprung, will not bear as much without springing, as when new. Every resetting leaves it weaker than before, till it is worthless. Setting axles so as to carry the wheels in the right position, is a mathematical problem comparatively easy of solution, which has been reduced to a very simple and certain process.

But a great step remains to be taken. The great want of the present is for a material for axles which will keep its place under any pressure it is liable to receive, or, next, for a re-arrangement of the material now in use, in such a manner as to put an end to this crying evil; "an ounce of prevention is worth a pound of cure." The arrangement by which I propose to effectually prevent this "constitutional weakness," very fortunately operates like most other "patent" medicines, as a sovereign remedy for several other very obstinate complaints, which nearly all wheel vehicles have inherited from the dark ages. We will now notice some more of these difficulties, among which stands foremost the universal practice of excavating a large hole in the hub of the wheel, in which to put the axle-box. What! you don't intend to make wheels with no boxes in the hubs? I do, indeed. I have done it, and my success in that undertaking was such as to induce me to try it again. Of all places in a carriage that we *don't* want the lubricating material, that place is in the hub around the tenons of the spokes. Hot weather shrinks the timber, at the same time melting the grease, and sending it through every pore and joint in the hub. This is essentially a "summer complaint," and one which no astringent has ever reached. If it is urged, in defense of this practice, that pipe boxes protect the spokes from this influence, I have only to remark that I have reset hundreds of old pipe boxes, and seldom saw one which was not smeared with grease from end to end on the outside. The wedges with which the boxes are secured,

open roads for it, and every check, of which good hubs have more or less, helps the matter along; making a wheel, and then (to use a homely term) gutting out the hub, till only a shell is left, and filling it with grease, is too much like creating a perfect being, with characteristics which are to insure its certain and eternal ruin. No. A wise Creator never did this abominable thing, nor will a wise mechanic deal thus with the creations of his genius. How much better it must be for the wheel, if we must use wooden hubs, to have them solid, with the spokes running to the centre, and free from the ruinous influence of grease. Of the remedy hereafter. I next come to the consideration of a deformity peculiar to wagons, and which, in addition to being of itself a very uncomfortable disorder, tends to seriously aggravate every other one to which this much disordered machine is subject. I refer to the want of springs. For several reasons, wagons for farming and teaming purposes are almost universally made without springs of any kind. In the first place, there is no existing arrangement by which springs can be introduced into such wagons, without raising the body higher than it would be without them, thus constituting a serious objection. Again, the first cost of steel springs is such as to prevent their coming into common use. Attempts have been made to introduce rubber springs, similar to those used for cars, but for the same reasons that apply to steel, have never come to be generally used. I am satisfied, however, that few wagons would now be found without them if they could be introduced in a durable manner, with but a trifling additional cost, and without raising the wagon body to an inconvenient height. Their advantages are twofold—comfort to the teamster, and safety to such loading as is liable to be jarred in pieces, and durability to all parts of the wagon, especially the wheels and axles. Railroad companies are alive to the great advantages resulting, in point of durability, from springs. Not a car, for any purpose, is built without them; and no possible reason can be given why their use *would* not be as great an advantage to a wagon as to a car, in proportion to its cost. The plan I propose affords opportunity for the application of rubber springs with the greatest facility, and that, too, without in the least misplacing any other part. I propose, in the next number, to present drawings and a full description of a gearing which involves, in addition to the complete eradication of the evils above enumerated, several other advantages of greater or less importance, which will appear as we proceed.

CARRIAGE-WHEELS.—THEIR MECHANICAL CONSTRUCTION AND USE CONSIDERED.

BY HENRY HARPER.

(*Concluded from Page* 18.)

Facts in regard to the skill men exercise in setting axles, can be settled with as much certainty as facts can in regard to the knowledge of the multiplication of numbers. If they choose to come the old dodge, by pretending that they have a certain knowledge of the art which they keep secret, all that is necessary to be done is to try them by their works.

The Eastern carriage factories depend much on the Western market for the disposal of their surplus work. They find it an easy matter, in their old and well-regulated factories, to make better work than can be produced in many of the newer Western shops, at prices that enable them to pay transportation and compete with Western factories. The quality of the timber, iron, finish and graceful appearance of the carriages, have been recommendations much relied upon; but to the foregoing qualifications have been added—perhaps by those who know little about the facts—a superiority in the draught. It is common to hear it said that Concord, or some other locality East, turned out the best running wagons in the world. This they attributed to the peculiar art they exhibit in setting the axles. The difficulty, with those who use these vehicles, in testing this assertion, has been that they have had no way of measuring the power applied. The former difficulty is now entirely removed by certain facts that have been discovered in the wear of axles; and the proof about setting the axle right, so that the wagon has an easy draught, is always with the one who uses the wagon. If the axles or axle-boxes of a Concord or any other wagon show signs of wear before the other parts are worn out, it is a proof that there was an unnecessary amount of friction at the axle, and this is certainly brought on by an improper set to the axle.

We have seen, in a previous article, that a wagon invented by Mr. White, of Berlin, Wisconsin, has worn out one set of tires without making an impression on the axles or boxes, and that the draught is from fifty to one hundred per cent. easier than other wagons. It is true all of this advantage is not secured by the set of the axles. The other parts are so constructed that the bearings on the extremities of the axles necessarily will be more equal than on ordinary wagons. The same principle which Mr. White invented has been secured, by letters patent, to J. R. Gorst, Liverpool, England, with only the addition of applying springs to the same, as has been described on page 174, vol. V. of this Magazine.

The great importance that we attach to Mr. White's experiment is, that it shows there is no necessity of carriage axles wearing out before other parts of the carriage. It also shows that the claims of Eastern factories, about making perfect running wagons and carriages, is unfounded, because they wear out both axle and axle-box. Proof of the same can be established at any time, by going into a livery-stable, where carriages are being worn out that have been made in Eastern factories. We can not find more than one carriage in a thousand that the other parts have worn mostly out without destroying at least one set of axles.

The expense of repairing the axle is a small item compared to the great loss sustained by the unnecessary draught which, at first, has been entailed on the carriage. The fact that the axle has become worn, shows, beyond a possibility of a doubt, that the proprietor has been obliged to furnish extra or unnecessary motive-power, in drawing the wagon about, to more than pay the original price. What would livery-men give to have a wagon or carriage warranted against such casualties?

When Geometry is philosophically applied to setting axles, this perfection in the wear and set of axles can as safely be warranted as the correct solution of any other problem in Geometry; even more so, because, by recent improvements, the solution has been made perfectly simple and easy of application.

I do not wish to be understood that every thing about the draught of a wagon depends upon the set of the axles

pearance. For carriages of this kind we recommend blue cloth linings.

AMERICAN PHAETON.

Illustrated on Plate XI.

As we have never seen anything of the kind among our foreign drawings, we are led to think this characteristically American. At any rate, it makes a very convenient vehicle for business purposes, although, as generally built, unnecessarily heavy. In this example we have adopted some peculiarities: the French mode of adjusting the joints and the recent style of sham-caning, and also given it a heel-sinking. For the use of physicians, this style of vehicle cannot be excelled.

CANED PONY PHAETON.

Illustrated on Plate XII.

Pony phaetons are becoming fashionable with us, and, as a matter of course, we must supply drafts to suit the times. The design we give has been prepared in this office, and represents a caned phaeton hung on eliptic springs. These phaetons are well suited for summer riding, but are unfitted for our cold winter climate. For these reasons, customers can only be found among those who are able to keep more than one vehicle; consequently, it must always be driven by the aristocratic few among us.

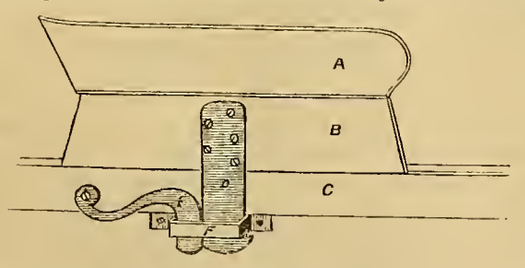
Sparks from the Anvil.

MORE NOVELTIES.

Last month we furnished our readers with several ingenious plans for facilitating the labor in the manufacture of carriages. We have another from Mr. A. S. Crossley, for the more readily

FASTENING AND DETACHING A SLIDE-SEAT.

This very simple arrangement is undoubtedly one of the best modes of fastening a slide-seat yet contrived, and on the score of economy, preferable, as there is nothing liable to get out of order as in nearly all those now in



use. The diagram is designed to represent a perspective view of the inside side of a wagon body, and the seat belonging thereto, and showing the manner of construction. As may be seen, the hook is screwed to the block on which the seat rests, and extends down on the side of the body sufficiently far as to permit a plate to be screwed on to receive it. This hook, after being dropped in the loop-in plate, is moved a little forward, and the space back is wedged by a dead latch, secured at one end to the seat block. This latch effectually secures the seat to the body. All the operator has to do is to raise his lattch with the finger, shift the seat a little back, and take it out altogether. Of course, every new position for the sea will require additional loops for the side of the body.

ON THE FORGING OF STEEL.

A pamphlet has very recently been published in England, on the management of steel, including forging, hardening, tempering, annealing, shrinking and expansion; also, the case-hardening of iron: by George Ede, employed at the royal gun factories department, Woolwich Arsenal, which we think will be found useful to our readers. We give here the first installment:

Steel being one of the most valuable metals, and requiring great care in the forging, hardening, tempering, annealing, and management of it in general, I think, after having had nearly twenty years' good practice, experience, and study combined, I am now able to give a little information to those who have not had so much to do with it as I have. All that I here state is from my own practical experience; and by following the plans I shall here give, the artist will meet with every success. There are many people who, for the want of a little useful knowledge on steel, refrain from making many a good tool, because they say it is sure to crack in hardening; but if the steel is good, and has not been spoilt in forging the article, then, by following my plans, they never need be afraid that it will be a "waster." There are tons of the very best steel condemned as bad steel, when, at the same time, it is the forging of it that has made it bad, through men not having a proper knowledge in the management of it; and those masters who study their own interest will only employ those men for the forging of steel on whom they can most depend. For I have seen plenty of the very best steel destroyed, and have even heard men remark to each other, "Make it well hot—it will work the easier;" and I felt what a sad thing it was to see men that knew better, yet they would destroy their employers' property. Therefore I say, as justice to the manufacturer and supplier of steel, it behooves masters to put those men only at the forging of steel on whom they can most depend.

In forging of cast steel, the fire must be regulated by the size of the work; and in heating the steel, when the flames begin to break out, beat the coals round the outside of the fire close together with the slice, to prevent the heat from escaping. To save fuel, damp the coal, and throw water on the fire if it extend beyond its proper limits. To ascertain the heat of the steel, draw it out of the fire, and that often, for it requires to be well watched to heat the steel properly; and if not hot enough, thrust it quickly in again. Soft coke is even better than coal for the fire. The heat the steel receives is judged of by the eye; and care should be taken not to use a higher degree of heat than is absolutely necessary to effect the desired purpose, and to use as few heats as possible; too frequent and overheating steel abstracts the carbon, gradually reducing it to the state of forged iron again. It is an idea of many men, that so long as the steel does not

fly to pieces when they strike it with the hammer, it is not too hot; but it is an erroneous idea, and easily proved when it comes to be hardened, and when it comes to be used; still it is an idea that many men will maintain, but only for the want of knowing better, and I hope that this will have the effect of altering their opinion. I can safely say that no man will ever injure the steel by being too careful how he takes his heats. Cast steel may be welded by boiling sixteen parts of borax and one of sal ammoniac together over a slow fire for an hour, and when cold grinding it into a powder. The steel must then be made as hot as it will conveniently bear, and the borax used as sand.

Paint Room.

OIL OF TURPENTINE FOR REDUCING PAINT AND VARNISHES.

There have been, and now exist, in many quarters, fears about finding a substitute for the oil of turpentine in reducing paints and varnishes to a consistence that it will spread easily with the brush, and secure other advantages that are derived from the volatile nature of turpentine. Enquiries have at various times been made of the writer as a practical painter on this subject. At first, his opinion was widely different from the majority of painters, in thinking that something of the nature of naptha, extracted from stone coal, would answer every purpose. Necessity, that prolific "mother of invention," in this case, has done in the short space of one year more towards settling the question definitely, than a score of years supported by the plainest of arguments could have done, and at the present time the majority of painters entertain no doubts or fears on the subject. But for the advantage of those who are led away by prejudice from the opinions expressed by the opposition in relation to its usefulness, before it became a settled question, we will examine the nature of turpentine and naptha, and give our personal experience in using both articles in paints, varnishes, and as dryers.

Oil of turpentine, or what is generally called spirits-of-turpentine, is obtained by distilling the crude gum obtained from the pine tree. The other ingredient, obtained by the same process, is the common yellow resin. The oil is purely volatile, so much so that when the most delicately tinted paper is saturated in it, and then dryed, it will not show any stains of oily nature upon it. On account of its thin, limpid and volatile nature, and of its readily incorporating itself with other oils and gums, it has for many years been used in them, in cases where something was wanted that would, for a space of time, render gum and oil into a more liquid state, and afterwards leave them entirely. The necessity for leaving the oil and gum after it is spread over the surface of the thing to be painted, is as great as any other good quality that it possesses. When it leaves them, it is taken up in the surrounding atmosphere, and with the atmosphere a portion of it is inhaled into the lungs of the painter; from thence it is taken by the proper organs throughout the whole system. A proportion of it is discharged with the urine, as every painter knows; a proportion of it is circulated with the blood, &c. The effects of it on the painter is to enervate him to such a degree, that few, if any, constitutions are able to withstand its prostrating effects. Much is said about the poison of paints affecting the painter, very little of which has any degree of plausibility. Paints are made of ponderous materials, particularly the poisonous ones, and with any degree of care on the part of the painter, cannot be introduced into the system by inhalation, especially after they are mixed with oils. The great danger from poison is not in the effect it has on the painter, but on those who come in contact with paints after the oil has let them loose from the place where they are spread. Experience, as well as the foregoing reasons, has satisfied me that the unhealthiness for which the trade is proverbial, is caused entirely from the use of turpentine.

The drying effects on oil which many suppose turpentine to have, is purely imaginary. It only leaves less oil to dry, and perhaps, by leaving the paint in a less compact state by its evaporation, allows oxygen of the atmosphere a greater chance to act upon it, but this same advantage is gained by any other volatile oil. Some suppose turpentine to have a body that does not evaporate, because they have seen it become mucilagenous after standing a considerable length of time. I have seen this myself. The question is, what creates this mucilage? The original ingredient connected with turpentine was resin. Supposing there is something connected with it after distillation, it must be resin, and we are all well aware that resin is not a desirable article to mix with paint or varnish. If it is, it can be easily added to naptha. It is apparent that turpentine or naptha is only valuable to the painter because it will readily mix with oils or gums to render them more liquid while they are being spread with the brush, and afterwards, having a nature to evaporate from the paint or varnish. With turpentine, this qualification has been satisfactory as long as it was procurable at a small price. Things are changed at present; it is impossible to procure it in sufficient quantities to supply the whole demand, if it is to be used altogether by the painter—at any price. When we look to the future, and see that doomed and accursed institution, which robs men of labor in producing this article, and making it cheap, is about to be buried with past barbarisms, we must expect our own interests in the robbery will cease, and that we shall have to pay the laborer for his toil by the way of an enhanced price.

At this juncture of events it is by far the most profitable and judicious way, to throw away previous prejudices if we have entertained them, and not faint-heartedly pronounce against a substitute for turpentine, without thoroughly trying it, as many have done.

So far as a limpid, thin and quick evaporating nature was concerned, naptha, or an oil distilled from stone coal, was at first found fully equal to turpentine. But there were other qualifications wanting. It would only partially mix with oil, and when stirred together would make the paint thicken up. This indicated that the naptha oil was mixed with water, which is a common thing in volatile oils, even turpentine. Again, it would evaporate so soon that there was a difficulty about spreading it, and besides, it had a very disagreeable smell. When it was mixed with oil and gums for varnish, it would separate sometimes so that the ingredients were worthless. All the points which were found wanting, opened a wide field for improvements, yet some of the disadvantages by the working of hands, or heads, have been turned to real advantages.

Foremost among the pioneers in this improvement has been the old and respectable varnish manufacturing company of Valentine & Co., of Boston. Others may have taken hold of it with equal success, but their successful experiments have not come under my individual observation, while many failures to improve by different individuals have; therefore I shall speak of only what I know and have personally tested. The first objection about partially mixing has been overcome to an equal extent with ordinary turpentine in their xxx benzole. Their "Valentine Spirits," for mixing with paint and varnish, in this respect—about thickening it up—is certainly superior to ordinary turpentine. I have tested this in every way that long experience in carriage-painting suggested, and am perfectly confident in what I say. The difficulty about evaporating too soon, on the whole may be considered as an advantage. It requires a more quick and skillful hand to spread it over the surface, but when it is spread, it is not so liable to sag, or run down, as turpentine varnish. It flows better, although you do not take the same care to spread it. In striping and other work with a pencil-brush, no inconvenience from its evaporating too soon is found, and yet it is excellent in not running down from where it is put. The smell, which with good reason was at first so much objected to, has been exchanged to a very agreeable one with most persons, both in the Valentine Spirits and xxx benzine. It holds gums completely in solution without separating. It differs from turpentine in one respect, that is: if casks or cans are left with an open vent, in either case damage would be sustained; but with the benzine varnish, if it is good, the damage would be greater, particularly so with japan. It is no inconvenience to keep varnishes as they ought to be kept, and no sign of bad varnish because they will not stand unnecessary tests that in the nature of things could not be expected.

These remarks are made more particularly for those who are over fastidious, on account of prejudices that have been brought to bear on their minds. Good workmen generally do not find fault with their tools to keep up their reputation as such, but I find some of a different class, who make the most they can by finding fault with somebody else when their work does not turn out to suit them.

With regard to the lasting qualities of turpentine or Valentine Spirits, there can be no difference, for both have ceased to exist with the paint or varnish long before the process of decay commences, and so far as time would permit the testing of Valentine's Varnishes, I have never seen any better, and seldom its equal. HENRY HARPER.

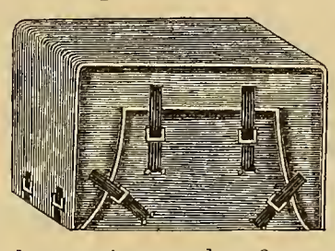
Trimming Room.

"BUDGETS," EIGHTY YEARS AGO.

IT is now about eighty years since "W. Felton, coach-maker and patentee of the new carriage-warmer, No. 3, Wimpole street, Cavendish Square, late of Leather Lane, London," published his "Treatise on Carriages and Harness." From these pages we purpose to give a view of the mode of trimming carriages as then practiced, leaving our readers to compare the past with the present, and, from the study, deduce their own conclusions as to the amount of progress made in this department of carriage building since Felton's day.

The most singular object seen in the drawings of carriages made at the time of which we write, is that called a "budget," now called the boot, some fair examples of which are shown in the drawings engraved and printed on pages 80 and 159 of volume three. These "budgets" were intended for carrying luggage in the days when traveling was performed on land, entirely by horse-power, and frequently by private *turnout*, and were mostly fixed on the fore part of the *carriage* part, between the springs. These were made large enough to take in trunks, horse-clothes, jackets for the carriage-body, hay for feed, and many other things, not omitting a hammer, wrenches, bolts, &c., required for repairs in long travel over rough roads, where blacksmiths' shops "were few and far between." They made a huge appendage to a vehicle, indeed; but then every part of a gentleman's equipage was planned on a *large scale*, and in the modern acceptation of the term, was "a great institution;" the contrast was therefore less observable.

We present the reader with an illustration of a budget



which Felton tells us has "an iron frame, and is covered with a stout black-dressed leather, over which the case or cover, made of the same, is placed, and buckles to the sides, back and front, the borders of which should be welted to the top-piece, as they fit much better than when made of one piece of leather, as they sometimes are. Within those budgets are straps fixed to the bottom, to confine whatever is placed in them, which otherwise would be injured by the motion of the carriage." Sometimes these budgets answered for the driver's seat, and in such cases were often hung to the fore-springs of the carriage for easier riding. These were used to coaches, chariots, phaetons, gigs, currieles, &c., and for the larger size, £8 was charged. The Salisbury-Boot, illustrated on page 173, volume II., now generally takes the place of budgets in English carriages, and like many other *excrescences* in that fogy land, is still in use. Occasionally we find it adopted here by a few, who, claiming to be American, show by their practices that they are out of their latitude. These budgets are about as useful *now* as the caudel appendage of the tadpole would be to the creature in his *toady* state. Mind, we do not here charge our "budget" fellow-citizens with *toadyism*. We leave this to their reflection. In our next issue, we intend to present our friends with still further peculiarities in trimming as practiced in olden times, but for which we have not space here.

OPERATIVE DICTATION *vs.* CAPITAL.—At a meeting of the iron dealers lately held in London, it was resolved and adopted unanimously: That this meeting, without any desire to interfere with the rights of the workmen to combine for any fair and legitimate object, is resolved to resist, by every means in its power, all attempts on the part of any combination of workmen to dictate to their employers the mode in which their work shall be conducted, and what workmen they shall employ; and with a view to maintain this principle, that a committee be formed, representing every iron-making district.

Editor's Work-bench.

LOOK OUT!

Never before has there been a time when the members of the craft were so often visited, as now, by that pack of hungry wolves generally designated "humbug patentees," with bills for alleged infringements of their *pretended* rights. We have complaints of their presence from almost every part of the country, showing that they are endeavoring to improve the time while business is lively, in operating upon the minds of the ignorant and timid. We hear of some instances where the harpies have succeeded in obtaining fifties and hundreds of dollars from poor, distressed country carriage-makers, simply because they have not the means or the courage to defend themselves as every good citizen ought to do for the benefit of mankind. With their ill-gotten gains from the frightened, they start with a capital sufficient to bring on a lawsuit against the more plucky, in the hope of worrying them into a settlement eventually; or else to make it appear to the "rest of mankind" that they have in reality some legal claim upon which to base their sham pretensions for damages. Before they proceed thus far, however, they ply their intended victims with paper missives couched in miserable English, concocted in some filthy hole they dignify with the name of office, threatening all kinds of vengeance, unless the persecuted settle the bill without delay.

Having exhausted all their ingenuity without frightening the "plucky," should the proceeding (in their judgment) best serve their nefarious plans, they next commence a suit for damages, and, in the prestige of such suit, they pluck several of the *weak-minded* in the vicinity, of *their* hard earnings. Strange as it may seem, these contested suits are used as *cards* for fleecing those weak enough to shell-out on a mere threat, by reporting everywhere that they have sued such-and-such-an-one. If suing does not frighten "the plucky," as we have before intimated, and any seeming delay in putting in an answer to these fictitious complaints occurs, such a circumstance is seized upon for taunting the defendant with the intimation that his lawyer does not understand patent cases, nor has he practiced much in the United States Courts. Perhaps he sends word that *he* has filed a judgment in the court of some other State, in hope of bringing the victim to terms, in his ignorance of law, winding up with the voluntary remark that "it is no use to show your stubbornness any further;" or, perhaps, it may vary in other cases so as to read, "you now have a chance to spend money, and you ought to spend some, it will make a wiser man of you, which may be a benefit," and besides, "such cases must not be treated very leniently," lest the public should come to think we are not in earnest.

The foregoing is a true picture of some of the tactics as now practiced in some parts of the country; under cover of claims to damages, they have thus far failed to establish in any case where such has ever been permitted by these lazy leeches to take due course of law. The only grounds on which they escape the punishment due to all swindlers of the public is the pretence that they have appealed from an adverse decision to a higher court, and that the higher court in all probability will decide in their favor—perhaps. Persons pursuing their disgraceful operations under such circumstances are, if possible, more lost in character than the midnight robbers of a hen-roost, and a scourge should be put in every man's hand "to lash the villains round the world."

ADVICE TO CARRIAGE-BUYERS.

In this article we design to go a little out of our usual practice, and, instead of instructing the craft, give a few hints to that class of persons who purchase and use carriages. In doing this, however, we trust that our remarks will not be altogether lost upon the honest manufacturer, and anything that we can do to promote the advancement of art among us, ought to be appreciated.

It has been charged upon us by our trans-Atlantic cousins that we, Americans, do not make our carriages as sound and durable as they do in England. If they had *said* that we do not make our carriages as *clumsy*, we could have pardoned them and overlooked the insult, and besides, more readily comprehended their meaning. When we hear an Englishman talking about *his* carriages running thirty or forty years, our minds naturally revert back to the period when steamboats and railroads were unknown. The very idea of being thus long confined to a certain style of vehicle is sickening to the Yankee mind. No, sirs! we live in a fast age, *and why should not carriages wear out fast?* But we are getting a little off the track.

In selecting a carriage there are several things to be considered. You not only want a vehicle with the geometrical lines correctly formed so as to please the eye, but well made, of well-seasoned timber, and as light as possible, consistent with durability. To secure these points, purchase your carriages from some mechanic who has gained for himself an enviable reputation for fair dealing and good work. Don't give your patronage to "slop-shops," for, by so doing, you injure the reputation of art and your own interests. Do not despise Poor Richard's warning against buying cheap wares.

Never expect to find a vehicle intended for two horses to answer as well for one. There are two reasons why it will not. Such will be too heavy for a single horse's strength, and the springs, if heavy enough to carry four, must certainly be too stiff when only two ride. This last is a consideration non-mechanical minds are prone to

overlook. If you cannot afford to keep two carriages, get but one, yet get the best fitted for your purposes.

Buy no carriages for pleasure with soft axles. Always inquire for the best "case-hardened." We consider all others worthless. Unless you can rely on the word of the builder, try for yourself with a file. A file will make little impression on the case-hardened or steel-converted axle. Insist on having the best "tempered springs made from the best English steel." The American, as now made, is not reliable, and we are pained to admit it. If, however, our condemnation of the article shall incite to improvement hereafter, we shall certainly have done something for our national reputation and the advancement of mechanical art at home.

Examine very minutely the ironwork. Unless the iron is fitted to the wood with exactness, the carriage will prove a poor one; it is evidently the ironing of a poor workman, of which class we find a majority at this time. See, as well as you are able, that the axles are well set, "that the wheels face." Unless this part is done with mathematical precision, your axles will run hard, and soon wear themselves out and the horse also. Some very judicious observations upon this subject will be found in this volume.

Never buy a gaudily-finished vehicle, such are like Pindar's razors, made to sell, and are certainly "more for ornament than use," an ornamentation that soon will look shabby. Too much plating about a carriage is in bad taste, for to keep it in passable order requires a constant rubbing, which very soon takes off the shining metal.

The painting of a carriage is a very important part. This, among us, is a defective matter, and half the orders filled are, from the importunities of customers, hurried out, half done. For these reasons, we would rather purchase of a good house a ready-made vehicle, and expect to find it better painted. If the varnish looks dull on a carriage, it argues that the work has been hurried out, with too little oil in the composition. On bad painting, the varnish is very apt to "strike-in," and exposure to the weather soon causes the paint to crack to the wood. A carriage, for prudential reasons, should not be put in use for three or four weeks after finishing, especially when English varnishes are used. When "green," and driven through mud and water, the dirt is likely to adhere to the sticky coatings, and, soaking through, not only take away the gloss, but lay the foundation for decay in the wood, and fit the iron and steel for rust and oxydation. The proofs of these serious defects will appear the first time a carriage is used.

The last consideration we shall recommend here, is for the purchaser to study comfort in selecting his carriage. Perhaps we shall be told this is unnecessary. Is it? Then why do we find so many uncomfortable vehicles running upon our roads? We answer: because this matter is too little regarded. We sacrifice comfort upon the altar of fashion, and the result is cramped limbs and pleasureless rides. This, however, is a matter any one can provide against, by getting into a vehicle *and measuring it for himself*. We intend to return to this subject at a future time.

GRUMBLINGS.

Everybody complains of the high prices now ruling for almost everything which goes to make up the necessaries of life, and especially against the charge for those things considered as luxuries. While some are offering *remedial* theories for admitted evils, others are using the privilege to "grumble," which, if not practiced elsewhere as extensively as among us, is certainly one of the ways in which the Yankee mind seeks relief from trouble. How satisfactory it is to be able to grumble! Were it not for this, possibly the pent-up gatherings of concentrated dissatisfactions would result in something very serious. Let us examine this subject a little in detail.

The carriage-maker complains that labor and stock are so enormously dear, that, when he has finished and sold his carriages, he has made nothing, and out of this *nothing* he is obliged to pay a tax of five per cent. to the government. And if he be a genuine copperhead, he grumbles the more earnestly, declaring that everything is going to ruin, the effects of an unnecessary war—and that *out of what is left*, he has to support his family, with coal at $14 the ton and flour at $12 the barrel. Dreadful!

The dealer in carriage-materials grumbles, and says he does not want to see a customer darken his doors, for it is so difficult to get an order filled now-a-days, that the profits will not pay for the trouble and vexation accompanying it. If he sends an order to Europe, he has to go into Wall Street and purchase gold at $2.87 to pay for his importations to-day, and perhaps sell his goods thus purchased for greenbacks on another day with gold for the standard, the gold down to $2.50, and, on four months time at that, perhaps will never be paid. He can't make anything, surely!

Our customers, they grumble likewise. They tell us that $425 is too much to give for a buggy. "Why, we used to purchase the very best for less than one-half the price you now ask." So they *guess* they will wait until things cheapen, "for you carriage-makers must be getting rich at such prices!" Why not, we sell as fast as we make! It is wonderful how rich carriage-makers get in the estimation of some, and still more wonderful that the carriage-makers "don't see it," and so they grumble.

The journeymen too—they grumble, and "go in" for increased wages. The bosses have as much work as they can do, and can well afford to pay higher wages. They

therefore demand $3 a day, and reserve to themselves (in practice) the right to work or play, just as they please; one of which practices consists in working three days in the week instead of six as formerly. With this three days' wages, they, however, *manage* to support their families; to go on one or two cotillion excursions during the season; and to pay the dues charged by the Association of which the majority are enrolled members. The business man "can't see" how this is done, and grumbles because his shop is half the time idle. How ungrateful! Can't he manage to pay his shop rent and other expenses, and get along as well on the profits of a three days' business as his men do? He thinks it cannot be done, and so grumbles again.

Grumbling seems to have become the order of the day. Everybody grumbles. Provisions, house-rents, taxes, &c., are all so high, that nobody can make anything—all is going to ruin—and yet, paradoxical as it may be, every one finds all his needs supplied. A strange state of affairs!

EDITORIAL CHIPS AND SHAVINGS.

Increased Revenues.—Under the new law, which came into operation the 1st of July, five per cent. instead of three, as formerly, must be paid on all new carriages made, as well as on some parts of *old* carriages, such as when a new top, or pole, wheels, &c., are put to them. We call this taxing luxuries with a vengeance; but how is it avoidable?

A Royal Carriage.—A state railway carriage, for the use of the Prince and Princess of Wales, has recently been completed at the Stratford workshops of the Great Eastern Railway. The body of the carriage is 26 ft. long outside, the principal compartment, or "saloon," being 11 ft. long, while there is also an ante-room and a dressing room, each 7 ft. 1 in. long, inside measure. The inside width of the carriage is 7 ft. 6 in., and the height 7 ft. India-rubber cushion-springs are placed between the body and the under frame. A layer of India-rubber is also interposed between the axle-box and its spring, and India-rubber washers encircle the pins in the spring links. Mr. Sinclair, the company's engineer, is making a like application of India-rubber in 220 new carriages of all classes, now in course of construction for the Great Eastern line.

Blast Furnaces in Cashmere.—At the annual supper of the clerks and foremen in the employ of Messrs. Gilkes, Wilson, Pease & Co., Middlesbro', Mr. J. Aspinall, the chairman, said Mr. J. B. Pease, one of their employers, was then on a tour in India, and in a letter which he had recently sent to the cashier of the firm, Mr. Pease remarked that he had seen a real original furnace for the manufacture of iron at Cashmere. The height of the furnace was 3 feet, and its cubical contents 3 feet and a small fraction. The tuyres were two in number to a furnace, and in their construction resembled a Scotch bagpipe. They were worked by the fingers, thumbs and arms of the men. The stone was of the hermatite class, not calcined before it was put into the furnace, but reduced to a powder. Charcoal was the fuel used, and the yield of a furnace was equal to 42½ lbs. of iron in 24 hours, but this quantity was very crude, and lost 50 per cent. by hammering.

Customs and habits are like the ruts in roads. The wheels of life settle into them, and we jog along through the mire because it is too much trouble to get out of them.

A Carriage for All.—The hearse is the only vehicle which stops before the doors of every man, rich and poor alike.

An Odd Sight.—The Wheeling, Va., *Intelligencer*, vouching for its accuracy, gives us the following comical sketch:

"We saw yesterday going up toward the upper ferry, a team of four animals—a horse, a pony, a mule, and a bull. The horse had the heaves, the pony was blind, the mule was lame, and the bull had no provision for fly time. In the wagon, which was an ordinary one, sat a white man, a crippled negro and a tame skunk. The skunk was firmly bound with a wisp of straw. The white man held the lines, the team held its own, and the nigger held the skunk."

Waspish.—Sydney Smith, one day observing Lord Brougham's one-horse carriage, on the panel of which appeared a "B" surmounted by a coronet, said to a friend, "There goes a carriage with a *bee* outside and a *wasp* within."

Blacksmiths' Coal.—Cumberland coal to-day (July 20) is selling at $13 a chaldron from the yards in New York, and the prospect is that it will still further advance. We learn that it sold a day or two ago, by the cargo, at $14.

LITERARY NOTICE.

We have been especially pleased with the July number of *The Atlantic Monthly*. Always a welcome visitor, the last seems to be better than ever before. "The Wife's Story," by Hawthorne, is capital. Bryant's "Palingenesis" needs no praise from us. Mitchell's continuation of "Wet Weather Work," although a little strained in the relation, is delightful reading. There are some sixteen other articles of varied worth, all interesting. The present number is the first of the fourteenth volume, and presents a good opportunity for subscribing for the work.

FOREIGN IMPROVEMENT IN CARRIAGES.

Oct. 20, 1863. Hansom Cabs.—J. W. Nottingham, Kensington Road, Surrey. This invention is as follows: The head of the cab, instead of being a fixture (as it is ordinarily made), or folding back like that of a barouche (as is sometimes the case), is constructed in a rigid form on a frame of iron or otherwise, and is so arranged as to be capable of being turned over so as to enclose as it were the back of the cab, turning bodily on pivots placed in front thereof, and thus forming a pleasant open carriage. The window or blind is formed of laths, either glazed or otherwise, and hinged together so as to be perfectly flexible, the ends of the laths running in grooves formed in the side of the head, and extending round the curved top of the same, so that the window or blind can either be pulled partly or wholly down, or raised up by the occupant; the window or blind, when entirely raised, lying under the curved roof. Instead of placing the springs, as in ordinary cabs, outside the body of the vehicle, and

between it and the wheels, they are placed beneath the body, and by these means a much wider body than ordinarily obtained can be made without increasing the width apart of the wheels. The driver's seat, instead of being removed altogether, as it is ordinarily, may be so arranged that it can be removed altogether when it is desirable that the occupant of the cab should himself drive. In this case, an arrangement is made so that a servant can stand behind the cab on the part whence the seat has been removed. The doors of the cab are made to open nearly the full width of the vehicle, and to fold or slide sideways in front of the wheels, so as to afford greater space for entering and leaving such vehicles, and also to prevent the liability of soiling the dress on entering and leaving the same. The shafts of the cab may be made entire, as in ordinary cabs, or made (either of metal or wood) with the forepart detachable by means of a socket or otherwise, so that, in the event of a shaft breaking, a fresh part can be readily substituted.

Nov. 10, 1863. Two-wheeled Vehicles.—F. Castlenan, Haute Garonne, France. In performing this invention, the inventor proposes to connect the shafts by hinges or pins to the sides of the vehicle at the centre thereof, and by a hand-screw passing through the front portion or frame of the body of the cart, and through a cross-bar joining the shafts, by which means the level of the cart may be regulated by turning the screw in the requisite direction. Should the horse fall down, the screw may be turned so as to elevate the front of the body and throw the weight more to the rear, in order to relieve the front of the shafts from a great portion of the weight. The invention also consists in attaching to the under forepart of the cart or cross-bar two vertical rods descending towards the ground; these rods are furnished with bearings at their lower part, containing small wheels, which are held a few inches from the ground; but when the horse falls, the shafts are allowed to drop down by means of slides in the rods, to which slides the shafts are fixed or hinged; and the bearings of the small wheels being held in the slides, it will follow that the wheels will be brought in contact with the ground, and so support the fore-part of the cart. *Not proceeded with.*

AMERICAN PATENTED INVENTIONS.

May 17. Dumping Cart.—Coles A. Carpenter, Glen Cove, N. Y.: I claim the arrangement of levers, catches and bars or arms, applied to a cart in the manner substantially as shown, by means of which the liberating of the front part of the body of the cart from the thills, and the liberating of the bottom of the tail-board from the body, and the consequent dumping of the load, may be effected by a single manipulation on the part of the driver or attendant as set forth.

Carriage.—A. S. Grant, Waupun, Wis.: I claim, *First*, combining with a detachable carriage or buggy top and the shifting rail, B, thereof, hooks and eyes, *b c*, of such a construction as will join the top to the back rail of the seat, and allow of the top or cover being turned down to a convenient position for being detached, and also of being turned up on its connection when it has been attached substantially in the manner set forth. *Second*, In combination with the subject-matter of my first claim, the laterally expanding side fastenings arranged substantially as described. *Third*, The combination of the hinging hook and eye fastenings, *b c*, applied to the back of the shifting-rail, B, with the gib and wedge fastenings, *g l d*, constructed and operating in the manner described. *Fourth*, The pivoted wedge pointed dogs, *s s*, in combination with gib fastenings, *g g*, and receiving loops, *d d*, the same constituting side fastenings for the arms of the shifting-rail, substantially as described.

Compound Paint Oil.—Z. S. Doty, Madison, Wis.: I claim the herein-described paint oil, composed of the ingredients therein named, and compounded in the manner and for the purpose substantially as set forth.

Harness Buckle.—Daniel M. Nixon, Danville, Ill.: I claim the frame, A, with its curved ends, and bar, *a a*, and cross-bar, D, in combination with the tongue, B, with its grooved end, *g*, and point, B′, constructed and operating as described.

24. Wagon.—S. R. Bolton, Prescott, Wis.: I claim the combination of the curved spring, D, friction roller, *b*, semi-circular bearing-plate, *c*, and adjustable stirrup, F, all applied and operating in connection with the axle, E, hounds and tongue, B, as and for the purpose shown and described.

Tire for Vehicles.—Alfred Brady, New York City: I claim the making, using, and constructing rims or tire for wheels, with a combination of surfaces of different diameters having the surfaces of a number of plane surfaces, or of plane and convex surfaces combined, as set forth and described in the foregoing specification.

Hold-back Iron for Carriages.—J. P. Simmons, Fulton, N. Y.: I claim the construction and arrangement of the spring lever, C, consisting of the angular sides, *b*, coils, *a*, and ends, *c*, when the same is used in combination with an iron whose hold-back, hook or horn is provided with the nib, *g*, the whole constituting a new article of manufacture, substantially as herein set forth.

Carriage-Axle.—Wm. T. Harrington (assignor to himself and Benjamin F. Anthony), Roxbury, Mass.: I claim the improved axle, as made with the extra journal, or extra arm and journal arranged with the primary journal, and to operate or revolve on a center pin, in manner and under circumstances substantially as described.

Trace Hook.—Alvin Hodgdon, Lowell, Mass.: I claim the improvement in the spring, D, for cheapness, convenience and safety, in combination with the hook, B, or snibal, C, to prevent accident, by detaching instantly an ungovernable or affrighted animal from the carriage.

June 21. Oil-Cup for Carriage-Axle.—Lyman Gregory, Battle Creek, Mich.: I claim the combination of the conical or conveying orifice, *c*, of the oil-cup, the sponge, F, or its equivalent, and the rod, *f*, connecting the sponge with the lid, D, all substantially as and for the purposes herein specified.

Tire or Hoop-bender.—Melchi Scott, Fairfield, Iowa: I claim the sliding apparatus, and the pincers, combined with the side levers and the adjustable rack, which being operated by the levers, *l l*, brings the bar forward until it begins to bend, when the pincers let go their hold until the next time the lever is raised. I claim also the graduating staff, *a*, in the lever, *l l*, with the numbers, 1, 2, 3, 4, 5, 6, corresponding with the numbers on the notched side plates, 1, 2, 3, 4, 5, 6, by which the tire may be made larger or smaller, by means of the corresponding numbers.

Carriage Hub-band.—S. T. Talcott, Ashtabula, O.: I claim the clutch, F, spring, D, cap, B, button, H, in combination with the flange, C, and band, A, substantially as and for the purposes set forth.

Acting Wagon-brake.—P. C. Van Houten, Cohocton, N. Y.: I claim the angular lever, *f*, in combination with the tongue, *a*, the pole, *h*, the attachment of the brake-bar, *n*, under the reach of the wagon by the rods, *p p*, to the cross-bar, *y*, in the manner and for the purpose described.

28. Tightening Tires of Carriage-Wheels.—Peleg S. Sanford, Westport, Mass.: I claim tightening the tires of carriage-wheels by separating the fellies with keys, as set forth and described.

July 5. Wagon-brake.—Thomas Christian (assignee to himself and Z. De Bow), Washington, D. C.: I claim the combination of the levers, G H, rack, G, gravitating arm, *h*, and gravitating pald, C, all arranged and operating in connection with a wagon-brake, in the manner and for the purposes herein specified.

CURRENT PRICES FOR CARRIAGE MATERIALS.

CORRECTED MONTHLY, BY MR. CHAS. WEEKS, FOR THIS MAGAZINE.

New York, July 23d, 1864.

Apron hooks and rings, per gross, $1.50.
Axle-clips, according to length, per dozen, 75c. *a* $1.40
Axles, common (long stock), per lb, 15c.
Axles, plain taper, 1 in. and under, $7.50; 1⅛, $8.50; 1¼, $9.50; 1⅜, $10.50; 1½, $11.50.
Do. Swelled taper, 1 in. and under, $9.50; 1⅛, $10.75; 1¼, $12.75; 1⅜, $15; 1½, $17.50.
Do. Half patent, 1 in. and under, $11.50; 1⅛, $13.25; 1¼, $15; 1⅜, $17; 1½, $19.25.
Do. Smith's New York half patent malleable iron box, 1 in. and under, $10; 1⅛, $12; 1¼, $14.
Do. Saunder's improv. taper, ¾ in., $11.50; ⅞, $12.75; 1, $12.75; 1⅛, $15.25; 1¼, $17.
Do. do. Homogeneous steel, ⅝ in., $15; ¾, $16; ⅞, $18.50; long drafts, $4 extra.

☞ These are prices for first-class axles. Makers of less repute, cheaper.

Bands, plated rim, under 3 in., $2.50; over 3 in., $3.
Do. Mail patent, $3.50 *a* $5.00.
Do. galvanized, 3½ in. and under, $1; larger, $1 *a* $2.
Basket wood imitations, per foot, $1.12.

☞ When sent by express, $2 extra for a lining board to a panel of 12 ft.

Bent poles, each $1.25.
Do. rims, under 1⅛ in., $2.25 per set; extra hickory, $2.50 *a* $3.50.
Do. seat rails, 50c. each, or $5.50 per doz.
Do. shafts, $6. *a* $7.
Bows, per set, light, 90c.; heavy, $1.25.
Bolts, Philadelphia, 25 per cent advance on list.
Do. T, per 100, $3 *a* $3.50.
Buckram, per yard, 50c. to 60c.
Buckles, per gross, ½ in., $1; ⅝, $1.20; ¾, $1.45; ⅞, $1 80; 1, $2.40.
Burlap, per yard, 50c.
Buttons, japanned, per paper, 30c.; per large gross, $3.
Carriage-parts, buggy, carved, $4 *a* $5.50.
Carpets, Brussels, per yard, $3; velvet, $4.50 *a* $6.25; oil-cloth, 85c. *a* $1.10.
Castings, malleable iron, per lb, 20c.
Clip-kingbolts, each, 55c., or $6 per dozen.
Cloths, body, $8 *a* $10; lining, $6 *a* $6.50. (See *Enameled.*)

☞ A Union cloth, made expressly for carriages, and warranted not to fade, can be furnished for $3 *a* $4 per yard.

Cord, seaming, per lb, 45c.; netting, per yard, 5c.
Cotelines, per yard, $8 *a* $12.
Curtain frames, per dozen, $1.25 *a* $2.50.
Do. rollers, each, $1 *a* $1.25.
Dashes, buggy, $1.75.
Door-handles, stiff, $1. *a* $3; coach drop, per pair, $3 *a* $4.
Drugget, felt, $2.
Enameled cloth, muslin, 5–4, $1; 6–4, $1.35.
Do. Drills, 5-4, $1.40; 48 in., $1.55; 5-4 A, $1.55; 48 in. A, $1.75
Do. Ducks, 5-4, $2; 50 in., $2.20; 6-4, $2.40.
Enameled linen, 38 in., $1.05; 5-4, $1.20; 6-4, $1.35.
Felloe plates, wrought, per lb, all sizes, 25c.
Fifth-wheels wrought, $2 *a* $3.
Fringes, festoon, per piece, $2; narrow, per yard, 18c.

☞ For a buggy top two pieces are required, and sometimes three.

Do. silk bullion, per yard, 50c. *a* $1.
Do. worsted bullion, 4 in. deep, 50c.
Do. worsted carpet, per yard, 8c. *a* 15c.
Frogs, 75c. *a* $1 per pair.
Glue, per lb, 25c. *a* 30c.
Hair, picked, per lb, 75c. *a* 95c.
Hubs, light, morticed, $1; unmorticed, 75c—coach, morticed, $1.50
Japan, per gallon, $4.75.
Knobs, English, $2.50 *a* $3 per gross.
Laces, broad, silk, per yard, $1.20 *a* $1.35; narrow, 15c. to 18c.
Do. broad, worsted, per yard, 50c.
Lamps, coach, $20 *a* $30 per pair.
Lazy-backs, $9 per doz.
Leather, collar, dash, 35c.; split do., 22c. *a* 25c.; enameled top, 37c.; enameled Trimming, 35c.; harness, per lb, 75c.; flap, per foot, 30c.
Linen, heavy, a new article for roofs of coaches, $1 *a* $1.25 per yard.
Moquet, 1½ yards wide, yer yard, $10.
Moss, per bale, 12½c. *a* 15c.
Mouldings, plated, per foot, ¼ in., 14c.; ⅜, 16c.; ½, 18c.; lead, door, per piece, 40c.
Nails, lining, silver, per paper, 10c.; ivory, per gross, 50c.
Name-plates.

☞ See advertisement under this head on 3d page of cover.

Oils, boiled, per gallon, $2.10.
Paints. White lead, extra, per 25 lb $5.25; Eng. pat. black, 40c.
Pekin cloth, per yard, $5.

☞ A very good article for inside coach linings.

Pole-crabs, silver, $5 *a* $12; tips, $1.60.
Pole-eyes, (S) No. 1, $2.75; No. 2, $2.90; No. 3, $3.10; No. 4, $4.25 per pr.
Sand paper, per ream, under No. 2½, $5.75; Nos. 2½ & 3, $6.25.
Screws, gimlet.

☞ Add to manufacturer's printed lists 20 per et.

Do. ivory headed, per dozen, 50c. per gross, $5.50.
Scrims (for canvassing), 35c. *a* 45c.
Seats, buggy, pieced rails, $1.75; solid rails, $2.50.
Shaft-jacks (M. S. & S.'s), No. 1, $2.80; 2, $3.25; 3, $3.50; 4, $4.75.
Shaft-jacks, common, $1.65 *a* $1.80 per pair.
Do. tips, extra plated, per pair, 37½c. *a* 56c.
Silk, curtain, per yard, $2 *a* $3.50.
Slat-irons, wrought, 4 bow, $1.12½; 5 bow, $1.25 per set.
Slides, ivory, white and black, per doz., $12; bone, per doz., $1.50; No. 18, $1.75 per doz.
Speaking tubes, each, $7.25.
Spindles, seat, per 100, $1.50 *a* $2.50.
Spring-bars, carved, per pair, $1.75.
Springs, black, 30½c.; bright, 31½c.; English (tempered), 35c.; Swedes (tempered), 37c.; 1¼ in., 1c. per lb. extra.
If under 36 in., 2c. per lb. additional.

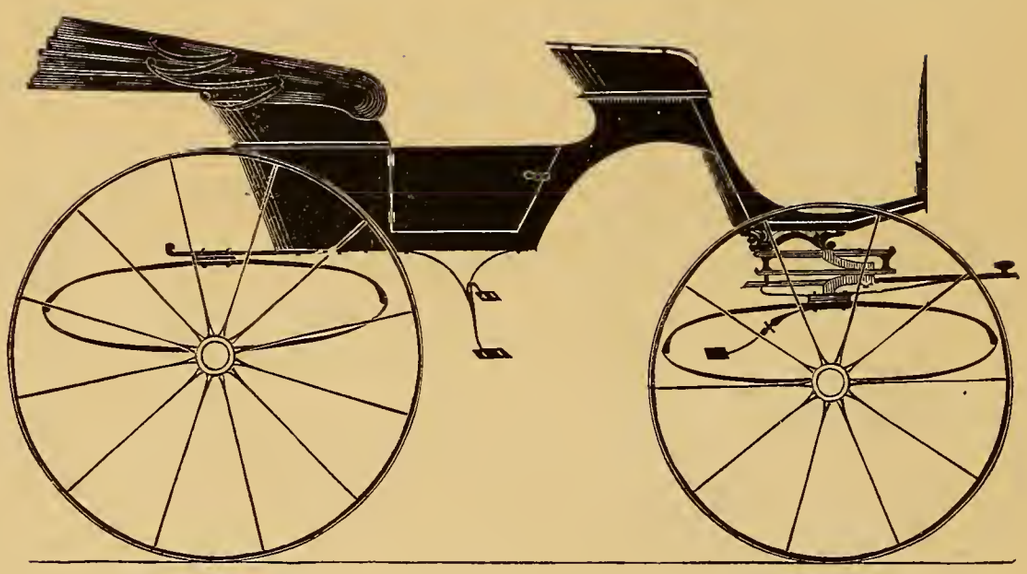
☞ Two springs for a buggy weigh about 28 lbs. If both 4 plate, 34 to 40 lbs.

Spokes, buggy, per set, $4.20, or about 7c. each for all under 1½ in.

☞ For extra hickory the charges are 10c. *a* 12½c. each.

Steel, Littlejohn's compound tire, 1-8 & 3-16 thick, 6½c. gold; 1-4 & 5-16 thick, 6c. gold.
Stump-joints, per dozen, $1.50 *a* $2.
Tacks, 10c. and upwards per paper.
Tassels, holder, per pair, $1 *a* $2; inside, per dozen, $5 *a* $12; acorn trigger, per dozen, $2.25.
Terry, per yard, worsted, $5; silk, $13.
Top-props, Thos. Pat, per set 65c.; capped complete, $1.50.
Do. common, per set, 40c.
Do. close-plated nuts and rivets, 75c.
Thread, linen, No. 25, $1.30; 30, $1.45; 35, $1.65, gold.
Do. stitching, No. 10, 95c.; 3, $1.15; 12, $1.28, gold.
Do. Marshall's Machine, 432, $2; 532, $2.30; 632, $2.60, gold.
Tufts, common flat, worsted, per gross, 20c.
Do. heavy black corded, worsted, per gross, $1.
Do. do. do. silk, per gross, $2.
Do. ball, $1.
Turpentine, per gallon, $4.25.
Twine, tufting, per ball, 35c.; per lb, 60c. to 75c.
Varnishes (Amer.), crown coach-body, $5 *a* $5.50; hard drying, $6; nonpareil, $6.50.
Do. English, $7.00 in gold, or equivalent in currency on the day of purchase.
Webbing, per piece, 70c.; per gross of 4 pieces, $2.60.
Whiffle-trees, coach, turned, each, 35c.; per dozen, $3.50.
Whiffle-tree spring hooks, $3 per doz.
Whip-sockets, flexible rubber, $4.50 *a* $6 per dozen.
Do. hard rubber, $9.50 per dozen.
Do. leather imitation English, $5 per dozen.
Do. common American, $3.50 *a* $4 per dozen.
Window lifter plates, per dozen, $1.50.
Yokes, pole, each, 35c.; per doz, $3.50.
Yoke-tips, extra plated, $1.75 per pair.

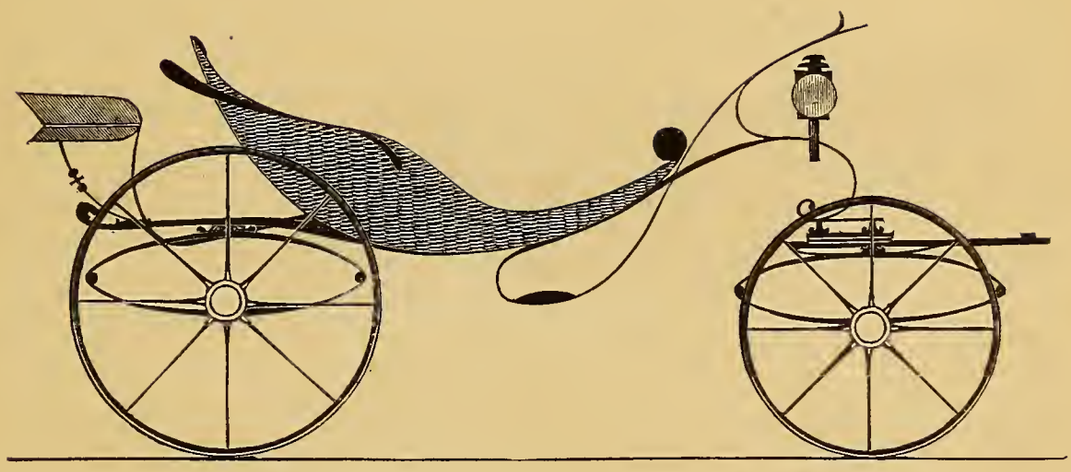
SPECIAL REQUEST.—Many of our friends have left with us a standing order for this Magazine, to be sent to their address, as long as we continued the publication, saying that when we wanted payment we must send them word. Others we know so well that we take it for certain they wish it continued. Some have now received the first three numbers of the Sixth Volume. Our rule being PAY IN ADVANCE, these will now please mail us five dollars, on reception of which we will receipt in full by return mail.



PARK PHAETON.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

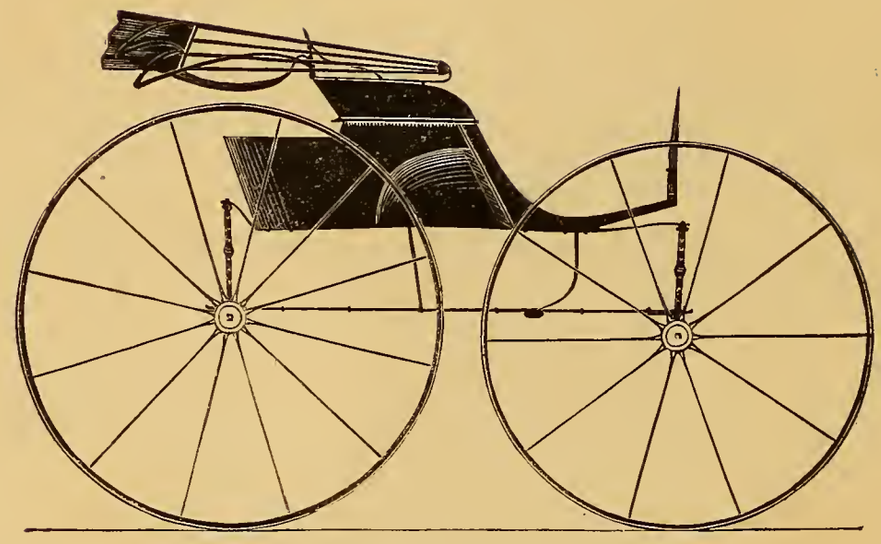
Explained on page 56.



BASKET PHAETON.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

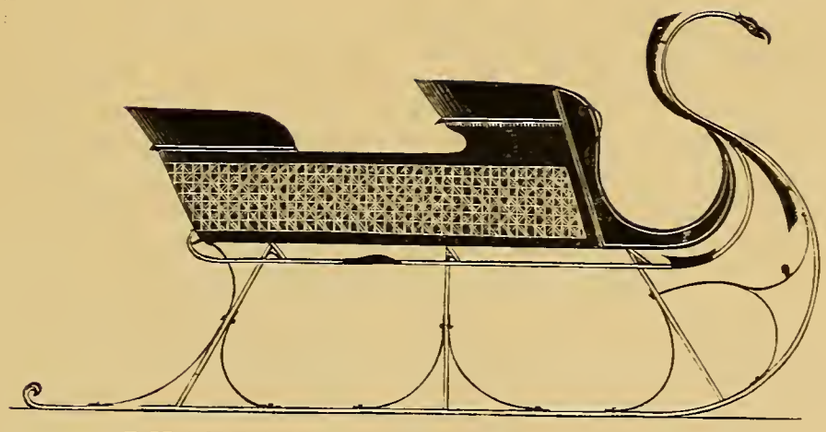
Explained on page 57.



SCOOPED BUGGY.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 57.



PHAETON SLEIGH.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 57.

THE NEW YORK
Scientific American

DEVOTED TO THE LITERARY, SOCIAL, AND MECHANICAL INTERESTS OF THE CRAFT.

Vol. VI. NEW YORK, SEPTEMBER, 1864. No. 4.

Mechanical Literature.

MECHANICAL POWER AND FRICTION.

BY HENRY HARPER.

In treating on this subject it is not my intention to shape a theory either in conformity with or antagonistic to those who have written on the subject before. It would be superfluous to treat on a subject that has been so often discussed, and follow in the same tread-mill course which many writers have settled down in. If nothing new can be said, certainly there has been enough already said. The different *ways* of presenting a single fact which writers rely upon as an improvement, I do not appreciate; on the contrary, I think it to be an evil, inasmuch as it confuses the mind so that it cannot be brought to bear with full force on the subject of enquiry.

In a standard elementary work by one of profound research, who seems to have investigated the whole catalogue of authorities on the subject, I find the following acknowledgment in the preface: "An elementary work on physical science can have little claim to originality except in the arrangement and classification of subjects and the selection of illustrations." Another says, "A work of this kind, from its very nature, admits of but little originality; the whole circle of science consists of principles deduced from discoveries of different individuals, in different ages, thrown into a common stock. The whole then is common property and belongs exclusively to no one. The merit, therefore, of an elementary treatise on the natural sciences, must rest solely on the judiciousness of its selections." The merit of *selection* which these two writers rest their claims upon is so great that teachers of our common schools must change their text-books as often as one-half dozen times during the educational period!

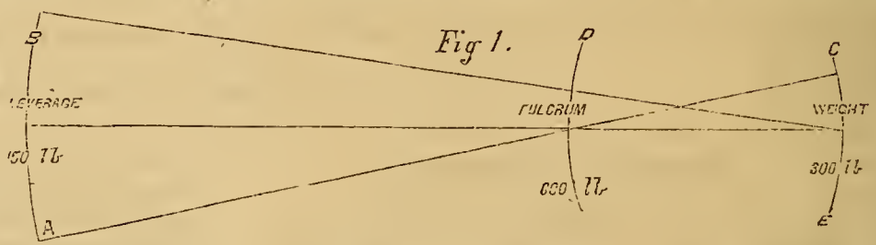
Turning from the preface to the treatise on mechanical powers, we find the mechanical powers misunderstood, in some cases; in others, the most important power—that which is adopted in the construction of all animated nature, and which is incorporated in many of our most useful machines, is not referred to by one of the authors, and by the other only enough to show that it is misunderstood. The last-mentioned author calls it "the toggle-joint power, used to uphold the tops of chaises, also used in various kinds of printing presses, to obtain the greatest power at the moment of impression." From a note appended to the last sentence it is made apparent that he neither understood nor attempted to describe the nature of lever-power, which, above all others, is the most useful and most used. Such an omission seems like a warning to cause us to rely more on a common sense exposition of the laws of nature than theories drawn from books. To those who attempt to criticise the following theories because they do not conform to principles laid down in other writings on the subject, we say that their labor will be lost, for we make no such pretensions, nor do we avoid any established truth knowingly for fear of not being original.

Power is defined as a faculty of producing an effect; mechanical power is an ability of producing a greater effect than the power expended; for instance, if we lift two pounds by expending one pound of power, we have made a mechanical application of power. Every ponderous substance, no matter how large or how small, has a mechanical power connected with it, in some form, therefore is a machine by which mechanical power can be produced, if the proper application is made to it. If more power is expended than the effect produced—or, in other words, if two pounds is expended to lift one, it is not a mechanical application of power, but lifting against a mechanical application. When we see a man lift eight or ten hundred, as we often do, a moments' reflection should convince us that it would have torn any muscle or cord asunder in his body if that amount of power had been applied to it, therefore his physical structure must be a mechanical power that produced a greater effect than the amount of power expended. In the most common actions of our life we expend mechanical power, and seldom are our motions directed in opposition to mechanical power. This is not only the case with that part of animated nature endowed with superior reason, but the same choice of mechanical power is used in inferior grades down to the lowest mental organization of the worm; every motion is governed by a mechanical appliance that makes a less power produce a greater effect than the power expended. Such being the case, it is strange language—it is a species of blasphemy—to say, as most writers do, that animated nature is so constructed that it acts in opposition to mechanical power, or that they expend more muscular power than is produced in the effect of their actions.

I have before me the hand-bill of an individual whose occupation is to exhibit feats of strength, who says he can draw more than any span of draught horses. This cannot be done by a superior strength of muscle, but must be done by a more intelligent application of mechanical power than horses are capable of showing. If this strong man should attempt to hold out, in a horizontal position, five pounds for thirty minutes, he would be unable to do it, because that would be exerting muscular against mechanical power; yet there is no doubt but that he can place himself in such a position that he can resist the draught of a span of horses for thirty minutes.

The intellect of man is incapable of arranging mechanical powers in machinery so that the lesser power will produce the greater effect, as it is found arranged in animal creation by the Great Architect—as his finite nature is short of infinity. It is perfectly arranged, and is applied in proportion to intellectual capacity. The prize-fighter who, in intellect, is supposed to be but a grade above the brute creation, practically recognizes the mechanical power of his physical organization, and will not go into an exhibition of brutality without a thorough training from some old "bruiser" whose experience has learned the mechanical force of every blow that can be brought to bear on his antagonist. The brute creation also have their practical training. The horse, trained to draught, puts the lever machine, of which his body consists, in a position to work with advantage, and at the same time preserve other relations necessary to locomotion. This education goes on until old age has impaired his machinery, yet he is capable of producing a greater effect of mechanical power than the vigorous and muscular colt who has received no practical education.

Fig 1.



Viewing mechanical power in the light that it has been taught—that is, that animals worked "*on the wrong end of the lever*," that educating them would only diminish their power, unless we could thwart the intentions of Supreme intelligence by placing them *on the right end of the lever*.

There are two primary mechanical powers, the lever and the inclined plane. In the lever are comprised those powers usually termed the lever, the pulley, the wheel and axle. In the inclined plane are comprised those powers that are usually termed the inclined plane, the wedge and the screw. The four superfluous terms that have been added at different times as primary powers, are merely the different application of the two primary powers, and should only be retained in a catalogue of their operations. A superfluity only confuses the mind and leaves the nature of the powers less distinct. The operation of the lever is always in the arc of a circle, and when the circle is made complete by mechanical appliance, it makes an endless lever, or what has been termed the pulley, wheel and axle.

The lever has three parts: First is the leverage—the part to which the lesser power is applied to create the greater. Second is the fulcrum, or the part on which the leverage and the power created rests, or is supported. Third is the weight, or greater power balanced by the least. It is necessary to apply the above distinguishing features to the different parts of the lever, so that they may be distinguished from each other, and not be confounded with that loss of power sometimes called *mechanical* power.

The application of the power to the leverage produces a greater magnitude of power than its heft, and the weight produces a power of equal magnitude to its heft, both of which bear on the fulcrum. The fulcrum, therefore, sustains a power equal to twice the power lifted. Hence mechanics often use the fulcrum instead of the weight part to create power, and they produce a power equal to twice that of the weight. Also in using the fulcrum to create power, the human physical construction gains great advantage by being able to apply a combination of leverages. In Figure 1, if we have a man's weight of 150 pounds resting on the leverage end of the bar, crowding it down towards A, it would balance 300 pounds on the weight end towards C, in an opposite direction from the movement of the leverage. This would make a weight of 600 pounds rest on the fulcrum. Upon this leverage a man could balance no more than twice his weight, but if we change the direction of the leverage and lift it towards B, and the weight of the fulcrum in the same direction towards D, making the power of the fulcrum 150 pounds, would lift 600 pounds, or just the amount that rested on the fulcrum. Not only that: if the man uses his physical machine, it is a combination of levers which would bring far more than 150 pounds to bear on the leverage. The power in this case is in a relative proportion to the radius of the circle through which the leverage and the weight moves: hence it has been laid down as a cardinal principle, that what we gain in power we lose in motion. It is not exclusively so, thanks to certain mechanical inventions that will be explained.

Returning to figure 1, we observe that, on account of man's physical construction, he cannot exert any more than his heft of 150 pounds on the leverage, consequently he raises no more than three hundred pounds weight; yet this is more than he could lift without the advantage of mechanical power in his construction. Should the working of this leverage be raised to B, making a lifting power of the fulcrum, the man lifting on the leverage could increase his power applied from 150 to 600 pounds, by his skill of applying the lever power which nature has so admirably introduced into his organization. This would be making a compound lever in every sense of the term, which would produce, instead of 300 pounds, 2,400, with exactly the same appliance, by only reversing the motion and making use of the fulcrum to create power. Compound levers are made by applying the weight part of the second lever to the leverage of the first, as is seen in figure 2. By this arrangement it will be seen that 75 pounds on the second leverage will exert 300 pounds on the weight part of the first lever. A glance at this shows how the mechanical combination produces the effect, and by adding to this combination, power can be increased to infinity; also that it is governed in every respect by the

laws that have been defined as belonging to the first lever. What we want to show now and bring particularly to mind is, that when man applies his physical strength to the leverage of the first lever in lifting up towards B, he makes a combination of powers by adding the lever power of his physical construction.

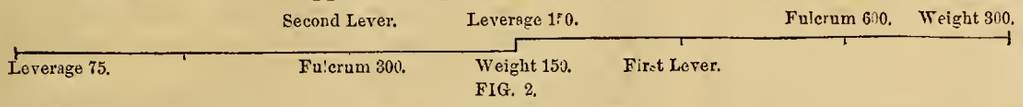


FIG. 2.

In order to understand more thoroughly the nature and classification of this power, and how it is arranged in man's physical construction, we will describe it as mechanism has placed it in mechanical constructions. It is the power, as we have noticed, that writers call the "toggle-joint" power, and, as they also add, "a species of the lever power," without describing the nature of its operation. The power under consideration is one of the most efficient ways in which the lever power can be applied, therefore nature has selected it in the mechanical construction of every living animal, and yet it has been so misunderstood as to be called a loss of mechanical power instead of gain. This mistake in physical science has been taught us without a dissenting voice (so far as we are aware), as an elementary principle of the science, and writers feel so complacent about it that they say "a work of this kind, from its very nature, admits of but little originality."

We will examine this power as it is has been seen by the writer, in an oil press, where the greatest amount of power that could be applied in a compact form is needed.

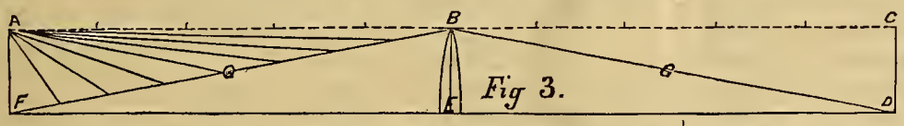


Fig 3.

The line D E F in fig. 3, represents a stick of timber 24 inches square and 40 feet long, laid in a horizontal position. The lines G G are timbers of 14 inches square, one of which is fastened at D by a hinge and notch in the large stick to keep it from sliding out of position. The ends at B are held together by a hinge joint, and the end F is left loose so that it will play back or forward as the joint B approaches or recedes from E. The point B and E are four feet apart, which is one-tenth of the length of the horizontal timber D E F. It will be apparent when this press is put in operation, by forcing the joint B down to E, that the end of the beam at F will extend out farther than the length of the 40 feet on the long beam D E F. The power of this press is gained by this extension beyond the point F on the end of the beam.

The nature of this power belongs to the class of levers, the fulcrum of which may be determined as to its relative power by an imaginary point the same as that to which gravitation tends. It is determined by a horizontal line drawn from the joint B to where it intersects a perpendicular line from F. The horizontal extension of the arm G describes the amount of leverage compared with the distance from F to A. The lines in the diagram above G lines are imaginary, to show the position of the fulcrum from which the power is to be calculated when compared to the leverage.

If the left hand lines A B G F A were the representations of a lever disconnected with the right hand sections, and the point A was made a fulcrum by inserting a pin in the corner at A for it to turn upon, it would be a lever, increasing the power five times and no more. But, as it has the two sections joined, the first move of the levers G G downward, the two sections united, increase the power five times, and it goes on increasing above the original starting until B reaches E, which is the farthest point that power can be gained, and the greatest amount of power. The exact amount of leverage obtained can be computed at any time by drawing a horizontal line from B to where it will intersect a perpendicular line from F. The distance that the two lines are apart, compared with the horizontal extension of the leverage, gives the exact amount of power.

This lever is peculiarly adapted to the operation of pressing oil from flax-seed meal, on account of the increase of power gained at the latter end of the process by changing the position of the fulcrum. At first merely the heft of the levers makes a powerful pressure, that brings the meal into a compact form. In the diagram, suppose the point at B descended half way to E with five times increased power at this half way point, it had gained ten fold, and when it reaches E it would have gained twenty times the power applied. It is valuable on another account: it has the least possible amount of friction that can be expended on any lever power; I am almost tempted to say it has no friction, but that would bring on a premature discussion of the subject which we intend to explain in its proper place.

The same power has been introduced in the printing press within my remembrance, and has been the foundation for various patents, all of which have some improvement simply in its application. In that application it has made some curious impressions on paper as to its nature. It has been definitely laid down as a principle that power given to animals was in opposition to leverage, or, as some would term it, working at the wrong end of the lever. How any mind could step over, without notice, the great absurdity that this declaration would involve, seems strange, yet it is so. Man, in the most ordinary acts of life, produces a power far beyond the tension of any muscle within his body, and yet philosophers have not noticed the absurdity of saying that the muscles create *this* power by a "lever of the third class," *which, they say, requires a greater tension of the muscles than the power produced.* Heenan, it is said, would strike a blow of 250 and 300 pounds' force, by actual measurement. Either force, if applied to the tension of the muscle that produced it, would have torn it in two at every blow, and, if applied laterally to his arm, would have broken every bone. These facts, which are perfectly clear, have not been noticed by those who suppose nature to act on such unphilosophic principles.

As we have said, the power used by the Creator in the mechanism of animated nature is the same that we have described in the oil press, and its constructions are of the most perfect kind, having the least friction, yet securing the greatest amount of power. Every part of anatomy is constructed on this one plan of lever power. We need not hesitate about adopting mechanical power that is so generally adopted by Infinite wisdom.

Figure 3 will represent one of the features of the operation of this power in a man's arm. If we take the point

D for the shoulder, and G B G F for the other parts of the arm, and straighten it by the power of contracting the muscles, the power will increase as five to one on the start, and finish with a power of twenty to one. The pugilist studies the effect of this construction with great care, therefore strikes "straight out," as it is termed, in the line of D E F. His antagonist must be at a proper distance to receive the blow at the time the lever produces the greatest power. Who has not heard of a lucky escape from the kick of a horse by being so close to the animal as not to get the full force of the blow? This was exactly upon the principle that figure 3 explains—that the power increases in proportion as the angle decreases. Every individual in the animal creation is a combination of hundreds of these levers that can be traced out, and seldom is anything done, that requires physical strength, without using them in the sense that a less shall produce a greater power. Walking, running, lifting, chopping, mowing, all are performed by a skillful application of the lever; and if any one undertakes to perform any of the manual labors without being trained to it, he will bring on sore and inflamed muscles from over action. Not one alone, but perhaps twenty levers are used in the simple act of walking. The knee, hip, ankle, foot and toe joints are bent and straightened in walking, for the purpose of gaining lever power. Every curve and straightening of the spine bones is for the same purpose, to balance the body on the ends of the bones, and not to fall with the length of them in a horizontal position. If we hold a part of our body in a horizontal position without other support than the muscles for a few moments, the muscle will be injured so that we cannot endure it. Every animal in walking, trotting, running, drawing, &c., derives his usefulness for labor from being trained to use his body in the several departments with skill. If he does not, he will, by his own act, destroy some part of the machinery in his body. Nature has so adapted the nervous sensation, that intelligence is easily conveyed to the mind of animals, and is seldom misunderstood. If a horse step so as to turn a joint sideways or different from that intended, it causes a strain of the lever power in the tension of the muscle, injuring it so that it gives him immediate pain, and inflammation follows. Such occurrences teach him to avoid like missteps. Ever since animals have been trained to domestic uses, they have uniformly shown action and position calculated to economize lever power as much as circumstances would admit. It is not to be expected that man can fully coöperate with the intelligence of the animal until he thoroughly understands the nature of the power that the animal uses. In this respect we see great delinquency in the wagon making fraternity, although they have made wonderful progress in that direction. The trouble seems to be that the craft have copied from others the form, without studying the philosophy of the machine called a wagon; therefore those nice points, which escape superficial observation, are not understood or retained in the imitation. In that way, many useful things that have once been invented are entirely lost for the want of a proper record in the mind. One of the prominent features in the lack of knowledge on this subject is the unconsciousness of that want by those who stand in need of it. Science has made some mistakes on this subject, but every one should contribute his mite to rectify those mistakes, and render the structure more perfect. It would be unjust to charge philosophy, as has been taught, with all the short-comings of wagon makers, for it is a notorious fact that few study the science with the intention of connecting it with trade; if they had done so, the blunder of calling the operation of a machine that works *against* mechanical power one of the mechanical powers, would not have been long tolerated by the craft.

The application of the lever is used in the motion of the snake crawling on the earth, and the constructions of his body are made directly in reference to the application of this power, the same as it has been described in the oil press. Figure 4 will illustrate the principle on which he is able to move in a forward course. It will be observed that there are three lines of different lengths; the one of the greatest curve is the longest, the dotted line next, and the straight line the shortest. In order to gain a forward motion he bends his body into the greatest curve first, then by the power of his muscles he straightens out into the lesser curve of the dotted line. Of course this will send out either one or both extremities farther from the centre of his body, which answers to the point B in the oil press, figure 3. If both extremities are sent out from the middle of his body, no locomotion can be gained, and he will remain stationary. The contrivance which we have resorted to of fastening the end at D in the stationary machinery cannot be used on account of the locomotion which is to be gained. Nature, in Infinite wisdom, of which our finite nature can only be the copyist, has provided for the case directly in reference to being a lever power of the same nature that has been described as belonging to figure 3. It is done as follows: The crawling animal that has no legs to propel it with, is provided with scales that will slide over on the principle of the inclined plane one way, and will catch the other way like spurs on the objects that it comes in contact with. The body, when straightened from the greatest curve in figure 4, to the dotted line, will extend out in the direction that it receives the least resistance, which will be at its head, and, consequently, the locomotion is in the direction of its head. This gives a locomotion to the whole body, every joint of his back bone answering as a lever, represented in figure 3. If nature, in the construction of creeping things, did not design for us a first class lever power the same as in other animals, for locomotion, there is certainly a most wonderful coincidence of appliances brought to bear by chance, that has the most direct tendency to that one point —so much so, that there can be no discrimination between *chance* and *design*.

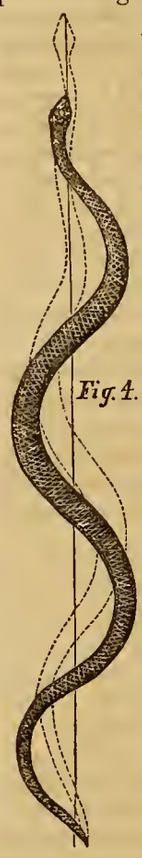


Fig. 4.

Fish are provided with the same system of leverage as is represented in figure 3, the point D being the resistance of the water against the fins, which gives the body a forward motion; the curve of the body, the side fins, the gills and scales all operate, as we have seen in the case of the snake, to propel the body forward.

We cannot so easily define the exact motion of birds in aerial locomotion, and we may here say that our application of machinery has most signally failed in its application to aerial flights. The probability is, that it is owing to our not being able to study the exact application of the

lever power in birds. Here nature seems to have clothed mechanism with so many delicate points that it appears to us something like sleight of hand, yet, like the "sleight of hand," we have certain analogous points to reason from that should convince us that the reality is different from the occular appearance. For instance, in other animals we see the same system of bones, tendons, and muscle, with the same relative strength and degrees of flexibility or rigidness, all delicately guarded from and all susceptible to injury from the same causes, one of which is an undue degree of tension of the muscles. If that would destroy the muscle in other animals, why should it not have the same effect on birds when the greatest strain is thrown on the part least able to bear it? The child may be deceived by appearances, but man should and generally does reason from analogy; therefore he may safely say that what would destroy the muscle of other animals would have the same effect on birds.

(To be continued.)

WHY WHEELS ARE DISHED.

MR. MILES' ANSWER TO MR. HARPER.

In Mr. Harper's reply to my last article on dished wheels, he seems to more than hint that I am treating his opinions somewhat disrespectfully, and characterizes my strictures upon some of his ideas as sneering criticisms.

He very kindly re-produces a great share of my article, for which I feel under obligations to him, as his extensive quotations may come under the eye of some who did not read the article itself. I hope and believe your readers will fail to see wherein I have violated controversial courtesy in the least particular. The right to ridicule (politely, of course) that which seemeth ridiculous is a Divine inheritance of which I shall, no doubt, avail myself as long as I live, and most cheerfully do I accord the same right to my fellow men. I consider, moreover, that I should fall short of my duty as a mechanical writer, were I to fail to hit any palpable error within the scope of my subject, which I have the opportunity and capacity to refute. I feel that what I do in this direction will save some one else the trouble, long after such errors might have terminated their mischievous career. I am for freedom of speech, even to the talking of wagon wheels.

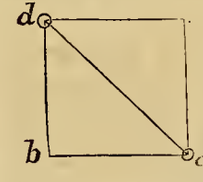
My friend kindly points out what he considers a grammatical error, or contradiction in my composition. He quotes from my article, "I differ from him (Harper) in believing that the dish of the spokes gives them no additional strength, but that the strength they possess when dished is much more durable by reason of their elasticity." Our readers all knew this to be my opinion, in the belief of which I differ from him. How I could express myself with more clearness, I still fail to discover. His criticism, however, accomplished all he intended it for; it multiplied words, and helped to keep up a show of defence. Were I driven to these resorts to use paper, I could fill quantities of it with rare specimens of consistency from my friend's composition, but when he so far fetches up his end as to give me only this to do, this controversy, as far as I am concerned, will terminate.

Mr. Harper makes in this article but one attempt at argument, and this only in the way of telling me how I might have saved myself from a "big blunder," which I had supposed an argument, and in so doing has achieved one more of his philosophical curiosities. Shade of Isaac Newton! has it come to this, that gravitation is to be suspended by the momentum (!) of a loaded wagon, "mogging" along at the rate of three miles an hour?

When Galileo brought forth his new telescope, and assayed to show his benighted cotemporaries the eighth planet, they not only refused to look through his glass, but declared that their plan of calculating everything by sevens would be overthrown by the discovery of more planets, *therefore* they did not exist. Neither had Jupiter any satellites, because not being visible to the naked eye, they were of no use to the earth, *therefore* they did not exist. And Henry Harper, an expounder of some later theories of gravitation, &c., seeing that the merry talk of the well-balanced wheel is likely to be interpreted so as to interfere seriously with some of his pre-conceptions, *therefore* (he says in effect) no well-behaved wheel ever talks; or, because the teamster would get "something of a jerk," or the momentum of the vehicle in its onward course would be interfered with by the slipping of the axles to the lowest point in the inclined boxes, *therefore* the loaded axles remain at the upper end of the inclined plane. Accommodating, really!

He says he has explained somewhere that "bodies put in forward motion cannot be diverted to an angular motion from the forward one without destroying the momentum of the forward motion."

Now, if I mistake not, it is a law of motion that a body, operated upon by two forces from different directions, takes a diagonal between the two forces, and moves just as far in the direction of each force as it would have moved had the other force not operated—thus, let a body at *a* be operated upon by a force in the direction and sufficient to propel it to *b*, and at the same instant an equal force draws it in the direction of *c*, where will the body be found? Most certainly at *d*. Hence, the lateral motions of a wagon gearing cannot absorb any of the force which propels it ahead, unless such counter force interposes extra friction, which may hinder the forward motion, which in this case happens to be just the contrary; for the box, on its transit from the collar to the nut, is relieved entirely of the friction of both. This is, therefore, the time when the least force is required to propel it ahead.



Mr. H. brings a most unfortunate illustration of his position, by citing the performance of a fly-wheel, which, he says, did not slip on its journals, "as he ever heard of." We cannot doubt this statement, but his assertion that this lateral tendency was counteracted by the rotary momentum, will not bear a moment's inspection.

Let any one experiment five minutes with a gyrascope, and if he had any doubts as to either of these forces affecting the other, they will vanish at once. Thus—loosen the thumb screws at the ends of the fly-wheel shaft, so as to give it a little lateral play, and while the fly-wheel is making 1,000 revolutions a minute, more or less, tip it out of level, first one way, then the other, and it will be found "talking" just as plainly as it does with no rotary motion. The only true reason why his fly-wheel did not slip laterally, was because it was so fitted in its boxes that play was impossible.

Let my friend take a seat in the front end of a railroad

car, in full view of the rear axle of the car ahead of him, and watch its motions as I have often done. If it happens to be an old axle, with much play, he will see a beautiful illustration of how his theory won't work, the vibrations of the car upon its axle increasing in frequency uniformly as the speed of the train increases.

If Mr. H. desired us to believe that wagons never jolt sideways, he should have carried his argument far enough to substantiate this assertion by the equally credible one that the earth is flat, and every road on the face thereof is an air line and a dead level, without obstructions of any kind; his doctrine would then bear the beautiful impress of consistency with itself.

Let our roads be ever so skillfully made and kept in order, and more or less ups and downs and obstructions must still be encountered at every step, and what we fail to accomplish in securing the maximum of power with the minimum of friction in our vehicles, must be overcome by force of hay and oats, and the severity of the "jerks" endured by the passengers must be mitigated as far as possible by the use of springs. I promised to explain in this number a most complete arrangement among others of a wagon spring; but for unavoidable reasons the reader must grant me indulgence for another month.

EFFECTS OF WHEEL CARRIAGES ON ROADS AND HORSES.

APPENDIX TO FORMER CHAPTERS.

Remarks on the Friction of Axles, the Elasticity of the Subsoil, and the softness of the surface-matter of Roads, as relating to the principle of Division of Weight—On Fat and Oils of different kinds, as applicable to *the Axles* of Wheels, and to other machinery.

As soon as the foregoing sheets were out of the press, I had a few copies put into boards, for distribution among my friends, with a view of obtaining any hints that might be offered me before the work should be laid before the public; and some of the following remarks have arisen in consequence of suggestions thus produced:

The reader will have observed that my arguments in favor of the principle of division are founded on calculations of the powers requisite to draw wheels carrying certain weights over stones or other palpable obstructions which are seldom likely to be opposed to more than one wheel at a time. But it is a fact, which I have proved by many years' practice, that three good ordinary horses can draw a ton more with four wheels than they can with two wheels, not only on smooth, level roads, but also *up hills*. My own carter has discovered this, contrary to his own prejudice; and it is his constant declaration that my *two horses*, which are strong active animals, can draw 65 or 70 hundred weight gross, with the wagon, quite as easily as the cart with 50 hundred weight, even up the hills, the wagon having narrow wheels, of the heights before mentioned (chap. v., § 1), and the cart having 6-inch wheels, 4 feet 8 inches high, with iron axles, working also in olive-oil.

Another circumstance also I will mention. I have a man in my employment who lately lived two or three years as a groom with a neighbor of mine who kept a two-wheel one-horse chaise, and a light phaeton, which latter he also frequently drove with one horse. This man says he always observed that when his master had been to town (five miles distant) with the four-wheel chaise, the horse returned fresher, even though there were three persons in the carriage, than when he had drawn the two-wheel chaise, with his master alone, notwithstanding that the differences of the net weights of the two carriages must have been at least from two to three hundred weight. This information was not the result of any question from me, but he mentioned it as a very strange thing, and which he very truly said he "could not make out," as he had "always thought that two wheels followed lighter after a horse than four."

Here are facts connected with the principle of division which have nothing to do with palpable obstructions, there being no ruts, nor any stones unless recently laid, between Frenchay and Bristol, the whole of this road having been what our country people call *Mac-Adam'd*. And it is demonstrable that these facts *could not exist*, so far at least as the road is concerned, if the road were a perfect inflexible mathematical plane, and if the wheels were perfect circles. Nor does it appear to me that the inequality of the surface of a good turnpike-road is sufficient to produce these effects. There must, then, I think, be other causes conspiring to produce them.

At an interview I had with J. L. McAdam, shortly after he had read the preceding pages, and had in very handsome terms expressed his approbation of what I had written on the subject of carriages, he asked me if I did not think it likely that axle-friction might increase in a ratio much greater than that of the weight. When we consider the nature of friction, this appears to me an almost self-evident position. Friction is the rubbing of two bodies, one against the other; and we know that if a cart or wagon were set to work with dry axles and boxes, the rough or projecting parts of the one would lay hold on the rough parts of the other, and they would thus tear each other to pieces; great quantities of metallic dust would be produced, and great labor must be exercised on the part of the horses to effect it. But it has been found that if any very soft unctuous matter be placed *between* the metals, in proportion as this destructive contact is thereby prevented, in that proportion is the wear of the metals diminished. This is remarkably the case in my own wagon. Although it has been in use about twelve years, I could not discover, the last time I examined the axles and boxes, that *any* wear whatever had taken place, whether in the iron of the one or in the brass of the other. Now it is certain that olive-oil will prevent destructive friction, with very considerable weights acting on the sliding-bodies; but, whenever the weight becomes so excessive upon an axle as that the axle shall drive the oil before it, or press the oil from under it, so that the metals come into absolute contact, the friction must become prodigious; and this increase of friction must be produced in proportion as the weight has this tendency of displacing the oil and of forcing the metals into contact; and it is therefore clear to me that a double weight might thus produce a tenfold friction.

Another circumstance has also attracted my notice since the body of this work was printed, which is the Shaking of the Roads. It was first suggested to me by Robert Anstice, of Bridgewater, who is a gentleman of great ingenuity, and of great accuracy in observation. The same fact I see recorded by the Quarterly Reviewers, in their notice of several works on the subject of Roads (*May*, 1820), with this very important fact accompanying

it, viz.: that the material on the road between Cross and Bridgewater, when compared with similar materials on roads lying upon a hard rock, lost in the proportion of seven to five. The fact is so well attested as to leave no doubt with me of its perfect accuracy. But how or why do these stones last longer on an elastic bed than on a hard rock? Precisely for the same cause that a stone placed upon a wool-pack would bear a greater pressure before it would be broken, than it would if placed upon an anvil. Now the road in question is not over a soft spongy bag, although this level is well known to have been formerly *sea;* it is a country formed entirely by the deposit of slime from the Bristol Channel; and it is now one of the richest grazing districts in England, with a sound clay bottom, the meadows being everywhere firm enough to carry oxen of the heaviest weights.

The knowledge of this shaking has led me to consider the nature of the foundations of roads in general. In this country the proportion of road that lies upon bare rock is very small; all the rest may, in one general term, be said to lie upon *earth*. Now earth of every description is absorbent of water. It is so ordered by the Great Author of Nature, for the purposes of nature; to support not only vegetable life, but also the myriads of animated beings that exist under the surface of the earth. Water circulates and percolates through every pore: and gases also abound, to a very considerable depth; consequently, the whole surface of the earth may be considered, in some degree, as an *elastic body*. It is not, therefore, only in the neighborhood of Bridgewater that the roads are elastic, and that water would be seen to tremble in the ditches at their sides, if ditches full of water existed. We hear the windows of houses and the plates and glasses on the shelves rattle when a carriage passes by, not near Bridgewater only, but in London and Bristol, and everywhere else. Consequently, I consider that *all our roads*, excepting only those that lie in immediate contact with a hard solid rock, are, to a certain extent, elastic. But even the surface matter of the road itself is, generally, taking England throughout, more or less pervious to water, and is therefore more or less elastic or yielding. In proportion, therefore, as this elasticity, or softness, or impressibility, or by whatever term it may be designated, exists either in the subsoil or in the road-matter, or in both, in that proportion will weights sink in passing over such roads. But I have endeavored to show, in the case of oxen and sheep in a soft meadow (chap. viii., § 8), that the effect of weight increases in a much greater ratio than the weight itself increases. Thus, suppose a sheep to weigh exactly one-tenth part of an ox, the foot of the ox would tread the earth five inches deep, while the foot of the sheep would not make an impression exceeding an eighth of an inch in depth, or a fortieth part of the depth of that of the ox; but as the hoof of the ox exceeds that of the sheep in superficial measure about ten-fold, the sheep by its tread would not displace more than one part in four hundred of the quantity of earth which the ox would.

If, then, it be granted that all *earth* abounds with both air and water, it follows that such earth is elastic or compressible. But a very great proportion of all the roads in England have a depth of this earth or compressible matter under them. And the *surface-matter of all gravel roads* being also absorbent both of air and water, such roads must necessarily be *still more* compressible or yielding.* Consequently all roads, excepting only those that lie in immediate contact with a hard rock, must yield, or bend, upon the principle of elasticity, or must sink in consequence of the looseness of the road-matter; and in many instances both these causes must combine to produce a resistance to every wheel that passes over them, which will be in proportion to the compressing power of such wheel. But it is shown that the compressing powers of weights, acting upon earth, increase in a ratio manifold greater than the weights themselves increase.

In enumerating the various objects of resistance to wheels (chap. 1, § 3), I have stated the pressure of wheels into surface-matter of roads as a cause of "prodigious expenditure of the strength of horses;" but I was not then aware of what is evidently the fact, that this pressure or sinking is not simply proportioned to the respective weights, but that it increases, as already mentioned, in a ratio manifold greater than that of the weights themselves.

These considerations, with the preceding arguments, afford an explanation, satisfactory at least to myself, of all the circumstances attendant on the Division of Weight. They explain the cause why horses can draw seven or eight hundred-weight each, even up a smooth road, and up a steep hill, in a wagon, more than they can in a cart; they explain the cause why my neighbor's horse always came home fresher from Bristol with his master's phaeton than with the gig, even though he had several hundred-weight more behind him; and they tend to establish the assertion of the man who drove the eight-wheel coach between Bath and Bristol, that *it followed very light after the horses*, which was only saying, in other words, that they drew it with ease.

In whatever point of view, therefore, we look at the principle of division, whether it be as regards the drawing weights over stones and other palpable obstructions, or over the little inequalities of the roads; or as regards the elasticity of the roads, and the sinking of the wheels into the surface-matter of them; or as it regards the friction of axles; or as it affects the duration of the roads themselves;—it appears to me to be alike important.

Grease, or fat oils, of any description, will prevent friction; but some are found to answer this purpose much better than others. Hard fat is objectionable on two grounds: first, on account of its toughness, or the difficulty with which its parts are separated from each other, which necessarily requires labor to effect; secondly, its want of fluidity, whereby the working part of any machine may often be quite bare, while the fat is deposited in considerable thickness where it is of no use. Fish-oils are frequently used about machinery, because they are bought at a low price. Now, all these oils contain a portion of gelatinous matter, which may be proved by heating them in a phial with a decoction of oak-bark or nutgalls. When shaken together, a chemical union is formed between the tannin, or tanning principle of the oak, and the gelatine; and, if the phial be set by to stand for a few days, the purified oil will rise to the top; the aqueous fluid, or tan liquor, will separate at the bottom, and the *leathery* matter, formed by the union of the tannin and gelatine, will be seen in the middle. This

* May not this account for the fact stated before the Committee of the House of Commons, by the Proprietors of Stage-Coaches, that their horses do not last more than about half as long near London as they do in more remote districts?

is the case with all the fish-oils, even with pure spermacetti-oil, although not in the degree as with cod and common whale-oils. I have found some samples of the latter sorts, when shaken with about an equal quantity of strong bark-liquor, to form into a thick mass like a custard; and, after it has stood a month, I have not discovered any separation to take place; consequently a *very large* proportion of such oils must be jelly. Now it is found that, when fish-oils are used about machinery, or about the axles of wheels, the oil evaporates or passes off, and the gelatinous matter remains, adhering to the machinery like gum; therefore fish-oils should never be used about machinery of any kind. This deposit of jelly is also observed in harness on which coarse fish-oils are used; but I have not observed it after using pure spermacetti-oil. This *seems* to be entirely absorbed by the leather, without leaving any deposit of gelatine or gummy matter on the surface of it, the leather handling smooth and clean, and remarkably mellow with its use. *Pure* olive-oil possesses none of the properties that render solid fat or fish-oils objectionable for machinery, and it is the only substance that I know of which is proper to be applied either to cart-wheels or to machinery of any kind; for the former of which purposes I think the best method of applying it is with a small painting-brush, and there is nothing better to keep it in than a common tin pint-porringer, with a cover to keep out the dust, in which cover should be a notch, to admit the handle of the brush. Three or four ounces of oil, given to the carter at once, will thus last a long time, as by the use of the brush he need not waste a drop of it.

I would not suppose that the quantity of gelatine in sperm-oil would render it objectionable for carriage-wheels; but I have found it so thin that the boxes would not retain it, and the wheels would not go twenty miles without complaining. I have, however, found that sperm-oil proves *gummy* about the works of a steam-engine. I lately gave a phial of very fine sperm-oil, purified by the before-mentioned process, to a watchmaker, thinking it might prove excellent for the pivots of watches, but it was *too thin* or too volatile even for that use. He said it was *soon gone;* but the watches worked remarkably well with it.

WAGONS AND WAGON WHEELS.

OUR readers may be pleased to read the following from our cotemporary named below, for August. As we understand the subject, we conclude such a vehicle better calculated for farm labor than for a pleasure carriage, and until prejudice undergoes a radical change, will never come into popular use. As being suggestive, however, we are induced to transfer it to our pages. It is from Elliott H. Angell, of Ingham Co., Mich., who states that he describes a wagon now in use in his vicinity, some portions of which are patented:

"For the benefit of the readers of the *American Agriculturist*, and to induce others to tax their inventive minds for still greater improvements in wheel vehicles, allow me to name some of the advantages in a wagon built on a plan invented by a citizen of this county. The wheels move straight forward; the face of the tire lies flat upon the ground, and is parallel with the center of the axle. It has four separate cast-steel axles, each tight in a cast-iron hub of the wheel. These axles bear upon as many friction wheels, one foot in diameter, thus dispensing with nearly all of the friction. The wheels are larger than ordinary wagon wheels, giving greater leverage. The wagon-box (and load) is considerably lower, and the draft is lower than in common wagons. There is no 'gather' to the wheels. A self-acting break is attached. The wagon is light and strong, and there is no 'shake' to the tongue, yet a slight side pressure upon the tongue will guide the vehicle readily. There are no skeins or boxes to wear out; it can be made at less expense than ordinary wagons of the same capacity.

"Carriage makers set the wheels on the axles with what they call a 'gather,' that is, they set them so that, if rolled straight as they stand on the wagon, each wheel would roll to the center of the track in going from eight to ten rods. This is done to have the wheels crowd the 'shoulder' instead of the 'burr,' or linch-pin. Now I submit to any candid mind whether it takes more power to roll the wheel the eight or ten rods, or shove it sideways the two feet three inches. There is then a loss of power which certainly adds much to the burden sustained by the team. In the wagon described, all this is saved by the wheels moving in a straight line without 'gather.'

"Every wheel and axle is a lever or system of levers and a fulcrum, no matter where or how they be used. The outer edge is the long arm of the lever or where power is applied (as in a water-wheel); the center is the fulcrum, and the friction is at the lower side of the axle, between the fulcrum and power (the ground is the power; the friction the weight). In the new plan the friction is on the top of the axle, and the spokes being two inches longer, there is an advantage of about six inches in leverage; the fulcrum is placed between the power and weight —another mechanical advantage. In addition to this, the upper side of the axle acts on the rollers or small wheels, one foot in diameter, and these turn round but thirty-two times in a mile, thus operating by a compound lever, and greatly lessening the friction. There is one wagon in this place that has been in almost constant use for eight months, and has been tested in many ways. On a hard, smooth road, less than half the power will draw it with or without a load; in muddy or bad roads, it requires about two-thirds the team that would be required were a common wagon used to draw an equal load. There is no piece of mechanism in use among civilized men more useful than a wagon, and I have given you this imperfect description to invite talent in this direction: though this is a decided improvement, yet there is a chance for still further improvement. Will not mechanics look into this, and at least compete in manufacturing?"

Pen Illustrations of the Drafts.

PARK PHAETON.

Illustrated on Plate XIII.

THIS is a very fashionable phaeton at the present time, selling for about $850. Without attempting to give all the details, which would only render matters too prolix, we give a few dimensions: Inside rocker, $2\frac{1}{2}+1\frac{1}{8}$ inches; rocker-plate, $2+\frac{1}{2}$ inches; panel at the

door, 1 foot deep; elevation of front seat, 17½ inches from a line drawn even with the under side of the back portion of the rocker, the front portion over the fore-carriage being 2½ inches higher to admit of a larger front wheel; door 16 inches at the bottom; seats, both panels, 4½ inches high, the front seat 13½ inches wide, and the back do., 18 inches, and both 2 feet 8½ inches long on the inside.

BASKET PHAETON.

Illustrated on Plate XIV.

We offer this as a very good design, for a very popular vehicle, of basket or wicker work. Many of these have found a market in this city this season, and we see no reason why they may not be in demand for some time to come. This has been drawn expressly for us by the most mechanical artist in this country, so correctly to scale, that we may be excused from a further description.

SCOOPED BUGGY.

Illustrated on Plate XV.

Fruitful as the past season has proved to be in a variety of new styles, we are yet able to add the buggy we here give to our readers, believing it will meet with favor from many. In it are combined the tilbury, gentleman's buggy and the cut-under phaeton, the combination making a very pretty design. We offer it as something new, in the hope that it will please.

PHAETON SLEIGH.

Illustrated on Plate XVI.

This sleigh has been designed with the view of producing a *sliding* article to conform in fashion with those *rolling* along our streets, and is different from anything we have seen. We call it the phaeton sleigh, as the body is modeled after the vehicle passing under that name. We have caned a portion of the sides and back, in order to give the same a lighter appearance. The fender, as may be observed, is carried around the back end of the running part, but to make it durable should be plated on the under side. Some judicious observations regarding the iron-work of sleighs will be found in volume III., page 181 *et seq.*, of this Magazine.

Sparks from the Anvil.

ON THE HARDENING OF STEEL.

BY GEORGE EDE.

My object now is to show to the reader some of the chief causes of steel breaking in hardening, and likewise to give a few remedies to prevent these causes; and I am sure, from my own experience, that whoever tries them will find them correct. In the first place, I wish to apprise the reader that all bright steel requires a coating of some description before putting it in the water, more especially when the article runs large; or the sudden action of the water on the outside of the steel in most instances is sure to crack it. As a proof of this, take a piece of steel cut from a bar with the skin on, harden it as often as you please, and you will find it is a very uncommon thing for that either to crack or break if it is not made too hot; but take the same piece of steel or another piece from the same bar, file or turn it bright, and it is quite likely to break the first time it is hardened. As a proof that the skin on the steel prevents the water from acting so suddenly on the outside of the steel, in cooling it so much sooner than the middle, common turning tools will always stand better, and keep a finer edge, if the tools are hardened from off the hammer with the skin on, to what they will if they are either filed or ground before hardening; that is, if the heat of the steel is regulated so as not to require tempering after being made hard. For the most useful hardness is produced by that degree of heat which is just sufficient to effect the purpose, the hardness of steel depending upon the intimate combination of its carbon; therefore the heat which effects this is the best. But there are a number of tools used in the turnery that cannot be ground after hardening, therefore these must be fitted up with the file, and the necessary precautions used in hardening them; for, not being able to grind them after they are hardened, owing to their peculiar shapes, it is a matter of importance that these should stand well, for were the edge to chip, through being a little too hard, or the edge to rub off through being a little too soft, the tool must be softened and fitted up again, and in many instances the tool would be wholly useless, for the proper size of it would be gone. Therefore, if extra care is to be taken with some tools, it is the like of tools that cannot be repaired. But all tools that can be ground after being hardened are the better for being hardened with the skin on the steel; and, if the tool-smith understands his business, he knows the proper shape of the tools as well as the mechanic who is using them, and he will give very little grinding on the tools, and as for water cracks there will be none. In the hardening of steel it demands a nicety of management which some artists are not often very anxious to display, and there are some who would not give themselves the trouble to do what they really know is requisite before they put the article in the fire, therefore they put it in and chance their luck. But Luck has never been my motto—Success is what I have always aimed at; it has always been my plan if I never gained credit to take care I never lost any; and I hope this will act as a word of advice to many young men just starting in the world. Before putting any article in the fire it is necessary to examine its shape, as every article has a particular way in which it should go into the water; therefore, it is requisite to know, before it is put into the fire, which way it is to be put into the water when it is drawn from the fire; likewise the water has to be studied into which the article is put, and likewise the heat on the article before it is put in the water, and the position of it in putting it in the water. Water that is intended for hardening with should never be dead cold; and the heat of the article, if the steel is good, should never exceed that of a low red heat; for, if the water is dead cold and the steel a little too hot, there is as much risk of its breaking as there is in pouring boiling water into a glass bottle; for dead cold water acting so suddenly

on the outside of the steel, the expansion of the middle is more than the outside can bear, and causes the steel to break; therefore, to avoid such risk, get a quantity of lighted charcoal, or a bar of ignited iron, and put it in the water, just sufficient to take the chill off. In dipping any article in the water, if there is a stout part and a thin part, always let the stoutest part go into the water first, and as near the center of the water as possible, so that there may be an equal pressure of water surrounding it. Putting the stoutest part in the water foremost causes the article to cool more equally, whereas if the thin part be put in the water foremost it is cold first, and the stout part having to contract after the thin part is cold, the thin part cannot give, consequently it has to break. But this cannot always be done, as there are no means of getting the stoutest part of some articles into the water foremost; for instance, such an article as a feather edge milling cutter, and many other things which have their stoutest part in the center—these must be put in perpendicularly by putting a piece of strong wire through the hole in the center, and putting it gently into the water; and instead of moving it backwards and forwards in the water, lift it up and down, so that fresh water may pass through the center every time it is lifted up and down, and the deeper the tank the better. But in lifting it up it must not be allowed to come above the water, or it will be sure to crack; the outside edges of such articles being much thinner than the middle they are cold sooner, so that the middle is wanted cold as quickly as possible after the outside edges; and were it drawn backwards and forwards in the water, the water being warm in the hole in the center, it would be longer in cooling. The outer edge being dead cold, and the middle of the cutter contracting, the outside is too cold to give, so it ends in the article breaking; but by a little attention to the above they are accomplished without breaking them. The wire that is used to bear the cutter while dipping it in the water must have three forks at the end for the cutter to lie upon, so that there is no obstruction to the water passing freely through the hole. With the inexperienced it is just heat it and put it in the water, without regard to anything which causes such losses to the employer, and then it is condemned as bad steel! but it is not all bad steel that breaks, for the very best steel will break if it is not properly managed.

I speak from experience that the shape of different articles has to be studied; for instance, take such an article as an eccentric collar, which shall be 1½ inch thick on one side, and ¼ of an inch on the other, having a 2-inch hole in it for the shaft; in hardening this it is most certain to break in the weak side, for one side being so thin, it is cold almost instantly, and the stout side contracting after the other is cold, it pulls it asunder. By taking a little trouble all this risk is avoided. Before such an article as the above is put in the fire, fit a piece of iron round the thin part, so that it is made up to the thickness of the stout part or a little thicker, and bind it on with a piece of binding wire, and coat it with potash, and I will guarantee that it hardens without breaking, because one part then is cold as soon as the other. There are various things that steel can be coated with, such as soft soap, black lead, or plumbers' size; but in hardening in a common fire, or a furnace, the prussiate of potash is the best. In hardening in lead, soft soap, black lead, or plumbers' size answers exceedingly well. In coating of steel, you first get the article just red, draw it from the fire, having the potash already powdered up fine and in a box with small holes in the lid, similar to a grater; shake the box till there is a coat all over the articles, put it in the fire again till it gets to the desired heat, and it is then ready to put into the water, except in very large articles, where there is a great body of steel. It is requisite then to draw it from the fire a second time, and give it another sprinkle of potash, so as to give it a thicker coat. By binding a little binding wire about it it assists to make the potash cling more firmly to it. There are many things that require to be hardened, where the substance of the steel is so great that it is necessary to bore holes about it in different places to make it cool more equally. In very large cutters, some are apt to have the hole where the spindle passes through too small, so that large and small cutters may fit the same spindle; but the larger the cutter the larger the hole should be; or otherwise bore a few holes round the middle hole, so that the substance of the steel is reduced, or it may be reduced by turning it thinner, so as to form a boss each side, thus greatly reducing the risk of its breaking in hardening. But if it happen that any article that has to be hardened has any holes about it near to the very edge, it is then requisite to stop these holes up with a piece of loom, and it will prevent the hole breaking out. Any size cutters, bushes, gauges, rings, or collars, or articles of any description may be hardened without breaking by following the rules I here lay down. Sometimes a steel ring or a cutter is required to have one thin edge; these must be put in the water with the stoutest part downwards, and if the edge is very thin, it must not be put in the water too suddenly. In very large round steel it is sometimes necessary to bore a hole through the center, to allow the water to pass through, and even then it will break asunder if it be drawn backwards and forwards in the tank; this should always be lifted up and down in the water to allow fresh water to pass through the hole, unless when it is under the water; if it be turned on to its side it can then be drawn backwards and forwards with the same result. It sometimes happens that there is a fracture in the steel before it is hardened; this can be detected when the article is in the fire and at a low heat. This fracture is sometimes found in the steel as it comes from the manufacturer, but is very often caused in the forging by excessive heating, and oftentimes the hardener gets blamed for faults which belong to other men. If there is a crack in the steel, when it is just red it can be detected, but hardening will not mend it. It may be useful to some to know that if a piece of binding wire be bound round any article, and a piece of loom wrapped round the wire, the wire merely to keep the loom from falling off, and the article, after drying the loom, may be put in the fire and heated all over, and when sufficiently hot may be put into the water, and the part that has the loom round it will remain soft, because the water cannot penetrate through the loom quick enough to harden the steel. If the loom be on the middle, the ends only will be hard; but if the loom be on the ends, the middle will be hard and the ends soft, and the mechanic will find this plan very useful in many cases. The less frequently the water used for the purpose is changed the better it is for the hardening of steel; therefore, as it wastes, fresh water should be added, and, as it is necessary to clean the tank out occasionally, it would be well, before using fresh water, to make it hot by putting a bar of ignited iron into it, and let it get cold again before using it; for when

quite cold water is used there is always a risk of the steel cracking.

As there is such a variety of different shaped articles, to speak separately of every one would require a whole volume, therefore I think the necessity for a much further minuteness of detail will be removed by a little observation and experience. My mode of treatment of steel in some cases may be classed, perhaps, among those inventions which some are apt to wonder they never thought of, and, like many other things, very simple after they are made known, the simplicity of which raises their value; but simple as they may appear to some, they are facts of great importance in the management of steel. By applying aquafortis to the surface of steel previously brightened, it immediately produces a black spot; if applied to iron the metal remains clean, but looks a little dull where the acid touched it. By this test iron may be known from steel, as the smallest vein of either will be distinguished by its peculiar sign. There are many large things broken by taking them out of the water before they are thoroughly cold; and some people are of the opinion that it is the action of the air on the steel which causes it to break, but my opinion is, that the middle of the steel not being thoroughly cold, and the outside being quite cold, the instant the steel is lifted from the water the middle begins to expand, and the outside being quite hard, the expansion is more than the outside can bear, so it causes it to break. But, be this as it may, it is a real fact that if a large body of steel be taken out of the water before it is thorougly cold, in nine cases out of ten it is sure to break. If a large piece of iron is heated and put in the water, and kept under the water a considerable time, after the outside of the iron is black, and then drawn out of the water, the heat from the middle of the iron will, in a few seconds, turn the outside to a red heat again. Water acts on steel in a similar manner. When first the article is put into the water the water begins to act on the outside of the steel, cooling it gradually towards the middle; and if taken from the water before it is quite cold, the heat from the middle begins to act on the outside of the steel in a contrary way to the water, by straining the outside of the steel more than it can bear; and, in most instances, I have noticed, when I have been trying experiments, that as soon as the water dries on the steel it cracks, and the larger the steel the greater the risk; so it is important that it should be quite cold before it is taken out of the water if the article be any way large.

(*To be continued.*)

Paint Room.

COLOR; ITS APPLICATION, &c.

CHAPTER V.

We will endeavor to illustrate our position with reference to the effects of certain colors according to their juxtaposition, as, for instance, light lines of color on dark grounds, or dark lines of color on light grounds; lines of one color opposed to lines of other colors; and so forth.

As carriages form our theme at present, it may not be out of place to introduce our readers into an omnibus, lined, as they mostly are, with advertising placards of all hues. As a matter of course, we are first struck with Nicoll's "**6** for **40** shillings." How does it always happen that this placard is the first to arrest our attention? The reason is obvious; it is the best in arrangement both as to quantity and color. It has at once the greatest amount of opposition, and the greatest amount of harmony. But let us analyse it. The ground is a positive, though not strictly a primary, blue, having a slight tendency to purple, such as has the color called smalt. The blue is of just that amount of depth which characterizes its color in its integrity, it is not so deep as to be heavy in approach to blackness, nor so light as to lose its power in paleness. In the centre of this mass of blue, is a mass of white—the represented shirt of the advertisement. The form of the object is clearly defined by its surrounding blue background. There is no redundant shading to cut up or reduce the mass of light or white, but just so many lines of shading of the original ground—blue—as to make out—architecturally, so to speak—the figure of the object sought to be represented. On this mass of white are conspicuously posed the most important figures of the picture, forming, as it were, the focus—the Hamlet of the piece—namely, "**6** for **40** shillings." The ground, be it remembered, is blue, a little inclining to purple. Now from the white central mass the figures and letters, above mentioned, stand boldly and conspicuously out in deep rich gold color, enhanced by a broad outline of the original blue, which outline or edging becomes doubly powerful, *as* blue, by the fact of its contact with pure white on the outside, rich gold on the inside; the effect of the ground of white is the giving *depth* to the blue outline, that of the inner gold color giving, by its natural contrast, the power of blueness—purply blueness—to the said edging or outline, and it will not fail to be observed—by those who look for it—that this edging or outline of the figures has gained in intensity by such approximation. Below the white mass, representing the shirt with its inscribed "**6** for **40** shillings," is a label of red, bearing also some inscription—we do not recollect what. Now the introduction of this red is judicious, as making up in the whole picture the complement of color; for there is not enough of purply quality in the blue to effect the balance of color without it. The quality of the red in the specimen we saw, was judiciously chosen, as having somewhat of an orange tint, but we must confess that its brilliancy was not such as to bear up against the purity of the other colors; the same scale or key of color being necessary throughout a picture or a placard, a painted window, or a coach panel, to insure harmony, and pleasurable excitement.

Let it not be thought that we descend from our high niche beside the goddess *Polychromia*, in using mean examples for the illustration of so high a subject of science. We are fully aware of the nobility and dignity of our science, and shrink from no measures, however familiar, however humble, to increase its appreciation and elucidate its principles. Ere, however, we betake ourselves to another example of the same kind, and to the same end, let us essay an analysis of the foregoing. In order to this, we will cancel the idea of its being a simple shopman's placard. We are not acquainted with Mr. Nicoll, nor do we wear his shirts; but simply take his placard as a piece of colored ornamentation. The ground, we have said, is blue, inclining to purple; that is to say blue having a little red added to it.

Say blue..... 8
red..... 1

Now the complementary color to this will be the gold color.

Say yellow..... 2½
red..... ½

We have thus, to make up the measure, a certain amount of red.

Say red..... 3½

which is added in the mass of red placed at the lower part; but the red has a tinging of yellow.

Say yellow..... ½

and the amount is made up to the number 16, the components of the system.

Red.....	5	Blue.....	8
Yellow.....	3	Red.....	1
Blue.....	8	Yellow.....	2½
	—	Red.....	½
	16	Red.....	3½
	—	Yellow.....	½
			—
			16
			—

This numerical calculation of amounts of color, though it may not be exact, is approximate, at any rate, to the fact. Were it less near it would be less effective.

The placard by its side announces the publication of a periodical, *Once a Week*, and this is its arrangement of color. The ground is a dull yellow or buff color. In the midst of this is a mass of black, with the inscription in white letters. On the yellow ground are vermillion letters in various places.

Now there can be nothing said in condemnation of the white letters on the black ground, but to the red letters on the yellow ground, we have an objection as far as effect is concerned, whether it be in reference to harmony, brilliancy, or—what in this case is of most consequence—clearness.

In the first place, then, the ground is yellow—yellow degraded to a lower tone, and which tells, therefore, for half-tint, or a tone but a trifle lighter than half-tint. On this, in vermillion letters, are the names of the celebrated artists engaged on the work. Vermillion is essentially a half-tint, and nothing else.

Now as it is an object to make these names stand out prominently to the public; *clearness* is of the first importance, and to produce clearness, we mainly depend on opposition, for through opposition we have relief.

It is evident that, as light and dark by contrast produce this, so half-tint opposed to half-tint will *not* produce it, and such is seen to be the case where the half-tint *red* is placed upon another half-tint *lowered yellow*. Independently of the want of opposition as dark and light, we have also a want of opposition in the two hues; one being yellow, the other yellowish red; the one being anything but the complementary of the other.

We have quoted these examples to illustrate our remarks, because they are familiar, and are to be seen everywhere.

The omnibus passenger may find plenty of such examples, with opportunities to study them at his leisure.

Deferred.—For lack of space we have been compelled to postpone the publication of an important article on Carriages and the Revenue Tax until our next number.

Trimming Room.

CARRIAGE-TRIMMING EIGHTY YEARS AGO.

As promised in our last issue, we now procced to give our readers some of the peculiarities in trimming as practiced eighty years ago, in order that they may contrast them with the present modes.

One of the most material things Felton inculcates, is richness in the ornamental appendages to "the furniture" of carriages, and adds, "the colors of the cloth make no difference in the value, except scarlet or crimson, which make an addition of exactly one-third in the price of the cloth." Those generally used for close carriages, are light colored cloths; those for open carriages, are of dark, or mixtures. The cloths should always be of the very best second, if not superfine; but second is what is mostly used. The quilting of the cloth with small ornaments, called tufts, also gives a richness to the lining; these should match the colors used in the trimmings; and the trimmings should be of such colors as are used in the liveries, but of any fancy pattern. The crest or arms lace has a noble appearance; but if the width of it exceed three inches and a half it looks heavy. A fullness of cloth to the seat-falls should always be allowed, and a lace of two inches and a half breadth for the holders used on the plainest occasions; that for binding the falls, pockets, &c., two inches.

Formerly in making swing-holders—those in which the arm rested—a yard and a half of lace was used, and this was furnished at the end with an ornamented button to loop in different holes made in the lace, so as to accommodate the length to the wishes of the passenger. A similar arrangement was made with the glass lifter, so that the window might be "hung to any agreeable height."

Two styles of trimming were applied to coaches; one plain, the other "full ornamented." The plain mode consisted in trimming the pockets, falls and valents, with two-inch lace, and the holders with lace two-and-a-half inches wide. The "full ornamented" had the pockets, falls and valents trimmed with three-inch broad lace of the same width with the holders, and a swing-holder for the arm to rest in. The sides were also quilted with small ornaments, made either of cloth or worsted, and festoon curtains were added to the windows as in modern vehicles; a similar rule applied also to chaises.

A convenience called *a sleeping cushion* was added to traveling carriages, which modern improvements and facilities have now rendered comparatively useless. This was a thin squab faced either with leather or silk, stuffed with soft wool, and quilted. These were added to close carriages for the head or shoulders to incline against. They were sometimes faced on both sides with leather and silk, to be used alternately. Those for the back part of the carriage were generally made smaller, extending only about half the depth of the side one. These "sleeping cushions" were usually bound around with a narrow lace, or with silk ribbon, and fitted to the sides with either buttons or strings. A net work was also placed across the roof inside, between the doors, for holding light parcels, "made either with narrow thin lace, like a tape, or with worsted line," and this net work was so arranged in some instances as to hang on hooks, so as to be detached at pleasure.

Curtains on spring barrels are at least one hundred years old, and therefore cannot be named as modern improvements. They are described by Felton just as we find them in our time. Glass frames were sometimes covered with lace on the inside, and outwardly with cloth. Anciently, glass for the windows was made of such unwieldy thickness, that to accommodate them to the frame, they were necessarily cut or beveled around the edges. This, however, was previous to Felton's day.

From a close study of the prevailing modes of trimming for carriages one hundred years ago, we learn that very little change has been made, except it be in some cases in material, or in the leaving off of such conveniences as were absolutely necessary in long journeyings, before such inventions as railroads were known. True, they did not use such fine fabrics as cotelines, reps, &c.; nor did the simplicity of the age demand them; but in the principal features, very little advancement has been made in trimmings for carriages for a century past. Our ancestors seem to have so far monopolized all possible improvements in this direction, that the modern trimmer has only "to tread in the steps of his illustrious predecessors," without hope of much excelling the past in his line of business.

In some points—we are sorry to say it—we think the modern taste has declined. Felton inculcates that the tufts and other ornaments should match the linings, but in how many parts of the land do we find these precepts unheeded—how much of the opposite do we find in practice. As we have previously given our idea of the "taste required in carriage-trimming," we have only to refer the reader to the article given under the above head on page 83, volume IV., for any extended remarks.

In closing this article, permit us by way of apology to add: that in our editorial career, as the conductor of this department, we have always found greater difficulty in giving our readers variety here than in any other. Whether this comes from the *literary* poverty of the craft, or from the *lack* of improvement, we leave for the judgment of others. This much we can say, we have tried our best to call out talent, but in vain.

Editor's Work-bench.

TEN DAY'S ABROAD.

About four years since (see vol. IV., page 173), we paid our Eastern friends a visit, but under quite different circumstances from those of which we now attempt the narration. Then the carriage-business was conducted under less embarrassments and with far brighter hopes—untrammeled with taxes, such as we now find "grievous to be borne." Then every brother-craftsman exhibited a cheerful and happy countenance, elated by the hope of receiving some reward for his labor. But unavoidable change has altered matters materially. In our travels, we find almost every manufacturer complaining of the exorbitant costs of material, and the little hope they have left of ever realizing any profit from the sales of their carriages, should they succeed in selling. As we have elsewhere considered these matters more in detail, we must pass on to the relation of some of the incidents connected with the historical part of our travel.

Stepping on board the steamer Elm City, the next morning, after a pleasant voyage and a night's rest, we found ourself safely moored at the long wharf in the City of Elms. Having secured accommodations at the Merchant's Hotel and made a hasty toilet, we were ready for seeing our friends in that once famous place for manufacturing carriages. But what a change! Before the rebellion, there were some thirty-five shops in full operation, now we found a great many closed entirely, and others doing but very little. Probably, not more than one-quarter the business is now done that there was once. The rebellion in the South was unfortunate for the craft as a body, as well as to our Newark and Rahway friends. The work made, however, is of a much better class than formerly, and intended almost solely for a northern market. At present, a little is shipped to New Orleans, and it is hoped, that when Farragut has again opened the port of Mobile, under the prestige of Federal arms, that to some extent, there will once more be a market for their carriages. By far the largest proportion now finds a sale among the dealers in New York and Boston, a portion being sent to Chicago.

Four years ago, there was a single establishment in which apparently carriages enough were made to supply the whole country on the cheap plan—but which has since *fizzled out*, and is now in other hands. Not one of the former managers is now living in the State, nor are they in the carriage business—having left, some of them clandestinely, and we understand set up mining—instead of longer *undermining* the carriage business—in Colorado.

Previous to our visit, we expected to find many of the copperhead persuasion in New Haven; but it is a great relief to find them decidedly Union with one or two exceptions; and although they have lost much by "*our* Southern friends," their chief hope now, as some express themselves, is, that the rebels may get "a good licking," and that if this should be the case, they would be content to put up with the loss of all sums due them in the South.

Through the kindness of Mr. W. Jennings, the ingenious and gentlemanly foreman of Messrs. Lawrence, Bradley & Pardee, we were shown through their large establishment, and had the opportunity of seeing for ourselves, how nicely their business is conducted, and also of viewing some of the finest specimens of carriages built in New Haven. We also, in this visit, made the acquaintance of Mr. Wells, of the firm of Wells, Cruttenden & Co., where we were shown some of the best specimens of carriage-building it has ever been our fortune to inspect. Mr. Wells, as many of our readers know, has the reputation of being one of the ablest mechanics in the trade, and

we are gratified to find that he takes much interest in the success of our publication.

After leaving New Haven, our next visit was to Ives' Station, on the line of the Canal Railroad. Mr. James Ives, who occupies the premises formerly rented by the now defunct Ives & Pardee Manufacturing Company, received us very cordially, and showed us no little attention. This gentleman is known as the inventor of some of the most important improvements made in hardware as connected with harness-making during several years past. We shall never forget the pleasant visit we enjoyed on this occasion, caused by the attention shown to us, until then, a stranger.

Further on, at Plantsville, we found our friends, H. D. Smith & Co., full of business as usual. This establishment produces many of the most important articles used in the construction of carriages. We hope to have their advertisement in time for presentation to the public on the cover of this number. After tea, by the kindness of our host, the senior partner, we were driven in a buggy, six miles, to Plainville, thus avoiding the necessity of waiting for the train until the next day—a great kindness on his part, and a saving of at least one-half day's detention in our journey.

Plainville is a small village located at the junction of the Canal and the Fishkill, Hartford & Providence Railroads, containing three very fine shops, where a great quantity of carriages were once manufactured for the Southern market. The rebellion in the Southern States has so crippled the manufacturers, that, with the exception of a little in one shop, for the California market, comparatively nothing is doing. From this point we changed our course, and by the Fishkill, Hartford & Providence Railroad passed on to Hartford. There we found our friends, S. N. Hart and L. Mansuy, who conduct the business of the two chief shops in the place, with a medium share of business on their hands. These gentlemen both received us with much kindness, and are both our patrons.

In Hartford, a "Carriage and Wagon Makers' Protective Union" was formed last March, the object of which, as taken from their published report, is as follows:

"The undersigned, carriage and wagon makers of the city of Hartford, in view of the largely increased costs of materials and labor in said trades, rendering it a loosing business at rates heretofore charged, do hereby agree, jointly and mutually, hereafter to make, repair and sell work in said trades, at prices and rates not less than those set down in the tariff herein contained, until two-thirds of the subscribers, upon due notice to all, shall direct otherwise; and for the strict and unvarying observance of this agreement we pledge our personal honor each to the other."

This pamphlet is signed by the President, Geo. S. Evarts, and thirteen others. We subjoin a few particulars from the Scale of Prices, that our readers may have a picture of carriage-making as it stood in Hartford last spring, premising that the committee are at present discussing the propriety of getting out a revised Scale, to meet the requirements of advancement in the rise of carriage materials of every description since:

Repairs to chaises.—Woodwork—shafts, $18; springs, $7; wheels, $15; gearing, $30. Painting—body, $16; wheels, $7; gearing, $14.

Repairs to open top buggies.—Woodwork—body, $18; gear, $26; shafts, $4 (ironing $5); wheels, $16; whippletree, $1; axle-stock, plain, $1 50; spring-bar, plain, $1 50; head-block, $2; reach, 75 cents. Painting—body, $12; gear, $12; shafts, $2; wheels, $6. Trimming shafts, $2 50.

For painting coaches and six-seat rockaways—when the old paint is taken off, $75; and when not taken off, $52. For painting a buggy—where the old paint is taken off, $22; and without taking off, $12. We give these prices, not as standards, but for the information of the proprietors of some of the "one-horse shops," now working for a mere pittance in many parts of our country. Prices ought to rule in the country at least 25 per cent. higher, to meet the increased costs of everything purchased now. But the length of this article will oblige us to defer further detail until next month.

STATE OF TRADE.

HAVING just returned from a trip to Boston and the intermediate cities, we feel ourself somewhat qualified for reviewing the effects the late tariff placed upon our industrial interests is having upon trade. We found, everywhere, a general complaint that the high prices for labor and material had so enhanced the prices in the costs of getting up new work, that very few felt willing to invest their limited means in a business so precarious as carriage-making is now likely to become. The consequences are that many men are getting out of work, and trade, generally, is very dull.

As applied to carriage-making we are convinced that our government has laid it on us a little too heavy; and that, unless some relief is afforded, the golden-egg-producing-goose will speedily die. The tax of three per cent. on new work, as formerly laid, was full onerous enough; but the piling of five per cent. upon so large a proportion of articles already taxed, as are found in our carriages, *is a little too thick*. Not content with this, our sage law-givers must have a *dig* into the profits of repairing old carriages, and therefore tax us three per centum when, by such repairs, they increase the value thereof to the amount of ten per centum. But right here a difficulty presents itself. Who can tell, in most instances, when this value accrues? Certainly, the carriage-maker cannot

judge; nor can his customer determine. A third party will not in all cases be competent, unless he cuts the matter short, as we were told the wiseacre over affairs at Taunton, Mass., has done, by taking a wagon to pieces and laying on the tax in sectional proportions: for instance, he says, when the carriage-maker takes off a wheel and makes *that* a tenth part more valuable, by repairing, the law obliges him to pay the tax, without reference to the remaining portion, in estimating the value. Such a decision entitles Uncle Sam's servant, in our opinion, to some *higher* position—a position where carriages are unnecessary. Under what rule of arithmetic has it been discovered that the value of wagons is increased by taking off the wheels? This law, as applicable to repairs, will without doubt cause us much trial and vexation, and ought to be repealed.

We have visited sixty or more manufactories, and the invariable question was asked, "What is the feeling in New York with regard to manufacturing carriages under the present high rates of costs?" Shall we tell our readers that the craft are more united in the opinion that it is suicidal to build carriages now than we have ever known them to be on a single question before, and why? Because a general belief has seized their minds that the public will never pay such high prices as they must charge for their manufactures in order to live. Some, in fact, who have already ordered carriages to be made, have now backed square down and refuse to take them. A leading house in this city has had some experience in this line; and many are discharging their hands, and studying economy, so as to be prepared for the storm they apprehend is gathering not far in the distance.

Trade in Boston is now better than it is farther west, or in any other place lately visited, the prices for new work being about the same as they are in New York for the same description of vehicles. A great deal of pains is taken, in the best shops, in the finish. In trimming, we think the Bostonians particularly excel. We saw many jobs which would be "good for the sore eyes" in some other localities.

We are told that the following is the value of top-buggies, in the Boston market, at present: for a Goddard made buggy, $750; for one of Hall & Son's, $600; and other less renowned city makers', $450; for a country made (Amesbury), from $350 to $400. This may be "gossip." We merely state what was told us by a resident fellow-craftsman, and offer it, for what it is worth, to our readers.

EDITORIAL CHIPS AND SHAVINGS.

Boston Styles.—We would announce to our Eastern subscribers, that we have made arrangements with competent artists, for giving at least, each month, one drawing suited to the wants of their section of country, in the hope of making our journal more generally useful to them, as well as to present our friends generally with a greater variety than we have heretofore done. The first design under the new *regime*, will appear in our October number.

A Word to Patentees.—We have, during the past month, had offers to take part in getting out patent-rights under certain conditions, which, should we accept, would make us interested therein. What we wish to say is, that we are not, nor will we mix ourselves up with such matters, as long as we publish this Magazine, and therefore it is useless to make any propositions of the kind. All notices of individual patents must be paid for, a distinction regarding their insertion being made between tools and carriages in connection with such advertisements, when admitted to the inside pages.

Taxes on Coaches and Vehicles.—The following regulations concerning the assessment and collection of the tax in the gross receipt of stage coaches and vehicles were issued, on the 16th of August, by Mr. Harrington, Acting Secretary of the Treasury.

By section 103 of the Act of June 30, 1864, every person, firm, company or corporation, owning or possessing, or having the care and management of any stage coach or other vehicle, engaged in the business of transporting passengers or property for hire, or in transporting the mails of the United States, is subject to a duty of two and one-half per centum upon the gross receipts of such stage coach or other vehicle, but the mode and time of assessment and collection of such duty are not provided. In accordance with the provisions of section 176 of the said act, it is therefore prescribed that any person, firm, company or corporation owning, possessing or having the care and management of any stage coach or other vehicle engaged as aforesaid, shall, within ten days after the first day of each and every month, make return to the Assistant Assessor of the District, stating the gross amount of their receipts for the month next preceding, which return shall be verified by the oath or affirmation of such owner, possesser, manager, agent or other proper officer, in the same manner and form as prescribed in the case of the returns of railroads, steamboats and other vessels; and shall, also, on or before the last day of the month, pay to the Collector of Internal Revenue the full amount of duties which have accrued on such receipts for the month aforesaid.

LITERARY NOTICES.

The *New England Historical and Genealogical Register and Antiquarian Journal*, for July, has come to hand, filled, as usual, with matter found nowhere else in the whole range of literature. This publication, issued more particularly for the benefit of New Englanders and their descendants, ought to have a larger circulation than it has ever yet received. It is issued quarterly, each number containing 96 pages, 8vo., making an annual volume of nearly 400 pages, by Joel Munsell, 78 State Street, Albany, at the low price of $2.00 per annum.

The principal contents of the August number of the *Atlantic Monthly* are, Charles Reade; How Rome is Governed; Concord; What will Become of Them; Head Quarters of Beer-Drinking; Friar Jerome's Beautiful Book; Literary Life in Paris; The Little Country Girl; Sweet-briar; House and Home Papers; The Heart of the

War, and Our Recent Foreign Relations, etc., a rich treat for the literary gourmand, and food for all minds.

The publishers, Messrs. Baker & Godwin, have placed in our hands a volume of the new *U. S. Excise Tax Law*, containing 112 pages of matter, indispensable for every business man, for which they only charge 50c. Everybody should have it at once.

CURRENT PRICES FOR CARRIAGE MATERIALS.

CORRECTED MONTHLY, BY MR. CHAS. WEEKS, FOR THIS MAGAZINE.

NEW YORK, August 23d, 1864.

Apron hooks and rings, per gross, $1.50.
Axle-elips, according to length, per dozen, 75c. *a* $1.40
Axles, eommon (long stock), per lb, 15e.
Axles, plain taper, 1 in. and under, $7.50; 1⅛, $8.50; 1¼, $9.50; 1⅜, $10.50; 1½, $11.50.
Do. Swelled taper, 1 in. and under, $9.50; 1⅛, $10.75; 1¼, $12.75; 1⅜, $15; 1½, $17.50.
Do. Half patent, 1 in. and under, $11.50; 1⅛, $13.25; 1¼, $15; 1⅜, $17; 1½, $19.25.
Do. Smith's New York half patent malleable iron box, 1 in. and under, $10; 1⅛, $12; 1¼, $14.
Do. Saunder's improv. taper, ¾ in., $11.50; ⅞, $12.75; 1, $12.75; 1⅛, $15.25; 1¼, $17.
Do. do. Homogeneous steel, ⅝ in., $15; ¾, $16; ⅞, $18.50; long drafts, $4 extra.

☞ These are prices for first-class axles. Makers of less repute, cheaper.

Bands, plated rim, under 3 in., $2.50; over 3 in., $3.
Do. Mail patent, $3.50 *a* $5.00.
Do. galvanized, 3½ in. and under, $1; larger, $1 *a* $2.
Basket wood imitations, per foot, $1.12.

☞ When sent by express, $2 extra for a lining board to a panel of 12 ft.

Bent poles, eaeh $1.25.
Do. rims, under 1¼ in., $2.25 per set; extra hickory, $2.50 *a* $3.50.
Do. seat rails, 50e. eaeh, or $5.50 per doz.
Do. shafts, $6. *a* $7.
Bows, per set, light, 90e.; heavy, $1.25.
Bolts, Philadelphia, 25 per eent advanee on list.
Do. T, per 100, $3 *a* $3.50.
Buekram, per yard, 50e. to 60e.
Buekles, per gross, ½ in., $1; ⅝, $1.20; ¾, $1.45; ⅞, $1 80; 1, $2.40.
Burlap, per yard, 50e.
Buttons, japanned, per paper, 30e.; per large gross, $3.
Carriage-parts, buggy, earved, $4 *a* $5.50.
Carpets, Brussels, per yard, $3; velvet, $4.50 *a* $6.25; oil-cloth, 85e. *a* $1.10.
Castings, malleable iron, per lb, 20e.
Clip-kingbolts, each, 55e., or $6 per dozen.
Cloths, body, $8 *a* $10; lining, $6 *a* $6.50. (See *Enameled.*)

☞ A Union cloth, made expressly for carriages, and warranted not to fade, can be furnished for $3 *a* $4 per yard.

Cord, seaming, per lb, 45e.; netting, per yard, 5c.
Cotelines, per yard, $8 *a* $12.
Curtain frames, per dozen, $1.25 *a* $2.50.
Do. rollers, each, $1.25 *a* $1.50.
Dashes, buggy, $1.75.
Door-handles, stiff, $1. *a* $3; eoaeh drop, per pair, $3 *a* $4.
Drugget, felt, $2.
Enameled cloth, muslin, 5–4, $1; 6–4, $1.35.
Do. Drills, 5-4, $1.40; 48 in., $1.55; 5-4 A, $1.55; 48 in. A, $1.75
Do. Dueks, 5-4, $2; 50 in., $2.20; 6-4, $2.40.
Enameled linen, 38 in., $1.05; 5-4, $1.20; 6-4, $1.35.
Felloe plates, wrought, per lb, all sizes, 25c.
Fifth-wheels wrought, $2 *a* $3.
Fringes, festoon, per pieee, $2; narrow, per yard, 18e.

☞ For a buggy top two pieces are required, and sometimes three.

Do. silk bullion, per yard, 50e. *a* $1.
Do. worsted bullion, 4 in. deep, 50e.
Do. worsted earpet, per yard, 8e. *a* 15e.
Frogs, 75e. *a* $1 per pair.
Glue, per lb, 25e. *a* 30e.
Hair, picked, per lb, 75e. *a* 95e.
Hubs, light, mortieed, $1.10; unmortieed, 75e—eoaeh, mortieed, $1.75.
Japan, per gallon, $4.75.
Knobs, English, $2.50 *a* $3 per gross.
Laees, broad, silk, per yard, $1.20 *a* $1.50; narrow, 15c. to 20c.
Do. broad, worsted, per yard, 50e.
Lamps, coach, $20 *a* $30 per pair.
Lazy-backs, $9 per doz.
Leather, collar, dash, 35c.; split do., 22c. *a* 25c.; enameled top, 37c.; enameled Trimming, 35c.; harness, per lb, 75c.; flap, per foot, 30e.
Linen, heavy, a new artiele for roofs of coaehes, $1 *a* $1.25 per yard.
Moquet, 1½ yards wide, yer yard, $10.
Moss, per bale, 12½c. *a* 15e.
Mouldings, plated, per foot, ¼ in., 14e.; ⅜, 16e.; ½, 18e.; lead, door, per piece, 40c.
Nails, lining, silver, per paper, 12e.; ivory, per gross, 50e.
Name-plates.

☞ See advertisement under this head on 3d page of cover.

Oils, boiled, per gallon, $2.10.
Paints. White lead, extra, per 25 lb $5.25; Eng. pat. black, 40e.
Pekin cloth, per yard, $5.

☞ A very good article for inside coach linings.

Pole-crabs, silver, $5 *a* $12; tips, $1.60.
Pole-eyes, (S) No. 1, $2.75; No. 2, $2.90; No. 3, $3.10; No. 4, $4.25 per pr.
Sand paper, per ream, under No. 2½, $5.75; Nos. 2½ & 3, $6.25.
Serews, gimlet.

☞ Add to manufacturer's printed lists 20 per ct.

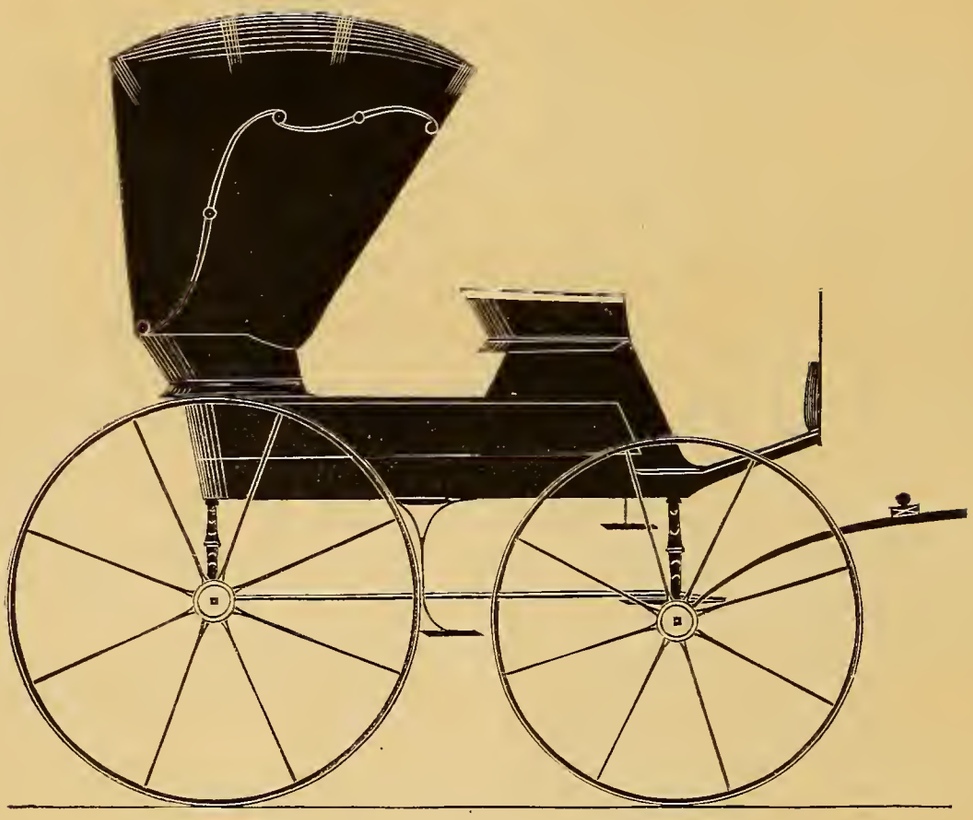
Do. ivory headed, per dozen, 50c. per gross, $5.50.
Scrims (for canvassing), 35e. *a* 45c.
Seats, buggy, pieced rails, $1.75; solid rails, $2.50.
Shaft-jacks (M. S. & S.'s), No. 1, $2.80; 2, $3.25; 3, $3.50; 4, $4.75.
Shaft-jacks, common, $1.65 *a* $1.80 per pair.
Do. tips, extra plated, per pair, 37½c. *a* 56c.
Silk, curtain, per yard, $2 *a* $3.50.
Slat-irons, wrought, 4 bow, $1.12½; 5 bow, $1.25 per set.
Slides, ivory, white and black, per doz., $12; bone, per doz., $1.50; No. 18, $1.75 per doz.
Speaking tubes, eaeh, $7.25.
Spindles, seat, per 100, $1.50 *a* $2.50.
Spring-bars, earved, per pair, $1.75.
Springs, blaek, 30½c.; bright, 31½c.; English (tempered), 35c.; Swedes (tempered), 37c.; 1¼ in., 1c. per lb. extra.
If under 36 in., 2c. per lb. additional.

☞ Two springs for a buggy weigh about 28 lbs. If both 4 plate, 34 to 40 lbs.

Spokes, buggy, per set, $4.20, or about 7c. each for all under 1½ in.

☞ For extra hickory the charges are 10c. *a* 12½c. each.

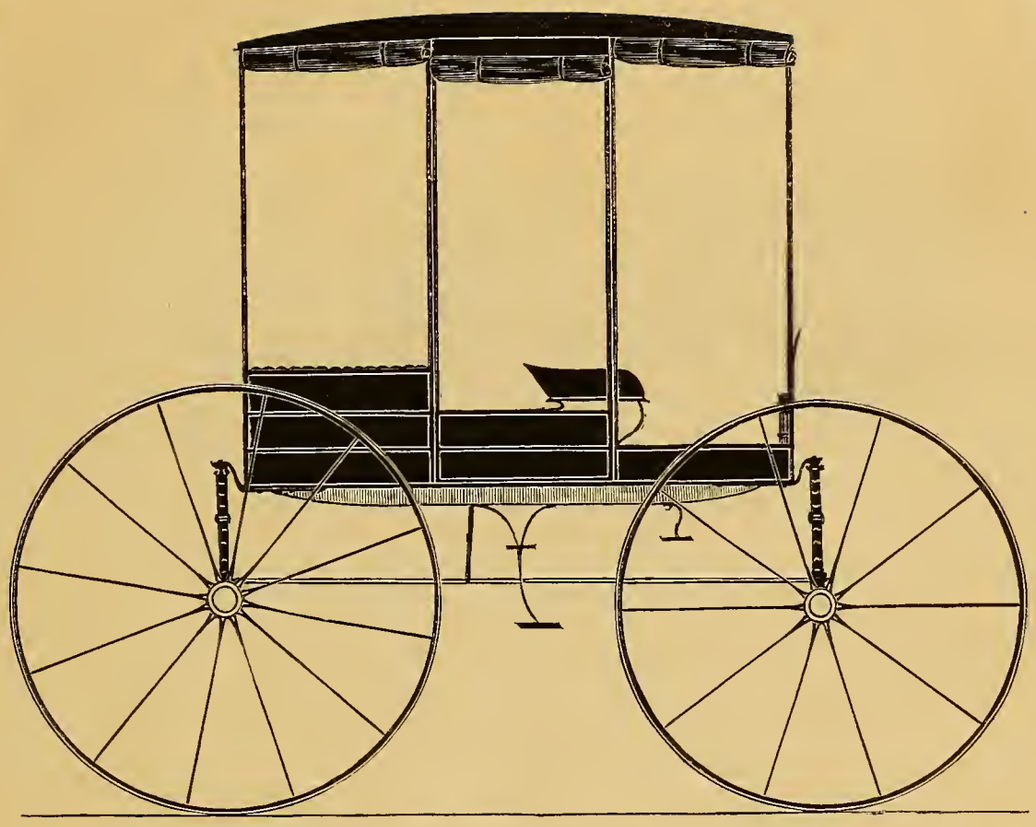
Steel, Littlejohn's eompound tire, 1-8 & 3-16 thick, 6½c. gold; 1-4 & 5-16 thiek, 6e. gold.
Stump-joints, per dozen, $1.50 *a* $2.
Taeks, 10e. and upwards per paper.
Tassels, holder, per pair, $1 *a* $2; inside, per dozen, $5 *a* $12; acorn trigger, per dozen, $2.25.
Terry, per yard, worsted, $5; silk, $13.
Top-props, Thos. Pat, per set 70e.; eapped eomplete, $1.50.
Do. eommon, per set, 40c.
Do. elose-plated nuts and rivets, 75e.
Thread, linen, No. 25, $1.30; 30, $1.45; 35, $1.65, gold.
Do. stitching, No. 10, 95e.; 3, $1.15; 12, $1.28, gold.
Do. Marshall's Maehine, 432, $2; 532, $2.30; 632, $2.60, gold.
Tufts, eommon flat, worsted, per gross, 20e.
Do. heavy blaek eorded, worsted, per gross, $1.
Do. do. do. silk, per gross, $2.
Do. ball, $1.
Turpentine, per gallon, $4.25.
Twine, tufting, per ball, 35c.; per lb, 60e. to 75e.
Varnishes (Amer.), erown coaeh-body, $5 *a* $5.50; hard drying, $6; nonpareil, $6.50.
Do. English, $7.00 in gold, or equivalent in eurreney on the day of purehase.
Webbing, per pieee, 70e.; per gross of 4 pieees, $2.60.
Whiffle-trees, eoaeh, turned, each, 35e.; per dozen, $3.50.
Whiffle-tree spring hooks, $3 per doz.
Whip-sockets, flexible rubber, $4.50 *a* $6 per dozen.
Do. hard rubber, $9.50 per dozen.
Do. leather imitation English, $5 per dozen.
Do. eommon Amerieau, $3.50 *a* $4 per dozen.
Window lifter plates, per dozen, $1.50.
Yokes, pole, eaeh, 35c.; per doz, $3.50.
Yoke-tips, extra plated, $1.75 per pair.



PARK PHAETON.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

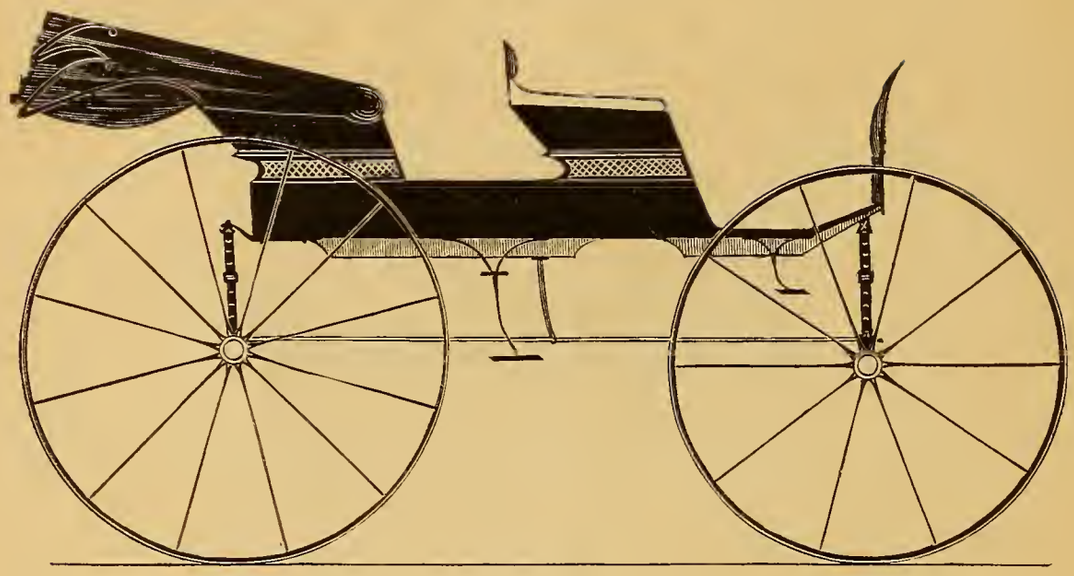
Explained on page 72.



ROXBURY ROCKAWAY.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

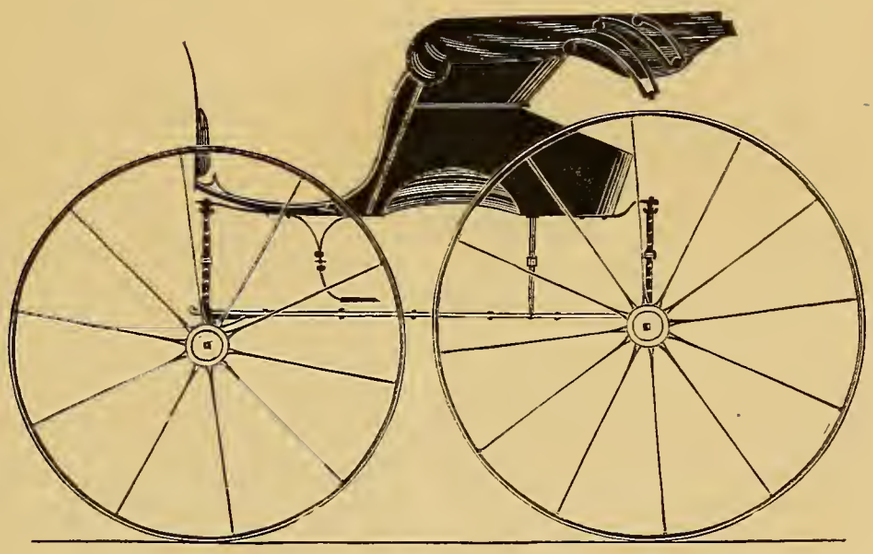
Explained on page 72.



BOSTON ROCKAWAY.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 73.



MANHATTAN BUGGY.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 73.

DEVOTED TO THE LITERARY, SOCIAL, AND MECHANICAL INTERESTS OF THE CRAFT.

Vol. VI. NEW YORK, OCTOBER, 1864. No. 5.

Mechanical Literature.

GLEANINGS FROM HISTORY.

BY THE EDITOR.

In Valentine's Manual we find the following observations regarding the earlier history of carriages:—"In the old Dutch times, the lumber wagon and the sleigh, running upon split sapplings, drawn by pot-bellied nags, whose speed was demonstrated by a methodical dog-trot, was the common order of travel on the road. The horses of those days were of a very poor class, all having been bred wild in the natural woods and pastures which covered the upper part of the island. Many thousands of animals were thus running at large, the only trouble taken by their owners being at a certain season of the year to engage in a common driving expedition, by means of which the animals were collected in a large pound, where the young of the season were branded with their owner's mark, and the whole were then turned loose until the winter snows rendered their protection necessary. Those which were turned out again in the spring were all of the feminine gender, except the bulls and stallions, which were public property, and were devoted to the common use. So great an increase was occasioned by this system, that it is said the island was overrun by animals almost as wild and dangerous as the wild-horse and buffalo of our prairies at the present day. But its consequence was a very inferior breed of animals, and its great economy effectually prevented the cultivation of stock with an eye to improvement of breed. A horse in those days ranged in price from ten to forty dollars, his value being estimated by his strength, almost exclusive of the idea of speed. After the coming of the English, however, and the gradual absorption of the wilderness into cultivated districts, a change in the character both of horse-flesh and in the means of conveyance speedily followed. The national predilection of the English for the pleasures of the road turned attention to the improvement of the breed of horses, and the result was not long in becoming evident in the more respectable character of the roadster. Driving became one of the amusements of the day, and 'half-way houses,' 'two-mile taverns,' etc., found support on the lines of the roads in the neighborhood of the town."

In 1656 some severe laws were made in reference to taking jaunts in boats, wagons and carriages on the Sabbath, especially during divine service. In this same year a stand for country wagons was located on the Strand at the foot of the present Wall street.

Romein Servein was complained of for riding with his car on the Strand (under Dutch government) on Sunday, also for sitting on his car while driving, and fined by the "schent" (an individual acting as the police) twelve guilders, and he not paying the fine, the Heer officer was subsequently ordered to lock up the cart.

Cornelius Aersen and Ide Van Vorst, and their servants, were complained of for racing on Sunday evening after sermon "with horses and wagons, and much noise and singing, from which great damage and disaster might have arisen." Fined three guilders against each master.

Cartmen were forbidden to stand on their carts in 1665 while driving through the streets, "as much danger arises therefrom;" but three years afterwards the law was rescinded so far as to permit them to ride, on condition that they drove slowly, and of forfeiting both horse and cart in "case of injury to any person; or in case any person should be killed, the life of the cartman to be under the lapse of the law; and further, that they shall be bound to keep the streets and highways in order."

In 1696, the first hackney-coach was introduced by an enterprising publican on the Bowery road. Private coaches were unknown previous to the year 1700, except that of the governor. After that period, however, there is mention of several coaches owned by leading individuals, the first of which we have any account being that of William Smith (1704). The nearest approach to that conveyance, in popular use, was the two-wheeled chaise for one horse, which was the fashionable vehicle up to the Revolution. The most agreeable drive in the vicinity of the town was called the "monument round," the course being along the roads now the lines of Chatham street and the Bowery as far as Astor Place, thence along a lane running westward to the present Greenwich Lane, and along the latter, passing Wolfe's Monument, to the river road, on the present line of Greenwich Street, and returning along that road to the city. Parties of pleasure by the old post-road also visited Hurlgate Ferry to partake of turtle feasts. Upon this road was a bridge across

the Sawkill (a stream emptying into the East River opposite Blackwell's Island), called the Kissing-bridge; the name of which had been adopted from an old Danish custom, according to which gentlemen were privileged to salute their lady companions on crossing every bridge.

As to the custom of riding on horseback, the lady did not in early times, as now, ride alone; but was mounted upon a pillow or padded cushion, fixed behind the saddle of a gentleman, or servant, upon whose support she was therefore dependent. This was a common mode of country travel for ladies in those days, as the roads, except one or two post-roads, were unbroken, and little other than bridle paths. Side-saddles came into partial use early in the eighteenth century. The pacer was the favorite animal under the saddle, and was valuable from its searcity. The housings used by gentlemen were of bright colored cloths, and sometimes trimmed with silver lace, spread under the saddle, which latter was covered with velvet; holsters being common appendages.

William Smith, before alluded to, came into New York about 1686, and was one of the earliest English merchants in this country. It is stated that the wearing apparel of Col. Smith was valued at four hundred dollars; eleven embroidered belts, at three hundred dollars; his silver plate at $400; a bedstead, with a bed and bedding (the latter of silk coverings) ninety dollars; a chest of drawers, of walnut and olive wood, $40; six other bedsteads, with seven feather beds, $150; four twisted rugs, $100; twenty-three cane chairs, thirteen leather chairs, nine other chairs, $30. *A coach with cushions and harness, one hundred dollars;* a velvet saddle and side-saddle, $25; a library, $100, and household linen of the value of $600.

In 1709, the posts which stood along the walks in Broadway were ordered removed, as being no longer eligible for tying horses, and, in 1730, stages were advertised as running fortnightly to Philadelphia from New York, during the winter months.

Governor John Montgomerie, who succeeded Gov. Burnet in 1728, possessed horses and carriages, viz., "one saddle-horse, eight coach-horses, two common horses, two breeding mares, two colts, a natural pacing mare, a four-wheeled chaise and harness, a servant's saddle, a coach with set of fine harness, two sets of traveling harness, brass mounted, with postilion's coat and cap; saddles, with holsters, caps and housings, a fine suit of embroidered horse furniture, with bridles, bits, &c."

It was ordained that the common council in New York, in 1735, may license such ancient cartmen and others who are disabled by old age, sickness, lameness, and other infirmities, as are not able to walk or drive their carts on foot, to sit upon the shafts of their carts, and drive the same for their ease and relief; "provided they drive not their carts faster than a walk, or foot pace, and not a trot, but slowly and patiently."

One Judith Vincent, in May 1, 1736, advertises, in the *New York Gazette*, an Indian servant named Stoffels, "who is a house-carpenter, cooper, *wheelwright*, and is a good butcher also; who is supposed to have escaped in a canow towards Connecticut or Rhode Island." From a notice published in 1737 (July 4), that "there is a ferry settled from Amboy over to Staten Island," and no mention is made therein of carriages, only that "the ferriage is fourteen pence, Jersey currency, for man and horse, and five pence for a single passenger;" we arrive at the conclusion that carriages were very scarce in this locality. The case, however, must have been otherwise in Massachusetts, as we find that, in 1737, a special tax was laid by an Act of Assembly on carriages (imported we presume) and other luxuries, for the maintenance of a spinning institution in Boston, on Tremont street—the Broadway of that city. In 1753, the excise on carriages was renewed for supporting the same institution, then known as the Manufacturing House, where any might learn to spin gratis, and, after the first three months' practice, might be paid for their spinning, for encouraging home manufactures.

The Rev. Mr. Burnaby, who visited this country in 1750, says that more than half the people were Dutch (he refers to New York), and that "there are several houses pleasantly situated up the East River, near New York, where it is common to have turtle feasts. These happen once or twice a week. Thirty or forty gentlemen and ladies meet and dine together—drink tea in the afternoon; fish and amuse themselves till evening, and then return home in Italian chaises (the fashionable carriage in this part of America), a gentleman and lady in each chaise."

About 1762, James Beekman ordered a coach from London. This coach is still preserved by a descendant, Jas. B. Beekman, Esq., in this city, and presents very much the features represented in the drawings shown in our Fifth volume, and which are reduced from larger ones in Felton's work.

And now begins the most interesting period in the history of coachmaking in New York, which research has placed in our hands since we penned the remarks in Volume II., on page 201. The facts there given were principally compiled from Directories in the Library of the Common Council of the City of New York; but the facts which follow precede the publication of the first Directory ever published here twenty-one years, although at this time New York had about 20,000 inhabitants. In 1765, the only coach-makers within the city proper were Elkanah Deane, an Irishman from Dublin, and Samuel Lawrence. There were others who called themselves wheelwrights, such as John Howes, Peter Webber and Jas. Hallett. In those days the law prohibited the use of tires to cart wheels, and this was continued in force down to our Revolution. Under English law time made citizens, and no one could keep a shop or exercise a trade until made a freeman. It was during this year that Governor Colden's English-made carriage was burned by the citizens, who had become incensed against him for so deeply interesting himself in the enforcement of the odious stamp act of the British Parliament, detailed on page 182 of the volume before named.

Three years afterwards, in 1768, the manufacture of carriages was announced as *a new business*, in New York, by Elkanah & William Deane, from Dublin. They brought out their workmen, as they state, from Europe at great expense, and were prepared to make (build) coaches, chariots, landaus, phaetons, post-chaises, curricles, chairs, sedans and sleighs, five per cent. below the importation prices. Without reference to chronology, we would here state that the first coach-springs made in America were by a Mr. Williams from England, who came out as a shop-mate of Grant Thorburn, and for a time is stated to have prospered in business. It will be seen, from a footnote to page 202, Volume II. of this work, that it has been claimed for Massachusetts, that the first carriage ever made in America was built by one White, at Dorchester; but that statement, taken from the *Historical Maga-*

zine, is thrown in the shade, by the above facts, some forty years!

The following names of wheelwrights, with the year in which they first figure, precede those we formerly gave from old New York Directories: 1769, Elias Anderson and John De Witt, Jr.; 1770, Joseph Chartres; 1771, David Shaddle; 1773, David Sawyer.

Previous to the Revolution, when the church stood within the walls of the Fort (site of present Bowling Green), the open fields outside displayed a numerous concourse of country wagons arranged in order, while the horses were let loose to graze on the shady hillside leading down to the water southward.

Among others, at the beginning of the American Revolution, resolutions were formed to abstain from the use of such importations as loaf-sugar, anchors, coaches, chairs (chaises) and carriages of all sorts. This, no doubt, gave encouragement to home trade. We learn from a recently translated work, "Elkings' Hessians in America," which professes to give a journal of the life of an officer in the Hessian corps, during our revolutionary struggle in 1776, and who was stationed on Staten Island, situated in the Bay of New York, that "almost every little farmer had his cabriolet and his black servant" at that time. The following extract will still further interest: "In the morning of the 19th of August [1776], the Brigade began its march, their tents and baggage being packed in wagons. The singular vehicles, small, painted red, and drawn by two little horses, driven by a negro, appeared to the good Hessians new and strange enough."

The winter of 1779–'80 is chronicled as a very severe one, which froze over the Hudson River so hard "that a beaten track for horses, sleighs and wagons was formed." Over this track eighty sleighs with provisions, and a large body of troops, crossed the ice to Staten Island. According to Coxe's View of the United States, in 1792, Winchester, Virginia, contained one or two coach-makers, five or six blacksmiths, and three or four wheelwrights.

MECHANICAL POWER AND FRICTION.

BY HENRY HARPER.

(*Concluded from page* 53.)

All matter is capable of operating with mechanical power, and is likewise capable of being affected by it. When machines are made, the workman should understand wherein they are going to produce mechanical power, also wherein mechanical power will affect his machinery, and direct that effect so that it will not fall on a part that is necessarily weak. Failing to understand and direct disqualifies him for a mechanic, and it is a misnomer to call him such. The name mechanic is an enobling title, if properly applied; but the mere artisan on whom it is so often conferred, is a quite different thing. The case is illustrated by the diversity of practices that wheelwrights maintain in building wheels. Some double the effect that mechanical power has on the weaker part of wheels, others treble and quadruple it, without mistrusting but that they are doing the best thing that can be done. The subject deserves more attention than has been bestowed on it, and it is to be hoped that the time will soon come when it can be discussed without resorting to the flimsy argument of what "every body thinks," and which comes so impertinently from those who have no other knowledge about it.

At this point in our subject we are prepared to show the effect that mechanical power has on wheels, and to which so little regard is paid by many members of the craft. Placing Figure 3 in a vertical position (see page 51) will explain the effect that mechanical power has on wheels when they are in use; taking the lines *G G* for opposite spokes in the wheel, and the angle to the dish (the point *F*) for the bottom, and *D* for the top of the wheel. If this is placed so that the *F G* line is vertical, the heft of the load will rest on the ends of the spoke *F G*, and no lateral power will affect the strength of the spoke, until the power has become so excessively great that it makes the spoke bend a little out of its vertical position. The resisting power of the spoke laterally would not be one-fiftieth part of the same power vertically; therefore, it should be the object of the mechanic to direct the mechanical power that acts upon the strength of the wheel into such a channel as to be capable of the utmost resistance, which, as we have said, is vertical. The line *F E D* represents a plane formed by the rim of the wheel passing around its circumference. This plane is kept exactly in that position by the tire that passes around the rim of the wheel. This tire will bear a strain, lengthwise, twenty times that which can be put on the wheel; therefore, no apprehension need be entertained of its breaking from that cause.

The strain a wheel occasionally gets from the heft of the load—which it is necessary to provide for—has generally one cause: that is, raising the opposite wheel above a level of the other, which shifts the center of gravity more on to the depressed wheel. The strain comes laterally on this wheel, acting as a lever-power. Mechanical science is required to throw this strain endwise on the spokes, so that it will affect them in the same way that the heft would if they were in a vertical position. It is so arranged that the lateral pressure comes on to the wheel at *F*, crowding it towards *A*, or what is the same thing, at *B*, crowding it towards *E*, which makes the resistance at *F*, crowding it in the direction of *A*. The lines *G G* act as levers to create power laterally, and lengthwise, as braces, to support the power that they have created, taken in connection with the line *F E D*, which answers to the tire of the wheel. The lines *G G* are fastened by mortises in the hub at *B*, and into the felloe at *F* and *D*. The strength that supports the spokes from lateral pressure, by the tenons that enter the hub, is of but little account, compared with what is required to support the wheel against these heavy strains. Its reliable support is thrown on the spokes endwise, and the tire lengthwise. As we have said, the former will, if the strain is excessive, bend laterally, so that the power of resistance, in certain cases, will be lost to a considerable extent. Another difficulty that arises from excessive strain on the ends of the spokes is, that they, being of wood and entering into wood, will indent themselves in, and wear away from each other, at the shoulders of both the hub and the rim of the wheel, making the diameter of the wood part to the wheel smaller, thereby loosing some of the support of the tire. For this reason there should not be unnecessary strain put upon the ends of the spokes, although the tire may be able to bear it.

We propose to show that, by different degrees of dish that wheelwrights give to wheels, this pressure on the

ends of the spokes is increased from one to sixteen times, without diminishing the strain on any other part of the wheel. It is a lever-power created by the shape of the wheel, and operating to its destruction: also, that this lever-power is the same that nature has so commonly used in the construction of animals, and is so often used in machinery, without being definitely explained by those who have written on physical science. Supposing Figure 3 to be a wagon wheel sixty inches in diameter, having six inches dish: without counting the support that the wheel gets from the tenons of the spokes, it will be a lever-power of the same capacity, in proportion to its size—which is five to one—that has been described in the oil-press. With this proportion of dish, if there is a power of one hundred pounds applied laterally at *B*, and resisted laterally at *F*, the increase that the lever-power gives—which is five to one—is thrown on the ends of the spokes, making five hundred pounds. As we have seen in the oil-press, this lever-power is doubled when it arrives at a middle point, between *B* and *F*; therefore, if it had only three inches dish, with the same lateral strain, the pressure on the ends of the spokes would be one thousand pounds. Dividing it again, to one and a half inches dish, the strain on the ends of the spokes would be two thousand pounds. Reduce the dish again to three-fourths of an inch, and with the same lateral pressure, four thousand pounds is thrown on the ends of the spokes. If it is only three-eighths of an inch dish, the same lateral pressure would throw eight thousand pounds on the ends of the spokes. The difference in the width of the two ends of the spokes is included in this estimate of the dish.

The strength that a wheel derives from the tenons of the spokes entering the hub, in this estimate, must not be set down at all as the lateral force of resistance that the spoke will have before it will break, but as all the resistance that it will have before it will *bend laterally*. Therefore, if a spoke would offer one hundred pounds resistance before it would break, it would be a high estimate to say that it would take one-fourth of that amount to bend it laterally. Estimating it at one-quarter the different amounts of pressure that the same lateral strain would put on the wheels, would reduce the above amounts respectively one-fourth the amount set down. One hundred pounds of lateral strain on one wheel would be all that could be produced, on any uneven surface of ground, with a load of four hundred pounds, including all that part of the wagon where the heft rested on the boxes of the wheels. Our lightest kind of vehicles would be subjected to this strain, yet it is a common custom of those who never have studied the consequences of such practices to give wheels no more than three-eighths of an inch dish, counting, as we do, the convex side of the wheel as part of the dish.

Practical experiments that I have tried fully confirm the supposition that this unnecessary strain destroys the endurance of the wheel. Workmen often say that they give the wheels very little dish, because every time the tire is set it will add to the dish, which gives them so much, after resetting the tire a number of times, that the wheel is drawn out of shape. When we take into consideration the different degrees of bearing on the ends of the spokes, which the same load makes on account of the dish that is given to the wheel, we can see why it is thus drawn out of shape. The tire does not become loose because it is any larger than when it was first set, but because the wheel has become smaller, from some cause. We can trace this cause to but one source, and that is, that the excessive pressure on the ends of the spokes indents them into the hub and felloes, or wears off from the shoulders of the tenons to the spokes, in proportion to the pressure put upon them.

The practical experiment to which I have alluded, is a set of wheels to a one-horse lumber wagon that I had built about ten years ago, and which were ordered to have one and a fourth inch dish. The workman remonstrated; he "never heard of such a thing! why the wheels will be nowhere after the tire has been set a few times! you will not catch me building such work, for the very name of it." The only argument that I could apply to his understanding was, that he would not get his pay for the wheels unless he built them to order, which finally had the effect to produce what he regarded as a foolish whim of mine, and which he wanted to wear out as soon as he prophesied they would.

I used the wagon about seven years—all I wanted to —and my neighbors used it, during the time I did not, all they wanted to, without charge. Among us all the wagon was not kept under shelter any of the time, that I am aware of. The tire did not need setting at the end of seven years, when I sold the wagon to a man who used it for three years more, very much as I had done. The wagon has not had the tire reset yet, and the wheels have only one and a quarter inches dish at this day. It is true the tire needs resetting at this time, and if the wheels were not made with that amount of dish, they would turn wrong side out when a lateral strain is put upon them; but as it is, the tire catches them before they pass their centres and throw the strain on the ends of the spokes. The reason that the tire has become loose is occasioned by the wheels swelling within the tire when wet, so that the pressure was thrown on to the ends of the spokes until they indented themselves into the hub and felloe, which has made the diameter of the wheel smaller. I do not think the tire would want resetting, at this time, had the wagon only been used with ordinary care.

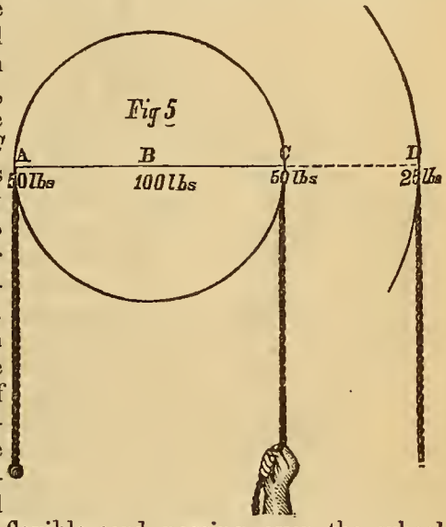
We have only traced this to the effect that the want of proper dish has on light work; come to trace the effect that will be produced on heavy work, such as coaches, lumber wagons, &c., it will appear too extravagant for belief, unless sustained by the clearest mathematical proofs. Draught-wagons are often loaded with six thousand pounds, for two horses, which would subject two of the wheels, on the same side of the wagon, to a lateral strain at one time of fifteen hundred pounds each, which would be the greatest amount that could be produced by an uneven surface for the tread of the wheel without turning the wagon over. If the wheels had but three-eighths of an inch dish, the lever-power created and thrown on the ends of the spokes to each wheel would be one hundred and twenty thousand pounds! Deduct one-fourth for the resistance that the tenons of the spokes give to the lateral pressure, and we still have the actual weight of ninety thousand pounds resting on the ends of the spokes to each wheel. The utmost strain that can be thrown on the ends of the spokes, under the same circumstances, to a wheel that has six inches dish, would be five thousand six hundred and twenty-five pounds, or one-sixteenth as much as would be on the three-eighths inch dish. We can arrive at these estimates accurately when

we know that the power acting on the wheel is the same as that which has been described in the oil-press. This three-eighths of an inch and six inches dish, are two extremes which, occasionally, we find a wagon-maker advocating. Very few will be found advocating the latter extreme; but, could the craft be made to understand the facts in the case as it is, the former class would be ashamed of the absurdity of their position.

The utmost amount of lateral strain that can be put on a wheel by uneven foundation, on which it stands, is one-half of the whole load that rests on the axle. In this case the wheels stand so balanced that all the weight rests on one wheel. This position does not depend altogether on the unevenness of the ground, but upon the height of the load and the width of the track. A load of hay will turn over where it would be perfectly safe to drive a load of sand. The reason is, that the center of gravity in the hay is necessarily—on account of the bulk—higher from the ground than the load of sand. This shows that the higher the load is from the ground, with the same width of track, the greater the lateral strain will be on the wheels on the same uneven ground. Therefore, it should be an object aimed at, for every wagon and carriage-maker to drop his axles as low as they can be without interfering with the ground. This can be done in cities, and all places where the roads are not obstructed by stumps, stones or deep ruts. It is unnecessary to show that the greater the strain put on any machinery, in proportion to its strength, the sooner it will be worn out. Common observation teaches us that the wider the track the less the uneven surface of the ground will affect the strain on the wheels.

The craft have indulged themselves in too many capricious fashions about the height at which they put the load of a wheeled vehicle, and the width of track which it runs on; not seeming to know that in that very act they were determining the strength, durability and, often, the convenience of their work. Those who purchase the work think, of course, the mechanic knows every thing that is required about a wagon, and, if it is only fashionable, there must be some good reason for its being the best. It should be kept in mind, by both the mechanic that builds, and the consumer that pays for and wears out these mechanical constructions, that *from the beginning to the end of time, there never has been, and never will be, one mechanical principle changed.* If our fashions are continually changing at the suggestion of those who never take the trouble to understand the *eternal* principle that *nature* has fixed, they necessarily will be continually crossing that fixed line, and we shall be kept on a continual change from bad to worse, and worse to bad, but seldom in the direct path. If, by chance, the right path is gained, there are no lines for the uninstructed to follow, and he has only gained the point, again to commence his wanderings from the path, and his course will naturally be attracted into that of *fashion*, which is about as senseless a thing as can be done. The slightest change in the position of any one of different parts, to a carriage from the law that nature requires to be followed without deviation, makes a loss of the cost, or, perhaps, ten times the cost of the vehicle, to the one who wears it out. Such are the every day occurrences, and such will be every day occurrences until we strike at the root of the evil, by requiring mechanics to understand the philosophy of the machine they construct.

The operation of the lever-power in a wheel is the same as that of a straight or angular bar. The wheel being a full circle, completes the arc of the circle through which the power on the lever and the power on the weight moves. Therefore, as soon as one part of the circumference of the circle changes position, an exactly corresponding part takes its place and continually keeps up the action of the lever, so that what has been called the "wheel and axle" sometimes has been denominated the "endless lever." Figure 5 represents its action in a circle, of which *B A* and *B C* are the radii or arms of the lever. These arms being of equal length there is an equality of power, which will require fifty pounds at *C* to lift fifty pounds at *A;* consequently it is of no use to apply the power in that form, expecting any gain. Neither can an equality of balance be maintained if one arm is depressed below the other. This difficulty is provided for by the use of a flexible cord passing over the wheel which communicates the action of the power at *A* and *C*, no matter what part of the circumference of the wheel is presented to those points. If we extend the radius of the circle to *D*, the leverage will be doubled, so that twenty-five pounds at *D* will lift fifty pounds at *A*. If we complete the circle of the radius *D*, then, no matter what part of it presents itself at that point, it will double the power in the same way. Further extension will increase it in the same proportion. These are simple features of lever-power, which has been distorted into a distinct power called the "wheel and axle power." A like mistake in the nature of the fulcrum has given rise to an equally imaginary power called the "pully."



The term "fulcrum" is said to be derived from a Latin word meaning stay or prop, and its definition is given as that which supports a lever. There is a distinguishing part to the lever which always acts as a support of both the power *applied* and the power *lifted;* consequently the power expended on this part is double that to either of the other parts. This part is generally termed the fulcrum; why not always so, as long as it maintains that peculiarity defined by the term fulcrum? Nothing seems more plain to my mind than that it should be so; but the idea has crept into science that the axis on which the lever turns is *always* the fulcrum. The axis of the lever sometimes supports one-half, and sometimes the whole of the lever and weight; therefore, according to this theory, it cannot be laid down as a general principle that power can be doubled by using the fulcrum as a lifting power; but, nevertheless, such is the true statement of the case, and the pully is a lever arranged upon that very principle.

In Figure 5 it will be noticed that it takes fifty pounds at *C* to lift fifty pounds at *A*. The point *B* is the fulcrum on which the two fifties are balanced, which, added

together, will make one hundred pounds. The mechanical mind has said, If I can change the supporting power into a lifting one, the power of the same machine will be doubled. To do this he has resorted to the flexible cord, made to pass under the wheel, which would keep the lever in its proper position while it lifted by the fulcrum, as is seen in Figure 6. The end of the cord, by which the power is applied, is fastened at *D*, and the power is applied at *E*. By the revolution of the wheel it keeps the part acting as the lever, *A B C*, in position, so that fifty pounds rest on that part which presents itself at *A*, and fifty pounds is lifted by the part that presents itself at *C*, which gives the fulcrum, *B A*, lifting power of one hundred pounds. This is the simple principle in the operation of what is called the "pully," but which is no more nor less than the lever that has the power applied with a flexible cord. Increasing the number of these circular levers by wheels placed within a block, forms what is called the tackle-block, in which the proportion of power for lifting by the fulcrum is gained that corresponds with the number of wheels in the block; but all act and are governed by the same principle that is here presented in the single lever of Figure 6.

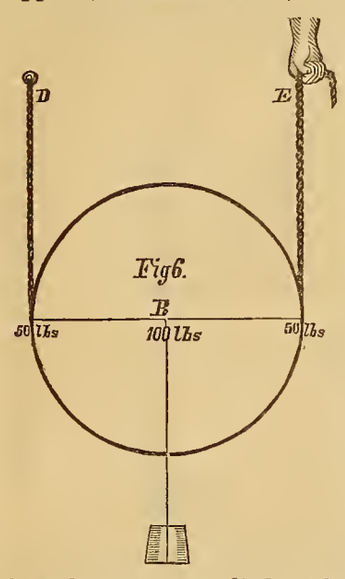


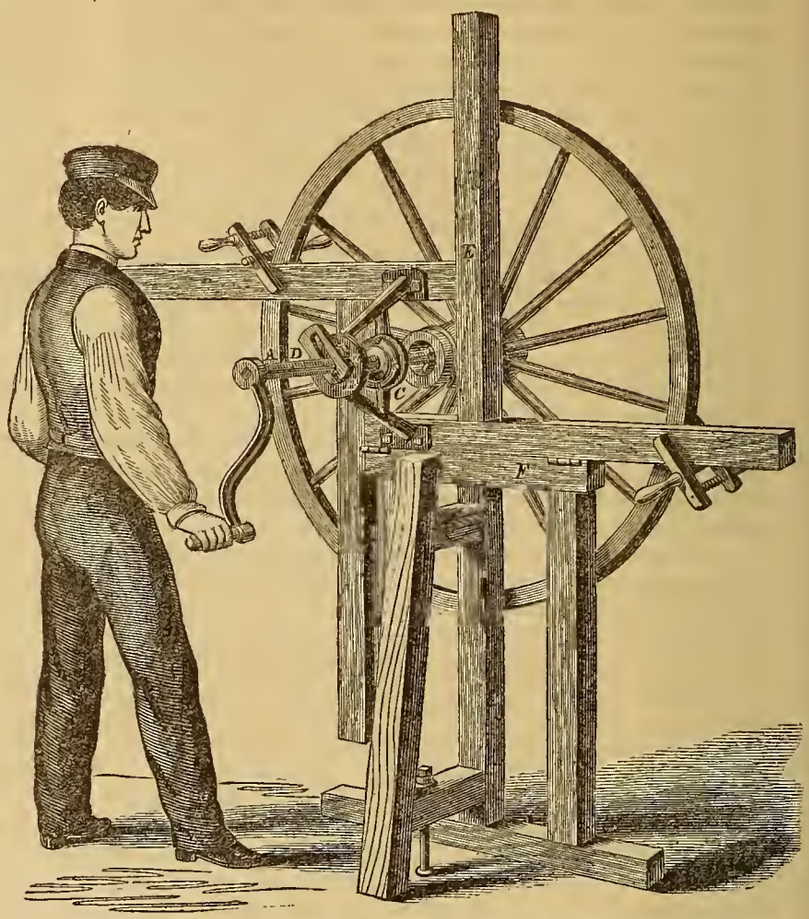
Fig6.

PEARSALL'S IMPROVED WAGON BOX-SETTER.

PATENTED SEPTEMBER 30, 1862.

One of the most essential points in carriage-making is to have the boxes in the wheels set so as to run exactly true. This cannot be done by hand without a great deal of cutting and trying, to the great injury of the hub and waste of time. We have seen many in our mechanical life, all with more or less imperfections. Some centering from the hub and dependent thereon for correctness; a very poor dependence it must be admitted; but the machine here illustrated, operating from the face of the wheel, effectually overcomes all difficulties in at once obtaining a true running wheel. With the hub uninjured by boxing a great advantage is gained, both to the spokes and to the hubs, since a *split-up* hub soon lets in the grease and ruins the entire wheel. This machine bores a taper hole as well as a straight one, and is indispensable in setting boxes for taper-axles—a thing hitherto unaccomplished by other box-setters. The hub is also accessible for trying the box as the work progresses, without going to extra trouble to see if it fits. The following explanations are given, that its operations may be more fully understood:

The shaft, A, is a feed and cutter-bar combined; the end near the workman is carried in a bearing, B, so arranged as to be secured permanently to bore a straight hole, or else permitted to have play, so that the shaft may



move in a circle in order to bore a taper hole. This latter peculiarity is obtained by holding the center of the cutter-bar fast, or so that it may turn merely on its axis, in the socket joint, C.

In this latter detail, there is a nut which nearly fits the socket, and has an oscillatory movement in the case, but does not revolve with the shaft, being prevented from doing so by projections cast upon it, fitting recesses in the socket. This nut gradually feeds the cutter-bar into its work, as the handle is turned. At the outside of the bearing, B, there is a slide, D, which has a diagonal slot cut in it; it works between checks, *a*, so that when the slide is moved one way or the other, the cutter-bar is pushed out of the center to a corresponding degree; it then stands obliquely with the hub, and the machine will then bore a taper hole. The slide is fixed in its place when set to the proper point by a set-screw on the top side. The frame, E, the wheel is fastened to, has hinges at F, so that the wheel can be easily set in its place and made ready for operating upon. This is a very neat, simple and ingenious arrangement for the purpose, and will do all that is claimed for it by the inventor. It was patented on the 30th of September, 1862, by G. T. Pearsall, of Apalachin, and S. A. Garrison, of Union, N. Y., through the *Scientific American* Patent Agency. For machines, territorial rights (except New England and New York State, all but Tioga county, which are sold), or additional information, apply to G. T. Pearsall, sole proprietor, Apalachin, Tioga county, N. Y.

INSTRUCTIONS FOR USING.

The wheel is first centered by marks on frame E, measuring from the hub or rim, as desired, and then secured firmly to the same by hand-screws. The whole is then secured in a vertical position, to bore the hole for the box. Set the knife in end of cutter-bar, A, so that it will cut a light chip the first time through, then reverse the knife and move slide, D, sufficient to make it start with full chip back; proceed in like manner until the desired taper is attained, which can be told by consulting scale on slide, D. If the hole is not then large enough, set out the knife until the desired size is attained. Mark the knife, and observe how much slide, D, is moved by the scale, and it will save time in adjusting the same for boxes of the same size. Make a correct pattern of the size and taper of your box, of a thin piece of wood, to prove your work. By a little practice, a medium-sized box can be set in five minutes.

The price of machine, complete, is $35. Without wood frame, $28. Liberal discount to agents. An agent wanted in every county. State rights sold on reasonable terms.

CERTIFICATES.

I hereby certify, that for the past seven months I have used G. T. PEARSALL'S Hub Borer and, Box Setter, and, having been in the carriage-making business for the last twenty-five years, consider this machine the best adapted to box-setting of any I have ever used or ever seen. It will fit a set of wheels for the boxes in thirty minutes, and fit them perfect with the face of the wheel, boring the hole to fit any taper of the box.

BINGHAMTON, *Sept.* 10, 1863. A. D. STOCKWELL.

This is a very neat, simple and ingenious arrangement for the purpose, and will do all that is claimed for it by the inventor.—EDITORS *Scientific American.*

A MAN OF FIXED IDEAS.

A PORTUGUESE, named Jose Joachin da Grama Marchado, whose establishment of horses, carriages and livery servants was extensive, lately died in Paris, leaving a singular will, which the next of kin pronounced to be the offspring of a diseased mind. He is said to have been a great student of nature as applied to dogs, horses, birds, insects, &c., the results of which he published some years ago, under the title of "The Theory of Resemblances." The following is an extract from the will, as made in 1833, the author of which is charged in French jurisprudence as having "a fixed idea:" "I desire that my body may be kept as long as possible, and put in a leaden coffin. My body is to be taken straight to the Pere la Chase Cemetery. The least possible money is to be spent on the funeral (a useless expenditure of vanity). The model of my tomb is to be that which I made for my starling; this bird, being embalmed, its body will be laid with mine. The model of my tomb is to be sent to Lisbon. My horses are to follow my hearse without being made to drag my carriage. My valet will carry in a cage one of my favorite birds. I particularly prohibit the invitation of any one whatsoever to my funeral. My servants will accompany my body to the grave; that will be a last testimony of gratitude on their part for all the good I have done them."

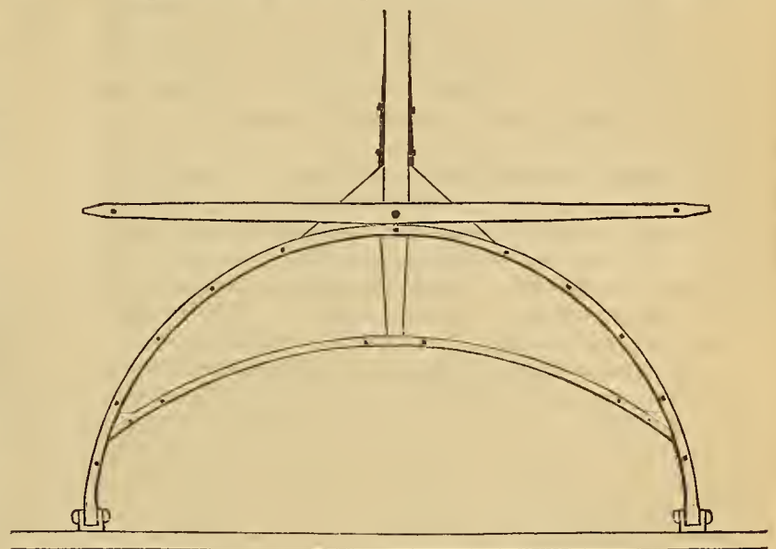
In 1845, another will fixes the funeral idea thus: "I shall be buried at 3 in the afternoon, at the hour when the rooks of the Louvre are in the habit of coming to my house to get their dinner, and only the people in my house will follow the hearse to Pere la Chase. The hearse will be modeled upon that sketched in my anti-room (the funeral of the poor). Six simple mourning carriages, twenty children of the Society of St. Nicholas, and twenty of the Society of Christian Schools will follow; each child is to receive twenty francs," &c.

Finally, in 1854, after bequeathing 20,000f. to the Society for the Protection of Animals, he wills "An annual sum of 500f. to be given to a sergeant de ville, or any other person, who is to stand at the end of the bridge des Saintz-Peres, just opposite my windows, with a placard on his hat, on which shall be written 'Society for the Protection of Animals—J. J. da Grama Marchado.' His duty will be to prevent cart-drivers and cabmen from ill-treating their horses. His hours of duty will be from 12 to 6. The remaining 500f. is to be divided into two parts, and given as a prize from the author of 'The Theory of Resemblances,' to those coachmen who may bring their horses into the stable without whipping them, as is too much the custom."

The Tribunal of First Instance, although holding that the testator was of unsound mind in many things, held that he was capable of making a will, and so declared it valid.

NEW PLAN FOR MAKING POLES.

WE give our readers a drawing of an improvement in making light wagon poles, which appears to meet with much favor in some quarters. The curved portion is formed of bent wheel-rims, and being circular, possesses, in considerable degree, the strength of the arch. The arrangement is so simple that we wonder it was not adopted long ago. In addition to the simple stays, a light plating on the under side constitutes the chief part of the blacksmith's labor in ironing it off. The single whiffletrees are omitted for the purpose of avoiding prolixity. Our drawing is on a three-quarter inch scale.



BLACKSMITHS IN ENGLAND.—The census recently published in England informs us that there are 108,165 blacksmiths of all kinds in the Island of Great Britain. We presume, however, that not more than one-tenth of this number are connected with the carriage business.

FARMER CARRIAGE-MAKERS.

BY THE EDITOR.

Not long ago we gave our readers an extract from the *American Agriculturist*, published in this city, in which a call was made for a family carriage, such as has never yet been, nor is it probable ever will be, built for farmers' use. The subject, it appears, has not been suffered to sleep, as we find from a letter in the *Tribune*, from G. W. Stebbins, of Portland, New York, and which Solon Robinson, one of the editors of that paper, has seen fit to lay before the American Institute Farmers' Club for their consideration. It reads as follows:

"Will it be proper to suggest to the Farmers' Club an improvement in pleasure carriages, so that farmers and their wives, after the exhausting labors of the week, may be spared the acrobatic feat of climbing into a high buggy preliminary to the ride to church; so that aged people may ride without the fuss of carrying out a chair, and without requiring a *boost* from the entire family? How we ever come to have such elevated vehicles I do not know, unless they were first used for their convenience in driving over stumps when the country was new, and are to be retained until some great genius, like that spoken of by Charles Lamb, who taught the people of China how pigs could be roasted without burning down the sty, shall arrive to show us we can just as well ride nearer the ground. If it should be thought advisable that the members of the Club, including 'outside members,' should each have built a carriage after a plan of his own, and then, at a grand carriage show, a premium should be awarded to the best, I should like to be counted in. A broad, sofa-like seat, that might be reached by an easy step, would be the main feature of the one I should offer. I sometimes dream of riding in such an one in the 'good time coming,' when roadside fences shall disappear, and every road shall be like a gravel walk throughout the entire garden of America."

To the above our modern Solon appends some notes which, so far as we can discern, furnishes our "exhausted" agriculturist with no satisfactory remedy for the defects he complains of in our modern pleasure carriages. If Mr. Stebbins will allow us to interfere, we would advise him to take a look at the vehicles our Fall River neighbors are accustomed to use in hauling cotton. As we saw them in our late Eastern journey, we concluded they were just the thing; hanging so near the ground—about fourteen inches—that "aged people may ride without the fuss of carrying out a chair," or any "*boost* from the family." The carriages we allude to have "the broad sofa seat," which, by the way, we think is a capital idea, as our *exhausted* agricultural friends could do their sleeping on the way to church, instead of as now they are in the practice of doing — *snoozing* during "meeting time." What a pity, too, that our critic did not live a century or two earlier, that the carriage-makers of the day might have adopted the low-hanging principle, so that our aged people, when wigs were in vogue, might have had their hair powdered without the trouble and expense of calling upon the tonsorial fraternity. By the way, the ladies of New Jersey will find this *low idea* a capital one, as, in these expensive times, if adopted, it will save enormous expense in the purchase of paint for their lovely cheeks; powder of the right tint being strewed all along the road over which it would be found necessary to travel. We know a lady who obtained a wealthy husband—though poor as Lazarus herself—from merely being seen wearing a dusty shawl, which, in the opinion of her admirer, added romantic interest to her natural charms! Who can tell how many matches might be made simply from riding in these low hung wagons. If they should fail in securing a mate, we predict it would not be on account of the lack of *powder*. And then, too, what an impulse these "low carriages" would give to trade! should it once get abroad that these "exhausted" farmers' daughters, *with dust on their shoulders*, had secured a matrimonial alliance by the use of low-hung carriages, we have no doubt that every unmarried dame in the land would so earnestly importune their dear pa's, that they would find no rest until one was provided for their special benefit. Let the Farmers' Club offer a premium for an improved model of a *low* carriage, by all means, and at once, that it may be forthcoming soon; and let the award be so *high* that it will be an object to bestow some thought on its successful accomplishment.

Taking a mechanical view of this matter, it appears that after all our supposed improvements in the construction of carriages, we have only been dreaming—are still regular "old fogies;" while our agricultural neighbors, by some sudden impulse, have "boosted" themselves into the highest pinnacle of art. It would seem that, while weeding their cabbage gardens, they have made great discoveries in the science of carriage-making. In the expectation that hereafter our subscription list will be enlarged from a new class of artisans, it gives us much pleasure to find them *awake* upon the subject of carriage-making; and we hope that in their further proceedings they will prove to be something more than mere "cabbage-heads."

Pen Illustrations of the Drafts.

PARK PHAETON.

Illustrated on Plate XVII.

An attentive friend has furnished us with this fine drawing of a popular kind of phaeton, for the special benefit of our patrons. As the reader will perceive, the valents of the seats are made to overlap the side panels, which last are made of half-inch whitewood, glued to a properly made frame. The moldings, there represented by white lines, are all put on afterwards, and in our example are so arranged that they very much relieve an otherwise too plain a looking side panel. A city-made phaeton of this kind is now worth about $850 or $900.

ROXBURY ROCKAWAY.

Illustrated on Plate XVIII.

The adjective portion of the name of this vehicle is derived from the circumstance that the first one was built by a carriage-maker of Roxbury, a town in the vicinity of Boston, of considerable celebrity in our earlier history. It is a very popular carriage among our Boston friends just now. For the design from which our engraving is

made we are indebted to our ingenious friend, Mr. J. R. Bartlett, of Boston, Mass. The front seat is made to turn over. The upper portion of the back quarter may be either filled in, or left entirely open.

BOSTON ROCKAWAY.

Illustrated on Plate XIX.

For this we are under obligations to our friend, Mr. Hayden Sargent, of the firm of Sargent, Brewster & Ham, 57 Sudbury Street, Boston, Mass. It makes a very light summer carriage, and will, without doubt, meet the wishes of many of our subscribers. The construction is so simple that our draft will require no special detail in order to be understood.

MANHATTAN BUGGY.

Illustrated on Plate XX.

We take much pleasure in placing this drawing before our readers. In some respects it is unique. It certainly is superior to anything of the kind heretofore produced by our artist. The arch in this example is intended to be scooped out, as in the buggy on Plate XXVII, Volume V. The box behind the seat should be left entirely open.

Sparks from the Anvil.

ON THE HARDENING OF STEEL.

(*Concluded from Page* 59.)

It is not requisite that the article should lie in the water till the water is dead cold, for in some instances the article is wanted for use as soon as possibly it can be had; in such cases, if the article is not too large to go into a handbowl, put the bowl under the water in the tank, and place the article in the bowl, lift the bowl and the article out together, with the water covering the article in the bowl, and then sink the bowl with the article still in it into another tank of dead cold water, or under a tap, with cold water running on it, and it will in a short time be ready to lift it out. But if the article is too large to go into a bowl, put it in a bucket and act as I have stated, and it will then come out safe without a crack, and not crack after it is out. Hundreds of things break by lifting them out before they are cold. I have had very large things to harden that have taken weeks to make, and, had I not taken these precautions, which some are apt to think too much trouble, I should have had many a waster; but trouble I never think about, success has always been my aim, and experience teaches me to give this little information to those that have not had the opportunity of gaining the experience I have had. There are many things cracked in hardening by heating the article all over and then dipping it in the water half-way. Such things as taps, drifts, and numerous other articles should always be hardened all over if they are heated all over, and then, if one part is required softer than the other, it is best to soften it after, or otherwise not to heat it farther than where it is required hard; for if they are heated all over, and you in dipping them in the water stop at any particular part, and hold it still in that spot, if the water is quite cold, in nine cases out of ten there will be a crack at the very spot which is level with the top of the water, and in some cases it will break clean asunder at that particular spot, as straight nearly as if it were sawn through with a saw. But these cracks may be prevented in a very great measure by simply putting the water in motion, or moving the article quickly about when it is in the water, as far as it is required hard; the water is then prevented from acting so evenly round it. Or if a few coils of binding-wire be bound round the part intended to be level with the top of the water, and a coat of potash be put about the wire, there will be no crack there, as it prevents the water from acting so suddenly on it. But in many things where the heat that is on the article is wanted to temper the part that is dipped in the water, such as chisels, drills, and the like articles; these things, when they are dipped to the depth required to harden them, should always be moved quickly about in the water, and it will prevent many a drill screwing off in that particular spot, and prevent many a chisel breaking. I have no doubt that many readers of this little book have noticed when they have been chipping, that their chisels have broken clean off about an inch from the edge, with a very light blow from the hammer, and the cause of that arises, in a great number of instances, from the chisel having been held still in the water when hardening it, for the water cooling it across in a straight line causes the hardened part to tear from the other, yet not sufficient to show till it is struck with the hammer, and then it drops off, and if the break be examined it can be seen that the water did it. But these kinds of articles having the skin on the steel when they are dipped in the water, it prevents the water from having just the same effect on them as it does on articles previously brightened. I recollect once having a quantity of small drifts to harden, and I was requested to keep the heads soft, so I put a certain number of them in a box, with charcoal dust to heat them, and when sufficiently hot I shot them into the water with the intention of softening the heads after; but I found upon examining them that I had a number of them very crooked, owing to their being very slight, and going from the box so suddenly into the water; so I adopted another plan. I heated a certain number together, and taking them out separately, dipped them straight and gently into the water, which answered the purpose so far. But it took a little longer to dip them separately; so, thinking to save this extra time, I thought I would only dip them in the water as far as I required them hard, and that would save me the trouble of softening the part that was not required hard. But not caring about going ahead with any quantity of things till I make myself sure that all is going on well, after I had done about two dozen I examined them, and I did not find one of them but what was cracked at the part that was level with the top of the water, so I dipped the remainder all over, and not a crack appeared in one after. I then made some lead red hot, and dipped the parts that were required soft into it, and accomplished them very nicely. So I think I have said sufficient to convince the reader that what I say is correct, and there are thousands of people that have an opportunity of testing it, and I will speak of nothing but what I have proof from experience to be correct. But to describe minutely the

various kinds of articles that I have had to do with would be more likely to tire than to please the reader. I will, however, give sufficient information, if properly studied, to enable the mechanic to harden and temper anything that comes to hand. It may be useful to warn him that drilling too large a center in articles intended to be hardened is a very great evil, such things as taps, fluted rimers, and such like; for when hardened, if the center is too large, there is almost sure to be a fracture at the bottom of the center; therefore it is best, after the article is finished, to file the center out, if it is not required in; but in some articles the centers are required in them after hardening. But if the hardener should meet with articles that he considers have too large a center in them, and that there is a risk of having a crack in them, if he stop the center up with a piece of loom to keep the water out of it there is little or no danger of its cracking.

I was once working for an employer that had a large order for taps, and he said that he did not approve of cutting the steel down into lengths with a chisel, for he found that a number of his taps had a fracture in them from breaking the steel after it was nicked round with the chisel. This, I will admit, is often the case if a dull chisel is used to nick it round with, and it will not be visible till after it is hardened, and then it shows. Bnt this was not the case in that instance, for when I examined the taps I found that the centers were too large, and at the bottom of the centers there were the fractures. I would advise all those that cut their steel down with a chisel always to keep a good sharp edge on the chisel, for the steel will then break easier and be less liable to splinter. In hardening a number of articles at one time it is best to put them all into a box together with some charcoal dust, let them lie till they have acquired the low red heat called cherry-red, and then empty the contents of the box into the water; they will then be very clean, without scales, and beautifully hard. It is a very good plan for all small taps, and, as it is usual to temper these things to a color after they are hardened, it is necessary to know that they are all hard before beginning to temper them, for it will sometimes happen that there will be some among them that are scarcely hard. If the box has been taken from the fire before it has been properly heated through, then the middle articles in the box will prove not hard enough; so, to make sure of good work, always try them with a smooth file to prove them, for in some instances one bad article would get all the lot condemned, even if all the others were right. But the use of the file can be dispensed with if they are brightened on a buff or a stone, which are the proper things for the purpose; for the persons that brighten them will find, if they are properly hard, plenty of brisk lively sparks fly from them while they are held on the buff, and if they are not hard enough there will be very little fire in them; therefore, with a very little attention, those that are soft can be detected and put aside, and heated again with the next batch. Dies may be put in a box and hardened after the same manner. I have found red-hot lead to be a convenient thing to heat many things in, but to be constantly employed at it, I believe to be very injurious to the health. I have been employed at it for weeks together, and have felt very bad effects from it, and I always avoid using it except in cases of necessity. Still, there are many things that can be accomplished better by heating them in lead than in any other way; such things as long fluted rimers, and various other things that are a great length, for they will always keep straighter by heating them in lead to what they will if they are heated in a common furnace. If the article be very long it must not be put into the lead too suddenly, or it will be sure to go crooked, for plunging a cold piece of steel too suddenly into red-hot lead causes it to go crooked the same as if plunged too suddenly into cold water. These should be gradually put into the lead, and gradually into the water, with a little salt in the water to keep it from bubbling, for it is not everything that can be straightened after it is hard without damaging it, or softening it again. Care must always be taken never to have the lead too hot, or the articles will be spoiled, for they will be found full of little holes if closely examined. Before putting the articles in the lead it is necessary to rub them over with a little soft soap, or mix a little black lead with water, and brush them over with it, or plumbers' size, and they will come out of the water clean, without the lead sticking to them. If the black lead is used, they must be dried before they are put in the lead, for the hot lead is likely to fly if they are put in damp. Soap does not require to be dried.

One advantage in heating large fluted rimers in lead is, if they go crooked in hardening they can be straightened when hard, for as soon as the cutting ribs of the rimer are hot they must be taken out and put in the water. The middle of the steel will then be quite soft, because, being in the lead such a short time, the middle has not got heated through, consequently the middle cannot harden; and if it go crooked, then by laying the rimer on a block of hard wood, or a block of lead, and putting a piece of wire into the grove of the rimer, and striking the wire with the hammer, it can be straightened without breaking it, even when the cutting edges are dead hard. If they are tempered before they are straightened they will straighten the easier. There is little or no danger of breaking them if they are not allowed to get heated all through; such things as these will always be hot on the cutting edges first, and these are the only parts required hard. But in respect to small rimers, they cannot be straightened the same way, for they get hot all through almost instantly they are put in the lead, but are not so likely to go crooked as if heated in the fire. Small rimers, when they have gone crooked, I have taken from the water before they have got quite cold, and placed them between two centers, and given them a blow on the full side with a small mallet, or if laid on a block of hard wood it will answer the same. But there is great risk of breaking them if they are too cold when they are struck with the mallet; therefore, if any prove too crooked to straighten this way it is best to heat them again. In these kinds of small articles the hardener, if he has a large quantity to do, must always expect a little waste; of small ones I used to average about one in two hundred a waster; and in the large size not one in five hundred. Any quantity of articles, such as drills, bits, &c., may be expeditiously hardened by dipping their points in the lead, and cooling them in water; a pair of tongs with long jaws is very convenient for holding a quantity at one time; if the articles are of an unequal thickness, and one jaw of the tongs be made hollow and one flat, a piece of soft wood may be put in the hollow jaw; the tongs will then grip them all; any quantity may be hardened as expeditiously as a single article if there be sufficient lead. Another thing to be observed is, that the surface of the melted lead becomes

quickly covered with a skin, which is the effect of the air on the surface, and it wastes the lead so fast that it becomes an object of importance to those who use much to check its formation, or to convert it, when formed, into the metallic state again. Charcoal converts the dross into metal again; but if a covering of charcoal or cinders be kept on the lead the dross will not form, for, if it is allowed to form, the lead is not only wasted, but it is a great obstruction in putting the articles in, likewise in taking them out. Lead is an excellent thing in which to heat any long plate of steel that requires hardening only on one edge, for it need not be heated any farther than where it is wanted hard, and it will then keep straight in hardening. But if it is heated all over in a furnace and put in the water all over, it will be warped all shapes, and cause a deal of trouble in setting straight, especially to those who are unacquainted with the settting of hardened steel. If it is heated all over, and one edge only dipped in the water, the edge that goes in the water will be rounding, and the edge that does not go in the water will be hollow; this is owing to the steel expanding in hardening, for the steel expanding in hardening causes the edge that goes into the water to get longer, and the other edge being kept out of the water and still hot, the hardened edge expanding longer pushes the other part of the steel round, causing the edge that is out of the water to be hollow. But if it is heated in red-hot lead, and the edge only that is required hard put in the lead, the other part will be quite cold; and when it is put in the water all over, the hot part will not have sufficient strength in it to alter the cold part, consequently the cold part keeps the hardened part true. The colder the water the more effectually it hardens the steel. Brinish liquids produce rather more hardness than common water, but in most cases common water answers the purpose. Water holding soap in solution prevents the steel from hardening; but as there are many things used in machinery that require to possess the greatest possible degree of hardness, it is necessary with such things to use a saline liquid. Gauges, burnishers, and certain kinds of dies require to be very hard, also, a file requires a nice hard tooth. When steel is required to be made extremely hard it may be quenched in mercury. But this can only be done on a small scale.

Paint Room.

SPIRITS OF TURPENTINE.

Much interest is manifested in this subject, from the circumstance that our usual sources of supply have been cut off by the rebellion of the States from which it was formerly chiefly obtained. In consequence, this indispensable article in coach-painting has increased in cost to an enormous sum, when compared with the price paid four years ago. In the earlier stages of the war, before blockade running was as unprofitable and dangerous as it has since become, considerable quantities were captured in the prizes to our naval vessels, but, in consequence of the altered state of things, we are compelled to go abroad for the article once so largely exported to these very same countries. In fact, the genuine American turpentine can scarcely be had here at any price. We have latterly been supplied with what was called English; but the strong resemblance it bears to benzine in smell has prejudiced us against its use. If it is not adulterated, it has at least a quality so unlike the old article, that we have discarded it altogether. In its place we have latterly been using the French manufactured, which our painter says is far superior to the English, and has certainly more of the nature of that formerly obtained from the Southern States.

The manufacture of turpentine is just now receiving the attention of our Canadian neighbors, but whether it will amount to much time alone must determine. They have pines in great variety, and, for the sake of commerce, we hope *the* pine for producing genuine turpentine. There is no evidence that the *Pinus Palustris*, or long-leafed pine, is found in Canada, and probably no species available for producing spirits of turpentine equal to the North Carolinian, as described in Volume Five, on page 57, of this Magazine.

For the encouragement of the Canadian manufacture of turpentine, tar and resin, two prizes for each of these articles have been added to the prize list for the approaching Exhibition. The costs of turpentine imported into the Province in 1859 was $34,518.

A new process of making turpentine has lately been patented at Washington, from which important results are expected. It consists in subjecting the whole of the wood to distillation, so that a larger yield may be obtained from the same tree. This, however, must have one great disadvantage—the destruction of the tree. The wood is cut into lengths of twelve or eighteen inches and split into small pieces, placed in a retort, and closed by a cover—the joint being fluted air-tight, to prevent the escape of vapor, and the uncondensable gases are taken by another pipe into the furnace and burned as fuel. A pipe leads from the under side of the gas-holder down into the lower condenser, where it coils like the worm of a still, and surrounded by water to facilitate condensation. The main condenser extends below the furnace and terminates in a cone, a pipe being provided from thence, leading off the melted resin. Certain stop-cocks are closed and others opened, after a fire has been continued from six to ten hours, and then the heat increased, expelling the remaining pitch from the wood in the form of tar, leaving nothing but the charred wood. Thus much for the patented process, which, if successful, must, in the nature of the thing, prove nothing more than temporarily so.

RANCID LINSEED-OIL MADE SWEET.

M. Fordred, a Frenchman, has recently taken out a patent in France, for a method of restoring the sweetness to linseed-oil that has become rancid from age. His plan is simply to force a current of warm air through the oil, either by means of perforated tubes, or by means of a vessel with a false bottom pierced with numerous holes. The proper temperature for the air is between 110° and 127° centigrade, equal to 230° and 260° Fahrenheit. Sometimes a thick scum forms at the commencement of the operation, but this afterwards disappears. To prevent this scum from taking fire, the vessel should be only half filled.

SOFTENING OLD PUTTY AND PAINT.

To effect this, mix soft soap with a solution of potash or caustic soda, or pearlash and slaked lime, mixed with sufficient water to form a paste. Either of these laid on with an old brush or rag, and left for some hours, will soften paint and putty so as to be easily removed with a chisel.

Trimming Room.

SOMETHING ABOUT HAMMER-CLOTHS.

Hammer-cloths are as old as the days of Queen Anne. It is difficult to fix the exaet period when they were first used, but there is in existence a print representing both Houses of Parliament in a procession to St. Paul's Cathedral, in the reign of "the good Queen Bess," that took place July 7, 1713, to return publie thanks for the peace of Utreeht, in which one is shown (see Volume IV., page 45). Originally its place on the carriage was occupied by a plain box, simply furnishing a seat for the driver, as in our republican times. In fact the hammer-eloth is nothing more nor less than the insignia of aristocracy, in either monarchical or republican countries, and is shown with strange inconsistency in the latter. In this country it is most probably used to cover up *some weakness*, as it was (as some think) to hide a box for the reception of a hammer, pincers, eold-chisel, linch-pins, ropes, &c., necessary for the repairing of *weak* portions of the traveler's carriage in former days. Be this as it may, it has not yet become a permanent "institution" with us, and we hope it never will, for they are but a clumsy appendage wherever adopted. Like everything else of an aristocratic nature, the last one hundred years has added very little to their improvement, as will be seen in Felton's drawings, when these are compared with those made in our age. These eircumstances furnish the best evidenee that hammer-eloths must eventually die out.

In Felton's time, judging from the illustrations he has bequeathed us, no coach was eonsidered eomplete without a hammer-cloth; some of these were elaborate and beautiful specimens of workmanship, rarely equaled in modern times.

He tells us that "hammer-eloths are among the prineiple ornaments to a carriage; they are a cloth covering to the coaehman's seat, made to various patterns agreeable to the occupier's fancy. The fullness of the plaiting of the cloth, its depth, and the quantity of trimmings thereon, proportion the expense to almost any amount; but those of the general sort are made of a livery or seamed cloth, of six breadths, which measure nine yards round, and about twenty-eight inehes deep, lined with a strong coarse linen; the size of the seat, in a great measure, regulates the number of breadths of eloth to be used; as the same fullness would appear with five breadths on a seat of three yards round, as six breadths on a seat of four yards, whieh is the general size now in use, and no hammer-cloth ought to be made with less. The top rows of fringe and laee are put on after the hammer-cloth is made up, and takes no more in quantity than what the seat measures; the others extend round the fullness of the eloth."

It was usual, in olden times, to have a covering to hammer-eloths in wet weather; these were of three sorts—the common oiled linen, the painted linen, and the painted prepared woolen or patent eloth. The first two are said to have been of little serviee, soon wearing out; the last wearing as long as two of the others, but far more expensive. It was made of thin woolen eloth, and painted of various patterns to suit the eolors with whieh the earriages were painted. "The tops of these were all made with a ridge on eaeh side of the coachman's sitting place, which makes a ehannel to convey the wet from running under him, and has also thin boards placed up the four corners to preserve the shape." Some of these hammer-cloths cost, in 1800, as much as £18 12s., and eontained nine yards of eloth and seventeen of broad laee.

The above gives us a very good idea of hammer-cloths as made in earlier times. The etymology of the word *hammer-cloth* is still a disputed question. On this point we are not now disposed to enter. Those who may have sufficient curiosity to study will find the whole subject already examined in Volume Five, page 107, of this Magazine.

Editor's Work-bench.

TO CARRIAGE-MAKERS.

Never did publishers in this country experience more trying times in making both ends meet than they do at present; and to keep above water, some have been obliged to lessen their pages and raise their prices the second time. Although we are using paper worth 33 cents a pound, whieh formerly could be purehased for 11 cents, and paying 95 cents per thousand ems, instead of 45 cents, for setting up the type (the old price), yet we shall not increase our charges for subscriptions before the close of this volume. Formerly we had a very large advertising patronage, which very much aided us in meeting expenses. This, however, has been mueh reduced by the force of eireumstances—our national troubles—making it almost useless for dealers in carriage materials to advertise, because, as they tell us, they cannot get goods made in sufficient quantities to supply the demands of customers with the present scarcity of hands, and therefore need not resort to such means. Under this deprivation we are obliged to rely almost solely on the subscriptions of our friends, and ours being a very eostly work—almost everything must be prepared specially for its pages—eonsequently the prospects of getting the first costs of publication, with the Editor's labor thrown in, are very slim this year. Indeed, we have labored cheerfully on for over three years, without any remuneration for our trouble, other than the satisfaction of feeling that we have done something for the improvement of earriage-making, and the honor of the eraft among our meehanieal and literary eotemporaries.

This being the state of affairs, permit us to ask, as a speeial favor, that those who are still indebted to us for the current volume, would send us five dollars, the subscription priee, and that each of our present subscribers would take a little extra pains to induce at least one mechanie or neighbor to become a subseriber. By so doing our subscription list would be doubled, and we placed beyond the possibility of loss. To encourage this we will permit any one to add a name to his and call it a club of two—see our terms on the cover—making the seeond subscription $4, which, if divided, will make eaeh copy just $4.50. We hope our friends—of course we mean all

carriage-makers—will accept this proposition and act accordingly. In so doing they will benefit themselves a little, and us a great deal.

We have labored long in this enterprise, *con amore*, because we are satisfied such a Magazine is necessary and useful in a country as extended as ours; and in proof of its usefulness we have had ample testimony in our late travels. Not only have we seen its beneficial effects where it has been regularly taken, but it has also afforded us the deepest satisfaction to find our course in conducting it has increased its popularity so extensively, that to-day we have more earnest and much warmer friends than we had in the incipient year of its publication. Some have told us that, rather than have us suspend the publication, they would make us a present of twenty-five dollars. This we are willing to admit as genuine evidence of friendship on their part for us; but we are not yet reduced to such a strait, pecuniarily, as to tax the liberality of others further than the proposition made in this article—that is, to request, as a special favor, that each one of our subscribers will try and send us at least one name added to his own, thereby getting back fifty cents of the five dollars already paid, besides doing something for the encouragement of Art, and the welfare of The New York Coach-maker's Magazine during the most trying period of our labor.

Without aiming to be thought a prophet, still, we cannot but think, that before our volume is completed in May next—for the whole of which we secured the paper in May last, the times will change so as to prove more favorable to publishers; and if such shall be the case, we shall then reduce our charges for the Magazine in conformity therewith. We are in favor of *cheap* literature, where it can be dispensed in *good* quality. Such we were able once to do, and hope yet again to furnish.

TEN DAYS ABROAD.

In this article we design to finish the account of our late Eastern visit, which want of space compelled us to break off in our last number.

From Hartford, *via* New Haven and Boston Railroad, we went on to Springfield, Mass.—a place of considerable note in American history. The only carriage-maker of any repute located there is our esteemed friend Mr. David Smith, a gentleman over 60 years of age, but who still seems to enjoy health and comfort. This brother takes much interest in our Magazine, and the reception he gave its Editor will never be forgotten while memory lasts. Not satisfied with taking us in his carriage to the Arsenal buildings, where our government, by employing night and day laborers, is replenishing its stock of fire-arms required for putting down the rebellion in the South; the beautiful cemetery, &c.; we were pressed to put up with him during our stay in the place. Our friend resides in a beautiful locality, and fortune seems to have attended his efforts beyond that of many others in the trade. May he and his amiable companion long live to enjoy the honest fruits of their industry. From what we heard we conclude that Mr. Smith's work bears an enviable reputation.

The morning of the fourth day found us on the way to Worcester. Our first call was made to the establishment of Messrs. A. Tolman & Co., where, besides the manufacturing of carriages, carriage-materials to a considerable extent are sold. The work made here will bear a favorable comparison with any made in the State of Massachusetts. Mr. Tolman has been a long time in the business, and the originality he has shown in many parts of carriage construction, added to his industrious habits, has undoubtedly contributed to his success over many others. We would like to add something here, but—well, we must do it at the risk of making the reader envious—our friend has by far the prettiest house and grounds in the suburbs it has ever been our fortune to see possessed by any fellow craftsman in our extensive journeyings; and, to crown the whole, he has a help-mate worthy of all. We shall remember our visit in all time to come. Through the kindness of Mr. Hamant, the gentlemanly foreman of this establishment, we were introduced to the Secretary of the Worcester Public Library, the Natural History department of which is under the immediate charge of Mr. H. We also made the personal acquaintance of Messrs. Whiting, Blood & Atchinson, the other carriage-manufacturers in the place, all of whom are our patrons. We were particularly pleased with the fraternal feeling each had for the other, and which seemed to falsify the common saying that "two of a trade can never agree."

The same evening we took leave of our friends in Worcester, for the far-famed city of Boston—by some claimed to be the hub of the universe. As we have, in a former visit, noticed the principal manufacturers, we must content ourselves by being very brief in our remarks. The most popular buggy in Boston is the Goddard. By the way, we must give our readers a sketch of the call we made upon the gentleman, Mr. Thos. Goddard, whose fame for good work is in the mouths of everybody. We have always heard it said that Mr. G. was English born; instead of which we find that he is a native of Boston, and a gentleman in every respect, as our half-hour visit to his shop testifies. Mr. G. learned the business with Walter Frost, in a shop located near where the Boston Museum now stands. Mr. F., we understand, is yet living a retired life at Woburn.

Mr. G. and his brother-in-law started business, under the firm of Goddard & Dennis, next door to his old boss,

between whom a friendship, uninterrupted, has been continued down to the present hour. Mr. G. has been in business several years, and has employees that have been with him over twenty. Mr. G. has one trait in his mechanical character differing from most others: he will not take an order to build a carriage where he thinks that, in executing it, he must sacrifice his ideas of what he considers correct mechanical laws. He thinks to do so would injure his mechanical reputation: no doubt his judgment is the true one. As Mr. G. is a subscriber to the Magazine, and these remarks will probably meet his eye, he will pardon us for allusions to him, in our endeavors to set the community right on some points.

To follow out in detail a recital of the visits made to different shops in Boston, would swell our remarks beyond what would be interesting to the public, or compatible with brevity. In connection with our visit to Boston we rode out to Dorchester, to see our friend, the patentee of the "Brown Buggy," so famous throughout the country. Mr. Brown has been successful beyond many of his cotemporaries, and is yet in the prime of life. May he long live to enjoy the fruit of his labor!

If Boston has not as many monuments as some of her sister cities, she has at least some objects of historical interest. On crossing the common we found an old elm —*Ulmus Americana*—hedged in by an iron-railing, of which an iron plate tells the following tale: "This tree has been standing here for an unknown period. It is believed to have existed before the settlement of Boston, being fully grown in 1722; exhibited marks of old age in 1792, and was nearly destroyed by a storm in 1832. Protected by an iron enclosure in 1854. J. V. C. Smith, Mayor." The interstices caused by age have been filled with clay, and other decayed portions of the trunk sheltered from the weather by canvass, so that the old "land mark" is likely to survive another century yet.

On our return we stopped over night at Taunton, calling the next morning on our friends, Messrs. Peck & White. Of three, this is the largest shop in the place, and the proprietors appear to be enterprising men. Nine o'clock A. M. found us on the journey to New Bedford. In this place there are five shops, and business appears to be thriving. The largest, probably the most extensive in New England, is the establishment of our friend, J. L. Brownell, Esq. He owns the best arranged shop we are acquainted with. It occupies a square on Third, Cannon and South Second Streets. The main building, on the south-east corner of Third and Cannon Streets, being 100 by 55 feet, and the L, extending along the south side of Cannon Street to South Second, 130 feet by 32. The ground floor is occupied as an office, sales-rooms and trimmers' room. On the second floor the painting is done; the third story and basement being used for storage. In the L, in Cannon Street, are the rooms for woodwork and blacksmithing. The building was formerly used as an oil factory, and is well-arranged for the carriage business, being both light and airy since the alterations made by the present owner. The next in size is that of Messrs. Forbes & Sear, who occupy the old building once used as the Methodist Church, and which, as altered, makes a capital carriage-factory. The other establishments are those of Messrs. H. G. O. Cole, Wm. C. White, and Franklin Shaw. The work finished in New Bedford is of a superior kind, and the readiness with which all furthered the interests of our visit, show them to be enterprising men, and progressive mechanics.

Leaving New Bedford, the same evening we reached Fall River, amid a drenching fall of rain. Carriage-making, in this place, has steadily declined during the last five years. As we have elsewhere stated, cotton mills are injurious to the interests of carriage-making, everywhere. The class of people who reside there, as a body, are too poor to ride in pleasure-carriages, and the few who can, require the best, and so order, from choice, their vehicles from New York or Boston. An inspection of the two shops in the place will not impress the visitor with any excellent ideas of their success. Indeed, the greatest amount of ambition exhibited in one shop was the early arrival of the boss's dog, who preceded him by nearly an hour, and when his master got there he was altogether too *sleepy* to see any use in his taking our Magazine. So we shook off the dust from our feet, and left for Providence, by the steamer R. Durfee.

From Fall River to Providence is a beautiful sail of over two hours, among islands and headlands of diversified interest. There are some fine farms in the landscape, but the chief object of manufacture is "paint oil," obtained by pressure from the fish known as *alewires*, with which the adjacent bay is filled at this season of the year. In some of these factories $70,000 is invested, and the oil is now worth $1 50 per gallon, chiefly used for painting houses, which is said to be durable; the worst feature being that it takes so long in drying, that a building becomes almost unendurable from the noxious odors emitted by it. We suspect this article forms a component part of the "paint oil" so frequently offered to our Western friends as an article of practical economy and utility, and of which a correspondent complains.

In Providence we found business very dull, and only one firm enterprising enough to favor our mission. We had an offer from another firm, who thought he could not afford to pay $5 for the Magazine for one year, but offered a reduced price, which we were *green* enough to refuse, under the impression that our interest suffered least by the refusal. From Providence, *via* Norwich,—in which latter place not much is done,—taking the steamer City

of New York, the next morning found us home again. As we gave, in our last number, a statement of the state of trade, as seen in our late visit, and further detail would swell our remarks to an unreasonable extent, we must close by simply adding that upon the whole our journey was profitable to us in several respects, and we trust not altogether unsatisfactory to the best friends of our Magazine. To those who so kindly strove to make our visit agreeable we tender our heartfelt thanks, in the hope of renewing their acquaintance at a future day.

CARRIAGES AND THE REVENUE TAX.

Many important changes were made in the Excise Tax Laws by the last Congress, making material changes in the laws as passed in 1863, and detailed in volume five, on page 44, of this Magazine. These, as applicable to carriage-making, we here propose to notice.

Under the provisions of the law, every manufacturing firm must annually pay ten dollars for a license, when the articles manufactured exceed annually one thousand dollars in value. At the close of each month, a sworn statement of all carriages sold, or shipped for sale elsewhere, must be promptly rendered to the Assessor of Internal Revenue, appointed for the district in which the manufactory is located. The penalty for neglect to do this beyond ten days works a forfeiture to the United States government of the goods, wares and merchandise manufactured and unsold. The law in this particular is very imperative, and gives the power of immediate seizure of the unsold goods, and possession of the premises where they are manufactured until finally disposed of, or the penalties are paid, according to prescribed modes of procedure against those neglecting or refusing to comply with the terms of the law. Five per cent. *ad valorem* is now imposed on all sales of new work, instead of three, as formerly, the law taking effect on the first of July.

One very important clause relating to repairs on carriages, is found in the new law. Repairs to old carriages, when the repairs increase the value of the article ten per cent. or over, must pay a duty of three per cent. *on the increased* value, the returns to be made monthly along with the newly manufactured. Schedule A imposes an annual tax on our customers as follows: on a carriage, gig, chaise, wagon, buggy-wagon, carryall, rockaway, or other like carriage, and any coach, hackney-coach, omnibus or four-wheeled carriage, the body of which rests upon springs of any description, which may be kept for use, for hire or for passengers, and which shall not be used exclusively in husbandry, or for the transportation of merchandise, valued at fifty dollars and not exceeding one hundred dollars, including harness used therewith, each one dollar.

Carriages of like description, valued at above one hundred dollars, and not above two hundred dollars, each two dollars.

Carriages of like description, valued at above two hundred dollars, and not above three hundred dollars each three dollars.

Carriages of like description, valued at above three hundred dollars, and not above five hundred dollars, each six dollars.

Carriages of like description, valued above five hundred dollars, each ten dollars. These taxes will become due on the first Monday in May annually, and must be paid by those owning the carriages above specified, and these taxes are made a lien thereon until paid.

Livery stable keepers and dealers in horses, when carried on as separate business, pay an annual license of ten dollars; but if both are combined in one business, one license answers for both.

The question has been asked: Does the ten per cent. value caused in repairing old carriages subject such carriage to a tax to the extent the *old* carriage would sell for after being so repaired, or merely upon the amount of the coachmaker's bill? Some contend that it does, but we are not of this opinion. We think the law is sufficiently explicit, when it says: "On all repairs of * * carriages, or other articles, when such repairs increase the value of the articles so repaired, ten per centum or over, a duty of three per centum on such *increased value* "shall be levied" and collected. It would manifestly be unjust to lay a tax on that already made before the law came into effect, and although we have heard the opinions of reputedly intelligent persons negatively to *our* decision, we still think our construction of the law is a correct one.

These important changes in the law—from a high tax as it formerly existed, to a still higher one on carriages—has already put an increased price on them, and no doubt for the present, put a check to the sale. We hope it may be only temporary, and we are the more encouraged to thus hope, from the fact that, at the time we write this, *our* busy season is past, and customers generally are enjoying themselves as best they may in different parts of the country, and therefore not wanting to purchase.

Unfortunately for us, being employed in producing work considered a luxury, and not a necessity, we have to suffer and put up with many things incidental to the times in which we live. We suppose that, for a special purpose, it is well enough to *put it on* where pleasure carriages constitute the luxury; but we doubt the justice of taxing a new carriage for the net sale value, when the article has already been taxed in a great proportion of the materials of which it has been made up, such as the springs, axles, &c. But carriages are decided luxuries, and our law makers are *decided* men, and as *somebody* must pay for our national "fiddling," those who ride have

been saddled with the burden, as a matter of course. Thus matters stand.

CURRENT PRICES FOR CARRIAGE MATERIALS.

CORRECTED MONTHLY, BY MR. CHAS. WEEKS, FOR THIS MAGAZINE.

New York, Sept. 24th, 1864.

Apron hooks and rings, per gross, $1.50.
Axle-clips, according to length, per dozen, 75c. *a* $1.40
Axles, common (long stock), per lb, 13½c.
Axles, plain taper, 1 in. and under, $7.50; 1⅛, $8.50; 1¼, $9.50; 1⅜, $10.50; 1½, $11.50.
Do. Swelled taper, 1 in. and under, $9.50; 1⅛, $10.75; 1¼, $12.75; 1⅜, $15; 1½, $17.50.
Do. Half patent, 1 in. and under, $11.50; 1⅛, $13.25; 1¼, $15; 1⅜, $17; 1½, $19.25.
Do. Smith's New York half patent malleable iron box, 1 in. and under, $10; 1⅛, $12; 1¼, $14.
Do. Saunder's improv. taper, ⅞ in., $13.50; ⅞, $14.50; 1, $14.50; 1⅛, $16.50; 1¼, $20.
Do. do. Homogeneous steel, ⅝ in., $16.50; ¾, $18; ⅞, $20.50; long drafts, $4 extra.

☞ These are prices for first-class axles. Makers of less repute, cheaper.

Bands, plated rim, under 3 in., $2.50; over 3 in., $3.
Do. Mail patent, $3.50 *a* $5.00.
Do. galvanized, 3½ in. and under, $1; larger, $1 *a* $2.
Basket wood imitations, per foot, $1.12.

☞ When sent by express, $2 extra for a lining board to a panel of 12 ft.

Bent poles, each $1.25.
Do. rims, under 1⅛ in., $2.25 per set; extra bickory, $2.50 *a* $3.50.
Do. seat rails, 50c. each, or $5.50 per doz.
Do. shafts, $6. *a* $7.
Bows, per set, light, $1.10; heavy, $1.25.
Bolts, Philadelphia, 25 per cent advance on list.
Do. T, per 100, $3 *a* $3.50.
Buckram, per yard, 50c.
Buckles, per gross, ½ in., $1; ⅝, $1.20; ¾, $1.45; ⅞, $1 80; 1, $2.40.
Burlap, per yard, 50c.
Buttons, japanned, per paper, 30c.; per large gross, $3.
Carriage-parts, buggy, carved, $4 *a* $5.50.
Carpets, Brussels, per yard, $3; velvet, $4.00 *a* $5.50; oil-cloth, 85c. *a* $1.10.
Castings, malleable iron, per lb, 23c.
Clip-kingbolts, each, 55c., or $6 per dozen.
Cloths, body, $6 *a* $8; lining, $6. (See *Enameled.*)

☞ A Union cloth, made expressly for carriages, and warranted not to fade, can be furnished for $3 *a* $5 per yard.

Cord, seaming, per lb, 45c.; netting, per yard, 5c.
Cotelines, per yard, $6 *a* $10.
Curtain frames, per dozen, $1.25 *a* $2.50.
Do. rollers, each, $1.25 *a* $1.50.
Dashes, buggy, $1.75.
Door-handles, stiff, $1. *a* $3; coach drop, per pair, $3 *a* $4.
Drugget, felt, $2.
Enameled cloth, muslin, 5–4, $1; 6–4, $1.35.
Do. Drills, 5-4, $1.40; 48 in., $1.55; 5-4 A, $1.55; 48 in. A, $1.75
Do. Ducks, 5-4, $2; 50 in., $2.20; 6-4, $2.40.
Enameled linen, 38 in., $1.05; 5-4, $1.20; 6-4, $1.35.
Felloe plates, wrought, per lb, all sizes, 25c.
Fifth-wheels wrought, $2 *a* $3.
Fringes, festoon, per piece, $2; narrow, per yard, 18c.

☞ For a buggy top two pieces are required, and sometimes three.

Do. silk bullion, per yard, 50c. *a* $1.
Do. worsted bullion, 4 in. deep, 50c.
Do. worsted carpet, per yard, 8c. *a* 15c.
Frogs, 75c. *a* $1 per pair.
Glue, per lb, 25c. *a* 30c.
Hair, picked, per lb, 80c. *a* $1.10.
Hubs, light, morticed, $1.10; unmorticed, 75c—coach, morticed, $1.75.
Japan, per gallon, $4.75.
Knobs, English, $2 *a* $2.50 per gross.
Laces, broad, silk, per yard, $1.20 *a* $1.50; narrow, 15c. to 20c.
Do. broad, worsted, per yard, 50c.
Lamps, coach, $20 *a* $30 per pair.
Lazy-backs, $9 per doz.
Leather, collar, dash, 37c.; split do., 22c. *a* 25c.; enameled top, 38c.; enameled Trimming, 36c.; harness, per lb, 75c.; flap, per foot, 30c.
Linen, heavy, a new article for roofs of coaches, $1 *a* $1.25 per yard.
Moquet, 1½ yards wide, yer yard, $10.
Moss, per bale, 12½c. *a* 15c.
Mouldings, plated, per foot, ¼ in., 14c.; ⅜, 16c.; ½, 18c.; lead, door, per piece, 40c.
Nails, lining, silver, per paper, 12c.; ivory, per gross, 50c.
Name-plates.

☞ See advertisement under this head on 3d page of cover.

Oils, boiled, per gallon, $2.10.
Paints. White lead, extra, per 25 lb $5.25; Eng. pat. black, 40c.
Pekin cloth, per yard, $5.

☞ A very good article for inside coach linings.

Pole-crabs, silver, $5 *a* $12; tips, $1.60.
Pole-eyes, (S) No. 1, $2.75; No. 2, $2.90; No. 3, $3.10; No. 4, $4.25 per pr.
Sand paper, per ream, under No. 2½, $5.75; Nos. 2½ & 3, $6.25.
Screws, gimlet.

☞ Add to manufacturer's printed lists 20 per ct.

Do. ivory headed, per dozen, 50c. per gross, $5.50.
Scrims (for canvassing), 30c. *a* 40c.
Seats, buggy, pieced rails, $1.75; solid rails, $2.50.
Shaft-jacks (M. S. & S.'s), No. 1, $2.80; 2, $3.25; 3, $3.50; 4, $4.75.
Shaft-jacks, common, $1.65 *a* $1.80 per pair.
Do. tips, extra plated, per pair, 37½c. *a* 56c.
Silk, curtain, per yard, $2 *a* $3.50.
Slat-irons, wrought, 4 bow, $1.12½; 5 bow, $1.25 per set.
Slides, ivory, white and black, per doz., $12; bone, per doz., $1.50; No. 18, $1.75 per doz.
Speaking tubes, each, $8.
Spindles, seat, per 100, $1.50 *a* $2.50.
Spring-bars, carved, per pair, $1.75.
Springs, black, 29c.; bright, 30c.; English (tempered), 34c.; Swedes (tempered), 36c.; 1¼ in., 1c. per lb. extra.
If under 36 in., 2c. per lb. additional.

☞ Two springs for a buggy weigh about 28 lbs. If both 4 plate, 34 to 40 lbs.

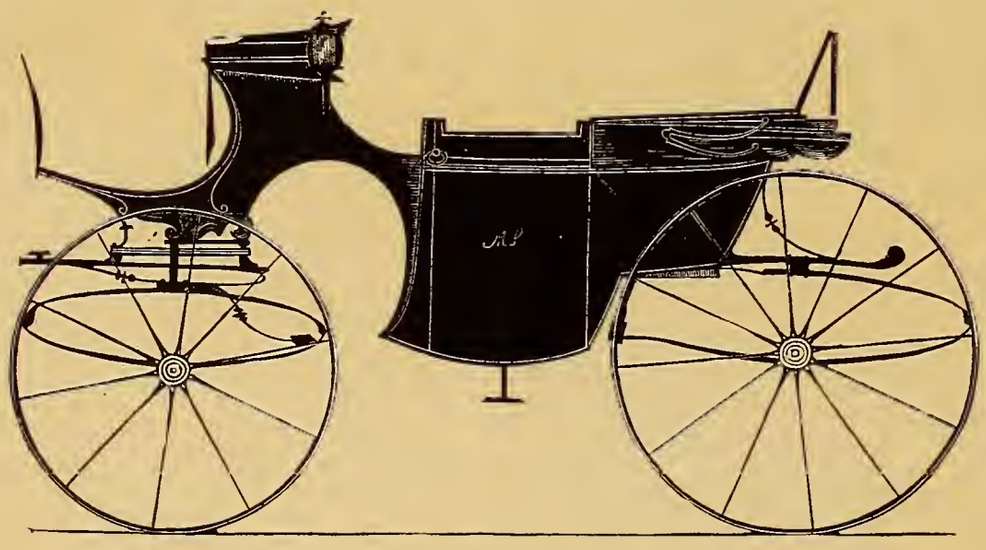
Spokes, buggy, per set, $4.20, or about 7c. each for all under 1½ in.

☞ For extra hickory the charges are 10c. *a* 12½c. each.

Steel, Littlejohn's compound tire, 1-8 & 3-16 thick, 6½c. gold; 1-4 & 5-16 thick, 6c. gold.
Stump-joints, per dozen, $1.50 *a* $2.
Tacks, 10c. and upwards per paper.
Tassels, holder, per pair, $1 *a* $2; inside, per dozen, $5 *a* $12; acorn trigger, per dozen, $2.25.
Terry, per yard, worsted, $5; silk, $11.
Top-props, Thos. Pat, per set 70c.; capped complete, $1.50.
Do. common, per set, 40c.
Do. close-plated nuts and rivets, 75c.
Thread, linen, No. 25, $1.30; 30, $1.45; 35, $1.65, gold.
Do. stitching, No. 10, 95c.; 3, $1.15; 12, $1.28, gold.
Do. Marshall's Machine, 432, $2; 532, $2.30; 632, $2.60, gold.
Tufts, common flat, worsted, per gross, 20c.
Do. heavy black corded, worsted, per gross, $1.
Do. do. do. silk, per gross, $2.
Do. ball, $1.
Turpentine, per gallon, $4.25.
Twine, tufting, per ball, 35c.; per lb, 60c. to 75c.
Varnishes (Amer.), crown coach-body, $5 *a* $5.50; hard drying, $6; nonpareil, $6.50.
Do. English, $7.00 in gold, or equivalent in currency on the day of purchase.
Webbing, per piece, 70c.; per gross of 4 pieces, $2.60.
Whiffle-trees, coach, turned, each, 35c.; per dozen, $3.50.
Whiffle-tree spring hooks, $3 per doz.
Whip-sockets, flexible rubber, $4.50 *a* $6 per dozen.
Do. hard rubber, $9.50 per dozen.
Do. leather imitation English, $5 per dozen.
Do. common American, $3.50 *a* $4 per dozen.
Window lifter plates, per dozen, $1.50.
Yokes, pole, each, 35c.; per doz, $3.50.
Yoke-tips, extra plated, $1.75 per pair.

TO CORRESPONDENT.

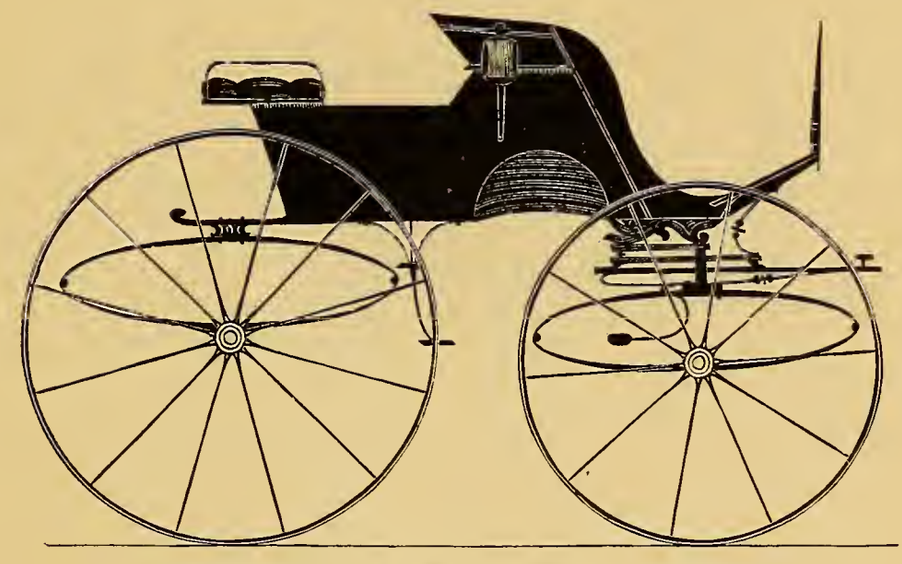
S. W. Flemington, July 4.—Will the writer of the letter here referred to give us the name of his State? Because of the omission, we cannot reply.



LANDAULET.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

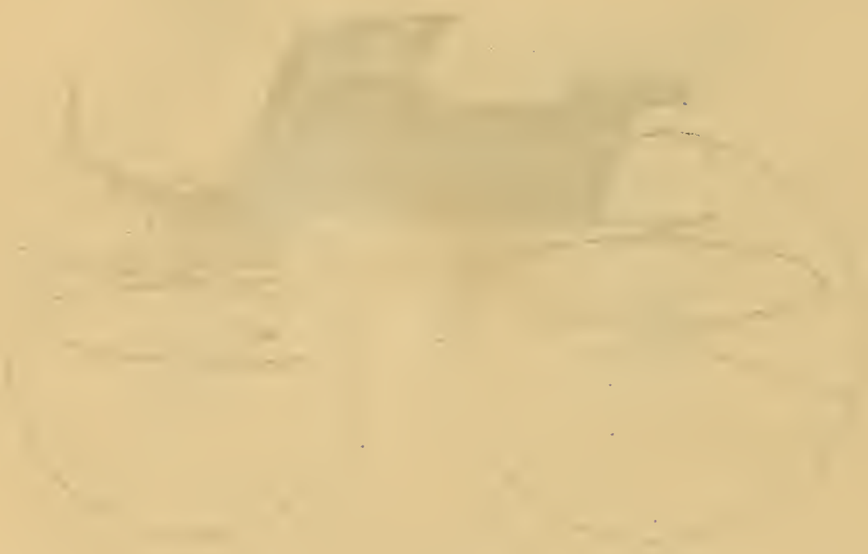
Explained on page 87.

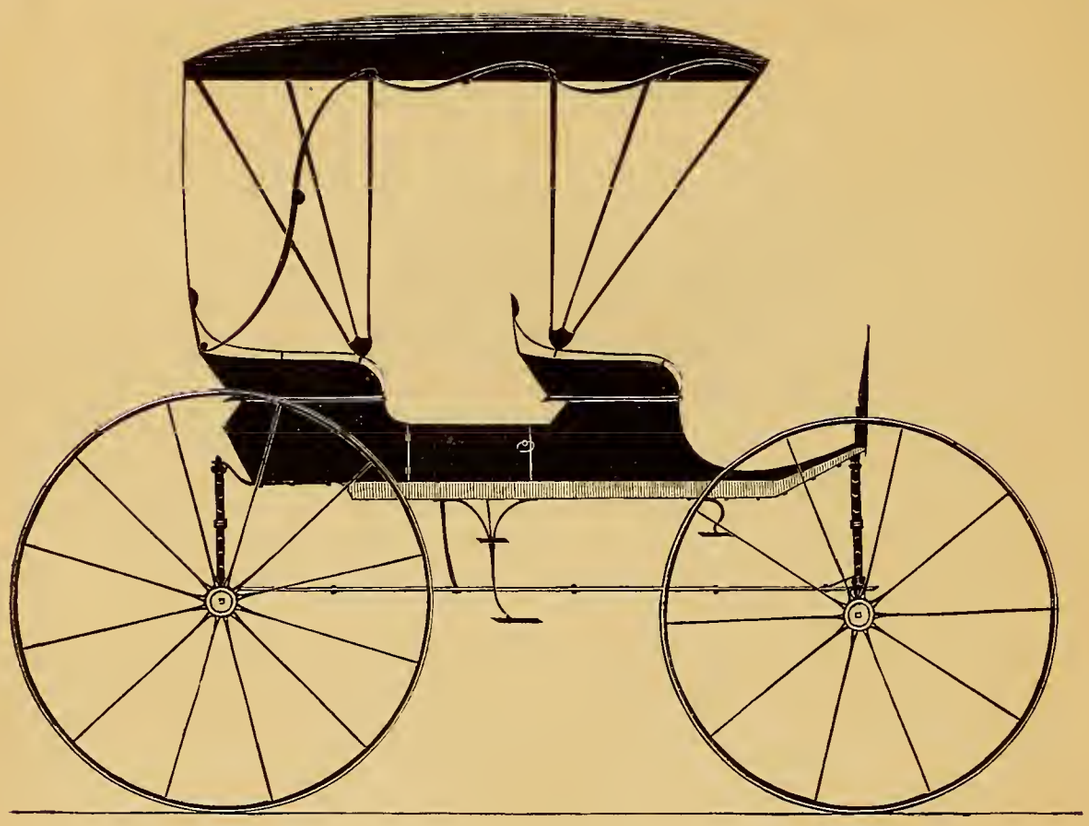


ROAD PHAETON.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 87.

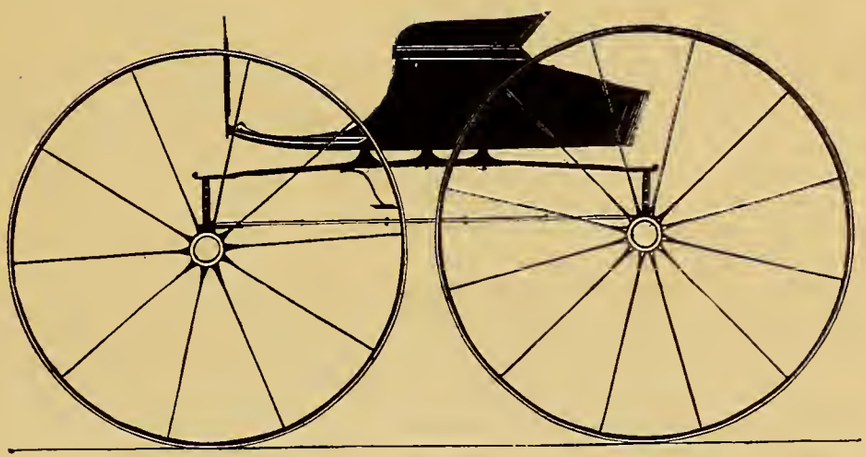




EXTENSION-TOP ROCKAWAY.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 87.



GENTLEMAN'S ROAD BUGGY.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 87.

DEVOTED TO THE LITERARY, SOCIAL, AND MECHANICAL INTERESTS OF THE CRAFT.

Vol. VI. NEW YORK, NOVEMBER, 1864. No. 6.

Mechanical Literature.

THE TIREVILLE MISCELLANY;

BEING SELECTIONS FROM THE PRIVATE JOURNAL OF JOHN STILWAGEN, ESQ.

BY THE EDITOR.

(*Continued from page* 23.)

Doubtless many of these extracts will appear overwrought, or merely the creations of fancy with the casual reader; but the practical and experienced carriage-maker will recognize in them much of his own experience, as verified in mechanical life. We candidly admit that we have shown the darkest side of the picture, purposely too, because we have a special object to accomplish—a caution for the employer in selecting his operatives, and a lesson of carefulness on the part of the journeyman in performing his duty. As the mariner, by availing himself of the services of a pilot, secures the safety of his ship and cargo on a dangerous coast, so may these sketches prove useful and instructive, if properly studied.

Nov. 27.—This morning I set a painter at work to re-varnish the lower half of an elliptic spring and the back-bed of a buggy, which had been scratched a little in putting on a new clip, with special instructions to "use nothing but clear varnish, and to make it a thin coat." What was my surprise to find afterwards, that the stupid man had given the job a coat of color and varnish, and so made matters—costly. Instead of the simple coat of varnish, calculated to make all right, I had to waste money and consume time, by giving all several coats, before the job could be put in a condition creditable to my shop. Had I charged the expense to the "dauber," it would have amounted to double his wages, and probably been a subject of slander with him forever afterwards; I therefore paid him off and sent him adrift, to *experiment* elsewhere.

Dec. 19.—On taking a survey of operations through the smith-shop, I discovered that a buggy just hung up by the finisher had the side panel split from one end to the other. Special inquiry elicited the fact that nobody had done it—the entire crew were reticent know-nothings. A closer inspection *told* me how the mischief was done, however. The body-loops were made to extend the whole length—in one piece—and in fitting, the smith had so formed his iron that it was not properly fitted—did not set up to the bottom—and when the finisher came to bolt this iron to the body, something must give; in this instance, the less rigid panel. Here again I had to be at the expense of a new panel, and the carelessness of the smith was aggravated by the circumstance that the body had been filled with ruff-stuff sufficiently hard for rubbing, and that it must be done on a certain day, or I must lose the sale. Will the public think I could keep cool under such trials?

Jan. 5, 18—.—Once more my patience has been taxed. The strap-buckles to a victoria phaeton needed blacking on the inside, to do which I set a new hand at work. I was astonished afterwards to find that the back panel presented the appearance of having been scratched. A closer inspection showed that the fellow had actually run his head against it, and the varnish, being a little soft yet, had pulled out a few hairs. I could have wished that it had taken off the entire scalp,—he evidently had no brains to injure by such an occurrence. This injury, like most others happening in the shop, *on inquiry, I found was done by nobody!* What a scape-grace this Mr. Nobody is!

Jan. 15.—The finisher—he never pretended to be anything more—to whom I have before alluded as having split the side panel of a buggy by putting on an improperly fitted loop-iron this morning, "turned up missing." Unfortunately having neglected to ascertain from him in time the number of his residence, I was under the necessity of hiring another man, or else awaiting his return. A little reflection led me to think that possibly the man might have been taken with a fit of sickness, and this opinion was somewhat strengthened by the fact that this being Friday morning, and in addition, a small balance still due him on the previous week's wages, so I decided to wait until Saturday night. As expected, John was *punctual* enough when Saturday night came round, to receive his wages. As an apology for his absence, he told a pitiful story about his having had a serious attack of chills and fever, which had incapacitated him for labor. Of course this explanation, coupled with a promise to be

promptly on hand the following Monday morning, was perfectly satisfactory for the time being.

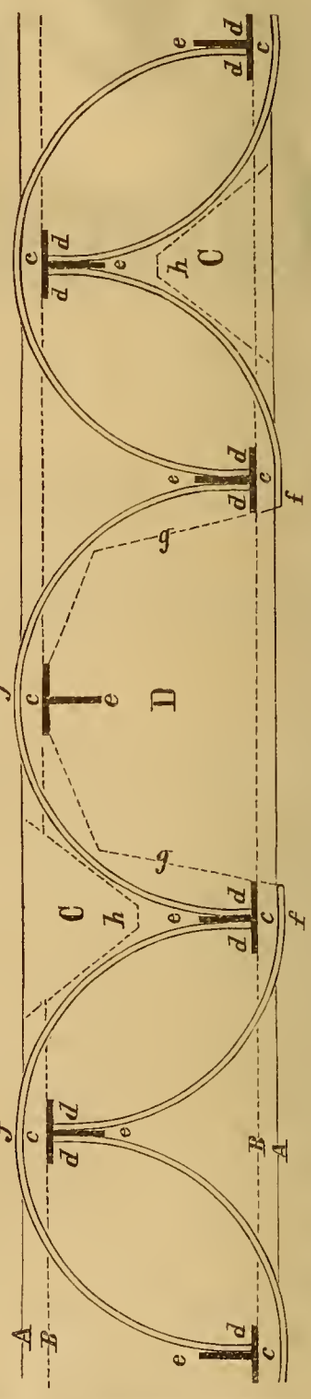
When Monday morning came John was still absent. Concluding that a second attack of his old enemy had overtaken him, I waited a few days more, *in pity for him.* A few days afterward, a boss carriage-maker from Scrabblehill called upon me to make some inquiries. He began by stating that he had recently engaged a blacksmith at the forge, who pretended to be a first class workman on any job, at fifteen dollars per week; but that a trial thus far had led him to suspect his capabilities for doing all he promised. Understanding from the jour's own lips that he had been in my employ, on first-class jobs for some time back, he had called to see if such was really the case, and what kind of a workman he was. At this point in the relation, a sudden thought flashed across my mind that the newly constituted blacksmith alluded to was no other than my late finisher, who I had charitably supposed was down again with another attack of chills and fever, particularly as, on further inquiry, I found his name was also John. Matters were now all cleared up. I discovered that I had been well rid of an unprincipled finisher to whom I was paying ten dollars a week, and that our *ambitious* cotemporary in the same line of business had obtained a *quasi* forge-man at fifteen dollars. Does not this account for the fact that many journeymen are made in these times, but very few real mechanics? Instead of serving out the proper number of years in obtaining a perfect knowledge of the business undertaken, theoretically and practically, it is too frequently the case that to-day a man goes into a shop as a mere helper, and in a few months afterward he turns up in another shop a finished workman! Evidently the unsystematic manner in which carriage-makers are now made needs a radical reformation. That such is the case, the most casual observer will scarcely deny.

(*To be continued.*)

RACK FOR RIMS AND HUBS.

When down in Camden, New Jersey, a few days since, we visited the carriage shop of our friend, Charles S. Caffrey, and saw there the nicest arrangement for preserving bent rims in a proper shape until used, or for storing hubs, that it has ever been our fortune to inspect, being one of his own invention. At our request Mr. Caffrey has very kindly furnished us with the sketch from which we have had the accompanying engraving made. The entire figure is supposed to represent the floor of one of the stories—in this instance one of three—wide enough to take in several tiers of rims, arranged one above another—a bird's-eye-view of which is here presented—and still allow them to project one inch over the edges in the center at *J*. This is done so that they may be conveniently handled when required for use. The length of the rack may be extended to meet the requirements of any manufacturer, as will readily be seen.

The lines A and A define the outside edges of one of the horizontal floors—one of three—B and B being two imaginary lines in dots to show where the forms or standards *c* are to be placed for securing the ends of the rims. The width between the lines A and B is four inches, showing that the standards or pillars supporting the floors must be placed four inches from the outsides respectively. These standards answering also as forms for the ends of the rims at *d* and running laterally with the floors, are made of pine boards, fourteen inches wide and one inch in thickness; with another at *e* standing at right angles with the first. These two —*d* and *e*—combined serve as pillars or standards for supporting the whole row or tiers of floors. This rack may be carried to any height — in this instance three stories — three feet apart, and one above the other. The width between the standard *e* is four inches shorter than the rims to be placed there are in diameter, in order to preserve the original shape, and also to secure them from any liability of straightening. For instance, the distance from *e.* and *e*, each respectively, is four feet. This is designed to hold a four-feet four-inch rim, or rims, contracting them four inches at the points. It will readily be seen that, by this arrangement, there is not only the holding of the rims securely, as they lie piled one upon another, but they are also preserved in the shape in which they come from the bender's hand originally. Indeed, Mr. Caffrey assures us that he can take a badly formed rim and actually put it in good shape by placing it in his rack for a few days. A rack of this description, say nine feet high—three stories —two feet six inches wide and some twelve feet long, omitting the hub rack D, will hold about seventy-five sets of bent rims, greatly economizing room in cities where such is a desirable object. In addition to this, a single rim, when wanted, can be laid hold of with the most perfect ease. The foregoing description applies to the "institution" solely as a rack intended only for storing rims. We will now change it a little, so as to make it a rack for storing hubs.



For this purpose—if much room is needed—we now cut in halves two tiers of rims at *f* and *f*, and use the recess D thus provided for a hub rack in the same frame. This is represented by the dotted lines *g* and *g* marking the location for a vertical position which forms a closet for the hubs. By this arrangement we economize space otherwise lost.

We would suggest here a little improvement of our

own. Suppose we restore the cut-off rims at *f* and *f* and use the space left by the rims—as for example at C—and then form different hub racks, as indicated by the dotted lines *h* and *h*, for partitions surrounding it, where any such space occurs, by multiplying them in different parts of the rack, if needed. This would still further economize room. Again, by elevating the first floor of the rack, say twelve inches, facilities for sweeping out the shop would be afforded, and thereby cleanliness and order secured—a matter too often neglected in the workshops of most carriage manufactories.

OPPOSITION TO STAGE-COACHES.

We have, in several passages in these volumes, given our readers some idea of the strong opposition manifested against the introduction of coaches into England, in the earlier part of the seventeenth century. In our second volume we printed some extracts from a tract published in 1673, entitled "The Grand Concern of England Explained, in several proposals offered to the consideration of Parliament: 1. For Payment of Public Debts. 2. For advancement and encouragement of Trade. 3. For raising of the rents of Lands; in order whereunto, it is found necessary," among several other reasons, "VII. That the multitude of stage-coaches and caravans may be suppressed." It is professedly written "By a Lover of his country, and well-wisher to the prosperity both of King and Kingdom." We propose to reprint from a copy of the *Harlein Miscellany* in the Astor Library, for the first time in this country, the entire section relating to coaches in about three numbers, which we have no doubt will prove interesting to modern carriage-makers. The six first proportions having been disposed of, the author enters upon the consideration of

The seventh proposal: That the multitude of stage-coaches and caravans, now traveling upon the roads, may all, or most of them, be suppressed; especially those within forty, fifty or sixty miles of London, where they are no way necessary; and that a due regulation be made of such as shall be thought fit to be continued. These coaches and caravans are one of the greatest mischiefs that hath happened of late years to the kingdom, mischievous to the public, destructive to trade, and prejudicial to lands:

First, By destroying the breed of horses, the strength of the nation; and making men careless of attaining to good horsemanship—a thing so useful and commendable in a gentleman.

Secondly, By hindering the breed of watermen, who are the nursery for seamen, and they the bulwark of the Kingdom.

Thirdly, By lessening of his majesty's revenues.

For the first of these: stage-coaches prevent the breed of good horses, destroy those that are bred, and effeminate his majesty's subjects, who, having used themselves to travel in them, have neither attained skill themselves, nor bred up their children to good horsemanship; whereby they are rendered incapable of serving their country on horseback, if occasion should require and call for the same. For, hereby, they become weary and listless when they ride a few miles, and unwilling to get on horseback; not able to endure frost, snow, or rain, or to lodge in the fields; and what reason, save only their using themselves so tenderly, and their riding in these stage-coaches, can be given for this their inability? What encouragement hath any man to breed horses, whilst these coaches are continued? There is such a lazy habit of body upon men, that they (to indulge themselves, save their fine clothes, and keep themselves clean and dry,) will ride lolling in one of them, and endure all the inconveniences of that manner of traveling, rather than ride on horseback; so that, if any man should continue his breed, he must be one that is a great lover of them, and resolve to keep and please his own fancy with them; otherwise, most certainly he (as most breeders already have done) will give over his breeding.

There is not the fourth part of saddle-horses, either bred, or kept, now in England, that was before these coaches were set up, and would be again if they were suppressed: nor is there any occasion for breeding or keeping such horses, whilst the coaches are continued. For, will any man keep a horse for himself and another for his man, all the year, for to ride one or two journeys; that at pleasure, when he hath occasion, can slip to any place where his business lies, for two, three, or four shillings, if within twenty miles of London; and so proportionably into any part of England? No; there is no man, unless some noble soul, that scorns and abhors being confined to so ignoble, base, and sordid a way of traveling as these coaches oblige him unto; and who prefers a public good before his own ease and advantage, that will breed or keep such horses. Neither are there near as many coach-horses either bred or kept in England now as there were saddle-horses formerly, there being no occasion for them; the kingdom being supplied with a far less number. For formerly, every man that had occasion to travel many journeys yearly, or to ride up and down, kept horses for himself and servants, and seldom rid without one or two men; but now, since every man can have a passage into every place he is to travel unto, or to some place within a few miles of that part he designs to go unto, they have left keeping of horses, and travel without servants; and York, Chester, and Exeter stage-coaches, each of them with forty horses* apiece, carry eighteen passengers a week from London to either of these places, and, in like manner, as many in return from these places to London; which come, in the whole, to eighteen-hundred and seventy-two in the year. Now take it for granted that all that are carried from London to these places are the same that are brought back; yet are there nine hundred thirty-six passengers carried by forty horses; whereas, were it not for these coaches, at least five-hundred horses would be required to perform this work. Take the short stages within twenty or thirty miles of London; each coach with four horses carries six passengers a day, which are thirty-six in a week, eighteen-hundred seventy-two in a year. If these coaches were suppressed, can any man imagine these eighteen-hundred seventy-two passengers and their servants could be carried by four horses? Then reckon your coaches within

* This seems intended to mean, that forty horses were employed between London and York, &c.; at the different stages, to draw a coach to and fro, which held six persons, thrice a week.—Ed. Har. Mis.

ten miles of London, that go backward and forward every day, and they carry double the number every year; and so, proportionably, your shorter stages within three, four, or five miles of London. There are stage-coaches, that go to almost every town within twenty or twenty-five miles of London, wherein passengers are carried at so low rates that most persons in and about London and Middlesex, Essex, Kent, and Surrey, gentlemen, merchants, and other traders, that have occasion to ride, do make use of: some to fairs and markets; others to visit friends, and to go to and from their country-houses, or about other business; who, before these coaches did set up, kept a horse or two of their own, but now have given over keeping the same. So that, by computation, there are not so many horses, by ten thousand, kept now in these parts as there were before stage-coaches set up. By which means, breeding of good pad-nags is discouraged, and coach-horses that are bred by cruelty and ill-usage of stagers are destroyed.

2d, Those coaches hinder the breeding of watermen, and much discourage those that are bred: for, there being stage-coaches set up unto every little town upon the river Thames, on both sides the water, from London as high as Windsor and Maidenhead, &c., and so from London-bridge to and below Gravesend; and also to every little town within a mile or two of the water-side; there are they who carry all the letters, little bundles, and passengers, which (before they set up) were carried by water, and kept watermen in full employment, and occasioned their increase (whereof there never was more need than now); and yet, by these coaches, they, of all others, are most discouraged and dejected, especially our Western and below-bridge watermen, they having little or nothing to do; sometimes not a fare in a week; so that they dare not take apprentices, the work they have not answering the charge they are at in keeping themselves and families. The consequence whereof is like to prove sad in a short time, unless speedily prevented; especially if these wars continue, and we happen to lose so many yearly of those that are bred, as of late years we have done. But if these coaches were down, watermen, as formerly, would have work, and be encouraged to take apprentices; whereby their number would greatly increase.

3dly, It prejudiceth in his revenue of excise; for now four or five travel in a coach together, and twenty or thirty in a caravan (gentlemen and ladies without any servants), consume little drink on the road, yet pay as much at every inn as if their servants were with them; which is the tapster's gain, and his majesty's loss. But if travelers would, as formerly they did, travel on horseback, then no persons of quality would ride without their servants, and it is they that occasion the consumption of beer and ale on the roads, and so would advance his majesty's revenue. I know it will be objected, "There are as many people now as will be when coaches are down, and they drink wherever they are; therefore, no matter, whether they drink at home or on the road, since the consumption will be the same. How can the king's revenue, then, be advanced, by servant's traveling with their masters or mistresses, more than it is already?" The answer is plain: At home they drink small or strong drink brewed by their masters, that pay no excise; but whatever they drink at inns pays the king's duties; and all innkeepers do declare, that they sell not half the drink, nor pay half the excise they did before these coaches set up.

Secondly, These coaches and caravans are destructive to the trade and manufacturers of the kingdom, and have impoverished and ruined many thousands of families, whose subsistence depended upon the manufacturing of wool and leather—two of the staple commodities of the kingdom. For, before these coaches were set up, travelers rode on horseback, and men had boots, and spurs, saddles, bridles, saddle-cloths and good riding suits, coats and cloaks, stockings and hats; whereby the wool and leather of the kingdom was consumed, and the poor people set at work by carding, combing, spinning, knitting, weaving and fulling, and your cloth-workers, drapers, tailors, saddlers, tanners, curriers, shoe-makers, spinners, lorimers and felt-makers had a good employ; were full of work, got money, lived handsomely, and helped, with their families, to consume the provisions and manufactures of the kingdoms; but by means of these coaches, these trades, besides many others depending upon them, are become almost useless; and they, with their families, reduced to great necessity, insomuch that many thousands of them are cast upon the parishes wherein they dwell for a maintenance. Besides, it is a great hurt to the girdlers, sword cutlers, gunsmiths, and trunk-makers; most gentlemen before they traveled in their coaches, using to ride with swords, belts, pistols, holsters, portmanteaus, and hat-cases; which in these coaches they have little occasion for. For, when they rode on horseback, they rode in one suit, and carried another to wear when they came to their journey's end, or lay by the way; but in coaches, a silk suit, and an Indian gown, with a sash, silk stockings, and beaver hats men ride in, and carry no other with them, because they escape the wet and dirt, which on horseback they cannot avoid; whereas, in two or three journeys on horseback, these clothes and hats were wont to be spoiled; which done, they were forced to have new very often, and that increased the consumption of the manufactures, and the employment of the manufacturers; which traveling in coaches doth no way do. And if they were women that traveled, they used to have safeguards and hoods, side-saddles and pillions, with strappings, saddle or pillion-cloths, which for the most part, were either laced or embroidered; to the making of which there went many several trades; seeing there is not one side-saddle with the furniture made, but before it is furnished, there are at least thirty several trades have a share in the making thereof; most of which are either destroyed, or greatly prejudiced by the abatement of their trade; which being bred unto, and having served seven years apprenticeship to learn, they know not what other course to take for a livelihood. And besides all these inferior handy craftsmen, there are the mercers, silkmen, lacemen, milliners, linen and woolen-drapers, haberdashers, and divers other eminent trades, that receive great prejudice by this way of traveling. For, the mercers sold silk and stuff in great quantities, for safeguards, hoods and riding clothes for women; by which means the silk-twisters, winders, throwsters, weavers, and dyers, had a fuller employment; the silkmen sold more lace and embroidery, which kept the silver wire-drawers, lace-makers and embroiderers; at least ten trades more were employed. The linen-draper sold more linen, not only to saddlers to make up saddles, but to travelers for their own use; nothing wearing out linen more than riding. Woolen-drapers sold more cloth than now; saddlers used, before these coaches were set up, to buy

three or four hundred pounds worth of cloth a-piece in a year; nay, some five-hundred and a thousand pounds worth, which they cut out into saddles and pillion-cloths; though now there is no saddler can dispose of one hundred pounds worth of cloths in a year in his trade. The milliners and haberdashers, they also sold more ribbons, gloves, hoods, scarfs, and other things belonging to their trade; the dust, dirt and rain, and riding on horseback, spoiling and wearing them out, much more than traveling in a coach: and on horseback these things were apter to be lost than in a coach.

(*To be continued.*)

SUGGESTED REMEDIES FOR DEFECTS IN CARRIAGE-BUILDING.

BY O. E. MILES.

On page 37 of the present volume, I endeavored to show in their true light some of the greatest evils we have heretofore had to contend with, in the manufacture of wheel vehicles. The existence of the imperfections I there point out are, to a great number of carriage-makers, probably no new thing, while many others consider it altogether visionary to look for any great improvement upon the present modes of construction. To those who consider improvement in these important points highly necessary and possible, I would address myself. Respecting the soundness of the philosophy embraced in my suggestions, I invite discussion, and will be most thankful to any one who will point out any error which may have escaped my notice, or suggest any modification by which my plan may be improved.

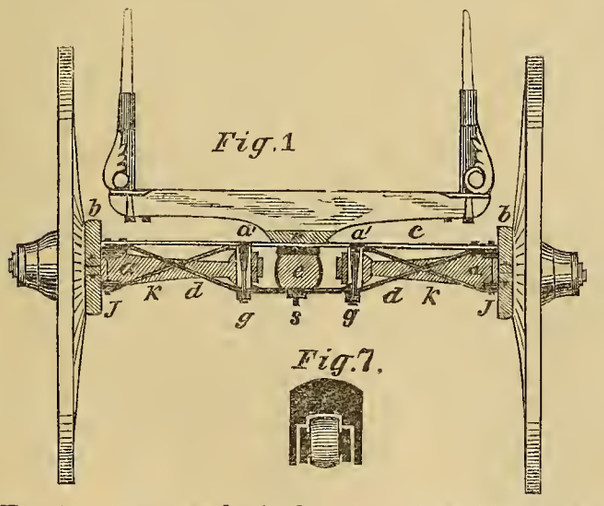
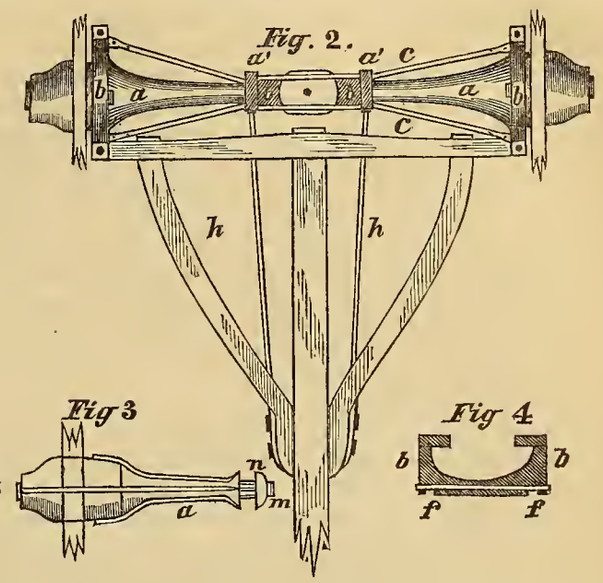


Fig. 7.

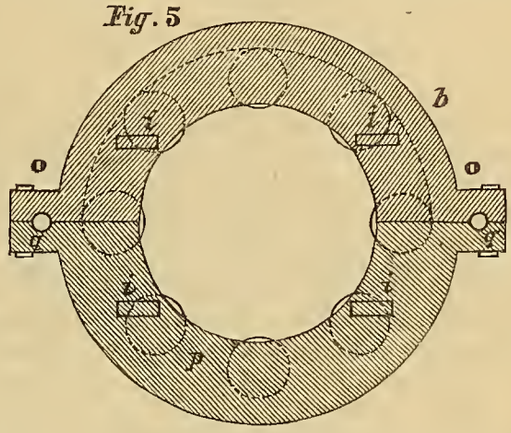
Fig. 1 represents a back elevation of the hind gearing of a heavy wagon, upon my plan of construction. Fig. 2 represents a plan view of the same, with the bolster and bolster plate removed. Fig. 3 represents a hub, with its arm attached and divided longitudinally through the center, to show the manner of connecting them together. Fig. 4 represents the casting detached, which forms the inner boxes, and spring step. Figs. 1, 2, 3 and 4 are on a scale of $\frac{1}{2}$ inch to the foot. Figs. 5, 6 and 7 represent the outer box, with its friction rollers, on a 2-inch scale. Like letters of reference indicate like parts in the different drawings.

It will readily be seen by Fig. 1 in what the main



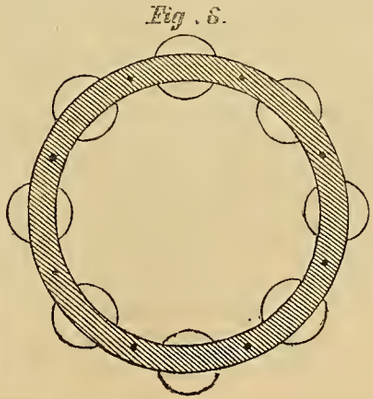
features of the plan consist. Namely, in having, 1st, the axles or arms *aa*, Fig. 1, attached firmly to the hubs, and running in boxes *b' b' bb*, which are attached to the gearing, instead of putting the boxes in the hubs, to run upon arms projecting from the gearing, as is the common custom. In so doing, it is evident that I preserve the whole

Fig. 5



of the timber of the hub, to assist in supporting the spokes, which is ordinarily removed to give room for the boxes, besides doing away with the ruinous necessity of putting lubricating material into the hubs; 2d, in forming by means of the boxes aforesaid, in connection with the square bars *cc*, and the round rods *dd*, a truss girder, upon which the load rests, which has many times more supporting strength than any axle ever made in the ordinary manner, from the same weight of material; 3d, in the perfect opportunity given by this arrangement for the introduction of the rubber spring *e*, where its great advantages are secured in a simple and durable manner, and without raising the wagon body

Fig. 6.



higher than an ordinary wagon with no springs. The casting which forms the inner boxes *bb* (see Fig. 4) has a rabbet cast in each of its upper corners, which just receives one of the two square bars *cc*, and a like rabbet in each lower corner, which receives one of the round rods *dd*, in like manner; which parts are all held securely together by the square clips *a'a'*, which pass down through yokes, which rest in the recesses *ff*, with nuts *gg* upon their lower ends, thus securing them in the most substantial manner. These yokes, in the hind part of the gearing, are elongated, so as to form the braces *hh*. Fig. 2. The bars *cc* have eyes in each end, corresponding to similar eyes in the ends of the rods *dd*. These eyes receive bolts which pass down through the lugs *iiii*, Fig. 5. upon the inner face of the boxes *b'b'*, having nuts at *jj*. The braces *kk*, are joined to the bars *cc*, by being welded inside of collars, which embrace both together, said collars occupying such a position upon the bars *cc*, as to just receive the casting *bb* between them, which causes said casting to keep its position in the center of the bars *cc*. The lower ends of the braces *kk* have eyes which receive the aforesaid bolts at *jj*, and are there secured by the nuts on the same. These braces serve to keep the boxes *b'b'* in their proper position. The arms *aa* are of hollow cast metal, and the cavity at the larger end is made tapering to receive the inner end of the hub, which is turned tapering to fit it, as shown by Fig. 3. After being driven nearly to the spokes, it is secured by a bolt running the entire length of the arm and hub, having a head at *l*, and a nut at *m*. The large nut *n* secures the wheel to the vehicle, it being only necessary to hold the nut with a wrench, and turn the wheel forward to run it on, and backward to run it off. The wheels are, in this drawing, represented straight for convenience, and the arms on a level line. It is proper to remark that the inner ends of these arms must be elevated to correspond with the dish of the wheels, so as to give the under spokes a perpendicular position. In this, as in ordinary wagons, if the journals are made parallel, that is without taper, no necessity exists for gather.

Again, this plan admits of the introduction of a system of friction rollers, upon the main bearings—an object long sought for, and even introduced into ordinary wagons, but at the expense of still greater damage to the wheels, as they must be put into the hubs, already gutted, to receive the boxes. In the use of this style of rollers, upon journals in other kinds of machinery, it has been found that the larger the journal in proportion to the rollers used, the better they have been found to work. Here we have an 8-inch journal, which with rollers $1\frac{1}{2}$ inch in diameter, will be perfect in operation, reducing the friction to a nominal thing, while the rollers occupy a space valuable for no other purpose. Fig. 5 shows the main box *b*, with its set of rollers enclosed, so plainly as hardly to require explanation. Fig. 7 represents a cross section of this box, with one roller. The rollers (eight in number) are suspended between two rings (Fig. 6), upon stout pins cast upon said rings, and almost meeting each other in the center of the roller. The rings are riveted firmly together, midway between the rollers, through supports cast upon the rings, which keep them the required distance apart. The two halves of the box *b* are closed upon this set of rollers, and the bolts *oo* put in their places, which confines them with the utmost security. It is evident the operation of these rollers is to travel round the journal, backwards, as the wheel is propelled ahead. The rollers have an oval tread, and the lateral motions of the vehicle, producing a rocking motion of the rollers, will effectually prevent them from ever becoming cylinders by wearing. Cylindrical rollers are liable from various causes to become tapering, or the journal they run on may become so; either of which produces a strong tendency to divert them from a straight course, and great friction results. A ball, or its equivalent, an oval roller, has no such tendency. The rollers, boxes and journals, should have chilled bearing surfaces, to insure durability.

In 1862, I built a wagon upon the above described general plan, with the exception of having no friction rollers. The box *b'* was lubricated with oil, fed from packing, contained in the lower chamber *p*. Many men loaded and tried this wagon in a great variety of situations, and the trial was, with scarcely an exception, highly satisfactory. The suspension rods *d* were of three-eighth round iron, and proved abundantly sufficient under loads of 5,000 pounds on rough roads. It is very evident to any one, that with these rods securely anchored at each end, spring is out of the question. Another important conclusion was arrived at, concerning a point upon which many differed with me, while I was making my patterns. It was this: It was thought by many that the great size of the box *b'*, and its journal, would load me down with friction. I was satisfied from the first that this circumstance largely increased friction, but contended that, by the same means, I had gained power in an equal ratio. Over twenty men who tried that wagon will certify to-day that they never hitched to a wagon that equaled it in ease of draught.

It may be asked how power is gained by this arrangement. It can only be accounted for in this way: It is an acknowledged fact that the farther from the ground power is applied to a wheel, the easier it is propelled. The load rests, in an ordinary wagon, on the under side of the axle-arm, or $1\frac{3}{4}$ inches below the center of the wheel. In my wagon, it rests 4 inches above the center. As the team may be said to re-exert its strength upon the wheels, wherever the load rests on them, it follows that my arrangement gives the team $5\frac{3}{4}$ inches advantage over the one drawing an ordinary wagon, other conditions being equal; but we have seen that we are mostly, if not quite, robbed of this great advantage, by a corresponding increase of friction. It is believed, however, the rollers will conquer this difficulty, and leave us in undisputed possession of the long arm of the lever.

I committed an error in making the boxes *b* too narrow, under the mistaken notion that by this means I diminished the friction. I had not then learned the fact, long since familiar to machinists, that increased width in a journal box adds nothing to the friction, but greatly to its durability.

In addition to this mistake, two of the boxes proved to be very soft, porous iron, and the result was, that after running four months, they commenced cutting, and were soon ruined. The bearing *b'* being so near a perpendicular line with the tread of the wheel, the bearing of the inner journal of the arm upon the box *b* is very slight, and requires very little lubrication. The draft-pole is attached to this wagon by means of a roll, inserted between the boxes *b'*, with the draw-bolt passing through the holes *q*, in the same manner that a sleigh-pole is attached to the runners. The reach is connected to the hind gearing in the same manner. (See Fig. 2.) The casting *r*, Fig. 1, forms the spring cap and bolster plate.

I would remark that, in the front gearing, this casting is in two parts, to admit of turning the vehicle, the upper part receiving the reach and bowns. The hind and front bolster are precisely similar in shape, each being provided with a king bolt, which slides freely through the casting below, to accommodate the motions of the spring.

The question has been more than once asked me—"If your trial wagon worked so well, why did you not proceed to build more of them?" I answer, I did immediately commence another, and while at work on the drawings I brought up against a snag, which led to a new discovery quite foreign to the object sought after. The box *b* threatened to interfere with the end of the bolster, and I set about contriving some plan to get rid of an inch or more from the end thereof, and still preserve the same width between the stakes. All that is necessary, thought I, is to rig a stake which can be secured to the bolster without a mortise, and then the timber which is now required to be left outside the mortise, can be dispensed with. The patent stake, illustrated on the second page of the cover of this magazine, occurred to me as the plan best adapted to this end (I mean the end of the bolster). Eureka! cried I. And what next? Well, my pockets were empty, and creditors clamorous, as might have been expected; after spending a year or two on new inventions, and as the stake suited everybody, and promised to pay sooner than the axle, I dropped the axle for the time, and have been making stake patterns ever since.

When we construct a carriage-gearing upon this plan, we of course leave out the rubber springs, and in the fore part the clip-circle takes the place of the clips *a'a'*, while in the hind part these clips secure a short wooden stock to the casting *bb*, upon which the spring rests. The arms *aa* would be of brass, polished, and very light. The suspension rods *dd*, in a single buggy, would be no larger than $\frac{3}{16}$ wire. These, with the braces *kk*, may be plated, so as to be highly ornamental. The shafts will, of course, be coupled directly to the boxes *bb*, which will give the horse the most perfect control of the front wheels, and, being considerably wider at the heel than when coupled in the ordinary manner, the springs may be correspondingly increased in length—an advantage again; and not the least of the beauties of this arrangement for a buggy will be its cleanliness, there being no grease about it where it can reach the clothing.

Respecting the value of the advantages I claim to have gained by this arrangement, I trust there are no two opinions concerning either of them. Should a diversity of opinion exist as to whether I gain them by the most direct plan, I have full confidence in my ability to convince any one that no more simple method can be adopted to secure them.

Pen Illustrations of the Drafts.

LANDAULET.

Illustrated on Plate XXI.

Carriages of this description being seldom called for in this country, we have never before attempted to present our readers with designs thereof in this Magazine. Presuming, however, that now the coupé has become quite fashionable among us these must necessarily very soon be called for, we have taken some pains to Americanize this design from one lately received from Paris, hoping that it will meet the wants of the public. The flat falling head given to this carriage admirably adapts it to summer use, making it far preferable to the coupé to which it is of all others nearest akin. Those who are familiar with the making of coupé bodies, need no directions from us; those who are not, are advised to not attempt the building of landaulets, as to do so will probably end in a failure.

ROAD PHAETON.

Illustrated on Plate XXII.

We feel much satisfaction in being able to present our readers with so excellent a design of a popular phaeton as the one now furnished by one of the artists attached to this office. It is intended to have a stanhope front, and a rounded back corner, with a cut-out side to facilitate the turning around. A wear-iron should be placed where the wheel touches, as a defense to the side panel. One back seat is made to turn in, so as to present the appearance of one seat only.

EXTENSION-TOP ROCKAWAY.

Illustrated on Plate XXIII.

This Rockaway is from an original drawing from our Boston friend, Mr. J. R. Bartlett, and gives a very good idea of the Eastern style of work. It will make a very light and airy carriage for family use. The construction is so simple that these are more cheaply made than some other styles, thus bringing them within the reach of most persons able to keep a horse. No doubt this design will meet with the approbation of our Western subscribers as well as those in New-England.

GENTLEMAN'S ROAD BUGGY.

Illustrated on Plate XXIV.

We present this as the latest form fashion has given to the coal-box, or gentleman's buggy. A projecting washboard is added to the toe-board, which the engraver has tried to show, but not as successfully as we could wish. For further information we add a few dimensions: The extreme length from front to back ends is 3 fect 11 inches; width of panel under the seat 1 foot; width of seat end panel at the center $3\frac{5}{8}$ inches; width of seat across the body 2 feet in the clear, and $15\frac{1}{2}$ inches lengthwise in the body. Wheels 3 feet 11 inches, and 4 feet 2 inches. The general practice of painting buggies black has become varied by using more fancy colors than formerly. Striping, if done at all, is laid on full $\frac{1}{4}$ inch, and sometimes $\frac{5}{16}$ inch. Red is the color mostly employed at present. These buggies are now worth about $275, trimmed with blue broadcloth and finely finished.

Sparks from the Anvil.

ON THE TEMPERING OF STEEL.

A ROD of good steel, in its hardest state, is broken almost as easily as a rod of glass of the same size, and this brittleness can only be diminished by diminishing its hardness. In this management consists the art of tempering. The colors which appear on hardened steel, previously brightened, are, a light straw color, a dark straw, gold color, brown, purple, violet, and deep blue; these colors appear in succession as the hardness gets reduced. There are various ways of tempering steel, dependent upon the nature of the articles, likewise the quantity of them, for, in a number of instances, a great many articles may be tempered as expeditiously as a single one. To temper any article to color it must be brightened after it is hardened, and then laid on a plate of hot iron, or upon a surface of melted lead, or in hot sand, or burning charcoal, or held in the centre of an ignited iron ring, or in the mouth of a furnace, or on a gas stove made for the purpose. But, in constructing a furnace for hardening with, it is a good plan to have the top of the furnace made with a good stout plate of cast-iron, so that the plate will always be hot, and ready to temper anything that can be done on a plate; and it will do to put the sand on, and for many other useful purposes, especially if the plate be movable, and a small opening left in the front of the furnace from the top down to the mouth, just to admit the tongs. If at any time hot lead is required, the plate can be removed, and the pot of lead placed in the furnace—the plate can then be put back into its place. The opening in the front will be very convenient for getting the articles into the lead, and when the opening is not required it may be stopped with a piece of sheet-iron. With a furnace of this description it is surprising the amount of hardening and tempering that can be accomplished; for large things take a considerable time in heating, and while the hardener is waiting for them getting hot he may be engaged tempering on the top of the furnace, and still have his attention on the other articles. In the way of case hardening, a man's sole attention is not required on the articles all the time they are in the fire, as many things lie for hours before they are ready to put in the water, and he may then be engaged in tempering; but if this plate should prove too hot for small articles, another piece of plate may be laid on the top of it, and the articles laid on the top plate. It is not every one, however, that has large quantities to temper, so as to require a furnace or tempering stove; but merely a few articles occasionally, such as hobs, taps, dies, drifts, rimers, chasers, drills, &c., for the use of the shop; in such cases the uses of the furnace can be dispensed with; for a small quantity they may be heated in a common smith's fire, and hardened in the usual way: taps may then, after they are brightened, be held inside of an ignited iron ring till a dark straw color appears on the surface, and then plunged into cold water; this is the best temper for general use; but if it is intended for any express purpose, for cutting things that are extra hard, in such cases a light straw color or yellowish white will be required. Hobs require to be yellowish white, for, as they are always required for cutting steel, it is necessary they should be hard; fluted rimers may be held inside of an ignited ring, and tempered to a light straw color. Dies may be hardened in the usual way, and when brightened placed on a cold plate of iron, and the plate and the dies put upon a large piece of ignited iron, and tempered to the same color as a tap—a straw color. Chasers may be hardened in the usual way, and placed upon an ignited bar, keeping the threads some distance off the bar, and tempering to a light straw or yellowish white. Drills may be hardened in the usual way, and the cutting part of the drill tempered to a straw color, while the rest is not higher than blue, so that its liability to break when in use is greatly diminished. Chisels may be hardened in the usual way, and tempered to a violet color; but if intended for cutting stone, a purple is required. Drifts may be hardened in the usual way, and tempered to a brown color. Milling cutters may be hardened in the usual way, and tempered to a yellowish white. Saws may be hardened in the usual way, in which state they will be brittle and warped: they may then be put into a proper vessel, with as much oil or tallow as will cover them, and placed over a fire and boiled to a spring temper, or they may be smeared with tallow, and heated, till thick vapors arise and burn off with a blaze; they must then be hammered flat, and afterwards blued. But if they are intended for cutting hard substances, such as steel, or iron, they must be tempered to a straw color.

A very convenient way of tempering when there is a large quantity of articles to do, is to place them in a vessel with as much tallow or oil as will cover them, and place them over a slow fire till a sufficient heat is given for the temper required. When the oil or tallow is first observed to smoke, it indicates the temper called straw color, and when the smoke becomes more abundant, and of a darker color, this indicates a temper equal to a brown; after which it will yield a black smoke, and still more abundant; this indicates a purple, after which it will take fire if a piece of lighted paper be presented to it, but not so hot as to burn when the light is withdrawn, and this is equal to a blue temper. The next degree of heat will be that which is mostly used for springs, when a white flame will be seen to burn on the articles if they are lifted out at this heat, after which the oil burns away. To add further oil is useless; any single article may be smeared with tallow, and held over a fire, or in a gas flame, and its temper known in a similar manner. For springs, if they are very slight, oil is the best to harden them, as they are not so likely to draw out of the proper shape; but if they are stout springs, water is best, for in hardening a stout spring in oil, the hardness is confined to the surface; for if the springs are properly hardened, and the steel good, and boiled in oil to the temper I have stated, there is no failing in them. Solid tallow is better than oil for hardening steel, which requires considerable hardness, but must not be made brittle. Tallow differs from oil in the absorption of heat for its fusion, for steel that is hardened in oil has always a covering of coal round it which greatly retards the transmission of heat. Water holding soap in solution produces a similar effect; any large piece of steel may be made sufficiently hard to wear well in machinery without making it brittle by hardening it in a body of solid tallow. A great many young mechanics are quite ignorant as to the nature of boiling oil, or tallow, and are anxious to try the experiment of tempering springs in boiling oil; to those I wish to say a few words. I was once asked by a young man the way to harden and temper springs, and I informed him to harden

them first, and if he had a quantity to do, to temper them in boiling oil, never thinking that he would attempt to do them on the fire in the house, and the result was that he nearly set the house on fire. I have just mentioned this circumstance merely as a warning to the inconsiderate, that they may not fall into the same error. They must not attempt to boil oil unless they have a place suitable for it.

Paint Room.

BENZINE IN CARRIAGE-PAINTING.

Hitherto we have abstained from saying much about the use of benzine in carriage-painting in our pages, chiefly because very little could be said *pro* or *con*, with certainty. Not having had time for experiment, its enduring qualities when exposed to the weather were unknown, and even at this time are a matter of dispute. As with a great many other questions, interest, not utility, has much to do in deciding for or against its use. In many of the country shops we find it almost in general use, while in cities where better prices allow the use of spirits-of-turpentine, it is almost entirely discarded. In our own shop a drop has never been found, and therefore, experimentally, we are in total ignorance. We have chosen to pay the higher prices for turpentine, rather than risk the frowns of old customers.

In our late journeyings we have taken much trouble to learn from others their opinions of benzine in general, and with the following results: While there are many carriage-makers who say that "it is better than ever spirits-of-turpentine was," because it answers better the sole qualities of a thinner and drier of paints, for which the former is chiefly used, there are others who say they would not have it in their shops, because it dries so quick it is with difficulty spread, and they have no faith in it. In some shops, so strongly impregnated with it, that it is scented in passing by outside the door, it is spoken of as one of the greatest discoveries of the age; far ahead of turpentine, an article they never intend to use again. Besides, they find that after a year's trial, the paint on a carriage looks and wears full as well as ever any mixed with turpentine did. One gentleman tells us that he finds it stands well for about one year and then is easily rubbed off with the hand, the adhesive qualities of the oil being almost entirely destroyed. Another uses benzine in painting carriage-parts, but employs turpentine only in painting bodies. Out of this confusion, we have been able to arrive at the conclusion: that its use is decided entirely by "pocket interests," and that when turpentine comes down in price to a reasonable standard, nothing more will be heard in favor of benzine for mixing carriage-paints. The whole matter is comprised in the lines of a modern poet:

> "In love, or in turning a penny,
> Always study the field of your luck;
> In petroleum and naphtha full many
> Ere now have been [will be] terribly *stuck*."

We add a few remarks on the properties of benzine, for the benefit of those inclined to study.

The crude naphtha, from which the article is extracted, comes to us in company with a large amount of water, as a precautionary measure, and this crude naphtha, when distilled, is known as rectified coal naphtha. This is further purified by mixing it with ten per cent. of concentrated sulphuric acid, agitating and setting it aside for some hours to rest; when the mixture is cold, five per cent. of peroxide of manganese is added, and the upper portion submitted to distillation. The specific gravity of the rectified naphtha is, 0.850; it is used extensively as a solvent of caoutchouc, and other applied gums, and also of resins for the preparation of varnish. By repeated purification and fractional distillation, what is termed benzole or benzine, by Pelouze and others, is obtained; naphtha being a heterogeneous liquid, made up of several hydrocarbons, of which benzine is the most important and abundant. It is thus seen that benzine is derived from a mineral, while spirits-of-turpentine is from a vegetable substance, both essentially different in their nature.

In comparing turpentine and naphtha in paints, a cotemporary remarks, that "when a piece of wet cloth is hung up in the air, the water which it has absorbed is evaporated, and floats away in the atmosphere, and the cloth is dried by the removal of the moisture. But in the drying of paint, there is no removal of moisture. The linseed-oil absorbs oxygen from the atmosphere, and is changed from a liquid oil to a solid resin. In the place of losing by evaporation, it gains in weight. It is, perhaps, hardly more proper to call the process "drying" than it would be to speak of iron drying when it cools from the liquid to the solid state, or of water drying when it freezes into ice.

"Spirits-of-turpentine is a solvent of linseed-oil, and when it is mixed it renders the mixture more fluid, thereby facilitating the spreading of a thin and even coat over the surface. It is very volatile and soon evaporates, but a small portion is converted into resin by the absorption of oxygen, the same as the oil, and therefore it adds slightly to the body of the paint. In evaporating, it opens the paint to the action of the atmosphere, and thus hastens the process of solidification.

"The lighter portions of those hydrocarbons which unite to form petroleum are solvents of linseed-oil, and therefore serve to render paints more fluid. They are also volatile, and evaporate from the mixture when exposed to the air. But none of the hydrocarbons of petroleum absorb oxygen, or change to resin. Naphtha, therefore, adds nothing to the solid body of paint," consequently, in the very nature of things, turpentine spirits must be far preferable to benzine. With no other object in view than the best interests of our patrons, we now take leave of this subject, hoping to have the opinion of others for publication, hereafter, as well as the practical results in the use of benzine for carriage-painting.

A COLORLESS VARNISH.

There are few things in photography that give the professional and amateur followers of the art more trouble than varnish; and as lac—a resinous substance, the product of an insect found on several different trees in the East Indies—is one of the principal ingredients used, it has been a great desideratum among artists to render shellac colorless, as, with the exception of its dark brown hue, it possesses all the properties essential to a good spirit varnish in a higher degree than any other known resin. A premium of a gold medal, or thirty guineas, was offered some years ago by the Society of

Arts for "a varnish made from shell or seed lac, equally hard and fit for use in the arts." There were two candidates, Field and Luning. When, on due examination and trial, both processes were found to answer the purpose, the society awarded the sum of twenty guineas to each of the candidates. We give the process known as—

Luning's Colorless Varnish.—Dissolve two ounces and a half of shellac in a pint of rectified spirits of wine, boil for a few minutes with five ounces of well-burnt and recently-heated animal charcoal. A small portion of the solution should then be filtered, and if not colorless, more charcoal must be added. When all color is removed, press the liquor through a piece of silk, and afterwards filter through fine blotting-paper. This kind of varnish should be used in a room at least 60° Fahr., perfectly free from dust. It dries in a few minutes, and is not liable afterwards to chill or bloom. It is particularly applicable to drawings and prints that have been sized, and may be advantageously used upon oil paintings which are thoroughly hard and dry, as it brings out the colors with the purest effect. This quality prevents it from obscuring gilding, and renders it a valuable varnish for all kinds of leather, as it does not yield to the warmth of the hand and resists damp, which subjects leather to mildew. Its useful applications are very numerous indeed to all the purposes of the best hard-spirit varnish.

A common lac varnish may be made by digesting four ounces of clear-grained lac in a pint of spirits of wine in a wide-mouthed bottle, keeping it in a warm place for two or three days, and occasionally shaking it. When dissolved, strain through flannel into another bottle for use. —*British Journal.*

Trimming Room.

TRIMMINGS, &c.

Lining cloths, in consequence of a decline in gold, have fallen some fifty cents on a yard, while body cloths have fallen still lower in proportion to former prices. We think, however, that they must come down still more, before manufacturers will feel themselves justified in purchasing and making up largely for the spring trade. Cotelines have been reduced in price $2 per yard, and velvet carpets 50 to 75 cts., while curled-hair has very materially advanced, as well as some kinds of leather. Other trimming materials remain at former quotations.

In New York City, though little more than repairing is now done, a very plain style of trimming is practiced, even to the covering of buttons, used as tufts, with cloth of the same material as the linings. The full backs of buggies have generally two rows of buttons at the top, but sometimes are varied by making a plain heavy roll across the top, under this a row of buttons, the lower portion being laid-off in pipes and extending down to the seat. Not a particle of leather is used in either the falls, cushions or back of the best city made buggies, at the present time.

We noticed in our late journey that in some parts of Pennsylvania and Maryland the old practice of *ornamenting* carriages, with white stitching, is still continued. This would seem to require of us that we continue to furnish our readers with original designs for stitching; but to do so would, in our opinion, merely show retrogression instead of progression. To those who desire them, however, we would say that we have some of our old designs still on hand, and will fill any orders at the rate of twenty-five cents each, cash to accompany orders.

Editor's Work-bench.

FROM HOME.

We have again been visiting the craft; this time westernly. Taking the Camden & Amboy Company's boat at pier four, North River, and after a pleasant ride of a few hours, by rail from South Amboy, we found ourself safely landed in the city of Philadelphia., Pa., in the evening of Sept. 19th.

Our first visit, the next morning, was to the establishment of our valued friend, Wm. D. Rodgers, Esq., located at 1,009 Chestnut Street. Mr. R. has very recently made some important additions to his premises, and is now prepared for doing a large business, which, we are pleased to find, present indications encourage him to expect. Of Mr. R's mechanical abilities the world has a favorable opinion, and, therefore, will need no praise from us. He evidently gets the best prices for his work of any one in Philadelphia, in the same line of business, and, no doubt, merits it. In Mr. S. W. Jacobs, on Arch Street, we made a new acquaintance, and were very much pleased with our reception. His is a well-arranged manufactory and repository, in which we observed some very excellent carriages, and learned from him that he, at one time, supplied one of the leading houses in New York with some of their finest work. In the same street we met with Mr. A. Flagler, who has now a repository in the city for selling carriages made at his old stand, in Wilmington, Del. He keeps on hand a very good assortment, but entertains rather an unfavorable opinion of Philadelphia as a business place. An hour's conversation with Mr. F. was very agreeably passed. For the first time, on this occasion we called on our old friends, Messrs. Beckhaus & Allgaier, located on the Frankford Road. They are building a fine hearse, for California, to cost $3,000 when completed. As we are promised a drawing of it for this Magazine, we defer details for the present. One thing we noted here deserving of mention. In most warerooms where carriages are stored, the old and objectionable mode of sweeping is done with a corn-broom, thereby raising a dust that immediately settles down again on the vehicles; whereas, in this establishment, the floor is cleaned with a moistened mop, and afterwards gone over again with a hair brush, leaving everything neat and clean. We all have learned that dust, once on, takes away from a carriage all that freshness and beauty peculiar to a newly made article, and which is so desirable for effecting ready sales. Messrs. Wallis & Blackiston also showed us some very fine work, very creditable to them as skilled me-

chanics. A call upon Messrs. J. S. Lane, D. M. Lane, and E. Lane—the two last in West Philadelphia—finished our visit as far as Philadelphia is concerned.

There are two shops located in Camden, New Jersey, opposite Philadelphia; those of the Messrs. Collings Bros., and Chas. S. Caffrey. The latter gentleman began business in 1855, and it is due to him to state that he is the builder of the very first class of work, for which he has become celebrated, and obtains a ready sale. Mr. Rodgers, of Philadelphia, and some others, as well as Mr. C., plate the ends of their hub bands, &c., with princes metal, and this again is plated with gold, giving to the work a very rich appearance. For this, at the present time, $35 extra is charged. This gentleman exhibits much originality in keeping his books, and arranging things generally about his factory, a specimen of which is given on page 66 of this volume. We shall take an early opportunity of giving our readers proof of this fact.

A visit to Germantown, seven miles north of Philadelphia, has put us in possession of some facts in relation to the origin of "the Germantown" carriage, which we here give for the benefit of posterity. The original builder is Mr. C. J. Jungkurth, and the shop, now occupied by his son, is said, by the old gentleman, to be the oldest in Pennsylvania. Mr. J. was born in 1789, and now, although in his 76th year, is as active and cheerful as most others not over fifty. An interview with him furnishes us with the following: John Bringhurst built the first carriage in Pennsylvania, in 1773 or '74—a chair, as it was then called. The first, or *original* "Germantown," was made by Jungkurth, in 1816, for Jas. Duval; and the second for Jas. Hamilton; the first being driven about 25 years. Geo. Watson, of Philadelphia, refused to build them for several years, in the interval sending all such custom to Mr. J. This place was formerly celebrated for carriage-making, maintaining seven or eight shops, now having only two, of which the old shop stands second. About 1814, after all the other shops had shut up, Mr. J. began business. He states that this was done at the urgent solicitation of a lady, Mrs. Waxmouth. Mr. J. having spent some seven or eight years in doing the small jobs of painting, &c., about town—for Mrs. W. among others—she said to him one day, "You have been fooling away your time, in this way, about long enough; you are a coachmaker, go to work and make me a carriage." When this was done she got me two or three orders more. From that time Mr. J. pushed matters, and established a reputation for himself. "For seven years," he says, "I hardly obtained any sleep, not more than three or four hours in the twenty-four, working day and night." The Ashmeads, Bringhurst, Fry, Wm. H. Ent, and Cox, were the names of the earlier carriage-builders in Germantown.

Wilmington was the next place visited. The first shop seen in the vicinity of the station is that occupied by our friends, Messrs. Sullivan & Thompson, the same having been occupied by the now deceased and much lamented Mr. Hunsburgher. These gentlemen, apparently, are fairly on in the road to success, and will, doubtless, prove themselves an honor to the craft. A visit to the large establishment of H. Pretschner, Esq., secured for our mission all the attention we could wish, which made us feel entirely at home. Mr. P. had the kindness to introduce us to the proprietor of a new shop, that of Mr. J. N. Cooling, in his immediate vicinity. A very creditable class of work is made in Wilmington, and finds a ready sale, in favorable times, chiefly among dealers in New York, Philadelphia and Baltimore. There are many fine shops in Wilmington, but which want of space precludes our specifying more in detail. Having never been west of Wilmington in our life, until now, we enjoyed the trip from thence to Baltimore very much. At Havre de Grace, where the whole train of cars, including the locomotive, are transported from shore to shore, across an arm of the Chesapeake, at one trip, we had a splendid view of the mouths of the Susquehanna, divided at this point by a large island, strongly reminding us of the scenery on the Hudson River. A railroad bridge is now being built here, which, when done, will give to the painter one of the most interesting views for the exercise of his pencil to be found in all our region of country.

The oldest carriage-factory in Baltimore is the one now occupied by John Curlett's son. The old gentleman has been dead about ten years, but the son received us in the most affable manner. We shall never forget his kindness to us. The other principal shops are those of Messrs. Wm. McCann, H. O'Connell, a gentleman formerly of N. Y., Geo. B. Colflesh, Wm. Bowers, H. R. Champayne, J. Riddlemoser, John Toner, S. E. Penning, C. E. Minnick, and Geo. J. Kurtz. To all these gentlemen, who received us with the greatest cordiality, we tender our heartfelt thanks, trusting that we shall meet again at an early day, and find them in a more prosperous business than the distracted state of the country now affords. For kindness among themselves, as well as to us personally, no section of the Union presents a finer illustration. There are many other reasons why we shall ever remember Baltimore.

Monday morning, the 26th of September, found us on our journey to the Federal capital, the far-famed city of Washington. Having first paid our respects to Messrs. McDermott & Bros., and Geo. R. Hall, the proprietors of the two best shops in the place, we next, as every lover of his country, on his first visit, ought to do, called at the White House, to see the chief representative of the Govern-

ment. By taking advantage of an ingenious suggestion from the janitor, we got ahead of the crowd at the door, and thereby had the privilege of an interview with Mr. Lincoln, uninterrupted. Although at the risk of exposing our political prejudices to the reader, we give the conversation in detail:

Editor.—"How do you do, Mr. Lincoln? I have not come, sir, seeking office, but to see the savior of my country."

President.—"How do you do, sir [with hands clasped]? Let's see, where do you reside?"

Ed.—"In the city of New York; am publisher of The New York Coach-Maker's Magazine."

Pres.—"Troy, I believe, is a great coach-making town?"

Ed.—"Yes; some are made in that city, but many are made in Albany. Watertown was once a celebrated place for carriage-making, but its glory has departed."

Pres.—"I have seen many of the Troy coaches running on the prairies, in Illinois." Here seizing Mr. Lincoln's hand again, we involuntarily exclaimed, "God bless you, sir! good-bye." Mr. Lincoln.—"The same to you, sir; good-bye!" Thus ended our interview with one of the greatest men of this or any other age. The crowd behind us having now come up to where we stood, the Editor "skedaddled."

We next called at the Patent Office, making the acquaintance of the Librarian, and others. This was not the least pleasant part of our visit to the capital. Mr. kindly presented us with six volumes of the Patent Office Reports, relating to mechanics, all yet published of this series, for which he has our thanks, and which act shall ever give him a prominent place among the circle of our friends. While in the building we took the opportunity to compare, with each other, the models of the two different perch-couplings, which have proved so troublesome to the carriage-making fraternity. If any one can discover any principle, in the later contrivance, covering that of the Everett's, we confess that their perception must be *clearer* than ours. As we intend to examine this matter at a future time, we omit any further details here. A walk through the Capitol, and among the grounds surrounding it, but which have been often described, finished our visit.

The operations of the rebels in our front, compelled us to return to Baltimore; from thence to Harrisburg, and home *via* the Lebanon Valley, and N. Y. Central Railroad. At Allentown we found our old friend, T. Statler, Esq., the proprietor of the most successful shop in the place. His kindness made us at home. The only other shop, with ambition enough to take our publication, is that of Snyder & Hendricks. We have thus hurriedly taken a view of our latest journey among the craft, not as fully as we could have wished, or some of our friends might desire; yet quite as much in detail as our limited space will warrant.

REVIEW OF TRADE.

The inflated prices asked for carriage materials, while the premium on gold was high, has had such an influence upon the manufacturers of carriages that its effects are still observable now that the premium has in some measure lessened. A general distrust in the stability of finances compels the business man to act with extreme caution in all he undertakes to do. Should he build carriages now, with a merely nominal reduction in the costs of production, he will most likely be compelled to sell at less than the actual first outlay—a ruinous loss.

In our October report of current prices it is shown that while goods of foreign importation have fallen in price, many of those of domestic manufacture have actually gone up. The tenacity dealers exhibit in holding on to high prices to save themselves, and the ambition they exhibit in trying "to shove off" their goods upon "poor carriage-makers," admonishes the prudent business man to use extreme caution, and buy only what the actual wants of customers require in filling present orders, and such a course undoubtedly will go far in causing a better state of things for the manufacturer. Of course *our* financial matters are very much influenced by the operations of our armies and the presidential elections near at hand. These once settled, business must resume its accustomed vigor, and the premium on gold probably fall to 150. Such a state of affairs would be favorable to the resumption of business, and no doubt prove beneficial to us.

As a general rule, trade has not been very brisk the past summer, and a much less number of carriages were sold in 1864 than in 1863. This was owing to the high prices manufacturers of carrriages were compelled by the force of circumstances to place upon their goods, seriously affecting sales. Many of our customers, looking only at the matter in a commercial light, absolutely sold their horses, and renounced their sports for awhile, rather than purchase such luxuries at such prices. In some cases those who had actually placed their orders afterwards repudiated or countermanded them from some cause, probably fearing a general "smash up."

Although the public thinks we have been coining money at *our* high prices, still we very much doubt if many carriage-makers have more than paid actual expenses for the past three years. Some tell us they have gone behind hand, and many are declining the business, particularly in the country towns, and turning farmers, which business certainly presents more temptations at present. Future success with us is predicated upon two circumstances, the fall of gold and increased demand for car-

riages. Should the former reach a reasonable point, the latter will certainly take place, and both connectedly will realize again the fond desires of every business man, and set us once more upon our legs.

The California trade has hitherto presented some encouragement to shippers, but from a private source we obtain the following report: "We regret to say a great and unexpected change has come over our carriage market within two months owing to several causes, one of the principal being the enormous number imported (as unspecified merchandise) and sold, good open buggies having been disposed of at $70, and top at $95 *a* $200."

IN MEMORIAM.

The following letter, from the sister of our lamented correspondent, came too late for another department of our journal. As there are many who have been interested in her contributions, and may be in her history, we take the earliest opportunity of presenting it:

Died, in Cambria, Niagara Co., N. Y., Annie M. Beach, daughter of Harvey Beach, in the 26th year of her age.

For some years past, the deceased has been favorably known to the reading public, by her literary contributions for some of the first periodicals of the day. The "Coach-Maker's Magazine," the "*Ladies' Repository*," the "*Rural New Yorker*," are among those for whom she was a regular contributer. The sweet strains of her muse found echo in many a heart, and there are those who will wish to read more than a passing notice of her death.

Annie M. Beach was born in Cambria, Niagara Co., N. Y., Oct. 23d, 1838. Her father, Harvey Beach, who is a native of this State, has resided in Niagara Co. for more than sixty years. Her mother's native State was Vermont. She came here with her parents in 1812. Since their marriage, which occurred nearly forty years since, they have resided in Cambria. Annie M. was the younger of two sisters, the light and life of the dear home circle. Fragile, like some fair flower, she was ever watched with anxious solicitude by those who loved her.

She was too frail to carry out her own grand aims and noble purposes. In the sweet purity of her heart, she cherished the beautiful, the pure, and the good. She was a member of the M. E. Church, a faithful christian. Ever cheerful, hopeful, and happy, she cast an influence around which was felt by all who came within its sphere.

Noble in her purposes, earnest in her endeavors, she often labored far beyond her strength in the affairs of the church and the nation.

She will be missed by those who had learned to love the sweet strains of her muse, in the church which she so much loved—in the sabbath school where she labored. She will be missed in the social circle, but more than all will she be missed in that sweet quiet home of which she was the light and cheer.

Her life was beautiful, it will ever point us heavenward. Her death was more than beautiful; it was sublime. With perfect composure she looked out upon the "dark waters," for she saw "light on the other shore." "I am not afraid to die," she says,—and her last entreaty to her friends was—"Come to heaven." She was buried on the sweet sabbath following her death. Her pastor spoke from these words, "She is not dead but sleepeth." The first hymn read was one of her own composition, published in the "*Ladies' Repository*," commencing thus:

> "Father, the world is cold and bleak,
> Thy home is beautiful and bright,
> I almost would my weary feet
> Might tread its peaceful plains to-night."

She has gained its peaceful plains—she is an angel now; —and surely "the world seems cold and bleak" to the sorrowing hearts she has left.

She was very beautiful in her coffin, sweet one, with pale flowers around her soft golden hair combed back from her calm brow; her little hands clasped, with a few pale flowers—beautiful immortelles—we could but wish that the dear form might never decay.

We know, that, far away, beyond the clouds and mists of Time, there is a bright, beautiful realm where Jesus reigns and angels dwell. *There is our loved one!* Gone, in her sweet purity, up to the Throne of God.

Cambria, N. Y., Oct. 6th., 1864. F. B. C.

EDITORIAL CHIPS AND SHAVINGS.

Hausknecht *vs.* Claypole & Lynn.—This case, before reported in this Magazine, and sent back for re-trial from a higher court, was again tried in the United States Circuit Court, in Cincinnati, on the 15th of October, and after a careful hearing was declared by the jury against Hausknecht, without leaving their seats. In our next number we shall commence the publication of the testimony in the case, so that those who have *foolishly* paid him moneys for pretended infringements may see for what they have paid.

Western Customs.—An Illinoian, traveling in Ohio, writes to a city cotemporary, that in Illinois the wealthiest farmers' wives very often ride on the top of a load of wheat or corn to market. It is the fashion in general there for women to ride in the common lumber wagon; the exception to ride in buggies or carriages: here it is *vice versa*. When the women of Illinois invite one another to go a visiting, the reply generally is, "I will go the first chance;" that means, "When husband has any trading to do, or any business that takes him your way, I will jump into the wagon and go along," and then, while husband is bartering his hogs, or corn, or pork, as the case may be, the women do up the visiting. Here the women are more independent; in the course of an hour's drive on a sunshiny morning one may meet a dozen neat buggies, or covered one-horse carriages, three-fourths of which are driven by women; there are a couple of ladies making calls; the other carriage holds a mother and her children going to see grandpa.

Coloring Woods.—A German has lately published the following directions for coloring woods: the surface to be colored is smeared with a strong solution of permanganate of potash which is left on a longer or shorter time, according to the shade required. In most cases five minutes will suffice. Cherry and pear-tree woods are most easily attached, but a few experiments will serve to show the most favorable circumstances. The woody fibre decomposes the permanganate, precipitating protoxide of manganese, which is fixed in the fibre by the potash simultaneously set free. When the action is ended the wood

is carefully washed, dried, and afterward oiled and polished in the ordinary way. The effect of this treatment on many woods is said to be surprising, particularly on cherry wood, to which a very beautiful reddish tone is communicated. The color is in all cases permanent in light and air.

PRESERVATION OF WOOD.—A curious example of the way in which wood may be preserved by the infiltration of metallic salts has recently been brought before the French Academy by M. Payen. An old wooden wheel, used for some mechanical purpose in the now abandoned copper mines of St. Domingo, was found there by General Morin. How long this wheel had remained in the mine is unknown, but, after analyzing, was found to contain considerable quantities of iron and copper, to the antiseptic properties of which its preservation must be attributed. The wood not only absorbed the metallic solutions, but so operated on them when absorbed as to prevent their re-solution by water, the iron having been found in the form of subsulphate of the sesqueoxide. The preserving power of such impregnation is best illustrated in the wood employed in the mines of Hallein, in Austria; the timber used in these mines is the same which was origally introduced anterior to the Christian era, and is, even now, in a very perfect condition.

DR. RADCLIFFE AND THE PAVIOR.—The celebrated Dr. Radcliffe could not look upon tradesmen's bills without a sense of keen suffering. Even a poor pavior who had been employed to do a job to the stones before the doctor's house in Bloomsbury Square could not get his money without a contest. "You rascal," cried the doctor as he alighted from his chariot, "do you pretend to be paid for such a piece of work? Why, you have spoiled my pavement and then covered it over with earth to hide the bad work." "Doctor," said the old man, dryly, "mine is not the only bad work the earth hides." "Eh, what, so you're a wit, are you?" said the doctor. "Then you must be paid."

OWNERSHIP OF ROADS.—A judicial decision of considerable importance has been rendered in Connecticut by the Supreme Court of that State. The case arose in this way. The select men of Simsbury had, for a certain sum of money, granted a man license to turn a cow into the highway. The owner of a tract of land bordering on the road claimed that the feed in the road adjoining his premises was his property, and not the property of the town. He brought a suit for trespass, which went to the Supreme Court, and was decided in his favor. The court held that in opening a highway the fee simple, the absolute ownership of the soil, was not vested in the public but only the right of way. The public had control of a road as far as was necessary to make a convenient passage, but no farther. If a road were abandoned by the public, it again became part of the property from which it was originally taken, and this was additional proof that the title to the soil occupied by the highway was vested in owners of the land adjoining. The public having nothing but the right of way, the grass and feed on the road were, therefore, the private property of adjoining landholders. The following are the words of the court: "The owner of land covered by a highway has the exclusive right to the herbage growing thereon, and a by-law of a town giving liberty to the inhabitants to pasture their cows in the public highway, under certain regulations, passed under the authority of a general statute (Acts 1855, ch. 64) empowering towns to pass such by-laws, has no validity."—*N. Y. Observer.*

LITERARY NOTICE.

THE publishers of the *Atlantic Monthly* have, like most others, been compelled, by the continued high price of paper, and the constant advance of material and labor in all departments of book-making, to increase the rates of subscription. Single subscriptions are now $4; two copies, $7; five copies, 16; ten copies, $30, or $3 each for all under twenty copies. Of the merits of the October number we can scarcely speak too highly; indeed, this sterling monthly is all the greatest literary gourmand could wish. Each succeeding number seems to be an improvement on the preceding, making this periodical a work of which an American may well be proud.

FOREIGN IMPROVEMENTS IN CARRIAGES.

November 19, 1863. IMPROVEMENT IN CARRIAGES.—E. Christmas.—This invention consists in substituting for the bottom-side plates, as at present constructed, a bottom-side and doorway plate, which, across or opposite the doorway, between the standing and hinged pillars, is made wholly of metal. These improved bottom-sides are formed of plate in the solid or in parts, and riveted or bolted together. The patentee prefers making up the required depth of section by placing two more plates, one upon another, and riveting the same together so as to form a truss by the chain, on common riveting principles, with the bottom-boards supported upon, between or under the said plates.

30. IMPROVEMENT IN THE CONSTRUCTION OF CARRIAGES AND OF VEHICLES, AND OF WHEELS APPLICABLE THERETO.—A. Etienne.—In carrying out the first part of this invention the patentee employs two springs crossing each other at right angles, and presenting four points of support, on which he fixes a frame of wood, and suspends the carriage body thereon by the intervention of two small springs on the frame, so as to create a double suspension and to diminish the friction. *Secondly.* He supports carriages, omnibuses and other vehicles on three wheels as follows: He places the two wheels on one axle under the center of the body in such manner that the carriage body shall rest thereon almost in a state of equilibrium or balance, so that the front wheel, which is placed in a central line with regard to the two wheels, and in or beyond the front of the carriage, shall bear no portion of the weight, but simply serve to steady and guide the vehicle. The third improvement in the construction of the wheels consists in making their circumference of a series of three irregular curves; for examples: If the circumference of a circle be divided into six equal parts, and three of those parts alternately be raised by irregular curvilinear lines, it will follow that at three periods of each revolution the wheel will acquire an impetus as it revolves from the raised curves to the lesser circumference, whereby the horses will be enabled to draw the carriage with very increased facility. *Patent abandoned.*

Dec. 5, 1863. IMPROVEMENT IN APPARATUS FOR SUSTAINING AND LIFTING DRAUGHT HORSES, TO PREVENT THEM FALLING OR INJURING THE VEHICLE TO WHICH THEY ARE ATTACHED.—F. J. Walthrew.—For this purpose the inventor connects to the saddle or to the harness, or to

other sufficiently strong belt or band passing round the horse, a chain, cord or straps proceeding to the top of the vehicle, or to an arm fixed to the vehicle, and above the horse, so that, should the horse stumble or fall, he is at once supported by the said chain, cord or strap. He also connects with the carriage a vehicle apparatus for hauling up the said chain, cord or strap in order that, should the horse run away or otherwise endanger the safety of the carriage or vehicle, he may by means of this apparatus be lifted off his legs and rendered powerless. The same apparatus will serve when the vehicle is standing to suspend the horse for the purpose of resting him. *Patent abandoned.*

AMERICAN PATENTED INVENTIONS.

July 5. Attaching Horses to Carriages.—Leander W. Boynton, Hartford, Conn.: I claim the draft harness, in combination with the metallic tubes, springs, bolts, and graduated scales, when the whole is constructed, arranged, and fitted for use, substantially as herein described and set forth. *Second*, I claim the above, in combination with the breech strap, C, and its shifting collars, *q*, for adjusting the height of the breech strap, when the whole is constructed and fitted for use, substantially as herein described.

Manufacture of Sleigh Runners.—Harmon Lovelace, Chatfield, Minn.: I claim a shoe for sled and sleigh-runners, constructed by casting metal around wrought metal rods in the manner substantially as, and for the purpose herein set forth.

Wagon-Brake.—John Snyder, Centre, Pa.: I claim the shaft, A, crank levers, BB, operating in the mortices, *ee*, with the rubber, I, and lever, P, all constructed and arranged as described.

12. Whip-Socket.—A. M. Whipple, North Adams, Mass.: I claim the employment or use for the purpose of fastening whip sockets, of a bolt, *a*, in combination with the leveled block, C, applied and operating as and for the purposes set forth.

Improvement in Cart.—Barton Ricketson, of New Bedford, Pa., and A. B. Smith, of Clinton, Pa., assignors to said Barton Ricketson: We claim the combination and arrangement of the bent axle, B, the thills, D and D, attached to the vertical portions of said axle, and the cast body, C, turning on the low portions of the axle within the thills, substantially as and for the purposes herein specified. We also claim controlling the tail-board, so as to open and close the same automatically, by connecting its fastenings with the bent axle, so as to be operated thereby, in the act of dumping the cart substantially as herein specified. *Third*, In combination with the self-acting tail-board, as set forth, we also claim the removable portion, L, and securing cord, *nn*, as described.

19. Hold-Back and Trace-Fastening for Vehicles.—H. W. Catlin, Burlington, Vt.: I claim the fixed or rigid hook, A, in combination with the swinging or pivoted eye, *b*, arranged to operate in the manner substantially as and for the purpose set forth.

Axle Clip for Carriage Work.—Moses Seward, New Haven, Conn.: I claim as an article of manufacture, an axle clip made by upsetting a round rod, of just the size necessary to cut the screws so as to give increased strength to the shoulders of the clip, and completing the same by a drop or hammer.

Tuyere.—M. W. Barret (assignor to himself and George Milburn), Mishawaka, Ind.: I claim the combination of the air-box, B, hearth, *b*, aperture, *d*, valve, *C g*, screw shaft, *f*, removable bottom, *c*, and latches, *kk*, all constructed, arranged and operating as specified.

26. Coupling for Carriages.—Chauncey H. Guard, Troy, N. Y.: I claim, *First*, The combination of the clip, B, ball, E, and segments, FF, in such manner that the said ball and segments shall perform the functions of the "turning circle" of the vehicle, whilst the said segments afford a seat for the reception of the spring, G. *Second*, Combining the segments, FF, spring, G, and forked brace, H, with each other by means of the bolts, *cc*, and *ee*, formed and arranged as herein represented and described.

Carriage Wheel.—George B. Woodward, Bolivar, N. Y., and A. B. Woodward, Alfred Center, N. Y.: We claim the combination in a suspension carriage wheel of the thimble nuts, E, and the small nuts, F, with the spokes or tension rods, C, and the hub, D, substantially as and for the purpose set forth.

August 2. Tuyere—Samuel C. Gray, Lewisville, Ind.: I claim the combination of the air-pipe, F, with the valve, G, and ash-pit, E, the water pipes, H and I; the first for supplying the tank with water, and the second named for the escape of water, and the manner in which the water surrounds the pipe, F, and ash-pit, E, the shape of the tank, A A A, etc., and fireplace, B, all arranged and acting substantially as and for the purpose shown and described.

Tightening Fellies.—Henry Thompson, Palmyra, Wis.: I claim the metallic box composed of two parts, A A, provided each with a partition, *a*, to divide said parts into two compartments, *b b*, in connection with the guide-plate, B, and the adjustable wedge-shaped head, C, all arranged and applied to the wheel, substantially as and for the purpose herein set forth.

16. Calliper.—C. Jillson, Worcester, Mass.: I claim prolonging and forming upon the legs of the inside calliper the dividing points, *g g*, as and for the purpose described. I also claim the rounding off of the points of the outer calliper, from the outside towards the inside of the bows when used in connection with a scale for the purpose of more accurately registering the distance between the contact points as the calliper is widened, as herein set forth and explained.

Whip Socket.—Charles B. Morehouse, New Castle, Ind.: I claim as an article of manufacture, the clamps or arms, B and *b*, and the nuts, C C, substantially as described, for the purpose of attaching a whip socket to a dash without making a hole in the leather or dash.

Process of Tempering Steel.—Ariel B. Sprout, Hughesville, Pa.: I claim a solution of soap suds, or the component parts thereof, adapted to be increased or diminished in strength when employed as a medium for tempering steel in order to give it any degree of hardness, and prevent the same from cracking or checking during the tempering process, as explained.

23. Tuyere.—Wm. Welden Ball, Grandview, Ill.: I claim the cap, C, provided on the under side and around its center, opening with a downwardly projecting flange, C, in combination with the dome shaped plate, A, having a depression, A 2, in the top, the edge of which dome-shaped depression rises above the edge of the flange, *c*, as shown and described, and all parts arranged for joint operation in the manner and for the purpose specified.

Whip-socket Fastening.—Edwin Chamberlin, Lansingburgh, N. Y.: I claim a whip-socket fastening, having a clamp or holder, B B, for a whip-socket, combined with jaws, A A, for embracing or griping a bar or rod, in a covered "dash" or other part of a carriage or other vehicle, substantially as herein described.

Wheel Carriage.—William H. Lewis, Greenwood, Mass.: I claim the combination of the semi-elliptic spring, G, with the thorough-braces, E E, the side springs, F F, and their cross-bar, *c*, the whole being arranged so as to co-operate substantially, as herein-before explained.

Buckle.—George Havell, Newark, N. J.: assignor to Frederick Stevens, Harrison Township, N. J.: I claim the projections, *a a*, forming the notches, *g g*, for the reception and securing the pivots, *c c*, in the manner and for the purpose described.

Composition for Paint.—Willard F. Cronkhite [assignor to Henry Noxon and Oiville M. Cronkhite] Syracuse, N. Y.: I claim the combination of the several ingredients as described, in the manner substantially as and in about the proportions set forth.

TO A CORRESPONDENT.

J. F., N. Y.—We, under no circumstances, send sample numbers until such have been paid for. We adopt this course to protect ourselves and customers from the imposition of such *patrons* as formerly obtained our Magazine without paying for it.

CURRENT PRICES FOR CARRIAGE MATERIALS.

CORRECTED MONTHLY, BY MR. CHAS. WEEKS, FOR THIS MAGAZINE.

New York, Oct. 24th, 1864.

Apron hooks and rings, per gross, $2.50.
Axle-clips, according to length, per dozen, 75c. *a* $1.40
Axles, common (long stock), per lb, 12½c.
Axles, plain taper, 1 in. and under, $7.00; 1⅛, $8.00; 1¼, $9.00; 1⅜, $10.00; 1½, $11.00.
Do. Swelled taper, 1 in. and under, $8.75; 1⅛, $9.50; 1¼, $11.25; 1⅜, $13.75; 1½, $16.25.
Do. Half patent, 1 in. and under, $11.25; 1⅛, $13.25; 1¼, $14.75; 1⅜, $16.25; 1½, $18.25.
Do. Smith's New York half patent malleable iron box, 1 in. and under, $10; 1⅛, $12; 1¼, $14.
Do. Saunder's improv. taper, ⅞ in., $13.50; ⅞, $14.50; 1, $14.50; 1⅛, $16.50; 1¼, $20.
Do. do. Homogeneous steel, ⅞ in., $16.50; ¾, $18; ⅞, $20.50; long drafts, $4 extra.

☞ These are prices for first-class axles. Makers of less repute, cheaper.

Bands, plated rim, under 3 in., $2.50; over 3 in., $3.
Do. Mail patent, $3.50 *a* $5.00.
Do. galvanized, 3½ in. and under, $1; larger, $1 *a* $2.
Basket wood imitations, per foot, $1.25.

☞ When sent by express, $2 extra for a lining board to a panel of 12 ft.

Bent poles, each $1.25.
Do. rims, under 1⅛ in., $2.25 per set; extra hickory, $2.50 *a* $3.50.
Do. seat rails, 50c. each, or $5.50 per doz.
Do. shafts, $6 per bundle of 6 pairs.
Bows, per set, light, $1.10; heavy, $1.25.
Bolts, Philadelphia, 20 per cent advance on list.
Do. T, per 100, $3 *a* $3.50.
Buckram, per yard, 50c.
Buckles, per grs. ½ in., $1.15; ⅝, $1.40; ¾, $1.70; ⅞, $2 10; 1, $2.80.
Burlap, per yard, 50c.
Buttons, japanned, per paper, 30c.; per large gross, $3.
Carriage-parts, buggy, carved, $4 *a* $5.50.
Carpets, Brussels, per yard, $3; velvet, $4.00 *a* $5.50; oil-cloth, 85c. *a* $1.10.
Castings, malleable iron, per lb, 23c.
Clip-kingbolts, each, 50c., or $5.50 per dozen.
Cloths, body, $6 *a* $8; lining, $5. (See *Enameled.*)

☞ A Union cloth, made expressly for carriages, and warranted not to fade, can be furnished for $2.50 *a* $3.50 per yard.

Cord, seaming, per lb, 45c.; netting, per yard, 5c.
Cotelines, per yard, $6 *a* $10.
Curtain frames, per dozen, $1.25 *a* $2.50.
Do. rollers, each, $1.25 *a* $1.50.
Dashes, buggy, $1.75.
Door-handles, stiff, $1. *a* $3; coach drop, per pair, $3 *a* $4.
Drugget, felt, $2.
Enameled cloth, muslin, 5–4, $1; 6–4, $1.35.
Do. Drills, 5-4, $1.40; 48 in., $1.55; 5-4 A, $1.55; 48 in. A, $1.75
Do. Ducks, 5-4, $2; 50 in., $2.20; 6-4, $2.40.
Enameled linen, 38 in., $1.05; 5-4, $1.20; 6-4, $1.35.
Felloe plates, wrought, per lb, all sizes, 28c.
Fifth-wheels wrought, $1.75 *a* $2.50.
Fringes, festoon, per piece, $2; narrow, per yard, 18c.

☞ For a buggy top two pieces are required, and sometimes three.

Do. silk bullion, per yard, 50c. *a* $1.
Do. worsted bullion, 4 in. deep, 50c.
Do. worsted carpet, per yard, 8c. *a* 15c.
Frogs, 75c. *a* $1 per pair.
Glue, per lb, 25c. *a* 30c.
Hair, picked, per lb, 80c. *a* $1.00.
Hubs, light, morticed, $1.10; unmorticed, 75c—coach, morticed, $1.75.
Japan, per gallon, $5.75.
Knobs, English, $2 *a* $2.50 per gross.
Laces, broad, silk, per yard, $1.20 *a* $1.50; narrow, 15c. to 20c.
Do. broad, worsted, per yard, 50c.
Lamps, coach, $20 *a* $30 per pair.
Lazy-backs, $9 per doz.
Leather, collar, dash, 35c.; split do., 18c. *a* 21c.; enameled top, 35c.; enameled Trimming, 33c.; harness, per lb, 75c.; flap, per foot, 28c.
Linen, heavy, a new article for roofs of coaches, $1 *a* $1.25 per yard.
Moquet, 1½ yards wide, per yard, $12.00.
Moss, per bale, 12½c. *a* 15c.
Mouldings, plated, per foot, ¼ in., 14c.; ⅜, 16c.; ½, 18c.; lead, door, per piece, 40c.
Nails, lining, silver, per paper, 12c.; ivory, per gross, 50c.
Name-plates.

☞ See advertisement under this head on 3d page of cover.

Oils, boiled, per gallon, $1.80.
Paints. White lead, extra, per 25 lb $5.00; Eng. pat. black, 35c.
Pekin cloth, per yard, $5.

☞ A very good article for inside coach linings.

Pole-crabs, silver, $5 *a* $12; tips, $1.60.
Pole-eyes, (S) No. 1, $3.10; No. 2, $3.30; No. 3, $3.60; No. 4, $4.85 per pr.
Sand paper, per ream, under No. 2½, $5.75; Nos. 2½ & 3, $6.25.
Screws, gimlet.

☞ Add to manufacturer's printed lists 20 per ct.

Do. ivory headed, per dozen, 50c. per gross, $5.50.
Scrims (for canvassing), 30c. *a* 40c.
Seats, buggy, pieced rails, $1.75; solid rails, $2.50.
Shaft-jacks (M. S. & S.'s), No. 1, $3.25; 2, $3.75; 3, $4.00.
Shaft-jacks, common, $1.40 *a* $1.60 per pair.
Do. tips, extra plated, per pair, 37½c. *a* 56c.
Silk, curtain, per yard, $2 *a* $3.50.
Slat-irons, wrought, 4 bow, $1.12½; 5 bow, $1.25 per set.
Slides, ivory, white and black, per doz., $12; bone, per doz., $1.50 *a* $2.00; No. 18, $2.50 per doz.
Speaking tubes, each, $8.
Spindles, seat, per 100, $1.50 *a* $2.50.
Spring-bars, carved, per pair, $1.75.
Springs, black, 27c.; bright, 28c.; English (tempered), 32c.; Swedes (tempered), 34c.; 1¼ in., 1c. per lb. extra.
If under 36 in., 2c. per lb. additional.

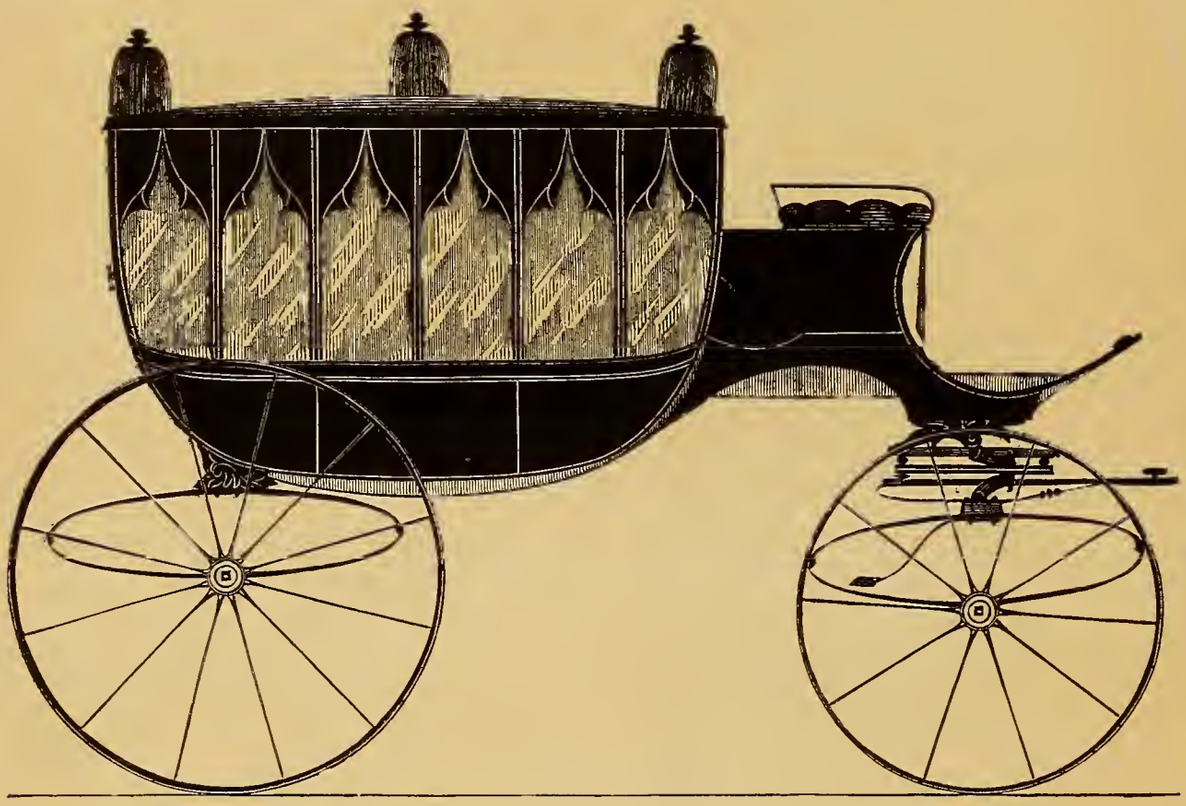
☞ Two springs for a buggy weigh about 28 lbs. If both 4 plate, 34 to 40 lbs.

Spokes, buggy, per set, $4.20, or abont 7c. each for all under 1½ in.

☞ For extra hickory the charges are 10c. *a* 12½c. each.

Steel, Littlejohn's compound tire, 1-8 & 3-16 thick, 6¾c. gold; 1-4 & 5-16 thick, 6¼c. gold.
Stump-joints, per dozen, $1.60 *a* $2.25.
Tacks, 10c. and upwards per paper.
Tassels, holder, per pair, $1 *a* $2; inside, per dozen, $5 *a* $12; acorn trigger, per dozen, $2.25.
Terry, per yard, worsted, $5; silk, $11.
Top-props, Thos. Pat, per set 70c.; capped complete, $1.50.
Do. common, per set, 40c.
Do. close-plated nuts and rivets, 75c.
Thread, linen, No. 25, $1.30; 30, $1.45; 35, $1.65, gold.
Do. stitching, No. 10, 95c.; 3, $1.15; 12, $1.28, gold.
Do. Marshall's Machine, 432, $2; 532, $2.30; 632, $2.60, gold.
Tufts, common flat, worsted, per gross, 20c.
Do. heavy black corded, worsted, per gross, $1.
Do. do. do. silk, per gross, $2.
Do. ball, $1.
Turpentine, per gallon, $3.00.
Twine, tufting, per ball, 35c.; per lb, 60c. to 75c.
Varnishes (Amer.), crown coach-body, $7; hard drying, $8; nonpareil, $8.
Do. English, $6.25 in gold, or equivalent in currency on the day of purchase.
Webbing, per piece, 70c.; per gross of 4 pieces, $2.60.
Whiffle-trees, coach, turned, each, 35c.; per dozen, $3.50.
Whiffle-tree spring hooks, $3 per doz.
Whip-sockets, flexible rubber, $4.50 *a* $6 per dozen.
Do. hard rubber, $9.50 per dozen.
Do. leather imitation English, $5 per dozen.
Do. common American, $3.50 *a* $4 per dozen.
Window lifter plates, per dozen, $1.50.
Yokes, pole, each, 35c.; per doz, $3.50.
Yoke-tips, extra plated, $1.75 per pair.

☞ We are overrun with letters from the country putting questions to us on almost every subject, robbing us of our time, money and patience. Now we wish it understood that we answer no letters, unless a stamp is inclosed for return postage, even from our subscribers, and in no case will we engage to answer non-subscribers' letters, involving time, &c., unless a 25 cent postage currency is sent. Very often we are asked to give information on some subject costing both labor and time in getting posted, and the only pay we get is—thank you! *That* don't pay *very well.*



NEW ENGLAND COACH HEARSE.—½ IN. SCALE.

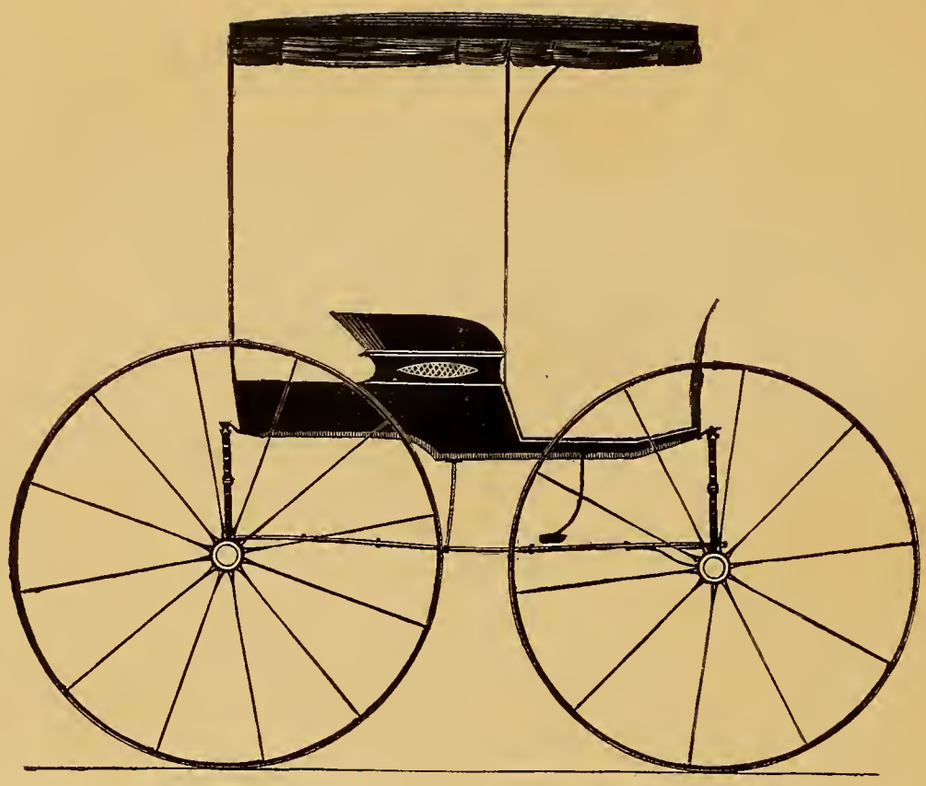
Designed expressly for the New York Coach-maker's Magazine.

Explained on page 103.

PHAETON.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 104.



STANDING-TOP BUGGY.—½ IN. SCALE.

Engraved expressly for the New York Coach-maker's Magazine.

Explained on page 104.

SHEPARD BUGGY.—½ IN. SCALE.

Engraved expressly for the New York Coach-maker's Magazine.

Explained on page 104.

THE NEW YORK
Freemason's Magazine

DEVOTED TO THE LITERARY, SOCIAL, AND MECHANICAL INTERESTS OF THE CRAFT.

Vol. VI. NEW YORK, DECEMBER, 1864. No. 7.

Mechanical Literature.

OPPOSITION TO STAGE-COACHES.

(*Continued from page* 85.)

Trade is a great mystery, and one trade depends upon another. Were it not too tedious, I could show you how many of several trades there are that go to the making of every one of the things aforementioned, and demonstrate, that there is scarcely a trade in England, but what is in one way or other concerned and prejudiced by these stage-coaches; especially the country trade all over England; for, passage to London being so easy, gentlemen come to London oftener than they need, and their ladies either with them, or, having the conveniences of these coaches, quickly follow them. And when they are there they must be in the mode, have all the new fashions, buy all their clothes there, and go to plays, balls and treats, where they get such a habit of jollity, and a love to gayety and pleasure, that nothing afterwards in the country will serve them, if ever they should fix their minds to live there again; but they must have all from London, whatever it costs. And there is one grand mischief happens to the country thereby; for gentlemen drain the country of all the money they can get, bring it to London and spend it there. Whereas, if they stayed at home, bought their clothes and other commodities of their neighbors, money would be kept circulating amongst them; and shopmen that have served apprenticeships and set up near them, would have a good trade, pay their rents, and live handsomely. The trade betwixt them and the city of London would be renewed; country ladies would be as well pleased, provided they be kept from London, as if they had all the rich clothes, modes and fashions, vainly and extravagantly invented and worn in the city, as soon as they have them there; and gentlemen would not only save the money they spend in journeys to buy clothes, but have as good as need to be worn in the country, at easier rates than they must pay at London, if they buy when the fashion comes first up.

3dly, These coaches and caravans hinder the consumption of all sorts of provisions for man and beast, thereby bringing down the rents of lands. For instance: a coach with four horses carries six passengers; a caravan, with four or five horses, carries twenty, or five-and-twenty; these, when they come to their inn, club together for a dish of meat, and having no servants with them, spend not above twelve pence or sixteen pence a-piece at a place, yet, perhaps, foul four, five or six pair of sheets. Horses they have none but what draw them; and, for those, the coachmen agree with the innkeeper beforehand, to have their hay and oats at so low a rate that he looseth by them, and is forced to beat down the price of them in the market; yet must let the coachman have them for what he pleaseth, otherwise he carries his passengers to other inns, by which means, the innholders get little or nothing, cannot pay their rent, nor hold their inns without great abatements; two-third parts of what they formerly paid is in some places abated. Upon such accounts as these, innholders, when these coaches do come, are undone; and if so, since most travelers travel in coaches, what must become of all the rest of the inns on the roads where these coaches stay not? Believe it, they are a considerable number; take all the grand roads in England, as York, Exeter, Chester, &c. There are about five hundred inns on each road, and these coaches do not call at fifteen or sixteen of them; then what can follow, but that the rest be undone, and their landlords lose their rents?

But were these coaches and caravans down, and traveling on horseback come into fashion:

First, Every passenger that now travels in a coach, would have one horse at least; many of them, one, two, or three servants with them, who now ride sneaking without any attendants at all; whereby, in all probability, according to moderate compensation, there would be at least, forty or fifty horses upon the road, instead of nine or ten that draw the coach and caravan.

Secondly, These travelers would disperse themselves into the several inns upon the road, each man where he could find the best entertainment; whereby trade would be diffused, innholders be enabled to pay their rents, and encouraged to provide accommodations fit for the reception of gentlemen.

Thirdly, Most horses go to grass in the summer-time, which would raise the rents of pasture-lands about cities and corporations, and other towns upon the roads, above what formerly they were; which of late years, by means of those coaches, have fallen half-in-half, even in Middlesex and other places adjoining to London itself. And no other reason for it can be given, but this: "That citizens

and gentlemen about the city, do not keep horses as formerly they did." Neither doth there now come a sixth part of the horses to London that used to do; but if stage-coaches be suppressed, there will be a necessity for men to apply themselves to the breeding, keeping and using horses as formerly they did; and it will necessarily occasion the consumption of five times the quantity of hay, straw and hard-corn that is now consumed; whereby farmers will have a rent for their commodities, and be enabled to pay their rents; for not only will there then be four times the number of horses traveling upon the roads as there are now, but in the city of London, and all the great towns in England, there would be great numbers of good horses kept by gentlemen, merchants and tradesmen, for their own uses; and by others also, to let out for hire to such as shall have occasion to ride, and keep not horses of their own.

It is very observable that before these coaches were set up, what with the horses kept by merchants and other tradesmen, and gentlemen in or near London, and the travelers' horses that came to London, that city spent all the hay, straw, beans, peas and oats, that could be spared within twenty or thirty miles thereof; and for a further supply, had vast quantities from Henly and other western parts, and from below Gravesend by water; besides many ships-lading of beans from Hull, and of oats from Lynn and Boston: and then oats, and hay, and other horse meal, would bear a good price in that market which was the standard for all the markets in England; but now, since these coaches set up, especially in such multitudes, and those so nigh London, London cannot consume what grows within twenty miles of it. But if they were down, would quickly be as great as ever; and that would raise the price of the commodities, advance the price of lands, and cause rents to be well paid again; not only would every traveler that now rides in a coach, travel on horseback, if coaches were down, and some of them with two or three servants, and so occasion a greater consumption of the provisions for cattle: but further, every one of these several travelers who before clubbed together for a dish or two of meat, would have one, two, or three dishes of meat for himself and his servants; which would occasion the consumption of six times as much beef, veal, mutton, lamb, and all sorts of fish, fowl, poultry, and other provisions, as is now consumed on the roads. And such consumption would raise the price of lands, and cause better payment of rents; especially if it be considered that not only will the consumption be increased by those that travel the road, but ten times more would be spent by those who would be employed in the making those things that travelers must have when they ride; who, if they have work and can earn money, will eat and drink of the best, as formerly they did; when several handicraft tradesmen in London kept twenty, thirty or forty journeymen at work, spent a quarter of beef, and a carcass of mutton in a week, in their houses; who, since these coaches set up, have fallen to a couple of apprentices; and though as eminent of their trade as any about London, yet can hardly earn bread to put into their heads. If it be so, then that running stage-coaches and caravans are so injurious to the public, destructive to trade, and the occasion of the fall of rents, it would be worth time to consider what is in them worthy of their being countenanced and desired; and whether the inconveniences be not much greater than the conveniences men receive from them. If this way of traveling were the way that of all ways appeared most beneficial, least expensive, conducing to health, advantageous to men in their business, absolutely necessary to some, useful to others, and imposed upon none, there were some reason for men's being in love with it; but if the contrary be apparent, then what madness possesseth men to court the inconveniences and mischiefs? Let us examine these things.

Men receive not the greatest benefit by traveling in these coaches; for can that way be beneficial to any, that hinders and destroys trade, prevents the consumption of the provisions and manufactures of the kingdom, and thereby lowers the rents of landlords?

For, first, Can a gentleman receive benefit or advantage, by saving five pounds *per annum* in a journey, when by his manner of traveling he lowers his own rents three times as much in a year as he saves by his journeys; by countenancing that kind of conveyance that hinders the consumption of the products of his own estate, and thereby makes his tenants unable to pay their rents?

Secondly, Is it to be believed that a tradesman arrives at any profit by these coaches, though he should have a little money when he rides in them, that he must necessarily expend if he travels on horseback? No, for this manner of traveling hinders the sale of those commodities they deal in; of which much more would be consumed than is if such coaches were down, and by the sale thereof they would get much more than they save, by confining themselves to traveling as aforesaid; so that plainly, it is their interest to promote that way of traveling that tends to the greatest consumption of the manufactures or commodities wherein they deal.

Thirdly, The husbandmen who live by the sweat of their brows in manuring the estates of the gentry, they are undone by this easy carriage; for it hinders the selling of their corn, hay and straw, and the other products of their farms, and brings down the price of what they sell; thereby rendering them unable to pay their rents, or to hold their farms without considerable abatements, which, if not given them, their lands are thrown up into the landlords' hands, and little or no benefit made by them.

Fourthly, The graziers they complain for want of a vent for their cattle, which they had before these coaches were erected; not that I do imagine coaches to be the only reason of the want of that consumption, though it be evident they go far into the promoting that misehief; for the want of people in England, the loss of many thousands from among us, of late years, and the leaving off eating of suppers by those that are left alive, go a great way therein. But these two may be easily remedied: the former by the general act of naturalization and liberty of conscience, proposed before, which would bring all foreigners in amongst us; the latter, by men's spending less in taverns, plays and balls, and keeping up in lieu thereof, the ancient laudable customs of England, of good housekeeping, and thereby relieving the poor. Half the money that gentlemen idly spend in taverns upon French wines, for which the coin of the kingdom is exhausted, or upon plays, balls, treating mistresses, fine clothes, toys from France, or other foreign parts, would defray the charges of having good suppers every night, whereby the product of our own lands would be consumed, and that would raise rents. Nay, I am verily persuaded, if it were duly considered, and that all men, as formerly, would fall to eating of suppers, at least to dressing of them, and when

dressed, if they eat not themselves, would give them to the poor, the increase of the consumption would raise the rents of lands as much above what now they do go at, at least in most places of England, as would defray the charges of those suppers. If so, would it not then be of great advantage to men in their estates, and to the kingdom in general?

(*To be continued.*)

MECHANICAL POWER AND FRICTION.

BY HENRY HARPER.

A WHEEL is but the section of a sphere, and for many purposes in mechanical construction its lever-power can be used to a better advantage than the whole sphere; but a perfect sphere is a lever-power with which the Great Architect sweeps the earth with the tornado's blast, fans it with the zephyr's breeze, heaves the mighty ocean's billows, or makes the rivulet glide in beauty at our feet. Numbers will not express the amount of these levers, internally and externally, that are necessary to our existence. A breath cannot be drawn, a pulse cannot beat, without setting these countless millions of machines in operation. Whatever we can trace out in creation that has a spherical form has the attribute of a lever as truly as it has of gravitation.

A mistaken notion is entertained, that wherever mechanical power is produced, it has been done by peculiarly constructed machines that we have invented concentrating power on one point instead of creating it. It has been regarded as assuming too much for finite mind to claim creative power, because, as it is said, "God has not vouchsafed to man the means of its primary creation." Such assertions are not founded on philosophical principles, although many may have thought them to be so.

In creating power God acts with mechanical laws, some of which we can understand and copy, producing the same result; others we do not sufficiently understand to imitate. For instance, we cannot tell how, from volition, the muscles are contracted which puts the machinery of our bodies in motion, so as to create power greater than that which was expanded in the contraction, but we can tell the effect that the contraction of that muscle has, and, by substituting another motive-power for the muscle, can produce the same effect. In that respect we create power in the same way that the Supreme Being does.

An ocean's wave may dash the strong-ribbed ship to pieces against a rock-bound shore. By the application of the same mechanical power—which is a lever—we can pile a long train of railroad cars in a heap of ruins. In that act we use the same power that God did at the commencement of time, and with which we are completely surrounded. The ocean's waves are an infinite number of spherical levers which buoys up the ship and dashes it against the rock-bound shore. The wheels of the railroad car are sections of a sphere, which will act in the direction of their circumference with a like lever-power, so that when they come in collision with an equal force, they are dashed to pieces.

We apply power to a wheel for mechanical purposes in various ways, that will always give leverage if it is in the direction of the circumference. With a sphere which nature uses, whatever way power is applied, it is in the direction of the circumference, for it is a geometrical form that presents an uniform side on every part of its surface; therefore, no calculation can be made to which point of the compass the leverage is tending, only that it is to be in the direction that the power was tending. We find it more convenient to use wheels for mechanical purposes, because we can apply the power at the center, thereby keeping up a continual motion in the direction of the circumference to the lever. This lever is very much on the principle of nature's lever given to animals. Figure 7 is a wheel that has its power attached at A, and in the

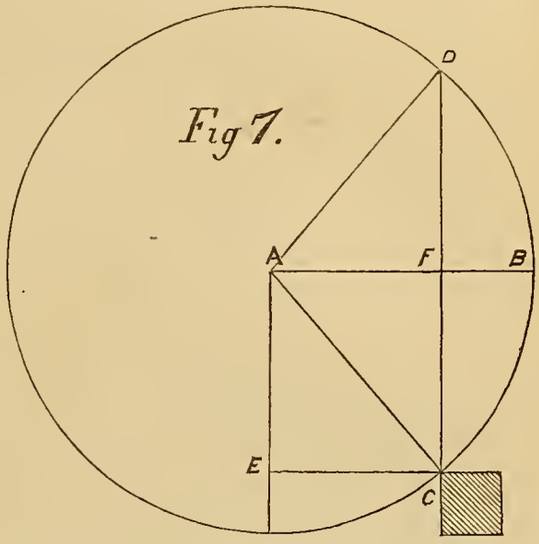


Fig 7.

direction of A F B. The weight has to be raised over the obstacle C. This forms a lever on the same principle as in Figure 3, gravitation supplying the office of the upper part of the lever, from A to D. The power gained is as the line C to F, compared with the lever from C to E. The C E shortens as the center of the wheel approaches a vertical position over the obstacle C, and the lever-power increases in the same proportion, as has been observed in Figure 3.

The power applied at A, in wagon wheels, is by an

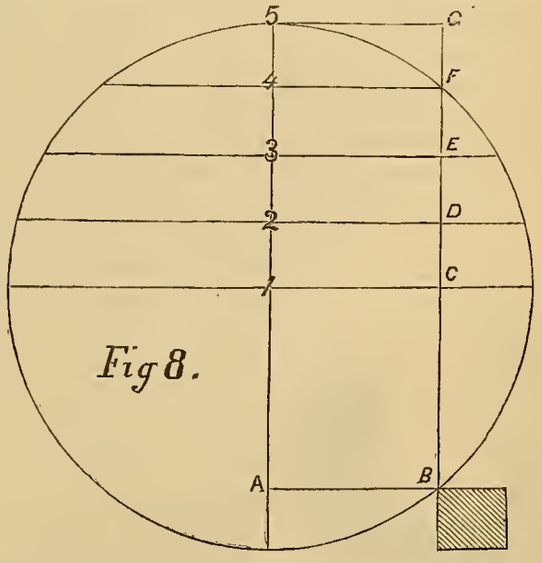


Fig 8.

axle-tree made large enough to sustain the load which is placed upon the wagon, and it has been a question often agitated whether there was an increase of power to the smaller axle over a large one. The wear on the axle shows that the wheel is propelled by the bearings of the

bottom part of the axle on the axle-box; therefore, as we increase the diameter of the axle-arm we certainly shorten the lever from F to C, which is actually diminishing the leverage of the wheel. Ways have been suggested for applying the draught-power on the top of the axle, as it is on railroad axles, and fastening the axle in the hub permanently. This would secure more leverage, but there are other conditions necessary to the easy draught of wagons which as yet appears to stand in the way of adopting this plan. It is not safe to declare what mechanical ingenuity may yet bring forward in this respect, although at present it seems to be rather an unfruitful field for improvement.

Figure 8 represents different degrees of leverage by the application of power to the wheel above its center and at its circumference. If the power is applied in the direction of C to raise it over the obstacle B, it will be observed that the leverage from B to C is but little above the lifting power, which is from B to A. If it is applied in the direction 2 D, a little more is gained, as by comparing the lines B D and B A will show. The power increases in the same ratio to 5 in the direction of G, where the most power is gained that can be applied to the wheel, and is four-sevenths more power than is obtained in the direction from 1 to C.

The power required to lift the center of the wheel vertically over B, applied horizontally from 5 to G, will not be one-half the heft of the load on the wheel. Let it be borne in mind that the direction in which this power is applied would have no tendency to raise the wheel vertically over B, if it was not a lever lifting the weight in a right-angled direction from that in which the power is exerted, and producing more than double the effect of the power exerted.

The wheel here presented is but the section of a sphere, and contains only the quality of a lever that can be imparted to that section by applying it in the direction of the circumference. It illustrates the action of a sphere as a lever better than the whole sphere, because the lines through which the power acts can be marked on the face of it better than the whole sphere. Its circumference forms the endless lever that is always ready to act in any direction a sphere presents to a side. This lever is often met with without noticing its nature. If a person steps upon a spherical substance laying on a hard floor, it rolls and carries his foot out from under him. It is readily explained by saying that the sphere rolled and carried his feet from under him, and perhaps gave him a fall, but there is something more than this required to explain the fall. It requires a certain amount of mechanical power to carry a person's foot laterally from the position in which he has placed it, and in which his muscles hold it. That power is easily understood by referring to Figure 9. Should he place his foot at 5, with an inclination of lateral power towards G, that inclination would be more than doubled by leverage, and move towards G, carrying the foot along with it, which would throw the person off his balance. But should the sphere indent itself into the floor to the line A B, the surface of the floor would form a fulcrum equal to that of B in the diagram on which the lateral power at 5 would have to act with its leverage before it would move the same, as we have seen in calculating the leverage of the wheel. If it should be indented in the floor to the line 1 C in the center of the sphere, it would have a permanent base to rest upon, without any power to act as a lever. Power is gained with friction rollers and wheels on this principle; they, by the action of the lever-power, lift the load over the uneven particles of the two rubbing surfaces that would otherwise lock together, so that it would require power sufficient to break one or the other off.

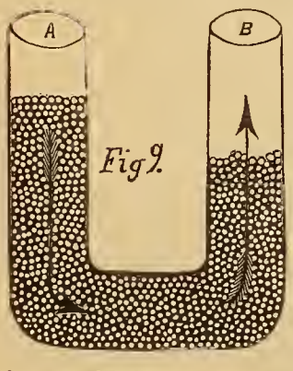


Fig 9.

Where numbers of spherical bodies are thrown together, the peculiarity which they possess of acting with lever-power upon any part of the surface lifts them up in opposition to the tendency in which gravitation draws them. In such cases they are a combination of levers, which makes the solid part on which they rest a fulcrum on which the mass acts to lift the separate parts opposite to the power of gravitation. If shot are poured into the tube (figure 9) at A, gravitation carries them down the tube in the direction of the dart, until they reach the bottom, which forms a fulcrum for the lever-power to act upon; that lever-power lifts them up the tube B, not quite on an equilibrium with A, but a little agitation by shaking—which is motive-power to the levers—produces an equilibrium in the two tubes.

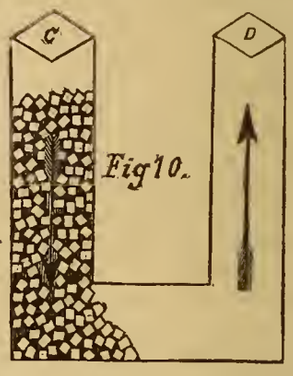


Fig 10.

If the same experiment with flat substances is tried, keeping the flat pieces horizontal within the square tube (figure 10), there will be no lever to act, consequently no inclination to rise from the tube C into the tube D. Shaking will give them no inclination to act as levers, unless by that means the parts are made to turn over. This explains the cause why liquids maintain an equilibrium; also proves beyond a doubt that they could not maintain an equilibrium if the atoms of which they are composed were not spherical and capable of acting with lever-power, so as to lift themselves up contrary to the tendency of gravitation. Also this fact taken in connection with others that I shall attempt to show, form conclusive proofs that the difference between liquids and solids is simply the spherical and flat forms which the atoms assume in the different stages, the former being that of liquids, the latter that of solids.

If a square solid piece of lead is put upon the platform of a railroad car, and another quantity of liquid lead confined in a box of the same shape of the solid piece, and placed along side, and another solid piece of the same volume in a spherical form placed by the side of it, the car being put in a certain degree of motion,—not enough to displace the square piece,—then suddenly stopped, it will be noticed that on starting the liquid lead will pitch back so as to rise over the edge of the box, the spherical lead will roll back, and the square piece of lead will maintain its position without moving. The same result will be had when the car is stopped, only reversed to a motion that pitches forward. On the start the inertia or disposition of the sphere of lead to remain in the position that it was placed, acting upon the leverage of the sphere, enabled it

for a time to keep in its position and roll back on the platform of the car, the same inertia acting upon lever-power made it to move forward on the cars. The square piece, having the same inertia, and acted upon to the same extent, will not move from its position either in the starting or stopping of the car. The reason for this difference is plainly understood in this case to be that the sphere, being a lever, could overcome the friction or other obstacles that held it to the platform by the aid of the momentum, and the square piece, although it had the same momentum, could not. The action of the liquid lead which was placed exactly in the shape of the square solid lead, is the same as the sphere, or perhaps it may move a little more freely, so that being forced by the sides of the box from remaining stationary, as its inertia inclined it to do, or from going ahead with the momentum, rises up contrary to the tendency of gravitation, and pitches over the edge of the box. Its action cannot be explained upon any other principle than the conformity in the shape of its atoms to that of the sphere.

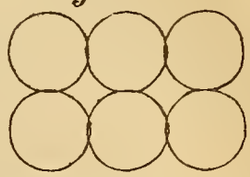
The difference between the rolling action of a railroad car and one with the wheels made fast so that it would act as a sledge, would illustrate the same principle. The momentum of the one acting upon the leverage of the rolling wheel would move the car forward after the application of power had ceased; the other, not having any leverage for the momentum to act upon, would stop as soon as the power ceased to be applied.

This gives an unmistakable clew to the formation of the atoms of melted or liquid lead, which otherwise than their mechanical action as levers we could not detect, on account of their diminutive proportions. In the melted state the momentum of the body would give it locomotion, so that the friction occasioned by gravitation could not hold it to its place; in the other case, where it is solid the momentum could not move it out of its place or overcome its friction.

If this is not lever-power gained by particles of lead assuming the spherical form in their liquid state, then there must be some *undiscovered* mechanical power that produces the result. It cannot be urged as an objection to the theory that the atoms are of too small dimensions to act as levers, for we can trace down among the microscopic animals hundreds whose dimensions will allow them to pass through the eye of a needle at the same time without touching each other, yet every one shows an anatomy built on mechanical principles and acting with mechanical power—as much so as the largest of animals.

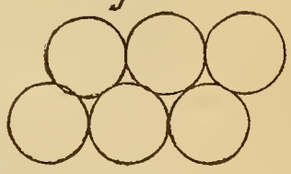
The power which momentum has of converting liquids into locomotion overcoming the power of friction is common to them all, water among the rest. In the absence of this power acting upon water, we find that it becomes a solid, as in the case of snow and ice. In the formation of snow we can visibly trace out the form that matter assumes in becoming a solid. The snow-flake that falls so lightly upon the ground is water that has congealed, and we can see the atoms which have taken a position side by side, so that they are the thinnest kind of a sheet, a number of which are attached together and fall in feathery-shaped masses. In this shape it has lost its power of locomotion from momentum, or, in other words, its leverage, which it had in the liquid state. There is nothing we can imagine or see of the action of vapor that would bring the atoms so in contact side by side that they would form themselves into such thin sheets, other than some unknown power which the temperature has upon them. But if we can clearly trace out the effect of that power in so arranging the atoms of vapor, there can be no hesitation in believing that the same power would act in the same way upon standing water, to place the atoms side by side before they became solid ice, the same as can be seen in Figure 11.

Fig 11.



In a liquid state the action of the lever would make the spherical atoms assume a more compact form like Figure 12, and this would be exactly in accordance with that singular phenomena where frost expands water and contracts other substances. The temperature does not have the power of producing this effect on water in a state of agitation, as in the plunging cataract or swift running stream. There no ice can be formed. This agitation would be that in which the spherical atoms would be revolving on their axes, producing the lever-power that acts upon the atoms that come in contact with each other, thereby introducing a mechanical power that operates against a tendency that cold has to arranging atoms side by side into ice. In some of the liquids that do not freeze it can be clearly demonstrated that the atoms of which they are formed are continually revolving on an axis, and thereby interposing a mechanical power against cold so as to prevent them from being formed into a solid.

Fig 12



If we take a sphere and give it a swift rotating motion around its axis, and while in that state gently rest it upon a table, it will move in a lateral direction. This will be the effect that the table has of supplying the lever sphere with a fulcrum to act upon, so that it gives the momentum lateral locomotion. Until it touched that solid part, there could be no action of the lever-power for the want of a fulcrum.

If we take oil of turpentine or any of the liquids that cold has no effect upon, and that are lighter than water, and gently lay a drop upon the surface of standing water, it will quickly travel on the surface, laterally, in every direction from the place in which it was deposited, until every atom appears to have laid itself out on the surface of the water. No hypothesis can account for this lateral motion on the top of the water, unless it is admitted that the atoms were spherical levers, and like the sphere that we have put in rotary motion and rested on the table, they are forming continual motion around their axis which gives them the lateral motion on the surface of the water by making it a fulcrum for them to act upon. I know that there is a theory about "repulsive" power that is sometimes attributed to matter, and which is said to be an attribute of smoke, steam, &c., which would apply with equal propriety to the turpentine on the water; but in the case where smoke and steam separates, the phenomena can be accounted for by the operation of mechanical power, and will be considered in their place.

In water the rotating motion is obtained by descending an inclined plane, the particles touching the inclined plane or meeting with any obstacle, are made to turn round to pass on over the rough parts with a lever-power. This retarding their motion is generally called friction, but it

seems to be nothing more nor less than the power required to work the leverage. The atom touching the hard surface turns, that involves the necessity of the next atom turning, and the next, and so on until the whole mass becomes agitated. This necessarily requires power applied to the leverage which prevents streams from dashing with continually accumulating force down an inclined plane.

(*To be continued.*)

Home Circle.

THE NIGHT AFTER CHRISTMAS.

'Twas the night after Christmas, when all through the house,
Every soul was abed, and as still as a mouse;
The stockings, so lately St. Nicholas' care,
Were emptied of all that was eatable there;
The darlings had duly been tucked in their beds,
With very full stomachs and pains in their heads.

I was dozing away in my new cotton cap,
And Nancy was rather far gone in a nap,
When out in the nursery arose such a clatter,
I sprang from my sleep, crying "What is the matter?"
I flew to each bedside, still half in a doze,
Tore open the curtains, and threw off the clothes,
While the light of the taper served clearly to show
The piteous plight of those objects below;
For what to the father's fond eye should appear,
But the little pale face of each sick little dear,
For each pet that had crammed itself full as a tick,
I knew in a moment now felt like Old Nick.
Their pulses were rapid, their breathings the same;
What their stomachs rejected I'll mention by name:
Now turkey, now stuffing, plum pudding, of course,
And custards, and cullers, and cranberry sauce,
Before outraged Nature, all went to the wall;
Yes, lollypops, flapdoddle, dinner and all.
Like pellets which urchins from popguns let fly,
Went figs, nuts and raisins, jams, jelly and pie,
Till each error of diet was brought to my view,
To the shame of mamma and Santa Claus too.

I turned from the sight, to my bedroom stepped back,
And brought out a vial marked "Pure Ipecac,"
When my Nancy exclaimed, for their sufferings shocked her,
"Don't you think you had better, love, run for the Doctor?"
I ran, and was scarcely back under my roof,
When I heard the sharp clatter of old Jalap's hoof;
I might say that I hardly had turned myself round,
When the Doctor came into the room with a bound.
He was covered with mud from his head to his foot,
And the clothes he had on was his very best suit.
He had barely had time to put *that* on his back,
And he looked like a Falstaff half fuddled with sack;
His eyes how they twinkled! Had the Doctor got merry?

His cheeks looked like *Port*, and his breath smelt of *Sherry;*
He hadn't been shaved for a fortnight or so,
And the beard on his chin was as white as the snow.
But inspecting their tongues, in despite of their teeth,
And drawing his watch from his waistcoat beneath,
He felt of each pulse, saying "Each little belly
Must get rid"—here he laughed—"of the rest of that jelly."
I gazed on each chubby, plump, sick little elf,
And groaned when he said so in spite of myself;
But a wink of his eye, when he physicked our Fred,
Soon gave me to know I had nothing to dread.
He didn't prescribe, but went straightway to his work,
And dosed all the rest, gave his trowsers a jerk,
And adding directions while blowing his nose,
He buttoned his coat, from his chair he arose,
Then jumped in his gig, gave old Jalap a whistle,
And Jalap dashed off as if pricked by a thistle;
But the Doctor exclaimed, ere he drove out of sight,
"They'll be well by to-morrow—good night, Jones, good night."

INDEPENDENCE.

BY O. E. MILES.

Our language does not afford a word so fraught with momentous import, so deeply laden with historic memories, or so intensely and hopefully inspiring as the magic word—Independence. Ever since the curse of labor was pronounced upon Cain, has the history of the race, so far as we have it, been a continued series of efforts to throw off the dominion of some power which is conceived to be unjustly burdensome or oppressive. A very marked ingredient in the composition of every well-balanced human organism, is the disposition to resist any thing and any body, which stands in the way of the free and full enjoyment of the God-given privileges of "life, liberty and the pursuit of happiness." Though many exceptions exist among races which, from a long reign of tyranny, or from other causes, are kept in an undeveloped condition, yet, in all advanced stages of civilization, we find the same all-pervading ambition to rise above the obstacles which Infinite Wisdom has left in the path of life.

Leaving for the present the great aggregations of long-continued and oft-multiplied wrongs, which require great armies and long and bloody contests to remove, we will examine into the character of a tyrant whose dominion, far extended and powerful though it is, can only be thrown off by the arts of peace. That tyrant is Poverty. His imperious rule is over all who for any cause fail in the acquisition of sufficient means to meet their material wants. It is, therefore, a comparative condition, and rests upon its victims with a severity proportioned to their wants and resources.

The unequal distribution of material wealth among men has engaged the attention and formed the material for many a grave discussion among social and moral philosophers of all ages, and many a plan has been urged for the limitation of the acquisition of property, but so far as we know without good results. The great diversity of financial capacity existing in different men make this a measure of more than doubtful policy. We know that great wealth is often made by individual enterprise a public good, which would never be realized were the same means distributed among those who reap its advantages. Under a government which recognizes the right of every man to not only own himself but to achieve his independence by any means which does not infringe the rights of his neighbor, we may look for the free use of all the means for this purpose which Nature has lavished upon our favored land, with all the individual and collective advantages resulting from such acquisition, as well as the benefit of the sad experience of those who, through a misuse of their opportunities, make pecuniary independence a curse to themselves and a public nuisance. To those who desire to gain an independence from pecuniary want by the most honorable means, and for the lofty purpose of securing to themselves and their offspring the time and all the facilities for cultivating the undying intellect, that which when we take our leave of this stage may go with us to the next; to those who take this view of a surplus fund of dollars and cents, it becomes a most interesting question, the one of, how or by what employment may I the soonest gain my independence?

The same beneficent lawgiver, who decreed that man should earn his bread by the sweat of his brow, and fixed

the immutable conditions of peace and prosperity in its possession, has made the enjoyment of material wealth dependent, in a great degree, upon the manner of its accumulation. Ill-gotten gain is a contraband article, which as surely smites its possessor as mechanical effect follows cause. The man who, in the pursuit of an ennobling industry, keeps foremost the elevation and improvement of his craft, who seeks to increase the efficiency of all the appliances with which he wields the mechanical forces, whose exertions continually aim at the production of a better article at a less outlay of means, or who secures to mankind great benefits from forces hitherto idle, soil hitherto barren, or opportunities hitherto unavailing, establishes a claim not only to the lasting gratitude of his fellow-men and the approval of his master, but a claim also to exemption from material want, which our Government recognizes and honors by a grant of the exclusive benefit of his discovery for a period sufficient, if the improvement be an important one, and its introduction to public use successfully accomplished, to place him on a footing with those who control the financial world. His independence has been reached through a course of physical exertion and mental training, eminently calculated to qualify him to appreciate its value and make the most of its advantages. He has, if he sees the experience of a great majority of inventors, been subjected to some of the most severe tests of human endurance. Animated, from the first conception of his bantling, with a feeling which every parent feels for a child, he is at once armed with a zeal in its development, and a strength in its defense, which none can feel or appreciate who are not or who have not been similarly possessed. Once convinced of the reality of the principle involved in his new creation, the task of arranging and constructing the details necessary for its application is the next thing in order, and then it is that his difficulties commence. Weeks, and perhaps months, are spent in the construction of costly patterns or iron work, some or all of which requires the assistance of others, whose sympathies can only be enlisted by an immediate consideration of dollars and cents, and, therefore, lack the essential qualification necessary for a thorough and impartial experiment, and when the trial comes the work lacks the correct proportions, or the requisite strength in some of its parts, and the result is, at best, only partially satisfactory; indeed, certain wiseacres who witness the trial pronounce it a total failure. They are, however, informed that the experiment has demonstrated all its projector expected of it, and the leer upon their soulless countenances gives way to amazement when he states that he is more hopeful than ever of the success of his plan. He is now surrounded by advisers, some of whom are very sorry the plan has failed, and others are beginning to fear it will not fail, and thus falsify their predictions. All these, and some others who have been so imprudent as to trust him, unite in the conclusion that he had better quit. His *real* friends, as ever, are about this time minding their own business, and are most happy to see him attending to his, and when the opportunity offers they rejoice with him in the hope which is an anchor to his soul. He casts aside his costly patterns without a tear of regret, for he has already given them credit for having performed their mission. They have furnished the key which only awaits his manipulation to reveal the extent of his victory, and supply the beauty of proportion to the new creature. Onward still he pushes the work to another and more successful trial, and still another when success is no longer a question. He has by this time received his patent, and the new plan is arresting the attention of capitalists with a view to investment. His friends, who had dwindled to a faithful few, whose fidelity could not be controlled by public or private opinion, are now in reverse proportion, both in number and character. "Prosperity makes friends, adversity tries them."

We will presume the inventor to have arrived at a stage in his enterprise when his daily rations are no longer dependent upon friends. The bread he so freely cast upon the waters is returning. Manufacturing enterprise is converting his idea into gold, and out of it comes his reward. Compare his achievement with the manner in which a majority of fortunes are made. Compare Galileo, Newton, Watt, Franklin, Whitney, Morse, Woodworth, Howe, and the host of lesser discoverers, whose several steps make up the stupendous reach of scientific advancement, with those whose fortunes are the vile outgrowths of human debasement, or are built upon national or individual misfortune, traders in men and women, rum and shoddy, the aristocratic landlords of the old world, and those of a like ambition in the new, the bulls and bears of Wall Street, and the small fry of the same genus in every community. How surely do the instincts which guided these cormorants to their wealth lead them to spend their surplus gold and the balance of their lives to the same or similar base purposes. Humanity feels not a generous impulse from their efforts. Their treasures are so much idle capital till inherited by those who know their uses; they yield it up with their misspent lives, mourning no lost opportunity but to rob, and repentant only of a few bad bargains.

Again, who can doubt the future of the man who is the living and active representative of a progressive idea? His fortune is the well-deserved tribute of grateful humanity. It is the nation's gift for a contribution to the national wealth, and yet a gift which imposes no tax on the industry of others. Those who use his improvement pay him but a small part of what it actually saves to them and their patrons by its use. The progress of his investigations has schooled his genius in a versatility of application, which in the future will bid defiance to all bounds. He has learned the value of an iron courage under difficulties, and a good-natured persistency under opposition. He has learned to give all his advisers a respectful hearing, and to decide how far he can safely follow their counsels. He has learned how to distinguish between the praise of an appreciative friend and the flattery of a fool. In a word, what qualification necessary to usefulness and happiness has he not? An independence thus achieved is independence indeed!

Pen Illustrations of the Drafts.

NEW-ENGLAND COACH-HEARSE.

Illustrated on Plate XXV.

Our drawing is taken from a hearse, found in the manufactory of our friends, Messrs. A. Tolman & Co., of Worcester, Mass., on our recent visit to that place. It will be seen that the original object of the design was an attempt to combine the principles of the hearse and coach

bodies in one. To do this more effectually the front portion of the body proper has been elongated somewhat in order to supply room for the longest burial cases. For the same purpose the driver's seat has been made unusually wide, since to avoid an undue length in the vehicle, it has been ingeniously extended to receive the foot of the coffin beneath it. We add a few figures for the more convenient use of builders.

Front wheels, 3 ft. 6 ins.; back do. 4 ft. 2 ins.; side pannels, 13 ins. wide, including that portion represented in the belt-rail, the portion of the body above being 19 ins. high; length of the roof, 5 ft. 11 ins., and of the front seat, 24 ins. The urns have been added by us.

PHAETON.

Illustrated on Plate XXVI.

We claim very little originality for this drawing. It is given to our readers for the sake of variety in a very popular class of phaetons. The construction is too simple to require extended detail.

STANDING-TOP BUGGY.

Illustrated on Plate XXVII.

This very unique design is furnished us by the foreman in the shop of our esteemed friend, Geo. L. Brownell, Esq., of New Bedford, Mass. As yet only one buggy has been made after this style. To those who prefer a standing to a caleche-top for a buggy—and such are becoming somewhat fashionable—this is a desirable patern.

SHEPARD BUGGY.

Illustrated on Plate XXVIII.

The gentleman to whom we are indebted for the Rockaway on Plate XIX—Mr. Hayden Sargent, of the firm of Sargent, Brewster & Ham, Boston, Mass.—sends us this drawing stating that it was designed by said firm for a gentleman of the name of Shepard, in that city, and that it is very much liked there. The sham-caning is done in white, and is bordered by a carmine stripe, the mouldings being striped with carmine also, giving it a light appearance. Mr. Sargent promises to send us, from time to time, more of the Boston fashions.

Sparks from the Anvil.

PERCH-COUPLINGS DISSECTED.

As announced in our last issue, the perch-coupling case (Haussknecht *vs.* Claypole & Lynn) was sent back and tried the second time, at Cincinnati, before Judge Swaim, in the United States Circuit Court, because, it is said on the former trial, H.'s testimony was rejected. This last trial commenced on the 5th of October, and, after several days' consummation, in which a vast accumulation of testimony was introduced, and some hard—*talking* was exhibited, was, on the 15th of October, decided, by an intelligent jury, against Haussknecht, without leaving their seats, in the following words, copied from the records of the Court:

"This day again came the parties by their attorneys, and also the jurors heretofore impanneled, sworn and affirmed the truth to speak upon the issue joined between the parties upon their oaths, do say that the said defendant [Lynn having died since the first trial] is not guilty in manner and form as the said plaintiff hath complained against him; therefore, it is answered, that the said defendant go hence without day, and recover of the plaintiff his costs in this behalf expended. Taxed at $———." We understand it will cost H. about $1,500 this time. This, however, is a mere song, should he succeed in getting his suit "fixed," so as to give him another four years' speculation among the craft.

During this last trial H. was put under arrest for contempt of court. This arose out of the fact that he used insulting language to ex-Judge Coffin, the opposing counsel, in effect accusing him of falsehood. The presiding Judge told H. he must be more respectful. Again H. offered insult to the opposing counsel, which being complained of, the Judge ordered the marshal to arrest him, and hold him as a prisoner until further orders from the Court.

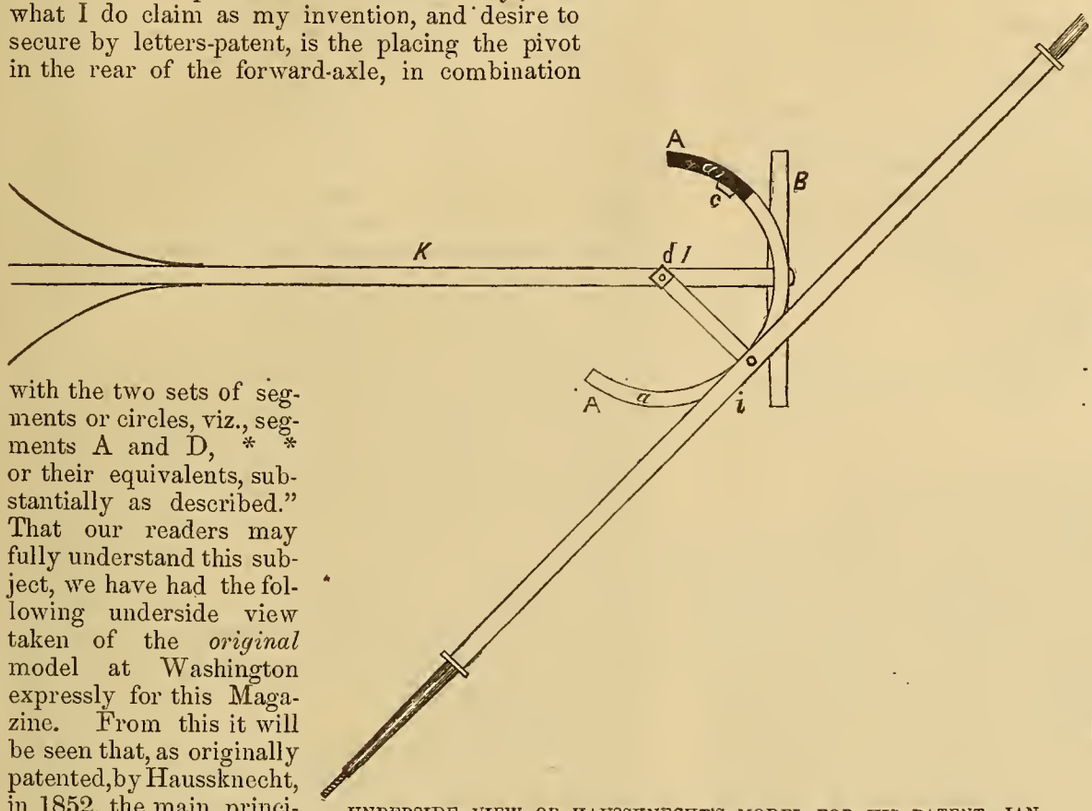
In our last issue we promised to present the testimony elicited in the trial. For this purpose the Clerk of the Court placed in our hands a huge pile of documents, perfectly bewildering to any but a lawyer, from which we retired in despair, convinced that we could never bring order out of such a mass of confusion short of two months. In its stead, therefore, we propose to dissect the perch-coupling matter in such a manner that he who reads may understand. This is the more necessary, as very likely the exceptions offered by H. will give him excuses for further visits among the craft, since to stop here would, as the Clerk of the Court intimated to us, "injure the business of the lawyers."

It will be borne in mind that Haussknecht obtained his first patent on the thirteenth day of January, 1852, after being rejected, for the reason that his *contrivance* conflicted with the patents of the Everetts, granted December 17th, 1850, about one year previously. A close inspection of the original models in the Patent Office, both of the Everett and Haussknecht couplings, convinces us that the first party never sold that they patented, nor has the latter confined his claims to strictly legal bounds. We will endeavor to prove this.

As offered to the trade, the Everetts substituted a half-moon head-block for the "friction-roller" on the front extremity of the head-block, and a bolt at the turning-point, instead of "the ball and socket joint at the center, on which the fore-axle turns, in place of the ordinary perch-bolt which is so liable to be bent or fractured when one wheel is passing over an obstruction." This fact may account for the censurable remissness the Everetts have thus far shown in defending their customers against the suits of their more enterprising aspirant. The Everett patent closes with the following words: "What we claim as new therein * * is the joint on which the fore carriage turns when placed in the rear of the fore-axle, in combination with the segment on which the ends of the perch rests, substantially as described, for the purpose of allowing the carriage to be turned in a small space [circle] without having the fore-wheels to run under the body, or interfering with the hind-wheels."

Parallel with this, Haussknecht tells us in his claims,

patented January 13th, 1852: "I do not claim the separate use of one segment on which the perch rests, neither do I claim two pivots attached to the body; but what I do claim as my invention, and desire to secure by letters-patent, is the placing the pivot in the rear of the forward-axle, in combination with the two sets of segments or circles, viz., segments A and D, * * or their equivalents, substantially as described." That our readers may fully understand this subject, we have had the following underside view taken of the *original* model at Washington expressly for this Magazine. From this it will be seen that, as originally patented, by Haussknecht, in 1852, the main principle—the "placing the pivot in the rear of the axle"—had already been patented, nearly a year before, by the Everetts. To say that something *was* wrong about the patent-office, when H. obtained his papers in 1852, is the mildest mode of expression we can consistently use. That our readers may see what the patentee claims since, we add a copy of the claims put forth in the re-issue of March 17th, 1857, in which it will be seen that when he surrendered his letters-patent of 13th January, these were "canceled, and the new letters ordered to issue to him with amended specifications," &c.



UNDERSIDE VIEW OF HAUSSKNECHT'S MODEL FOR HIS PATENT, JANUARY 13TH, 1852.

EXPLANATIONS.—A A segmental fifth-wheels of which *a* is the bottom, and *a*1 the top half; *d*1 the pivot or turning point, *c* one of the hooks (the corresponding one not shown), B head-block; *i* axle and K the perch.

Such was the state of affairs down to January 15th, 1857, a period of about seven years, during which time the Everetts sold various rights throughout the land, and Haussknecht was seldom heard of in connection with patents. If the public and the Everetts were infringing upon *his* rights, why did he not announce them earlier? Probably he will tell us he did charge the Everetts with infringements upon his patent. If so, in this connection we ask, Why did you, in 1857, apply for new letters-patent, in which you virtually *disclaim* the important principle claimed by the Everetts, viz., the pivot connecting the front running gear with the hind part, placed behind the fore-axle, in combination with the two segments of wheels resting one on the other, &c.; and yet still go on claiming damages on abandoned principles? One fact carriage-makers have not yet fully realized. If the patentee in 1857 abandoned all the points said to have been infringed upon in his patent of 1852, what ground has he for damages now, since we have heard it nowhere stated that the public have infringed upon the re-issue? That the public may understand the new claims, we present them with a certified copy:

THE UNITED STATES PATENT OFFICE,

To all persons to whom these presents shall come:

GREETING:

This is to certify that the annexed is a true copy from the records of this office of letters-patent re-issued to Gustavus L. Haussknecht, March 17th, 1857.

In testimony whereof, I, S. T. Shugert, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this eighteenth day of December, in the year of our Lord one [L. s.] thousand eight hundred and sixty, and of the Independence of the United States the eighty-fifth.

S. T. SHUGERT.

THE UNITED STATES OF AMERICA.

No. 437.

To all to whom these Letters Patent shall come:

WHEREAS, Gustavus L. Haussknecht, of New Haven, Conn., has alleged that he has invented a new and useful Improvement in Running Gear of Carriages (for which letters-patent were issue to him, dated 13th January, 1852, which letters having been surrendered by him, the same have been canceled, and new letters ordered to issue to him, on an amended specification), which he states has not been known or used before his application; has made oath of his intention to become a citizen of the United States, that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of fifteen dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose.

These are therefore to grant, according to law, to the said Gustavus L. Haussknecht, his heirs, administrators, or assigns, for the term of fourteen years, from the said thirteenth day of January one thousand eight hundred and fifty-two, the full and exclusive right and liberty of making, constructing, using, and vending to others to be

used, the said improvement, a description whereof is given in the words of the said Haussknecht, in the schedule hereunto annexed, and which is made part of these presents.

In testimony whereof, I have caused these Letters to be made patent, and the seal of the Patent Office has been hereunto affixed.

GIVEN under my hand at the city of Washington, this seventeenth day of March, in the year of [L. S.] our Lord one thousand eight hundred and fifty-seven, and of the Independence of the United States of America the eighty-first.

JACOB THOMPSON,
Secretary of the Interior.

Countersigned and sealed with the Seal of the Patent Office.

C. MASON,
Commissioner of Patents.

THE SCHEDULE REFERRED TO IN THESE LETTERS PATENT, AND MAKING PART OF THE SAME.

To all whom it may concern:

BE it known that I, Gustavus L. Haussknecht, of the city and county of New Haven, State of Connecticut, have invented certain new and useful improvements in the running gear of carriages, or vehicles, and I do hereby declare that the following is a full, clear and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which Fig. 1 is a side elevation of a carriage [omitted]. Fig. 2 [omitted] is a front view of the fore-axle, or carriage, the wheels being removed, and a representation of parts belonging thereto. Fig. 4 [also omitted] is half a bottom view of the same.

Fig. 3 represents a view of a fore-axle, or carriage, the whole being removed where the spring is fastened to the axle, and moving with the same.

Fig. 5 is a side elevation of a two-horse carriage. Fig. 6, half a bottom view of the same.

To enable others skilled in the art to make and use my invention, I will proceed minutely to describe it.

Figs. 1, 2, 4 [B] is the hind, and [*i*] is the front axle, or the end of which the running wheels revolve; [*m*] is the front eliptic spring, the upper half of the spring bar [*n*], which supports the body of the carriage, and its lower half to the head block [*b*] attached to the end of the perch [*k*], and the under side of which is secured to a traveling segment [*a*], which moves over or upon an under segment [*a*] secured to the front-axle; [*b*] is the center, or an eye of the arm attached to the segment which couples the fore-axle to the carriage at [*b*], where the pivot pin is secured to a similar arm of the upper segment, and made fast to the perch. [A] represents the two segments, or couplings, commonly called fifth-wheels, to the upper one of which are fastened hooks [*cc*] projecting over the edge of the lower one, serving as stoppers, and preventing them from separating.

Fig. 3 [*m*] is a spring fastened to the axle [*i*], and moving with the same. [A] represents the coupling of the fore-axle (the head-block is dispensed with); [*n*] is the spring bar, the under side of which is secured to a traveling segment [*d*1], which moves over or upon an under segment [*d*] fastened to the top of the spring; [*b*] is the center of the two segments, or where the same are connected by a pin placed perpendicularly over the lower pivot, or turning point of the lower coupling.

The mode of construction at Figs. 5 and 6 is merely the same as described in Figs. 1, 2, 4, only that carriages without stiff poles require full circles, or plates called fifth-wheels, shown at [A], to resist the weight or action of the poles, which operates as a lever, unless its weight is carried by the horses at the front end.

My improvement permits the use of large fore-wheels, with all the advantages derived therefrom, and can be adapted to vehicles or carriages where the body is elevated some distance above the fifth-wheels and axles, describing a quicker curve on smaller circle with perfect safety. The distance of placing the turning point in rear of the forward axle depends upon the tract of wheels, for instance say 8 inches for narrow tract, or 4 inches for wide tract. The fore-axle and head-block are not weakened by a large king-bolt hole, as in the common mode of construction, and the forward wheels are saved from being strained by cramping around, whereby most of the spokes are getting loose in the wheels.

I am aware that carriages have been described where the pivot which connects the front running gear with the hind part or body thereof, is placed behind the fore-axle, and combined with two segments of wheels resting and sliding one or the other, and the center point of which over and some distance above the center of the front-axle; and I, therefore, do not claim this as my invention. But what I do claim as my invention, and ask letters-patent, is:

1st. The combination and arrangement of the pivots in the rear of the fore-axle, and the segments, with the perch and head-block on perch cross-bar, of carriages having perches, as hereinbefore described, or the equivalents thereto, for the purpose of enabling carriages to turn in a shorter space than by the common mode of coupling, with perfect safety.

2d. I claim the additional set of segments, or their equivalents, the pivots placed perpendicularly above the lower turning point, to be employed where the springs are fastened to the axles and move with the same.

GUSTAVUS L. HAUSSKNECHT.

Witnesses—THOS. C. DOWN,
CHARLES KEMBLE.

(*To be continued.*)

Paint Room.

BENZINE vs. TURPENTINE IN PAINTS AND VARNISH.

BY HENRY HARPER.

ON page 75 of this volume there is an article on the subject of turpentine. Although there is a wide difference entertained by the writer and myself on the subject, yet I am glad to find the question introduced, so that practical workmen may have an opportunity of expressing their opinions, such as are derived by actual test of the two articles, benzine and turpentine. I have had experience in the use of turpentine for over thirty years, and rely more upon that than the second-hand information which the writer says he has obtained from his workman.

Using benzine instead of turpentine has become a case

of necessity with us, and for my part I am glad that it is so; for I am satisfied it is a superior article, in particular for varnishes, and it would never have had the thought and experiment bestowed on it, it has had, had it not been forced upon us. It is not fair to judge of benzine by the specimens first introduced any more than to judge of the value to the arts of India-rubber before Mr. Goodyear's improvements. The two articles have had something of a similar fate in their introduction. Both have encountered objections, which the faint-hearted and short-sighted thought could never be overcome. In the case of India-rubber, the genius of Goodyear—which every American is now proud to claim, nationally—has adapted it to almost every conceivable use in the arts and sciences. Yet in his case there were those same faint-hearted, short-sighted people in abundance, who must have every new idea beat into them, so that there can be no possible room for doubt before they will receive it. There was so much opposition that the noble mind of Goodyear was for many years, if not for a lifetime, cramped by poverty; but now wherever the eye rests, all over the land, are mementoes of his greatness in the articles manufactured from this same India-rubber.

It is but a few years since an article called naptha was introduced into use in painting. It had its objections at first, but these have been removed by those upon whom the labor fell of providing a substitute for turpentine. The first trial was but a partial success. The "naptha" would partially mix with oil, but so imperfectly, that when it was left standing unagitated, it would separate and rise on the top of the paint or varnish. It had a very offensive smell, and would evaporate so quickly that it was difficult to spread with the brush. When mixed with linseed-oil, frequently, instead of making it thinner, it would curdle like milk. Perhaps the paint in a few cases would cleave from the wood. To minds never comprehending the cause of these phenomena the case was a hopeless one, and there being a great many of that class, it was almost unanimously voted a failure. But there was another class who from long experience in business had learned the cause of the aforesaid objections, and felt confident that they could remove them. They did not give up investigation of the subject because they could not accomplish all they wished at the first trial; but every failure suggested a remedy. The pursuit has been followed up with indefatigable perseverance by those who started, and with such confidence in ultimate success, that thousands and tens of thousands of dollars must have been lost by individuals in case of a failure. The improvements directed by different minds to the same object were of a similar nature, although, as might be expected, there was not a mathematical similarity in their results,—some coming nearer in accomplishing the desired object than others,—but all were making vast strides, and culminating in perfection. These improvements took new names to distinguish them from what had been a comparative failure, and to point out in what branch of the arts a particular kind could be used with advantage. Benzine, benzole, &c., have become common names for articles used as a substitute for turpentine. Valentine & Co., of Boston, have, I believe, made the greatest improvement in the article, and have classified different grades, so that they can be used with less expense, on an average, by applying to different objects the articles designed for them.

These are known as one, two and three x benzine, all of which are as good for certain specified purposes as turpentine, and are much cheaper. Next in quality is their "Valentine Spirits," an article that we do not extol too high by saying that it is superior to turpentine, for it certainly is. It reduces any kind of paints and gums better, never has an inclination to curdle or make the paint thick, and spreads full as easy. The smell is agreeable to many, and to most persons less offensive than turpentine. I have tried its usefulness by every test that long experience in painting could suggest, and am confident that turpentine can never take its place, even at a reduced price. In carriage varnish, and all kinds of wearing varnish, it is easier spread than turpentine, from the fact that there is no danger of its "sagging down" in ridges, as turpentine is liable to do if a heavy coat is applied. It flows much better and quicker than turpentine varnish, and does not require the same care in spreading with a brush, after the workmen become used to it. What could we ask more?

How is the lasting quality of the varnish, say you? I have tried benzine varnish from the factory of Valentine & Co., and have never seen more lasting varnish than that has proved to be, so far as time has shown. But it is a question which never would enter the mind of one fully understanding the use of turpentine or benzine in varnish. Both are used because they mix with oil and gum, rendering them thinner for spreading with the brush, and afterwards evaporating without any chemical change in the oil or gum, leaving nothing but the oil and gum to harden and forming a glazing over the things varnished. Where turpentine or benzine is pure there will be no more of it left in the varnish than if it never had been mixed with it. nor will the varnish be chemically injured.

Some may think they have proofs they can rely upon contradicting the above statements. Such may have paid the highest price for varnish to get the best quality, but when used it did not last well, and "of course it must be the benzine that was in fault." Now, such occurrences were an every-day affair before benzine was known, and if a person did not take proper precaution he was cheated in the same way, three cases out of four on an average. It is nothing new for men to cheat when they have a chance to do so, and make money by it, and there is no business where there are more chances to cheat than in the varnish trade. Again, if detected in it, there is no cheat we can better afford to forgive than a cheat in the quality of varnish; consequently, those who cheat would be glad, if they could, to hide it until they might find opportunity to present themselves for another trade. This class never advertise conspicuously. They are not so stupid as to play the same trick over and over, but have a variety of "dodges," as the showman says, "too numerous to mention," and which we are poorly prepared to meet with all our shrewdness, and therefore had better let them alone.

There is a plain course for the carriage-makers to pursue who take this Magazine. They are presented with advertisements from the largest and most reputable varnish-manufacturers in the world—factories which have sustained their reputation without a stain for over a quarter of a century; factories in which strict honesty is maintained, and which to swerve from would destroy their business in one year—these are the men to buy varnish from. Every bill is warranted to give satisfaction. They can and do sell cheaper than these unreliable peddlers, *unless you count the fair promises and blarney of the latter worth*

something. It is much cheaper to advertise in a respectable paper than to tell the story verbally to every one that they deal with, and we should remember that it is ourselves who are made to foot the bills of these cheats. Our duty does not end in merely buying ourselves, but we should recommend, as far as we feel warranted, those whose dealings please us, to others.

I have been led into these extended remarks from complaints made to me in the West by purchasers who have been swindled by a certain Eastern firm. Being forewarned by The New York Coach-Maker's Magazine, I have avoided them entirely, and given such information to others as I felt it my duty to do. Many did not regard it. Recently, on a short tour through the country requiring a call on the carriage-making craft, I found those who had dealt with them full of complaints against them. According to their own stories, they had suffered losses which would more than have secured to each of them a copy of the Magazine. Every painter will admit that it will be full five-dollars' damages on one carriage if the cheat is in the quality of the varnish. Some have found out that they do not get full measure. Some have not got the quality. Others have found their bills doubled in what they ordered. Attention had been called to some particular defect, and perhaps, if they had examined the case particularly, they would have found some other cause of complaint. One man had sent him double what he had ordered, and undertook to use it. After using three gallons, he found the quality was not what he had expected, and refused to use any more of it. He went to the banker to pay for what he had used, and take up his note; but here he was told that the quantity that he returned, together with what he said he had used, would not make out the original amount that had been sent to him. The purchaser was so positive of what he had used that he would not pay for any more, and a threatened lawsuit was then hanging over his head, in which, if he was successful on the first trial, it would not cost him less than the price of two or three volumes of Magazines; but, if it should be carried farther, the amount of costs and perplexity would be extended to a greater amount. It is a ruinous policy, and no man who undertakes the carriage business should do so—or for that matter any other business, even farming—without at the same time getting all the information applicable to it that can be reasonably procured. The man who neglects his duty in that respect is neither wise nor *honest* towards his customers.

Trimming Room.

PREPARATION OF LEATHERS USED IN COACH AND HARNESS MAKING.

It affords us much satisfaction to place before our readers the following details in the preparation of leathers used in carriage and harness making, abridged from a recent lecture delivered before the Society of Arts, in England, by Dr. F. C. Calvert, F.R.S., and F.C.S., which it is stated is carried on at the present day nearly as it was fifty years ago, and still is but little known to the public:

Currying.—The objects in view in currying leather are several: to give it elasticity—to render it nearly impermeable—to impart to it a black or other color, and, lastly, to reduce it to a uniform thickness. These qualities are imparted by the following processes: After the leather obtained from hides or the thicker qualities of skins has been damped, it is placed on a stone surface and energetically rubbed, first with a stone, then with a special kind of knife called a slicker, and lastly with a hard brush. The leather is then ready to be stuffed or dubbed, which consists in covering it on the fleshy side with tallow, and hanging it in a moderately warm room; and as the water contained in the leather evaporates, the fatty matter penetrates into the substance of the leather and replaces it. The dubbing process is then repeated on the other side of the leather, which is now ready to be softened and rendered flexible, and this is effected by rubbing it with a tool called a pummel. The leather then undergoes the last mechanical operation, which reduces it to uniformity of thickness by shaving off the inequalities of its surface by means of a peculiarly shaped knife called a slicker. The greatest part of the curried leather is blackened on the grain side by rubbing it with grease and lampblack, and lastly brushing it over with a mixture of grease and glue. I believe that some kinds of curried leather are dyed by a purely chemical process, that of rubbing the tanned skin, first with iron liquor, and then with a solution of gall-nuts or other tanning substances. The most tedious of the foregoing processes is that of dubbing, which has been greatly improved of late years by the Americans. The scoured skins are placed in a large revolving drum, of ten or twelve feet diameter, and lined inside with wooden pegs. A certain quantity of tallow is then introduced and the whole set in motion, and whilst the hides are thus tossed about, a current of warm air is passed through the drums, which carries off the moisture and allows the grease to penetrate the hide. By this means thick hide leather can be stuffed in four or five days.

Split Leather.—A large branch of trade has sprung up within a few years owing to the invention of machinery for splitting hides, skins, and kips, by which the quantity of leather has been considerably increased, though I am afraid this has been done at the expense of its quality.

Fancy Leathers.—Allow me to give you a slight insight into the methods of preparing various fancy leathers, such as Morocco, Russia enameled, &c. * * * Until the middle of the eighteenth century, Morocco leather was wholly imported from that country, for it was in 1735 that the first Morocco works were established in Paris, and similar manufacturies were soon set up in various parts of the Continent and in this country. The process by which Morocco leather is prepared is as follows: The goat and sheep skins, which are especially used for this branch of manufacture, are softened, fleshed, unhaired, and raised or swelled by methods similar to those already described; but one essential element of success in this kind of leather lies in the perfect removal of all lime from the skins, which is effected by plunging the well-washed skins in a bath of bran, or rye flour, which has been allowed to enter into a state of fermentation. The result is, that the lactic and acetic acids generated by fermentation of the amylaceous substances combine with the lime and remove it from the skins. The other essential point is the mode of tanning the skins. Each skin is sewn so as to form a bag, and filled, through a small opening, with a strong decoction of sumac, and after the aperture has been closed the skins are thrown into a large vat containing also a decoction of the same material.

After several hours they are taken out, emptied, and the operation is repeated. To render these skins ready for commerce it is necessary to wash, clean, and dye them. The last operation was formerly tedious, and required great skill, but since the introduction of tar colors, the affinity of which for animal matters is so great, it has become comparatively easy. The skins, after they have been dyed, are oiled, slightly curried, and the peculiar grain, characteristic of Morocco leather, is imparted to them by means of grooved balls or rollers. There are two inferior kinds of Morocco leather manufactured, viz., those called *roan*, prepared in a similar way to Morocco, but not grained, and *skivers*, also prepared in the same manner, but from split sheep-skins.

Russia Leather.—The great esteem in which this leather is held is owing to its extreme softness and strength, its impermeability, and resistance to mildew, which latter property is imparted to it by the use of a peculiar oil in its currying, that is birch-tree oil, the odor of which is well known as a distinguishing feature of Russia leather. As to its preparation, I will merely state that it is very similar to that of Morocco, with these differences, that hot solutions of willow-bark are used instead of sumac; that it is generally dyed with sandal-wood and a decoction of alum; and, lastly, as already stated, the birch-tree oil is used in currying it.

Enamel Leather.—This class of leather is usually prepared with calf and sheep skins tanned in the ordinary manner. They are dyed black by rubbing them over with a decoction of logwood, and then with iron liquor or acetate of iron. The leather is softened with a little oil, and is ready to receive a little varnish, which is applied by means of a brush. The varnish is composed of bitumen of Judea, copal varnish, oil varnish, turpentine, and boiled oil.

Editor's Work-bench.

NOTES OF A TRIP TO CINCINNATI.

After two weeks' resting from the trip of which our readers had a description on page 90, we took the opportunity on one fine afternoon in September, to step on board an elegant ferry-boat of the Central Railroad of New Jersey, at pier No. 2, North River, which in a few minutes conveyed us over to the new depot in Jersey City, where we found the train in waiting to convey us to our destination. This is one of the chief routes to the great West, and is advertised as being some thirteen miles shorter than either of the other routes. After leaving Jersey City, we are hurried through the ancient Dutch settlement of Communipaw, so humorously described by the pen of Irving, and so often made sport of by witlings since. On our left hand for some distance we have a splendid view of the New York Bay, including the shores of Long and Staten Islands, and the Narrows, protected by three forts, forming the channel through which commerce finds a passage into the vast Atlantic. Having passed successively New York Bay Cemetery, a rural hamlet for the dead, Saltersville and Bergen Point, we find ourselves crossing Newark Bay, on a pile bridge 9,000 feet long, giving us a still better view of Staten Island and the Kills, the latter separating the island from the main land. The pivoted drawbridge, with two openings of seventy-five feet each, resting on a solid pier of masonry, is a fine structure, and a credit to the engineer. We soon arrive at Elizabeth, the capital of Union County. This place was formerly known as Elizabethtown, its settlement dating as far back as 1664, and its charter to 1739. Once it was the capital of the Province of New Jersey, and the residence of Governor Carteret. It was considered as *finished* several years ago, but latterly it seems that the people have taken the strange notion to add *a little* in the line of building. Twenty-six miles brings us to Plainfield, a few minutes' ride from which places the tourist on the Washington Rock, celebrated as being the point from which *our* General Washington was in the habit, at one period of the Revolution, of watching the movements of the enemy, then rapidly pushing his army across the State to the banks of the Delaware.

The next place is Somerville, thirty-eight miles from New York, but of very little interest as a place for carriage-making. About one mile beyond we reach the little village of Raritan, located near the banks of a river of that name. Here we found our kind friends, the Messrs. John J. Sharp & Co., and passed a very agreeable three hours in the company of the senior partner. This gentleman is a very intelligent and pleasant fellow-craftsman, occupying the only shop in the place. We were impressed with the fact that there is a wide difference between the rents paid in cities and villages, on being told that for ample out-buildings and grounds situated on the one side of a public road, and an excellent house, with garden and fruit-trees attached on the opposite side of the way, our friend is only charged an annual rent of $200, a mere song when the conveniences are considered. Our next stopping-place was at Easton, and having paid our respects to Messrs. Albright & Son, and F. Lerch, Esq., who all made our call as entertaining as possible, we afterwards hurried on to Bethlehem, where a call upon our friends, Messrs. J. J. Hoffman, and Sensenbach & Whitesell, concluded our business. There is another shop in the place, but its proprietor "*never found any benefit from reading our Journal.*" This we deny, for an inspection of the shade to his front window displays one of the most palpable evidences we ever saw of his having *plagiarized* the design from the first volume of this work.

Our journey onward to Harrisburg was made during one of the most splendid afternoons the season has bequeathed us. On every hand the mellow rays of the sun gilded the outlines of an autumnal landscape peculiar only to America; the foliage of the trees having been re-

touched as Jack Frost alone can paint them in the finest shades of red, yellow and green. This day's travel lay through the iron regions of the Lebanon valley, evidences of which we passed on every hand. Changing cars at Harrisburg, a place mentioned in our last journey, where carriage-making is a miserable business, we passed on to Pittsburg through the far-famed Alleghany Mountains, the night being so cloudy and dark that we saw nothing except mountainous ridges and deep gorges, skirting the railway leading through the rocky chain.

Reaching Pittsburg, the first business the next morning was to call upon our esteemed friend, E. West, Esq., who very kindly piloted us through his shops. Notwithstanding the hard times among others, we found our friends here favored with a prosperous business and apparently making money. The carriages made in this establishment will bear a favorable comparison with the best built in America. A visit across the fine suspension bridge spanning the Ohio River brought us to the shop of Messrs. Workman & McCallen, in Alleghany City, the only shop there worth naming. They rendered our visit both pleasant and profitable.

The next place in our travel was Wheeling, Va., and as our friend West recommended a voyage down the Ohio, as being pleasant as well as novel, we made up our mind to try it. As our Eastern readers will be somewhat interested to learn how we got through, we shall give the voyage in detail.

Going down to the quay at the mouth of the Monongahela, where we counted forty stem-wheel steamers moored to the levee, bows on, there not being room to lay alongside, we had *the pleasure* of finding the regular packet just pushed out into the stream. A gentleman, however, consoled us with the knowledge that the fine steamer "New York," Capt. Lighter, would start at 4 o'clock P. M., and certainly be in Wheeling by daylight the following morning. Encouraged by this we went on board, saw the captain, and were *tempted* by an invitation from him to set down to dinner and make ourselves at home. Of course no gentleman would desert a steamer and run for the rail cars, after being supplied thus kindly with sufficient "ammunition for his stomach," and consequently, as in duty bound, we handed over the fare, $3. Well, to make our story brief, we will tell the reader that 4 o'clock came, *and so did* 8, when we began to grow uneasy, and inquired of the freight agent when the boat would start, receiving the rather unsatisfactory answer that that long-wished for and interesting moment to some twenty-passengers would come around as soon as the captain, who had gone into town to take leave of his wife, came on board. We subsequently realized the importance of such leave-taking on one's setting out on so *long* a voyage as that by boat from Pittsburg to St. Louis and back. It shows the captain to be a sensible man in this case, at least, and exhibits *some* forethought. Supper "discussed," and the captain once more "on deck," we again, about 9 o'clock, asked "When will this boat start, sir?" "Well, sir," says our mate, "as soon as the moon rises,—the pilot says,—about 11 o'clock at night." Our colored "brudders," of which the crew mainly consisted, whose countenances displayed faces in which were set

> "Eyes so bright that they shine all night,
> When de moon am gone away,"

availed us nothing on this occasion; stay we had to until nearly midnight (cloudy at that), and stay we did. However, the long wished-for time *did* come at last, and after much rubbing and poling and poling and rubbing, down the stream, we turned into our state-room, on emerging from which in the morning, we found the steamer fast aground twenty miles below! Wheeling still some seventy-five miles distant, and *not quite* in sight. But a tempting breakfast is setting, and who cares, especially "as everybody" says we shall get to Wheeling by noon. Breakfast being "bolted," we once more find our craft going down stream, through scenery on both shores second only to the finest on our own Hudson. Resuming the thread of our voyage, suffice it to say that at noon the steamer rounded to at Steubenville some sixty miles below Pittsburg, following the course of the river, where three hours were consumed in taking freight on board, and from which place we did not get away until 3 P. M. To mend matters a little the captain gave his passengers a fourth meal. Indeed, the question arose in our mind whether or not taking passage on one of these boats was not the cheapest mode (in war time) of obtaining board. But thanks to our "darkey crew," their *muscle* has stowed away several hundred barrels of apples, and we are afloat again. Having proceeded down the river about two miles, the freight agent's eyes encountered a huge pile of barrels on the crown of a bluff some seventy feet above the bed of the river, too tempting to allow of his passing without an effort to obtain it, so rounding to, after losing at least three-quarters of an hour, he, with deeply expressed regret, was obliged to give it up as a bad job, the boat being already so deeply laden that it could not be floated within several times her length of the shore. This last disappointment was, however, soon atoned for, for we had not proceeded far on our journey, and arrived opposite a place called LaGrange before our ambitious freight agent discovered a loaded wagon standing on the shore and an attendant signaling him to round to. (*To be continued.*)

LONDON CARRIAGE-ARTISANS' EXHIBITION.

THE craft in London are about inaugurating an exhibition, which, if properly improved, must result greatly

to their advantage. A preliminary meeting was held early in October, by both employers and workmen, at the Carriage Bazaar, in Baker-street, George N. Hooper, Esq., presiding, to consider the propriety of establishing an Industrial Exhibition, to be held annually in which the productions of the coach and coach-harness makers were to be combined, and the co-operation of the Society of Arts solicited.

On taking the chair, Mr. G. N. Hooper, who is a member of the firm of Hooper & Co., coach-makers to the Queen, and who as our readers already know takes the deepest interest in everything relating to improvement in carriages, stated the great pleasure he felt in meeting so many skilled artisans who were willing to support the new proposal, and expressed himself quite certain, that an exhibition, open to all branches connected with carriage-building, would prove very attractive, not only to the different members of the trade, but to the general public, who were at present quite ignorant of the method upon which pleasure carriages were constructed. Resolutions approving the object of the meeting having been passed, an adjournment was taken until a subsequent day when a committee was to be formed.

We learn that another meeting has since been held in the Northern school-rooms, Castle-street, Long Acre, by the employers and operators of the above Industrial Exhibition, when a scheme after the plan of the Painter-stainers' Company was adopted for providing medals and certificates to be presented to the most skilled artisans in each branch of the coach-building trade, at the close of which a resolution was passed that the thanks of the members be presented to the "Worshipful Company of Coach and Harness-makers of the city of London, for the use of their Hall."

From a private note, addressed to us by Mr. Hooper, as late as the 26th of October, we learn that everything promises well, and that it is proposed to hold the first exhibition, very shortly, of which we are in time promised a prospectus. Mr. H. adds, "If any of your ingenious countrymen would lend contributions, I am sure they would be welcome to the committee." This fraternal invitation, we hope, will find favor with some of our American coach-makers, and if accepted, enable them to prove to Europeans that we are not a whit behind them in mechanical ability.

LITERARY NOTICES.

The *New England Historical and Genealogical Register and Antiquarian Journal*, for October, completing the eighteenth volume, has been received at this office. This highly entertaining quarterly should receive the patronage of all lovers of our earlier records, and of every descendant of Pilgrim ancestry. For the past three years this work has been issued by Joel Munsell, Esq., of Albany. In future it will be published in Boston, by the New England His. Gen. Society, of which it is the organ. The nineteenth volume will be edited by Wm. B. Trask, Esq., and issued from the Society's Rooms, 13 Bromfield Street, Boston, of which society Mr. Trask is also the agent, and to whom all subscriptions ($3 a year) should be addressed. Volumes begin with the January number, annually. We would like to find this exceedingly interesting work have a patronage worthy of its intrinsic merits.

The *Historical Magazine and Notes and Queries*, in American History, Biography, &c., is a work of a kindred nature with the above, although distinctly different in its literary character. This last is published every month by the editor, John G. Shea, Esq., at 83 Centre Street, New York, at $3 a year. We are quite certain that did our intelligent readers know how much pleasure is lost by not taking this periodical, they would not delay a single moment before sending in their orders. Some of the very choicest excerpts from American history are here for the first time presented from the original manuscript, coming daily to the light. In it also will be found records of the proceedings of all our different historical societies now instituted in our country. It is, indeed, the *multum in parvo* of American historicals.

As advance in price is the order of the times, our friend Judd, of the *American Agriculturist*, is accustomed to give his readers more matter for a less sum than anybody else, we perceive he has been obliged to advance his terms to $1.50 a year. A volume begins with the year, and a farmer cannot possibly invest the amount of subscription more profitably than in this invaluable publication. It is published monthly in New York.

We also find our old favorite the never-to-be-forgotten *Atlantic Monthly*, for November, on our table, as interesting as ever. This work is published in Boston, at $3 a year.

The same publishers send us the prospectus of a new work they propose shortly to issue, entitled *Our Young Folks;* an illustrated monthly Magazine for boys and girls, to be edited by J. T. Trowbridge, Gail Hamilton and Luey Larcom. Regular contributions to its pages will be furnished by Capt. Mayne Reid, Mr. and Mrs. Agassiz, H. Beecher Stowe, "Carleton," Dr. Dio Lewis, Ed. Morris, Edmund Kirke, Longfellow, Whittier, Holmes, Stoddard, Grace Greenwood, Mesdames A. D. T. Whitney, L. M. Child, Misses M. S. Cummings, L. M. Alcott, and numerous others of acknowledged talent. The work will be illustrated by capital designs from Darley and others, calculated to make this new serial welcome to the "homes and hearts" of our juvenile readers. The letter-press will consist of stories and sketches, biography, history and poetry, travel and adventure, out-door and in-door sports, games and puzzles, and every variety of matter entertaining, instructive, serious and comic. The work in size will be a little more than two-thirds that of the *Atlantic*, containing not less than sixty-four pages. Terms: Two dollars a year, payable in advance. This and the *Atlantic* are offered, both for $5. Address Ticknor & Fields, 135 Washington Street, Boston, Mass.

Messrs. H. D. Smith & Co.'s Advertisement.—We would call the attention of our readers to the business advertisement which appears this month on the outside of

our cover. It now for the first time is correctly printed. In our absence from home, in October, the printer took unwarranted license upon himself, and supplied some of the prices from an old copy. These on our return we corrected, and had a revised copy sent the firm, but the proof came back too late to be available for November. With these explanations we hope our readers will see that all blame (if any exists) is chargeable to the printer.

CURRENT PRICES FOR CARRIAGE MATERIALS.

CORRECTED MONTHLY, BY MR. CHAS. WEEKS, FOR THIS MAGAZINE.

NEW YORK, NOV. 24th, 1864.

Apron hooks and rings, per gross, $2.50.
Axle-clips, according to length, per dozen, 75c. *a* $1.40
Axles, common (long stock), per lb, 12½c.
Axles, plain taper, 1 in. and under, $7.00; 1⅛, $8.00; 1¼, $9.00; 1⅜, $10.00; 1½, $11.00.
Do. Swelled taper, 1 in. and under, $8.75; 1⅛, $9.50; 1¼, $11.25; 1⅜, $13.75; 1½, $16.25.
Do. Half patent, 1 in. and under, $11.25; 1⅛, $13.25; 1¼, $14.75; 1⅜, $16.25; 1½, $18.25.
Do. Smith's New York half patent malleable iron box, 1 in. and under, $10; 1⅛, $12; 1¼, $14.
Do. Saunders' improv. taper, ⅞ in., $13.50; ⅞, $14.50; 1, $14.50; 1⅛, $16.50; 1¼, $20.
Do. do. Homogeneous steel, ⅝ in., $16.50; ¾, $18; ⅞, $20.50; long drafts, $4 extra.

☞ These are prices for first-class axles. Makers of less repute, cheaper.

Bands, plated rim, under 3 in., $2.50; over 3 in., $3.
Do. Mail patent, $3.50 *a* $5.00.
Do. galvanized, 3½ in. and under, $1; larger, $1 *a* $2.
Basket wood imitations, per foot, $1.25.

☞ When sent by express, $2 extra for a lining board to a panel of 12 ft.

Bent poles, each $1.25.
Do. rims, under 1⅛ in., $2.25 per set; extra hickory, $2.50 *a* $3.50.
Do. seat rails, 50c. each, or $5.50 per doz.
Do. shafts, $6 per bundle of 6 pairs.
Bows, per set, light, $1.10; heavy, $1.25.
Bolts, Philadelphia, 20 per cent advance on list.
Do. T, per 100, $3 *a* $3.50.
Buckram, per yard, 50c.
Buckles, per grs. ½ in., $1.15; ⅝, $1.40; ¾, $1.70; ⅞, $2 10; 1, $2.80.
Burlap, per yard, 50c.
Buttons, japanned, per paper, 30c.; per large gross, $3.
Carriage-parts, buggy, carved, $4 *a* $5.50.
Carpets, Brussels, per yard, $3; velvet, $4.00 *a* $5.50; oil-cloth, 85c. *a* $1.10.
Castings, malleable iron, per lb, 23c.
Clip-kingbolts, each, 50c., or $5.50 per dozen.
Cloths, body, $6 *a* $8; lining, $5. (See *Enameled.*)

☞ A Union cloth, made expressly for carriages, and warranted not to fade, can be furnished for $2.50 *a* $3.50 per yard.

Cord, seaming, per lb, 45c.; netting, per yard, 5c.
Cotelines, per yard, $6 *a* $10.
Curtain frames, per dozen, $1.25 *a* $2.50.
Do. rollers, each, $1.25 *a* $1.50.
Dashes, buggy, $1.75.
Door-handles, stiff, $1 *a* $3; coach drop, per pair, $3 *a* $4.
Drugget, felt, $2.
Enameled cloth, muslin, 5–4, $1; 6–4, $1.35.
Do. Drills, 5-4, $1.40; 48 in., $1.55; 5-4 A, $1.55; 48 in. A, $1.75
Do. Ducks, 5-4, $2; 50 in., $2.20; 6-4, $2.40.
Enameled linen, 38 in., $1.05; 5-4, $1.20; 6-4, $1.35.
Felloe plates, wrought, per lb, all sizes, 28c.
Fifth-wheels wrought, $1.75 *a* $2.50.
Fringes, festoon, per piece, $2; narrow, per yard, 18c.

☞ For a buggy top two pieces are required, and sometimes three.

Do. silk bullion, per yard, 50c. *a* $1.
Do. worsted bullion, 4 in. deep, 50c.
Do. worsted carpet, per yard, 8c. *a* 15c.
Frogs, 75c. *a* $1 per pair.
Glue, per lb, 25c. *a* 30c.
Hair, picked, per lb, 80c. *a* $1.00.
Hubs, light, mortised, $1.10; unmorticed, 75c—coach, morticed, $1.75.
Japan, per gallon, $5.75.
Knobs, English, $2 *a* $2.50 per gross.
Laces, broad, silk, per yard, $1.20 *a* $1.50; narrow, 15c. to 20c.
Do. broad, worsted, per yard, 50c.
Lamps, coach, $20 *a* $30 per pair.
Lazy-backs, $9 per doz.
Leather, collar, dash, 35c.; split do., 18c. *a* 21c.; enameled top, 35c.; enameled Trimming, 33c.; harness, per lb, 75c.; flap, per foot, 28c.
Linen, heavy, a new article for roofs of coaches, $1 *a* $1.25 per yard.
Moquet, 1¼ yards wide, per yard, $12.00.
Moss, per bale, 12½c. *a* 15c.
Mouldings, plated, per foot, ¼ in., 14c.; ⅜, 16c.; ½, 18c.; lead, door, per piece, 40c.
Nails, lining, silver, per paper, 12c.; ivory, per gross, 50c.
Name-plates.

☞ See advertisement under this head on 3d page of cover.

Oils, boiled, per gallon, $1.80.
Paints. White lead, extra, per 25 lb $5.00; Eng. pat. black, 35c.
Pekin cloth, per yard, $5.

☞ A very good article for inside coach linings.

Pole-crabs, silver, $5 *a* $12; tips, $1.60.
Pole-eyes, (S) No. 1, $3.10; No. 2, $3.30; No. 3, $3.60; No. 4, $4.85 per pr.
Sand paper, per ream, under No. 2½, $5.75; Nos. 2½ & 3, $6.25.
Screws, gimlet.

☞ Add to manufacturer's printed lists 20 per ct.

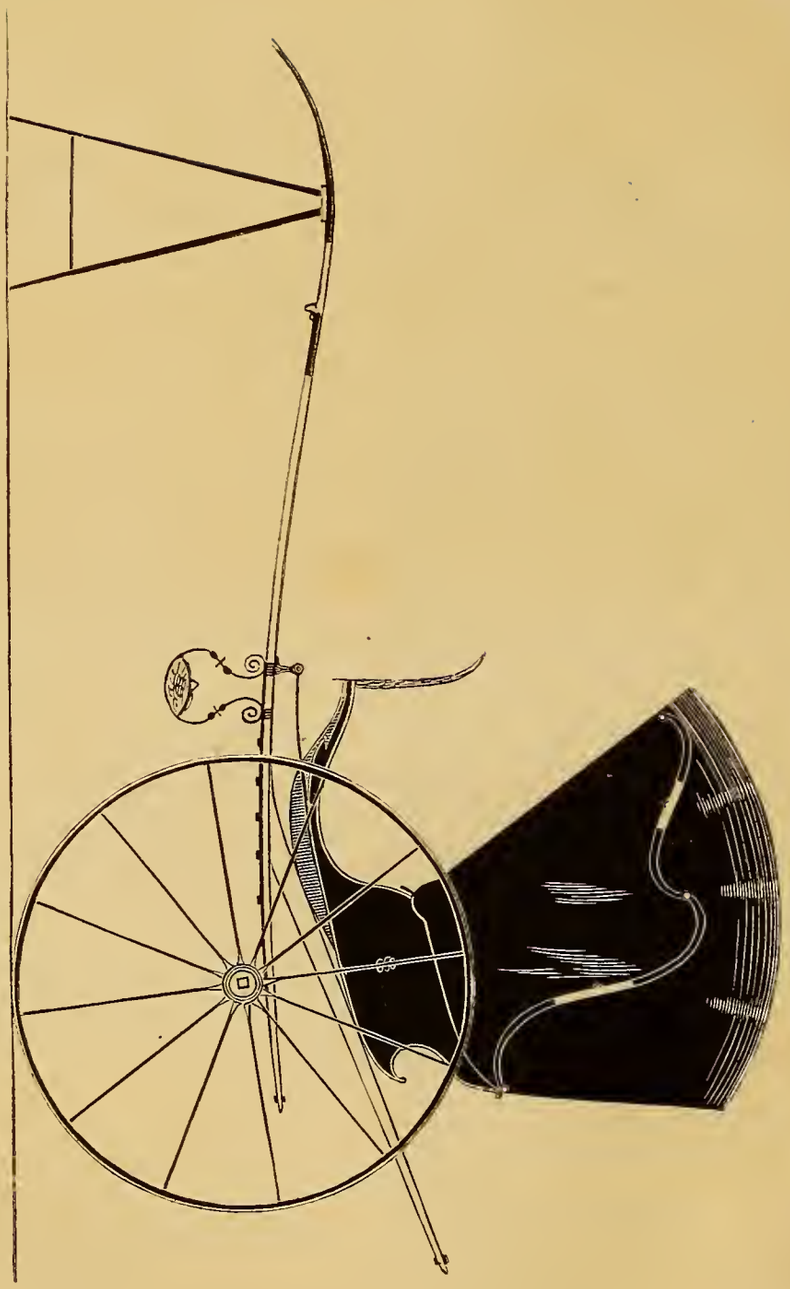
Do. ivory headed, per dozen, 50c. per gross, $5.50.
Scrims (for canvassing), 30c. *a* 40c.
Seats, buggy, pieced rails, $1.75; solid rails, $2.50.
Shaft-jacks (M. S. & S.'s), No. 1, $3.25; 2, $3.75; 3, $4.00.
Shaft-jacks, common, $1.40 *a* $1.60 per pair.
Do. tips, extra plated, per pair, 37½c. *a* 56c.
Silk, curtain, per yard, $2 *a* $3.50.
Slat-irons, wrought, 4 bow, $1.12½; 5 bow, $1.25 per set.
Slides, ivory, white and black, per doz., $12; bone, per doz., $1.50 *a* $2.00; No. 18, $2.50 per doz.
Speaking tubes, each, $8.
Spindles, seat, per 100, $1.50 *a* $2.50.
Spring-bars, carved, per pair, $1.75.
Springs, black, 27c.; bright, 28c.; English (tempered), 32c.; Swedes (tempered), 34c.; 1¼ in., 1c. per lb. extra.
If under 36 in., 2c. per lb. additional.

☞ Two springs for a buggy weigh about 28 lbs. If both 4 plate, 34 to 40 lbs.

Spokes, buggy, per set, $4.20, or about 7c. each for all under 1¼ in.

☞ For extra hickory the charges are 10c. *a* 12½c. each.

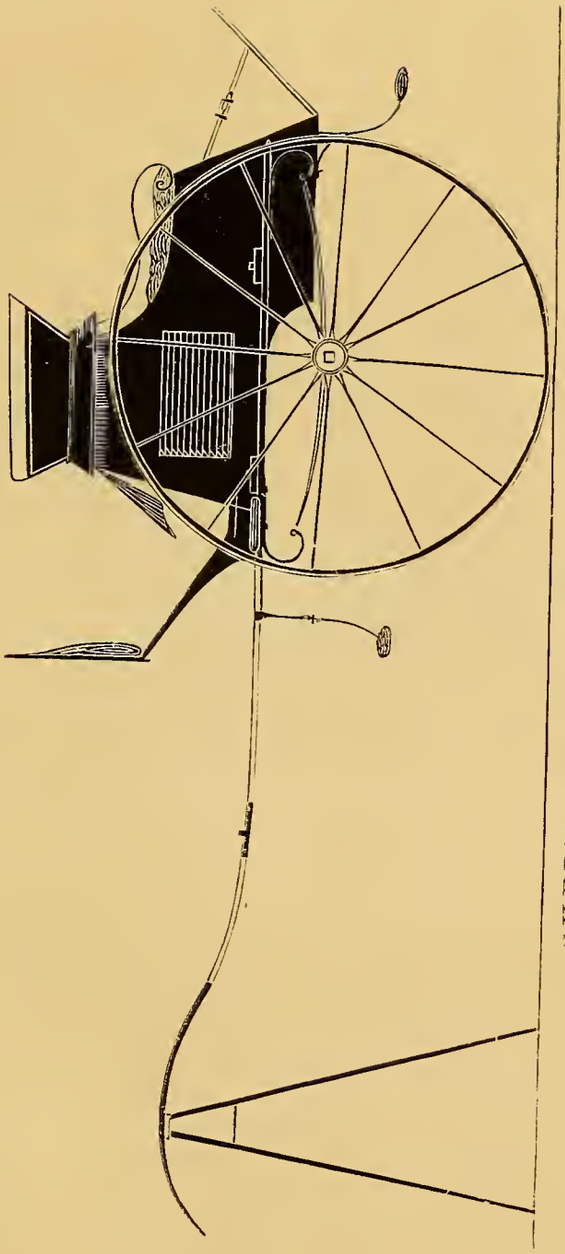
Steel, Littlejohn's compound tire, 1-8 & 3-16 thick, 6¾c. gold; 1-4 & 5-16 thick, 6¼c. gold.
Stump-joints, per dozen, $1.60 *a* $2.25.
Tacks, 10c. and upwards per paper.
Tassels, holder, per pair, $1 *a* $2; inside, per dozen, $5 *a* $12; acorn trigger, per dozen, $2.25.
Terry, per yard, worsted, $5; silk, $11.
Top-props, Thos. Pat, per set 70c.; capped complete, $1.50.
Do. common, per set, 40c.
Do. close-plated nuts and rivets, 75c.
Thread, linen, No. 25, $1.30; 30, $1.45; 35, $1.65, gold.
Do. stitching, No. 10, 95c.; 3, $1.15; 12, $1.28, gold.
Do. Marshall's Machine, 432, $2; 532, $2.30; 632, $2.60, gold.
Tufts, common flat, worsted, per gross, 20c.
Do. heavy black corded, worsted, per gross, $1.
Do. do. do. silk, per gross, $2.
Do. ball, $1.
Turpentine, per gallon, $3.00.
Twine, tufting, per ball, 35c.; per lb, 60c. to 75c.
Varnishes (Amer.), crown coach-body, $7; hard drying, $8; non-pareil, $8.
Do. English, $6.25 in gold, or equivalent in currency on the day of purchase.
Webbing, per piece, 70c.; per gross of 4 pieces, $2.60.
Whiffle-trees, coach, turned, each, 35c.; per dozen, $3.50.
Whiffle-tree spring hooks, $3 per doz.
Whip-sockets, flexible rubber, $4.50 *a* $6 per dozen.
Do. hard rubber, $9.50 per dozen.
Do. leather imitation English, $5 per dozen.
Do. common American, $3.50 *a* $4 per dozen.
Window lifter plates, per dozen, $1.50.
Yokes, pole, each, 35c.; per doz, $3.50.
Yoke-tips, extra plated, $1.75 per pair.



BOSTON CHAISE.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

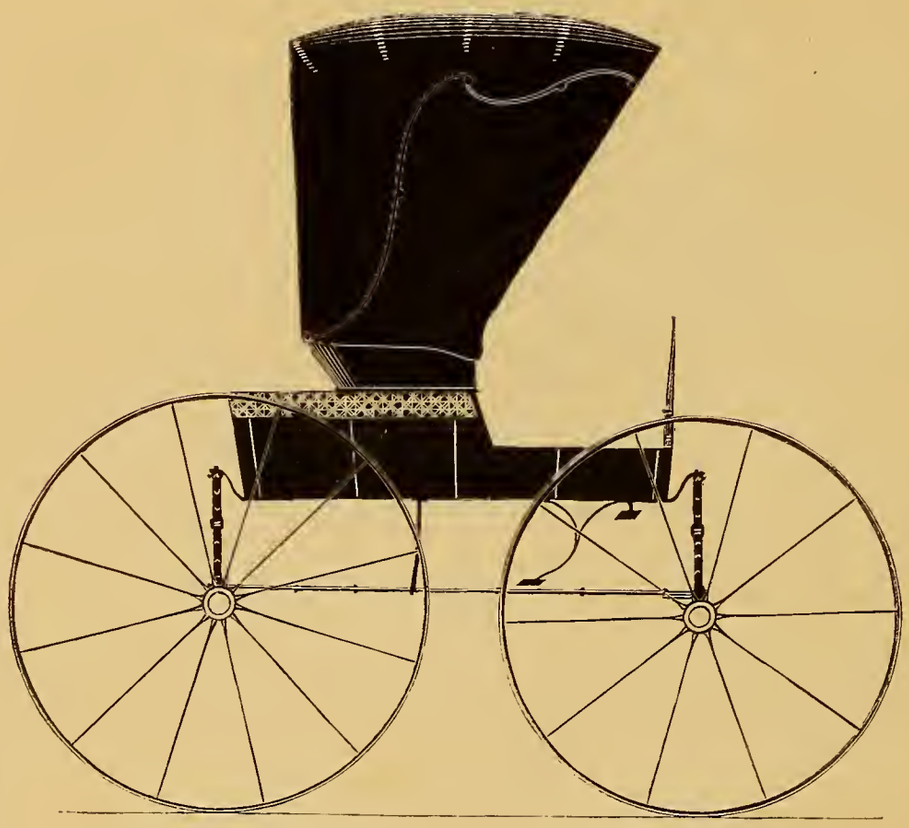
Explained on page 118.



SHERIDAN DOG-CART.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

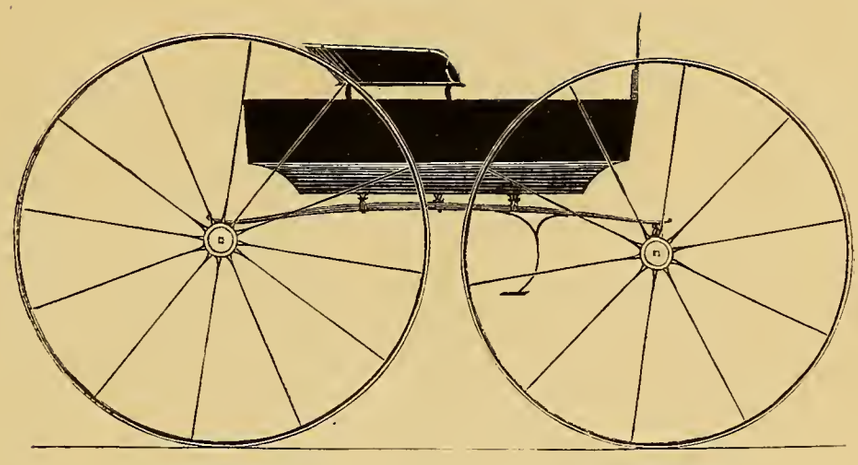
Explained on page 118.



NEW ENGLAND BUGGY.—½ IN. SCALE.

Engraved expressly for the New York Coach-maker's Magazine.

Explained on page 118.



MONITOR BUGGY.—$\frac{1}{2}$ IN. SCALE.

Engraved expressly for the New York Coach-maker's Magazine.

Explained on page 118.

THE NEW YORK
CARRIAGE MAKER'S MAGAZINE

DEVOTED TO THE LITERARY, SOCIAL, AND MECHANICAL INTERESTS OF THE CRAFT.

Vol. VI. NEW YORK, JANUARY, 1865. No. 8.

Mechanical Literature.

PIECEWORK versus DAY-WORK.

BY O. E. MILES.

Among the signs which have marked the progress of the human race, from its earliest record to the present, none are more profitable to contemplate as being suggestive of our duties and destinies than those which have characterized the relation of master and servant, employer and employed. It is needless, however, to take the American reader back to Bible times, and wade with him through volumes of history to enable him to observe the difference between the condition of the slave of the primitive ages and the employee of free America. We have only to step from Illinois across the Ohio River, to span the gulf which divides the two conditions. We will only stay within the tottering walls of the cursed temple of human oppression long enough to congratulate its wretched inmates—the oppressor and oppressed—upon the good time coming, and hastening back to our workshops and factories in the free North, we will ask ourselves what we can yet do to heighten the already exalted standing of the workingmen of our country. What better can we do for an employee than to employ him ten hours of each day, and pay him liberally and promptly? How are we to better secure his obedience and efficiency, or in justice to ourselves as employers, give him a better opportunity to achieve his own independence? There is a plan which is adapted to all the manufacturing and mechanical trades, the practice of which has come to be very generally adopted, and which we wish might become universal. It is that of remunerating labor in proportion to the quantity and excellence of the production, instead of estimating work on the basis of time.

Let the reader go with us once more to the sugar and rice fields, as while in the palmy days of the slaveholders, and from thence we will usher him into an English iron or cotton mill, where, though actual human chattelism has been abolished, the laborer is held in a condition only next above it by a moneyed aristocracy. (We need not have crossed the water for this comparison but for the fact that the English work-shop, with its lordly proprietor, and scarcely less pompous boss, and the servile underlings who, supplying the sinew, together constitute an institution which serves better to illustrate disgraced free labor than their more scattered representatives in our southern country.) We will next introduce you to the day laborer of the free North, mechanics who ply their vocation a specified number of hours for a specified sum of money; and, lastly, we pay a visit to certain machine shops, carriage factories, armories, and other establishments, in which every operative contracts with the employer to execute a certain part of the work according to a fixed gauge or standard of style and finish, for which he receives a stipulated price. We have thus seen the laborer in the four principal grades of servitude, which form the several steps from the condition of an absolute tool, with neither liberty nor learning, up to the proud level of equal rights and equal respectability with his employer. It is in one of the two latter stages or conditions that we find all jour. mechanics at present employed in this country. We find in different shops, and often in the same shop, men employed both by the day and by the piece; and though the former mode is, in the progress of universal reform, slowly yielding up its place to the better system, we would offer a few reasons why we desire speedily to see the practice of hiring mechanics by the day altogether abolished.

The principal reasons for such a reform have their foundation in a desire for the mental and moral advancement of the laboring masses, the same reasons among others for which good men have ever advocated the abolition of slavery. That some of the same obstacles to human progress which lay at the door of unpaid labor still linger in the system of hiring by the day, is susceptible of easy proof.

Among a gang of slaves, a negro of extraordinary capabilities has no advantages over the "common nigger." He has his living and clothes, and no prospect of living or dying anything better than a slave. The veriest beast that works by his side has as much.

In shops where a uniform scale of wages is paid, the workman of superior ingenuity reasons the same: "What is the use," he says, "to increase my speed or put on extra touches? The blockhead who works at the next bench gets the same that I do. The work is as good as the pay."

It is the easiest imaginable feat to keep up a great

show of activity that amounts to little except false motions, and so secure the highest wages the situation affords, for the same man who would accomplish twice as much were he employed by the piece. How often do we hear in answer to a question like this, "How many wheels do you make a week?" such an answer as the following: "O, I make three sets. If the boss would give me piece-work I should make four." It is thus easy to see what the inevitable tendency of such a course must be. Instead of the energy and aptitude of the fastest man in the works being emulated by the rest, the one who works the nearest like a pile-driver is sure to be the working pattern for the shop; and not the least of the disadvantages arising from such management is, that under these circumstances it is next to impossible for the proprietor to figure the exact cost of any article of manufacture so as to be guided to an equitable selling price, though with such as care for no guide but to undersell their neighbors this is a matter of small moment. The moral as affecting the employee is most obvious. The incalculable advantages he is sure to reap from the cultivation of every good habit in the judicious assortment of material, in the procurement of the best tools, and the keeping of the same in perfect condition, as well as their orderly and convenient arrangement so as to be ever accessible when wanted; and above all, so dividing his time as to handle each piece of his work, and each tool, the fewest possible number of times during the progress of his job; these, with numberless daily additions to his mechanical education, which go to make up the sum total of a great character, are sure to be lost if the natural stimulant to improvement is thus withheld by compelling him to imitate machinery. For every cent he thus defrauds his employer, the treasure out of which he cheats himself may never be counted. He settles into that tread-mill course which is quite likely to result in the conclusion that the use of tools is a hard road to travel. He relapses still further, perhaps, to tilling the soil, or some vocation still more unfavorable to his organism, and is heard of no more in the field of construction. The mechanical galaxy may have lost a bright star, mechanical history a glowing page, and the world a genius. As its effects thus redound to the detriment of all humanity, so its eradication should be the subject of universal solicitude.

THE OUTSIDE PASSENGER.

SOME years ago a young lady, who was going into a northern county in England, took a seat in a stage-coach. For many miles she rode alone; but there was enough to amuse her in the scenery through which she passed, and in the pleasing anticipations that occupied her mind. She had been engaged as governess for the grandchildren of an earl, and was now traveling to his seat. At mid-day the coach stopped at an inn, at which dinner was provided, and she alighted and sat down at the table. An elderly man followed, and sat down also. The young lady arose, rang the bell, and addressing the waiter, said: "There is an outside passenger! I cannot dine with an outside passenger!" The stranger bowed, saying: "I beg your pardon, madam! I can go into another room," and immediately retired. The coach soon afterwards resumed its course, and the passengers their places. At length the coach stopped at the gate leading to the castle to which the young lady was going, but there was not such prompt attention as she expected. All eyes seemed directed to the outside passenger, who was preparing to dismount. She beckoned, and was answered: "As soon as we have attended to his lordship we will come to you."

A few words of explanation ensued, and to her dismay she found that the outside passenger, with whom she had thought it beneath her to dine, was not only a nobleman, but that very nobleman of whose family she hoped to be an inmate. What could she do? How could she bear the interview? She felt very ill, and the apology sent for her not appearing that evening was more than pretense.

The venerable peer was a considerate man, and one who knew the way in which the Scripture often speaks of the going down of the sun. "We must not let the night thus pass," said he to the countess. "You must send for her, and we must talk to her before bedtime." He reasoned with the foolish girl respecting her conduct, insisted on the impropriety of the state of mind it evinced, assured her that nothing could induce him to allow his grandchildren to be taught such notions, refused to accept any apology that did not go to the length of acknowledging that the thought was wrong, and when the right impression appeared to be produced, gave her his hand. *That* man *was* a *noble*man.

PLAN TO KEEP BRIGHT THE EXTERIOR OF CARRIAGE WINDOW-GLASSES.

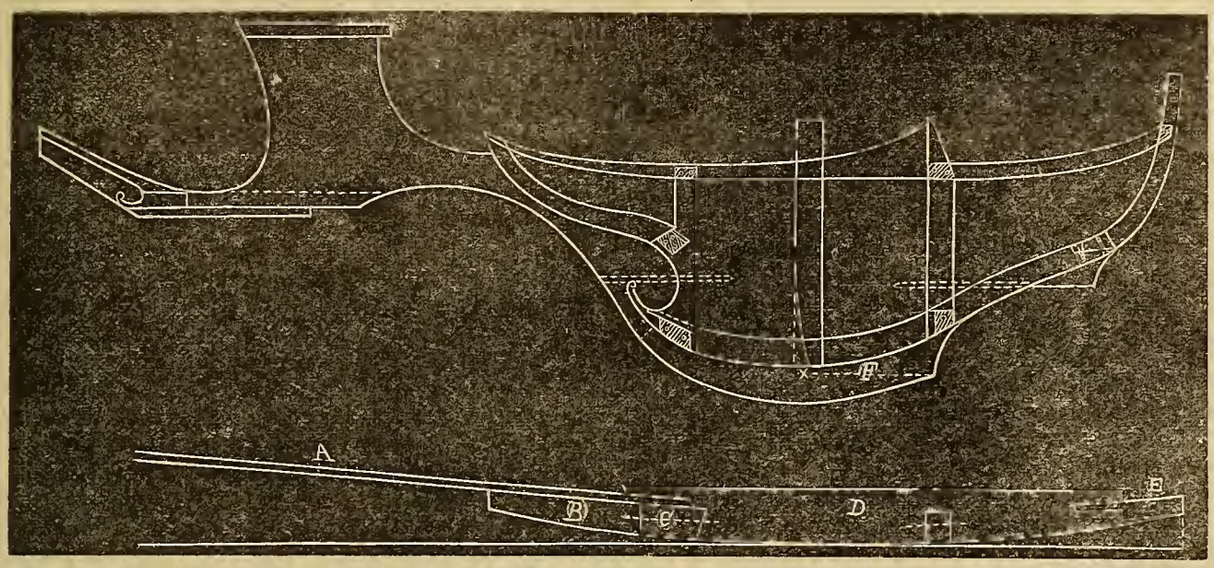
IN looking over a lot of old books lately, we found in a work entitled, "Records of the Outinian Society, published one hundred years after the death of Wm. Penn, and calculated to lessen the evils incident to the pursuit of happiness by marriage, or otherwise," &c., printed by "Nicholas Bulmer & Co., Cleaveland Row, St. James, London, 1822,"—the "plan" named at the head of this article. Referring to two drawings, the writer says:

"Nos. 5 5 is an invention well suited to travellers with an object, that has only lately been sometimes performed, their principal one, that of examining the country in their routes through it, to discern picturesque beauty. It is above all suited to a traveller who is an invalid, as some of the most earnest of this class, have been. The difficulty of brushing off the effects of damp, light frosts, or rain drops from the outside of the chaise window, after a heavy shower though they half conceal the views, would naturally induce the traveller to contemplate the landscape several minutes with the glass down; but a projecting slip of Lapland rug, or *seal's skin*, extending along the top of the window blind and temporarily fastened there as an *exterior carriage window cleaner*, cleans the glass while lowering, and displays the scenery through it, immediately after, whenever pulled up, in excluding the cold air. This has been executed by Mr. Harris, Coach Maker, of Orchard Street, Portnam Square," [London.] Since this "invention well suited to travellers" has not continued in use down to our time, we infer that the invention very speedily "played out," as well it might as far as usefulness goes.

ENGLISH CARRIAGE ARCHITECTURE.—No. XV.

WE present this as furnished to us, although we cannot approve of the model, nor of the lines of sweep in the composition. The only object, then, is to give the reader the mode of construction in use in England. The usual manner is to box the rocker into the bottom-side. A represents the side of the boot, or dickey-seat panel;

B, front corner-piece; C, front standing-pillar; D, bottom-side; E, corner pillar; F, turn-under of standing-pillar.



BAROUCHE, WITH CANT-BOARD, ¾-IN. SCALE.

OPPOSITION TO STAGE-COACHES.

(*Concluded from page* 99.)

But to proceed: If the gentlemen, the tradesmen, the husbandmen, the graziers be not benefited by this traveling I am sure the last sort of travelers, to wit, the poor, they cannot be profited thereby; for wagons (or the long coaches first invented and still in use) would be most for their interest to travel in, being far less expensive than the other; so that these running coaches are not beneficial to every sort of travelers.

Secondly. Men do not travel in these coaches with less expense of money or time than on horseback, for, on horseback they travel faster; and if they please, all things duly considered, with as little if not less charges. For instance, from London to Exeter, Chester or York, you pay forty shillings a-piece in summer-time, forty-five shillings in winter, for your passage; and as much from those places back to London. Besides, in the journey they change coachmen four times, and there are few passengers but give twelvepence to each coachman at the end of his stage, which comes to eight shillings in the journey backward and forward, and at least three shillings comes to each passenger's share to pay for the coachman's drink on the road; so that, in summer-time, the passage backward and forward to any of these places costs four pounds eleven shillings; in the winter five pounds one shilling; and this for only eight days' riding in the summer and twelve in the winter. Then, when the passengers come to London they must have lodgings, which, perhaps, may cost them five or six shillings a week, and that in fourteen days amounts unto ten or twelve shillings, which makes the four pounds eleven shillings either five pounds one shilling or five pounds three shillings; or the five pounds one shilling five pounds eleven shillings or five pounds thirteen shillings; besides the inconveniency of having meat from the cooks, at double the price they might have it for in inns. But if stage-coaches were down and men travelled again as formerly on horseback, then when they came into their inns they would pay nothing for lodgings, and as there would excellent horses be bred and kept by gentlemen for their own use, so would there be by others that would keep them on purpose to let; which would, as formerly, be let at ten or twelve shillings *per* week, and in many places for six, eight or nine shillings *per* week. But, admitting the lowest price to be twelve shillings, if a man comes from York, Exeter or Chester or London, be five days coming, five going, and stay twelve days in London to dispatch his business (which is the most that country chapmen usually do stay), all this would be but three weeks; so that his horse-hire would come but to one pound sixteen shillings, his horse-meal at fourteen-pence a day, one with another, which is the highest that can be reckoned upon, and will come but to one pound five shillings, in all three pounds one shilling, so that there would be, at least, forty or fifty shillings saved, of what coach-hire and lodgings will cost him; which would go a great way in paying for riding-clothes, stockings, hats, boots, spurs, and other accoutrements for riding; and in my poor opinion would be far better spent in the buying of these things, by the making whereof the poor would be set at work, and kept from being burthensome to the parish, than to give it to those stage-coachmen, to indulge that lazy, idle habit of body, that men, by constant riding in these coaches, have brought upon themselves. Besides, if thus their money were spent, they would save a great deal, which now, if men of any estates, they pay for the relief of those poor who (for the want of the work they had before those coaches were set up, and might have again if they were put down), are fallen upon the several parishes wherein they live for maintenance; which charge would be quickly taken off if they were restored to their work. Thus in proportion may a man save from all longer or shorter stages. For instance: From Northampton men pay for passage in coach to London sixteen shillings, and so much back; from Bristol twenty-five shillings; from Bath twenty shillings; from Salisbury twenty shillings or twenty-five shillings; from Reading seven shillings—the like sums back—and so in proportion for longer or shorter stages. Judge, then, whether men may not hire horses cheaper than five shillings a day? I am sure they may for half the money: especially if coaches were down, that men might receive encouragement; for then there would be, as formerly, in all great cities and towns of England, good and sufficient horses kept to let; and such

a correspondency would be between all the places, that a man in any town shall have a horse to ride to what place he pleaseth, and liberty to leave him when he comes to his journey's end, without further charge, till he have dispatched his business; which done he may, at the same place, hire one to carry him back and be gone, without waiting a week or ten days after his affairs are ended, at vast charges, merely for a passage in a coach (as many of these gentlemen are forced to do who pretend it a point of good husbandry to travel in them), which hazard nevertheless they run, and often find the smart of it. They never consider or account the charge thereof; if they did they would easily perceive that traveling in coaches is not the way of traveling with least expense.

Thirdly. Traveling in these coaches can neither prove advantageous to men's health or business. For what advantage is it to men's health, to be called out of bed into these coaches an hour before day in the morning, to be hurried in them from place to place, till one hour, two or three within night: insomuch that, after sitting all day in the summer-time, stifled with heat and choked with dust, or in the winter-time, starving and freezing with cold, or choked with filthy fogs, they are often brought into their inns by torch-light, when it is too late to sit up to get a supper, and next morning they are forced into the coach so early that they can get no breakfast? What addition is this to men's health or business, to ride all day with strangers, oftentimes sick, ancient, diseased persons, or young children crying; to whose humors they are obliged to be subject, forced to bear with, and many times are poisoned with their nasty scents, and crippled by the crowd of the boxes and bundles?

Is it for a man's health to travel with tired jades, to be laid fast in the foul ways, and forced to wade up to the knees in mire; afterwards sit in the cold, till teams of horses can be sent to pull the coach out? Is it for their health to travel in rotten coaches, and to have their tackle, or pearch, or axletree broken, and then to wait three or four hours (sometimes half a day) to have them mended, and then to travel all night to make good their stage? Is it for a man's pleasure, or advantageous to his health and business, to travel with a mixed company that he knows not how to converse with; to be affronted by the rudeness of a surly, dogged, cursing, ill-natured coachman; necessitated to lodge or bait at the worst inns on the road, where there is no accommodation fit for gentlemen; and this merely because the owners of the inns and the coachmen are agreed together to cheat the guests?

Is it for the advantage of business, that a man when he sets out on a journey, must come just at their hour, or be left behind; so that often he is forced, when one hour's staying would finish his business, to go out of town, leave it undone, and make a new journey about it? Is it for advantage of a man's business, that though he have a concern of great weight or moment to transact upon the road as he goes along, yet if it lie but a stone's-cast out of the coach-way, the coachman will not drive thither, nor stay for him at any place, except the baiting, or lodging-places where he calls, where they change horses; and there stay no longer than he pleases neither? To be forced, whatever accident of sickness or illness happens, to ride these coachmen's stages, though never so late in the night, or else to be left in the middle of a journey in a strange place? Is this for the conveniency or advantage of a man's health or business? Rather the quite contrary. Yet this hath been many persons of good quality's case; though they have offered to pay the whole coach-hire, and all the passengers' charges, to have put into an inn (late at night on this side the set stage); yet have they been denied, forced to ride, though in peril of their lives, till midnight: and it is not hard to instance in many that have lost their lives by such usage.

All which inconveniences, if stage-coaches were suppressed, would be remedied, lazy humors be discountenanced; and a great conveniency indeed it would be, both to travelers and the country through which they ride, for men and women to travel on horseback again. For then they may, when their business is done at one place, presently take horse and go to another, without loss of time or staying for a passage in a coach; set out as early in the morning, and take up as soon in the evening, and bait as long and often by the way, and in what places they please; make choice of their company on the road, avoid such as suit not with their tempers; go out of the roads when, and travel as long or short journeys as they please; keep out of cold, wet, or fogs; and take into inns when the weather is not fit to travel in, and so preserve their healths. And by this means great advantages would happen: for then all towns, and every inn, would have something to do; trade would be more diffused, many poor families in the country would be maintained, that are now in a starving condition; travellers would come into their inns before candle-light, stay in the morning until shops open, understand the trade of the place they are in, lay out monies in buying things they find fit for their use, and which are of the manufactures of the town where they come; in some places, silk or worsted-hose; in others, lace, gloves, stuffs, boots, or shoes, linen-cloth, and other things, which would be great relief and encouragement to the manufacturers of those commodities, as well as to those that buy them, and bring money to those places where they are made.

Fourthly. These coaches are not absolutely necessary to any persons whatever; for sick or aged people, or young children, if they have occasion to travel, may ride in the long wagon-coaches, which were those that were first set up, and are not now opposed, because they do little or no hurt. For gentlemen that are able to ride on horseback, keep coaches of their own, or to hire a coach, will not appear so sordid as to travel in them. And truly, if they be poor people that are to travel, it is not fit they should be encouraged in their pride and extravagancy, or suffered to ride amongst gentlemen, or like persons of honor, in a coach with four or six horses; and for sick and aged people and young children these long coaches are more convenient for them than running coaches, if they were to be continued up, for they travel not such long journeys, go not out so early in the morning, neither come they in so late at night; but stay by the way, travel easily, without jolting men's bodies or hurrying them along, as the running coaches do.

Fifthly. Neither are these running coaches useful to any, for those that are fit to ride, or ought to be suffered to ride in them, are such that if they have business requiring a coach, may either keep one themselves or hire one.

Sixthly. But though these coaches are neither absolutely necessary to some nor useful to others, yet they are imposed upon many; for since they set up in such great multitudes, especially about London, men careless

of keeping horses, knowing the certainty of passage in them, have sold them, and must therefore when they travel either ride in these coaches or not at all, there being few or no horses kept now to let out to hire.

If by what hath been said upon this point it happen gentlemen may travel on horseback, more to the advantage and benefit of trade, and so to the public good, with more advantage to their healths and business, and less expense of money and time, than they can in stage-coaches; if these stage-coaches be not absolutely necessary to some, useful to what other coaches may be made to others, and yet thus imposed upon many, what reason can be given why they should not all, or most of them, be suppressed? If they were not destructive to trade, why should petitions from almost all sorts of tradesmen come up from most cities and towns in England against them, as there have been lately presented to his Majesty and the council? Why should the justices of peace at their quarter-sessions certify to his Majesty and his honorable privy council, under their hands (as they have done), that the great mischiefs aforementioned, under which the kingdom now suffers, have been greatly occasioned by these coaches, and that many thousands of families are ruined by them, as from London, Westminster, Salisbury, Middlesex, and divers other cities, counties, and towns, certificates have come? Why should the lord mayor and aldermen of London, at their court at Guildhall, upon serious consideration and debate of the petition of the several companies of London against the said coaches (wherein most of these grievances are mentioned), allow of the same, and give leave that it should be presented, if they are not convinced that they are destructive to trade? For surely they understand trade, and were not so weak as to be cheated into their consent and approbation, neither have they any time since repented of or disowned the same (as the stage-coachmen in false and scandalous pamphlets have presumed to print), notwithstanding which they are ready to own the said petition, and make good the contents thereof. And the drapers, haberdashers, and milliners (who they pretend would be prejudiced by their being superseded) are ready, with the other tradesmen mentioned in that pamphlet, to evince to the world that they are injured by their being kept up, so that the very coach and harness-makers themselves petition against them, as being mischievous to their trades, in regard they prevent the making of great numbers of coaches every year, which must have been made if gentlemen had traveled in their own coaches, and thereby they hinder the consumption of great quantities of leather.

If all these things be true, what can be said against their being suppressed?

It is objected, the owners of these coaches set them up for the conveniency of the subjects—have betaken themselves to this painful way of living, and laid out their whole stocks, merely to accommodate gentlemen, and have now no other way to live; what shall become of them if they be put down?

Answer. It is the case but of very few that the suppressing of them would hurt; for if all stage-coaches were to be suppressed, I dare say five to one of those that keep them would receive advantage thereby, as clearly will be evinced if it be considered that when this business was before his Majesty in council (where it depends undetermined), none of the stages opposed the being put down, except Exeter, Salisbury, Dorchester, Bristol, Southampton, Dover, Norwich, Lincoln, York, Westchester, Worcester, and Shrewsbury, who call themselves "stage-coachmen upon the grand roads of England," and there is not the owner of any of these coaches but hath other ways to live if he were prohibited driving them, for they are all of them either inn-holders, or coach or harness-makers, following those trades, or carriers or licensed coachmen in London, and may live as well as the hackney-coachmen in London. The other stage-coaches are all, or most of them, kept either by inn-holders, first, who (one in a town) did set up a coach, and so carried all the guests to his own house; then a second sets up another; and so a third and fourth in a town; which done they run one against another, purposely to get the guests from each other's houses; whereby they not only destroy multitudes of houses, but are great losers themselves; so that themselves would be thankful to have them put down, and yet are forced to keep them up, till there shall be a general suppression, because otherwise they shall loose their whole trades. Or else the stage-coaches are kept by such, as before the late act for reducing the number of hackney-coaches in London to four hundred, were owners of coaches, and drove hackney there. But when the number of four hundred was full, and they not licensed, then, to avoid the penalties of the act, they removed out of the city, dispersing themselves into every little town within twenty miles of London, when they set up for stagers, and drive every day to London, and in the night-time they drive about the city; pay no five pounds *per annum*, yet take away both the town and country-work from those that do pay it, and break and annoy the streets in the cities and suburbs thereof; hindering the four hundred from the jobs and small journeys they depend upon, when they agreed to pay five pounds a-piece *per annum* for their licenses: whereby they are many of them ruined. But take it for granted it were so, that these stage-coachmen had laid out all their stocks for the use aforesaid, and must be undone, if put down; and there were at least two thousand of them; what is that? Of two evils the lesser is to be chosen. Have they not already destroyed very many thousands of families? Will not the continuing of them, in a very short time, be the undoing of many thousands more? Is the interest of these surly, rude, debauched coachmen, to be put in the balance with many thousands of curriers, shoemakers, saddlers, girders, spurriers, cutlers, lorimers, clothiers, clothworkers, cloth-drawers, drapers, tailors, and an hundred trades more, to which men were bound seven years' apprenticeship to learn their trades, and are of great advantage to the public? Surely they ought to be encouraged; being the manufacturers of the staple commodities of the kingdom; by the manufacturing whereof great profit doth arise to the public. Yet of these, if occasion require, it will be made appear, above one hundred thousand with their families, are in great measure ruined by them. And I pray you, who are advantaged thereby? What persons are employed or set at work by them, save only a few servant-coachmen, postilions, and hostlers; whom they pretend they breed up, and make fit for the service of the nobility and gentry of the land: a most incomparable school to train men up in and fit them for the gallows, more likely than to live in sober families; but in the meantime, while these are breeding up, the price and rents of lands are so brought down by the hindrance these coaches do make of the consumption of provision and manufactures, that in a short

time few gentlemen will be in a capacity to keep coaches: so that if all running stage-coaches and caravans were suppressed, it would do well. But if some few coaches were continued—to wit, one to every shire-town in England—to go once a week backwards and forwards, and to go through with the same horses they set forth with, and not travel above thirty miles a day in the summer, and twenty-five miles in the winter, and to shift inns every journey, and so trade might be diffused; these would be sufficient to carry the sick and the lame that they pretend cannot travel on horseback; and being thus regulated, they would do little or no harm; especially if all be suppressed, within forty or fifty miles of London, where they are no way necessary, and yet so highly destructive. But this, as well as the rest, I submit to judgment.

Pen Illustrations of the Drafts.

BOSTON CHAISE.

Illustrated on Plate XXIX.

IT gives us much satisfaction to be able to present our subscribers with so fine an illustration of the Boston Chaise, on this occasion. We have been favored with the design by Mr. Giles P. Barker, foreman in the manufactory of our friend George L. Brownell, Esq., of New Bedford, Mass. He will please accept our thanks for this manifestation of kindness to us and readers.

Very little need be added by way of description. The shafts and long springs are best made of lance-wood, as these retain the proper form much better than hickory. Next to lance-wood we prefer best second growth ash. The "thorough-brace" in the design is mostly hidden by the spring. All other details are sufficiently explained in the drawing.

THE SHERIDAN DOG-CART.

Illustrated on Plate XXX.

THIS beautiful design for a dog-cart is communicated for our Magazine by our attentive friend, Mr. John R. Bartlett, of Boston. We think it will find favor with any craftsman of correct taste, and add another to our already somewhat extensive list of dog-carts published in this work. We hope to hear from Mr. Bartlett often. He will always find his contributions welcome to our pages.

We are not of those who advocate fancy colors and gay ornamentation in painting carriages, generally; but if such must be indulged in, it cannot be more appropriately "gone into" than on dog-carts. We say then, if so disposed, *do your prettiest;* the more the better.

NEW ENGLAND BUGGY.

Illustrated on Plate XXXI.

THE design on this plate is similar to that given on Plate XXVII. This is from a drawing by G. P. Barker, of New Bedford, Mass., and represents a class of buggies quite popular among our Eastern friends the past season. The sham-caning in this design, is quite a relief to that, which if the panel was all black, would give it a heavy appearance.

MONITOR BUGGY.

Illustrated on Plate XXXII.

WE believe Mr. R. M. Stivers, of this city, is the original designer of this buggy. We see that he is making several of them for customers, and we have no doubt that the novelty attached will render them very popular with the "fancy" of the Bloomingdale Road and Central Park. It is another of that class of novelties in which the past year has been prolific, as our pages abundantly exhibit.

Sparks from the Anvil.

EXPANSION OF STEEL.

IT is a well-known fact among those who are in the habit of hardening, that the hardening of steel increases its dimensions; still there may be some that have had very little to do with it, that may yet be ignorant of it, therefore it may be useful to acquaint those with it. The amount of this expansion cannot be exactly stated, for it varies in different kinds of steel, and even in the same steel operated upon at different heats. But this expansion can be prevented in a great measure, by annealing the steel about three times before the article is completely finished; for instance, when the first skin is taken from the steel it should be annealed again, and then another cut taken from it and annealed again, and so on for the third time. I have found that articles treated this way will always keep their size better in hardening, than if the steel were only annealed once. This may appear to some to be a deal of trouble, but they will find there is a saving in the end, for hardened steel is very difficult to work, and the working of hardened steel is unknown to a great number of people, and many that know how to work on it, have not things convenient for it, such as buffs, laps, or stones; therefore, to keep the article as near the proper size as possible is a matter of importance. I have had articles that have only been annealed once, that have taken many hours to lap to the proper size after hardening, and I have had articles of the same kind, and from the same steel, and hardened at the same heat, that have been annealed three times, that have scarcely required to be touched after they have been hardened.

ANNEALING OF STEEL.

IN the annealing of steel the same care is required in the heating of it as there is in heating it for hardening, for over-heating the steel is as injurious in one case as in the other. In the process of annealing artists differ very much, some approving of heating the steel and burying it in lime, some of heating it and burying it in cast-iron borings; while others approve of heating it and burying it in saw-dust. A far better plan is to put the steel into a box, made for the purpose, and fill it with charcoal dust, and plug the ends up so that the air is kept from the steel,

then to put the box and its contents into the fire, till it is heated thoroughly through, and the steel is at a low red heat; it must then be taken from the fire, and allowed to remain in the box, without opening the box till the steel is cold. Then when taken out the steel will be nice and clean and very soft, and without those bright spots which some mechanics call pins, and which are no small impediments to the filing and working of steel, and if any difference, the steel is improved by the process. A piece of stout gas pipe, with a bottom welded in, and a plug made for the other end, makes a very good box for a small quantity of steel; but, for a large quantity, the box must be large in proportion. If the steel is very large it is as well to make a charcoal fire to heat it in, and then let the steel and the fire get cold together before it is taken out, and it will be equally soft. But it sometimes happens that a piece of steel is wanted in a hurry, and the steel, perhaps, is too hard to work on, and cannot wait for its being softened in a box; in such cases it may be heated in an open fire, and buried in charcoal dust till it is cold, or if it be heated to a red heat sufficient to be seen in a dark place, and then plunged into cold water, it will work more pleasantly; but not so soft as if it were heated in a box with charcoal. There are many that do not know the value of a good tool, because the steel they work on has never been properly annealed, and before the tool has half done its duty it is worn out, or wants repairing: whereas, if the steel had been properly annealed, the same tool might have lasted ten times as long without repairing.

CASE-HARDENING OF IRON.

Case-hardening is an operation much practiced, and of considerable use, and in this art there are many different opinions. The prussiate of potash renders iron nearly as hard as steel, by simply heating the iron to a red heat, and putting the potash on it, and plunging it in cold water, but this hardness is confined to the surface. But the greatest effect may be produced by an air-tight box and animal carbon alone—such as horns, hoofs, or leather, just sufficiently burnt to admit of being reduced to powder, in order that more may be got into the box with the articles. Bones reduced to dust will answer the same purpose. The articles intended to be case-hardened are put into the box with animal carbon, and the box made air-tight by luting it with clay; they are then placed in the fire, and kept at a light red heat for any length of time, according to the depth required; in half an hour after the box and its contents are thoroughly heated through it will scarcely be the thickness of a sixpence; in an hour, double, and so forth, till the desired depth is acquired. The box is then taken from the fire, and the contents emptied into pure cold water; they can then be taken out of the water and dried to keep them from rusting, by riddling them in a sieve with some dry saw-dust, and they are then ready for polishing. Case-hardening is a superficial conversion of iron to steel; but it is not always merely for economy that iron is case-hardened, but for a multitude of things it is preferable to steel, and answers the purpose better. Delicate articles, to keep them from blistering while heating, may be dipped in a solution of salt, and while wet also dipped into a powder of burnt leather, or bones, or other coaly animal matter.

SHRINKING OF STEEL.

As a slight mistake at times is the common lot of all, a few words will not be out of place upon the shrinking of such pieces of work as the mechanic may have had the misfortune of boring too large, and which would be useless but for the process of shrinking it smaller. Shrinking is simply heating the steel and plunging it in cold water, but should it not prove small enough the first time, the operation must be repeated, and if insufficient the second time, it must be operated upon the third time, which generally effects the purpose. After the third time, I have generally found the hole to cast either oval or bell-mouthed, but after shrinking it the third time, and the article still remaining a waster, there is another source open, which is simply to heat it again, and dip it in the water half-way, leaving one-half of it above the water, and then to heat it again and dip in the reverse way, half-way in the water; this will often accomplish what other methods have failed to do. Small holes will shrink rather more if the hole be filled with loom; shrinking and expansion of steel vary so much, that I have, at a red heat, shrunk the hole in a steel ring considerably; and at a whitish heat on the same steel the hole has been considerably larger. Iron rings, or collars, may be shrunk after the same manner as steel, by simply heating and cooling in water.

Much might be said upon the various kinds of tools used in the turnery, but there is such a variety of them, differing in form and size according to the necessities, it would take a whole volume to do them justice; some turners are apt to think the tools of their invention best of any, and their attachment to them, not to say bigotry, is often accompanied with a silly attempt to conceal from their fellow-workmen the benefits of their amazing discoveries as to the best shape of a tool; but having had good experience in tools, and their different shapes, I give it as my opinion that the best shape of a tool is a tool that answers the purpose, does the work well, wherewith least steel is cut to waste in the dressing of it, least time required in the grinding of it, and whose wear is longest without repairing.

THE PERCH COUPLINGS.

Not having received the necessary drawings from Washington, in time, we are reluctantly obliged to defer our dissection of the perch-coupling question until next month. In the mean time we present our readers with an extract of a letter lately received from the "so-called" patentee of the Haussknecht coupling, much of it being so abusive that, out of regard for his *reputation*, we omit it. The reader will compare the Haussknecht *decision* with the verdict of the jury in the case of Haussknecht *vs.* Claypole & Lynn, as given in the article on page 104, and decide for himself as to which is the most reliable.

"The judge did not charge the jury on the validity of the patent or testimony introduced, tending to prove prior use, but the judge being in error on the construction of the patent or invention, the plaintiff interrupted the charge, requesting the jury to find defendants have not infringed, which was done for the purpose of bringing the case before the Supreme Court of the United

States, where the case is intended to be argued to get a proper construction of the patent."

We have had several "constructions" from Mr. H. in relation to this very patent, none of which have had much weight with juries, as is evinced in his having been thrice defeated on as many occasions, and we shall therefore await with some interest the "proper construction of the patent" from the Supreme Court, trusting that, until it is obtained, H. will discontinue any "*improper constructions*" as heretofore offered to the craft, and cease making demands for infringements on *something* he has never yet established in any law court, until he has a better cover of law for so doing.

Paint Room.

COLOR: ITS APPLICATION, ETC.

CHAPTER IV.

IN illustration of the theory of simultaneous contrast, we proceed to state the effects of various colors as acted upon by circumstances of juxtaposition.

We have already set forth the powers and complementary hues of the primaries and secondaries, as well as those of the secondaries in relation to their corresponding tertiaries.

We begin with the first in order—red; and shall suppose a figure or pattern of any sort as painted upon a ground of its opposite or complementary hue—green. Now, the effect of the green ground will be to enhance the value of the red pattern painted upon it; and this will take place in proportion to the amount and intensity of the green ground; that is to say, the intensity as far as its truth of opposition is concerned. Should these, however, be wanting in relationship or truth of complement, the power of each will be lessened. Thus a red of a somewhat purply tone—as lake for instance—on a green ground that shall incline towards blueness, will be less powerful as red, and will be less harmonious than if the green ground had been yellower in its tone. In the same way a red having a tendency to yellowness—as vermilion for instance—would be most effective and most harmonious on a ground which partook more of blueness than yellowness.

Should we, however, prefer to use a red, of what is called degraded power—as Indian red for instance—then it will be necessary to make use of a green for the ground, that shall also be slightly degraded; that is to say, a green composed not alone of blue and yellow, but of a small admixture of the third color, red, or of some pigment that shall have a proportion of red in its composition—as brown for instance. The green will thus be brought down to the same scale or key, and the harmony will be more complete.

The Indian red, be it remembered, is cold red, showing a slight approach to purple; the green, therefore, should have an inclination to yellowness, rather than blueness, to preserve the balance of harmony.

But it may be that the pigment called light red, or that warm red we find so often as a ground on ancient wall-painting, is preferred. In this case it will be evident that our ground of green should have more blue than yellow in it; but it must still be a slightly degraded tone of green, though by no means so much degraded as in the case of the Indian red.

A white line or edging, however narrow, interposed between the red and the green, will have the effect of neutralizing, in a great degree, the power of contrast without interfering with its harmony.

There is a circumstance that must not be lost sight of as regards balance of color independent of complement of hue, namely,—balance of power as to light and dark; or rather paleness and fullness. Now, in proportion as the colors used are strong colors, as primaries or secondaries, so must they have their due weight or fullness in balance of each other; but in proportion as they are more degraded so is this less essential. The tertiary colors may be juxtaposed in varying degrees of intensity, each to the other, in proportion to their neutrality, until they approach the state of perfect and complete union, namely, black or white. A *dark* gray of one quality of hue, for instance, may be opposed to a *light* gray of another quality of hue, and harmony be the result.

Another condition of balance is to be considered as in regard to quantity of surface. Let us suppose, for instance, a very minute pattern of red on an extensive ground of green. It will not, of course, be denied that the power of the red will be increased as far as it goes; but in such case a sort of reaction takes place, and because the red occupies so little space, it is apparently absorbed by the green, which it thus only tends to degrade. Were such a circumstance of necessity, however, the condition we have mentioned as regards want of balance in pale color opposed to full color might be made avoidable, but in such case would be resorted to for discord's sake only.

We have before taken occasion to observe, that of the three primary colors red occupies the place of half tint. It is, nevertheless, essentially a color of extreme power, and unless duly considered as to position is somewhat difficult to deal with. On account of these two conditions it is considered to be suited to such parts of a building or painted ornamental surface, having various projections and different faces, as shall not be fully lighted, but subject rather to reflected light chiefly. It is therefore used effectively on under surfaces of projecting parts; soffits, returns, the under sides of projecting cornices, and such like—the blue taking general faces, and the yellow the most salient portions; and the same general arrangement obtains, whether the color be used pure or degraded.

There is still another circumstance to be taken into account in regard to position—that of its color returned in reflection upon other surfaces, colors, things or persons. This, as a matter of considerable importance, we shall revert to after having considered the effects of simultaneous contrast in the other colors.

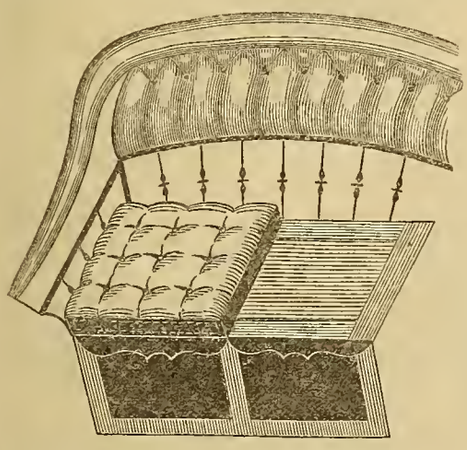
Trimming Room.

DESIGN FOR A LAZY-BACK.

SPRINGFIELD, O., Nov. 11, 1864.

MR. E. M. STRATTON: *Sir*,—Inclosed you will find a design for a very neat as well as durable Lazy-back, and if properly drawn I think will meet with favor from many of your subscribers. The original back is one and

a half inches wide, and trimmed perfectly plain with bow leather. The balance of back should be made of cloth, in diamonds or rolls, as the taste of the trimmer may dictate. We have not given up scroll stitching yet in this part of the West, and should you at any time conclude to give us a few more patterns, I will with pleasure supply you with any amount of original designs you may want.



Yours, &c.,
R. J. B.

As respects the stitching designs, we have only to say that, did we think them called for, we would gladly avail ourself of our correspondent's generous offer; but believing that we can more satisfactorily fill our plates with something else, we must for the present decline. We will however say that, if wanted, we have a large stock already engraved and printed we will dispose of, cheap, to any who order them.

BLACK LACQUER FOR HARNESS, &c.

Mix four ounces of shellac and half an ounce of the finest lamp-black in a stone bottle, with twenty ounces of alcohol of the strength of eighty degrees, and close the mouth of the bottle with a damp bladder. Add nothing more to the mixture for twenty-four hours, but shake it often in that time. Then pierce a hole in the bladder with a needle, place the bottle in hot water, and let it stand in it half an hour, taking it out often to shake it. Unfasten the bladder-skin, pour one ounce of Venetian turpentine in the bottle, close up the mouth again, and place it once more in warm water. The bottle should be kept always corked, and it requires to be shaken before using the contents.

Editor's Work-bench.

NOTES OF A TRIP TO CINCINNATI.

(*Concluded from page* 99.)

The summons from the shore was no sooner understood than obeyed. The agent, indeed, was in so great a hurry to come to land that he could not patiently wait the power of steam, but in order to expedite matters ordered a "darkey" deck-hand to jump into the river and swim with a line to the shore. This *reasonable* request James Edwards, of Evansville, Illinois, as every free "nigger" in these rebellious times supposes he has a right to, refused to do. For this he was summarily dismissed, and the last we saw of him was at the platform of the railroad station, as independent as a "wood-sawyer," muttering something about his having already done enough of "dat are jumping into rivers on the Mississippi, and that he did not care anything about the agent's discharge, since he could get his living anywhere."

The boat having been made fast to the shore, it being 4 o'clock in the afternoon, our nervous system became agitated, so that we hurried forward, and had the *pleasure* of overhearing the agent's and teamster's conversation, the amount of which was that "the latter had one hundred and eighty barrels of apples, one wagon load of which was present, and the remaining loads he would haul down from some half a mile distant, provided the boat would wait until it could be done." We need not tell the reader that this modest request was readily acceded to, and when this worthy freight agent met the complaints from passengers on all sides for stopping so often, he declared "he did not care anything about their accommodation, for he was bound from the start to make all he could for the boat on this trip." As we were still some seventeen miles from Wheeling, we told the captain we intended to leave him here, although we had paid the fare through, and take the cars, which we understood would be along in forty minutes. "Well," says he, very coolly, "I shall charge you nothing for that." Thus answered, we stepped on shore with five other *boat-satisfied voyageurs*, and instead of forty minutes, had the great pleasure of waiting four and a half hours, in a cold dépot, until the train came along, which we then learned had been delayed in consequence of the up-freight train having run off the track. Thus, with a loss of our supper and the additional expenditure of a dollar, we *did* succeed in reaching Wheeling at nine o'clock P. M., on the second day of our journey, cold and hungry. We have since come to the conclusion that it is more prosaic than poetical traveling *on* the Ohio River in these flat-bottomed stern-wheel steamers, and consequently would not recommend them, unless the passenger adopts this mode as the most effectual in obtaining board and lodging on the lowest terms. We are certain that should a person of leisure pay his passage to St. Louis on starting from Pittsburg, and travel with the *speed* we did, that the food he would dispose of for the owners would, in the end, give him the best of the bargain, viewed in the light of board.

Wheeling, Va., is connected with the opposite shore of the Ohio by two bridges, the river at this point being divided into two parts by an island called Columbia. Before the Rebellion broke out, Wheeling was a place of some note, but its prosperity has been very much checked by that unfortunate event. There was formerly a very large carriage-manufactory here, conducted by Messrs. E. Hayes & Co.; but which is now broken up, the principal partner having removed to Illinois. At present there

are but two shops of any importance, one of which belongs to our friend J. Grosscloss, Esq.

From this place we took the Ohio Central Railroad for Zanesville. We will say of this road, if any traveler wishes to see the worst specimens of dirty station houses, nasty cars, or unaccommodating conductors to be found in this country, let him by all means take this route; and, to get the most *beautiful* type of the latter, be sure and take the down morning train. At Zanesville there are two shops, one of which was formerly occupied by Claypole & Lynn, the firm to whom the perch-coupling man has lately paid no little attention, as alluded to elsewhere in this number of the Magazine. The building at present is occupied by Messrs. Wm. Clancey & Co., whose kindness put us in possession of some very important facts, of considerable benefit to the public.

Between Zanesville and Columbus, at a place known in local parlance as "Butler's Wood-pile," there still lives an old man named Leffert Butler, one of the earlier settlers of the country, and a mighty hunter in his earlier days. The wolves about that region were all afraid of him, and played shy; so very careful were they not to cross his track that his reputation was very much injured by his ill-successes. In this dilemma the old man happily bethought himself of a trick by which he come it over the pack of howling enemies, and made many of them bite the dirt. To this end he one evening mounted his faithful horse, to whose neck he had attached a common cow-bell, and rode into the forests, the sound of the bell leading the wolves and deer to believe that there was nothing about more dangerous to them than a herd of cattle, Butler, as they approached, in the mean time, sitting unnoticed upon the back of his animal, ready to send the death messenger in their midst the moment they came within range of his rifle. In this ingenious way he maintained his hunting reputation, thinned out the wolves, and supplied his table with the choicest venison. But this hunting propensity left his fields uncultivated, and him dependent on others in his old age.

Columbus, the capital of the State of Ohio, is a well laid out and pretty city. This being our first visit, we were so fortunate as to meet in the streets an old friend from New York. Through his kindness we were introduced to the Messrs. E. & H. F. Booth, Scott & Shaff, P. M. Gutches, J. Shannon, Pringle, and others. These gentlemen received us in the kindest manner, and most of them generously gave us their patronage. This locality, as many of our readers to their sorrow know, is the place where the *modest* self-styled "Tall-son-of York" used to scribble and send forth to bewilder the craft, couched in execrable English, false mechanical teachings, deceptions and falsehoods, sufficient to "damn to everlasting fame" a less vulnerable character than he ever could honestly lay claim to. Whoever wishes to learn more of the miserable mechanic and illiterate author of the "Extra," our friend Tousley took the opportunity to show up so effectually in 1858, is advised to visit Columbus and the region around; he will find that the half was never told of the "*smart tricks*" of this *quasi* editor before. It seemed as though almost everybody had something in store to tell us about the *animal*, until we became fairly sick of hearing them. Should any desire to see this beauty, let them stroll down to Zanesville on some fine afternoon and observe that tall figure with gold-headed cane in hand, and his coat-tails floating in the wind, looking for all the world as though he considered himself the Great Mogul, strutting through the streets, the laughing-stock of a wondering public.

Cincinnati was our next visiting place. In the journey we found many fine farms spread out along the Sciota Valley, those along the Little Miami appearing to be scarcely equal thereto. The conductor's check on the Little Miami and Columbus and Xenia Railroad, on which we traveled, bore the following sentence: "☞ This check secures your ride in the train at this time, but on all other trains and at all other times it is worthless," a matter in which the law has something to say, it having on several occasions been decided that when tickets are sold, the holder has the right to "stop over" if he chooses, and resume his journey on another day, even though it be a month afterward.

Cincinnati is a much finer city than we had imagined it to be, and carriage-building is very extensively carried on there. The carriages turned out will compare favorably with any built in the Eastern States, and, in the opinion of many, not at all behind those made in the city of New York. Among the builders we may enumerate Messrs. Geo. C. Miller & Sons, J. W. Gosling, I. & B. Bruee, John Curtis, D. Veerkamp, H. Niemeyer & Son, C. H. Behlen & Co., J. Hoese, Moore & Albrecht, C. W. Langhorst, and a few smaller shops. The Messrs. Miller and Niemeyer have called into use the aid of steam, to facilitate labor, with decided advantage, overcoming to a great extent the inconvenience caused by the present scarcity of mechanics. Messrs. Miller & Sons have very recently made additions to their premises, and now have a well-arranged and commodious manufactory, second to none we visited in our tour. Business was very good, and fair prices obtained. We had the pleasure, also, of visiting the extensive bending and wheel-making establishment of Royer, Coleman & Co. This is probably the largest establishment of the kind in America, and well worthy a visit from any one visiting the city. We were very much pleased with Mr. Royer's attentions to us on this occasion, and hope soon to favor our friends with their advertisement more in detail.

Our next stopping place was Dayton. There are now only four shops in the place, the chief being that of Messrs. Cohan & De Camp, where we saw some very creditable specimens of work. Not far distant we encountered one of the *rarest* specimens of—old fogyism we have stumbled upon in many a day. He told us, *flat in the face*, "that he never took any Magazines to teach him; that business he left entirely to his journeymen. We did not have anything original, and if we did, it would be useless to him. He built such carriages as no one else did, and consequently always found ready sales." At this point in the interview our Yankee curiosity overflowed, and we eagerly embraced a proffered invitation to inspect his stock. A glance showed us an assortment of "old tubs," *very* fashionable fifteen years ago, and we told him so. He said "he knew that, and the great secret of success now-a-days consisted in building carriages unlike any of his neighbors. He sold as fast as he could build." Shade of our grandfather! we had traveled several hundred miles among the craft, in our time, and never before knew so much as his impromptu *phillipic* taught us in about fifteen minutes. Indeed, we almost began to think that we had better discontinue the Magazine, and go back a few years. The idea, however, that should *he* live fifteen years hence, our present volume would become useful to him, brought some consolation to our mind. Another *fact* he imparted to us: he said "Cincinnati is always one year behind New York and Dayton, two, in style." To do our friend justice, then, candor compels us to state that his work is *only* thirteen years behind the Dayton mechanics, after all. In Dayton there are two spoke, hub and wheel manufactories, the oldest and chief of which is owned by Messrs. Blanchard & Brown, whose business card will be found on the cover of this number of our Magazine. This house is a very reliable one, of twenty years' standing, and the proprietors are gentlemen with whom it will be found pleasant to deal.

Dayton was, in an earlier day, honored with the presence of an individual who has since been known as a "pioneer" in mechanical publications for the coach-making fraternity, more recently of Columbus. A fellow-journeyman of his at the time, who pronounces him a "great botch," gives us a rich story. It seems that, with this *fast* jour., fast work has not been entirely confined to the past few years; it has only become more chronic in his latter days. Our informant states that *our* fast jour. took of a firm a job to build five phaeton bodies at a certain price, which when *finished* the boss *liked so well*, that he undertook to pay him off in his own way. With this intention the jour. was generously given the option to either pay for the stuff he had spoiled, or else take up with five dollars for his "butchery." As customary with him on other occasions since, in making or settling bargains, he took *all* he could clutch in the case referred to, the $5.

In the evening we proceeded on to Springfield. At this point, as we drink nothing stronger, the lime-water of Southern Ohio had seriously affected our health, and we were warned, after making hasty calls to the shops of Messrs. E. & J. Driscoll, and Toland & Co., to seek relief by submitting to a physician's "regimen." Having given him a day's *experimenting* on our stomach and pocket-book, with not the least evidence of bettering the condition of either, the next morning we seized the *fragments* as trophies, and "put" for New York *via* Cleveland, Buffalo and Albany, too unwell to complete our programme in visiting our friends in Northern Ohio. The three days' travel in getting home had so completely exhausted our physical strength, that we were confined to our room for nearly two weeks, unable to attend to business. This statement, we trust, will prove a sufficient apology to our numerous friends for the seeming delay we have been obliged to show in answering the large accumulation of letters received at this office during our late journey, and likewise for the unusually (for us) late appearance of our November number.

REVIEW OF TRADE.

Upon the whole, success, as applied to carriage-making the past year may, with propriety, be pronounced a failure. While the most popular manufacturers (we allude to such as have a large capital, showy shops, and advertise extensively) and dealers of the leading cities have been able to obtain a high price for their carriages, the larger class, the smaller capitalists (many with no capital), have found it an up-hill business, extremely discouraging. This anomalous state of things is, in a great measure, owing to the baneful operations of the internal revenue laws of the last Congress. Perhaps, should we substitute *unequal* for "baneful" in the last paragraph, it would more forcibly express our meaning; for, while the tax above alluded to operates to the advantage of such manufactories as are favored with an extended popularity, by affording color for charging a very high price on their orders, the less popular ones are injured in the same ratio. To illustrate our meaning: In the one case we will suppose a buggy is sold for five hundred dollars, on which the tax of five per centum is *twenty-five dollars;* in the other case, the same buggy—that is, the same class—brings only three hundred and fifty dollars, on which the tax amounts to *seventeen dollars and fifty cents.* Now, a very slight acquaintance with arithmetic will demonstrate that it is much easier to pay a tax of twenty-five dollars out of the proceeds of a buggy sold for five hundred, than can be done where one costing full as much (generally more) is parted with for three hundred and fifty dollars,

incurring a tax by the sale of only seventeen and a half dollars. And why? Because popularity, in the favored instance, gives the manufacturer no less than one hundred and forty-two dollars and fifty cents the advantage over the less fortunate, in the sale of a single buggy. We do not here mean to complain of the law, and only design to show its unequal effects, which, we suppose, are unavoidable.

It would be easy to go further, and show that nearly all the higher priced carriages sold in some establishments cost the builders less than others sold in other shops at lower prices. This is chiefly accomplished in buying their stock directly from the manufacturer for ready cash, and by farming out the four different departments—wood-work, smith-work, painting and trimming—to one individual at the head of each, for a stipulated price, in which agreements all failures for any imperfections in the work are thrown upon the contractors. By this means the capitalist avoids much of the perplexity and loss falling upon those who are only able to employ a few hands, and are compelled to change them from one job to another, as exigencies require. Systematized labor in many of our larger shops gives them another advantage over the smaller ones. They, too, know just what a carriage costs them in the building, while those hiring their workmen by the day do not. Do you ask why? Our answer is, they never take the time to figure up the costs, but sell their carriages by the price set by a neighbor, or the offerings of their customers. We are ashamed to confess it, but facts compel us to say here that we do not believe that one-half of the builders of carriages in America, when they sell, know what it has cost them to get the article up. They must sell because they are pressed for money. The result is they either soon fail, or *are doomed to a beggarly life all their days.*

Dealers in carriages have much the advantage over manufacturers as matters now stand. They know just what *their* carriages cost them, which in many instances is a great deal less than it costs to build! The unfortunate manufacturer who took an order six months ago is the man who suffers in this instance; and his sufferings are much intensified by the fact that customers at present do not go directly to the producer, as formerly, with orders for their carriages, but to the repositories, and buy, affording him little hope of future relief. It is a fixed fact that in this city the dealers have sold nearly double the amount of carriages the past year they did in 1863. Their stock on hand has increased in value every day it remained unsold, while the poor manufacturer has suffered a loss every day he has been occupied in filling an order for them. If an order was offered by a customer, the prudent man could only take it in safety by fixing a price to meet contingencies; and this, in nine cases out of ten, was enough to drive them to the dealer at once. In every case, too, the internal revenue tax is *saddled* upon the manufacturer. The dealer escapes! This is another illustration of *unskillful* legislation in our lawgivers, and ought to be remedied, together with that other *wise* decision that taxes the poor manufacturer with double and treble amounts on many parts of a vehicle, such as the springs, axles, &c. This obliges him to fix so high a figure for his carriages that it virtually amounts to a prohibition. Another reason why none but *showy manufacturers,* or dealers, can make any money now is that none other than the wealthy class purchase carriages, and these are guided a great deal by the *showy* appearances of outside things. The result is, the already rich of the trade are made richer, the already poor are made still poorer, and more heavy carriages are called for than the lighter class. But we are making this article too long, and must postpone further remarks until next month.

PROVINCIAL EXHIBITION IN UPPER CANADA.

THE nineteenth annual exhibition of the Agricultural Association for Upper Canada was this year held in the city of Hamilton during the last four days of September. In class 41 of the Arts and Manufacturers Department, which included carriages and sleighs, it is stated that there were excellent specimens in good taste and workmanship exhibited. Judging from the number of firms to which the awards were confined, we conclude that not many were represented. We fail to find among them such first-class manufacturers as C. F. Hall, of Toronto, the McBrides, of London, and some others we might name.

The following list of awards we condense for our pages from a Canadian cotemporary: For the best one horse pleasure-carriage, Macabe & Co. received a prize of $10, and for a single-horse dog-cart the same party was awarded $1, and as a second prize on an express wagon, $4. For the best two-horse pleasure carriage a prize of $12 was awarded to J. P. Pronguey, and for the second best a prize of $8 was given to H. G. Cooper & Co., both firms being the leading ones in Hamilton. For the best trotting buggy, $8 was awarded Thos. Macabe & Co., the same party receiving a prize of $10 for a double-seated one. For the best single-seated buggy H. G. Cooper & Co. were awarded $8, the same party receiving a prize of $5 for the second best. For the best trotting sulky, William Robinson, of Galt, received a prize of $5, and for the second best, J. E. Anderson, of Port Dover, received $3. The second prize of $6, for a sleigh, was given to Samuel Lake, of Newburgh.

Among the "extra entries," we find a prize of $7 given to William Robinson, of Galt, for a two-horse dog-cart, to J. E. Anderson, of Port Dover, for a spring gig, $4, and to H. G. Cooper & Co., of Hamilton, for a "commercial wagon," $4.

The Judges, Messrs. Josiah Holmes, of St. Catharines, M. O. Donovan, of Whitby, and James Kay, of Galt—by the way all old subscribers to this Journal—recommend that in future all covered vehicles be put in one separate class, and that open or uncovered be placed in another separate class. They further suggest that lumber and market wagons be embraced in the same class with carriages; but on what grounds we are curious to know. The exhibition for 1865 is appointed to be held in September, in the city of Toronto.

EDITORIAL CHIPS AND SHAVINGS.

Re-tailing Horses.—It often happens, says an English paper, that two carriage horses may be perfect matches in all respects but their tails. The one may have a fine flowing caudal appendage, and the other may be curtailed of his fair proportions. In such cases the art is called in; the groom matches the flowing mane with an equally flowing tail. The false tail is cunningly placed on in the following manner: The caudal stump is shaved, and the false hair is fitted on to it by the crupper, and detection is impossible. There is scarcely a first-class stable in London, where many carriage horses are kept, that these false tails are not an absolute necessity of their getting-up, and they must be seen hanging on the walls as a matter of course, and are looked upon, in short, as only a part of the harness.

Preservation of Wood.—The following method is practiced in Germany: Mix forty parts of chalk with fifty of rosin, four of linseed oil, melting them together in an iron pot; then add one part of native oxide of copper, and afterward with care, one part of sulphuric acid. The mixture is applied with a brush while hot to the wood. When dry it forms a varnish hard as stone.

An Ancient Wheel.—A French journal describes an old wheel, lately discovered in the mines of Portugal, supposed to have once been used by the Romans, in hydraulic operations. The wheels—eight in number—are made of wood, the arms (spokes) and felloes of pine and the axle and its support of oak, the fabric being remarkably light in its construction. They are supposed to be at least 1,450 years old, yet the wood is in a perfect state of preservation, owing to their immersion in water charged with the salts of copper and iron. One of these wheels is on exhibition at the Academy of Arts and Trades, and is twenty-one feet seven inches in diameter, and nineteen feet across the face. The wheel is supposed to have been worked by men, similar to that of a tread-mill in later times, in drawing water.

Carriage Shops in the New-England States.—We have taken considerable pains to examine the New England Directory to become acquainted with the statistics of carriage-making as there shown. By actual count we find that at present there are in Maine, 336 shops; in New Hampshire, 195; in Vermont, 346; in Massachusetts, 414; in Rhode Island, 70, and in Connecticut 228: in all 1649 shops. In this enumeration we have not included those denominated wheelwrights. In 1859 there were only 1564 shops, having increased 85 shops in five years. Supposing each shop on an average contains five persons, this estimate will give us 8248 souls engaged in the carriage business there. In Maine, as compared with 1859, there are 51 shops less; in Massachusetts, 100; while in New Hampshire there is an increase of 19; in Vermont of 143; in Rhode Island of 5; and in Connecticut of 21. Owing to the Rebellion trade has fallen off in the larger cities, and the increase doubtless will be found in the new establishments, located in towns where carriage-making was never done before. Our late visit proved this.

London Operative Coach-makers' Exhibition.—This Exhibition, of which we have previously given notice, will take place at the Hall of the Coach-makers' Company, 14½ Noble Street, beginning on Wednesday, the 1st of February, 1865, and is to continue open until the 15th of the month. Exhibition hours from 10 A. M. to 4 P. M. and from 6 to 10 P. M. Admission 6d. in the morning and 3d. in the evening. Exhibitors free. We propose to notice this Exhibition more in detail next month, the lateness of the hour of receiving the Prospectus precluding our doing so in this number.

The Coach-maker's Letter-box.

Boston, Mass., Dec. 15, 1864.

Mr. Editor: That perseverance and energy are necessary to carry on any great work to a successful issue, is acknowledged by all men. Therefore, allow me to congratulate you on this fact: That after three and a half years of intestine war, such as no other nation has ever before experienced, the Coach-maker's Magazine, of New York City, is still rejoicing in life! Why, sir, you have surprised your best friends, knowing as they do the vast difficulties that a scientific publication has to contend with in time of war. I well remember those dark days when some of our best paper and magazine publishers had to bend, and give way before the accursed storm of Secession; it is a source of pride to all members of the carriage-building profession to know that their Magazine has stood the blast and is weathering the gale; all honor to our worthy pilot, who stood by the helm and steered so well. I will now cheerfully comply with the request asked, and redeem the promise given a long time ago, that I would send you a series of letters for publication on topics of general interest to the craft. I shall confine my remarks and observations, at present, to New England in general and Boston in particular. I shall, therefore, take up my imaginary residence in the Athens of the Western World, choosing it as the central point, from which my thoughts, on subjects treated of in these letters, shall radiate.

Our Manufacturers.—Although the times at the present moment do not exert any very great propelling power on the manufactures of the country, yet I find those of Massachusetts in a flourishing condition. The facilities they have here for manufacturing are immense. With the largest cotton mills in existence, we have competed successfully with Great Britain, in the markets of the world, for the ready production of cheap fabrics, bringing within the reach of all the luxury of clean linen for the unwashed hordes of mankind. In the wilds of Australia, in the isles of the Pacific, the steppes of South America, throughout the sunny lands of the Indies, of imperial China, and Japan, and wherever our national ensign has waved in the breeze—there you will find the products of

American enterprise and skill. Our factories have all been tested to their utmost capacities in filling orders for the Government, arising out of the war; especially the woolen mills. The home demand at one time fell off somewhat, but then the demands of the foreign market increased, as an offset, causing our export trade to pay finely so long as the cost of manufacturing was less than the ratio of gold, regulating exchange, all sold to foreign buyers at market rates for gold, which after being converted into greenbacks produced more dollars than the current prices at home, thus demonstrating the fact that gold bears a certain fictitious value, as compared with the true standard—the necessaries of our life.

MEN, PROSPERITY AND HEALTHY LIFE.—The wonderful increase in the solid wealth of New England (no inflation) for the last five years is plainly visible to the most casual observer; especially is this true of Boston and its vicinity. The buildings, both public and private, that have been erected of late years, equaling, and in many cases excelling any city on the continent, go far to prove the prosperity of this section of our beloved country.

The next feature remarked by the tourist, is the style and splendor of private equipages which meet the eye on all of our public drives and thoroughfares; down Bacon Street over the Mill-dam, and out on the road to Brighton, long famous in the annals of horse-flesh and fast driving; where you can witness any fine day a scene of such exhilerating pleasure and joyful pastime, that one would gladly concede that Phæton showed better taste than we ever gave him credit for, when he made the audacious request that came so near resulting in a universal conflagration. That beautiful and comfortable carriages is one of the true exponents of our progressive civilization, no one at this hour of our history will, I think, deny. Yet I know of some writers on political economy who have alleged that the Americans as a nation were running wild over their temporary prosperity; that our reckless expenditure of all the elements of national strength, our manner of living, our Mammon worship, love for the almighty dollar, our elegant soft-cushioned carriages, and other effeminate luxuries—were fast producing a psuedo civilization on this the Western portion or part of the race. Avaunt, ye literary scoffers, you understand not the mighty fact you dare to analyze! Know you not that every luxury and comfort a man enjoys and pays for requires so much honest toil in the producer, and adds to the national wealth? This I am aware is a very broad field for philosophical thought, which I might enter armed with those stubborn things called facts—but not now, at some future time. But I am wandering some from my subject.

The leading establishments here that are building first-class work, have never been fully able to supply the growing demand for stylish light work, which has increased rapidly within a few years. Messrs. Godard & Hall, the two oldest manufacturers in the city, are doing a fine business; producing work in their usual style of comfort and fine finish which is an honor to the State. They are enjoying the fruits of their labors in a reputation which has become national. In addition, it is with pleasure I chronicle the existence of a new first-class establishment which started a year or so ago, ostensibly, I understand, for the purpose of manufacturing light work of all varieties, which at present bids fair to occupy a leading place in the carriage world of New England. It is under the control and management of Mr. C. G. Parker, a gentleman whose enterprise and mechanical abilities are very highly spoken of, having always had a great deal of curiosity even from boyhood up, for the mechanic arts, loving and enjoying the study of them both in theory and practice. So a few days ago I visited this factory, which is finely located, being near the Revere House, in a central position. I was kindly shown through the various shops by the gentlemanly superintendent, Mr. J. R. Bartlett, who I believe is not unknown to your readers. I noticed many new points of interest in the work which are deserving of especial mention, but which time forbids. On all the proportions of the various parts, in regard to strength combined with lightness, which I noticed particularly, there was evidence of a master's hand. I was very much pleased with some specimens of work in the salesroom. Yet I was surprised, as it comprised the lightness of the New York leading styles, and in some points of comfort, I think, surpassing it. You Gothamites must look well to your laurels. With thanks for the courteous manner in which I was treated, I wish the establishment that success which it deserves.

Business is rather quiet in the carriage trade at present, but this is not surprising. The high cost of material; the season of the year; and the presidential election, with its excitements and stormy issues, and the great calm that has succeeded it—all have a depressing influence on the local trade. But what a joyous knowledge it is to know that this calm produced by the storm, in clearing off our political atmosphere, has enabled us to see with prophetic eye all the stars that ever adorned our national firmament. And again, Thanksgiving has passed us by with its thankful hours. The time-honored custom, this year, was celebrated with deeper feelings than ever before. Never since we have breathed the breath of national life has there been in our history a day when so many great events combined together to make it one of joyful praise and thanksgiving. It was eminently a day of reminiscences, of reviewing the past to gain strength to live the life that is to be. The ides of November are the saddest of all the year, when Nature seems mourning for departed glories, and will not be comforted, styled emphatically the "melancholy days." But this year was the exception to a general rule. When the herald of morn announced the coming day, it proved to be one of those soft, mellow days of Indian Summer, full of ripeness; Nature seeming to join with man in giving thanks to Deity for the blessings of the past. Our victories by land and sea; for the progress of liberal ideas; for the fruits of the earth in due season, to strengthen and vivify majestic man for another year, to pursue his eternal and mysterious destiny; but for the grand sum of all victories on the 8th of November, when the people proclaimed to the assembled nations of the earth that henceforth and forever all men shall be free—saying that the awakening morn shall soon come to herald the brightness of that day when the last link shall be broken, the captive set free forever more. Glorious thought, forming an epoch in the march of time; a worthy work for a worthy race of the mighty Anglo-Saxon type.

Adieu, TELEMACHUS.

FOREIGN IMPROVEMENTS IN CARRIAGES.

648. April 15, 1864.—CONSTRUCTION OF WHEELED CARRIAGES.—A. H. A. Durant, Conservative Club, and

W. H. P. Gore, Palace Garden's Terrace, Kensington, London. This invention applies, *First*, to those carriages which are ordinarily called Hansom Cabs, and more particularly to such Hansom Cabs as are constructed according to the specifications of letters patent granted to William Nottingham, dated 20th October, 1863 (No. 2,573). In constructing these cabs, which the patentee purposes to name the Albert Cab, they make the framework of the cab of corrugated iron, for the purpose of combining strength and lightness; and when a rigid head is used, as described in the said specification, they mount the same on an eccentric hinge, or they place the pivots upon which the head turns over in grooves or slots, so that, as the head is turned down, it shall at the same time slide forward, so as to be out of the way of the driver's knees. Or instead of making the head of the cab in a rigid form, they propose to make the top part of the head flexible, and when the latter is thrown back, either to slide in grooves at each side, close to the back of the cab, or to wind on to a roller placed in a box below the foot-board of the driver's seat or elsewhere, the object being to allow of more room for the knees and feet of the driver than in cabs constructed precisely according to the specification of the aforesaid letters patent. This part of the invention is also applicable to other wheeled carriages made with a head to turn over on pivots, as described in the said specification. Another part of this invention applies to Hansom Cabs generally, and to other wheeled carriages and perambulators, and consists in constructing the door or doors of cabs or carriages (or a portion thereof), and the apron of perambulators, in the form of a flexible shutter, sliding in grooves at the sides, and capable of being pushed down, so as to wind on to a roller placed in a box fixed upon or beneath the floor of the carriage, and having suitable catches or fastenings to secure the same when drawn up. A *third* part of the invention is applicable to all kinds of wheeled carriages, and consists in dispensing with the ordinary plate springs, and placing a flat spring coiled between the axle and the body of the carriage, or between the axle and the box of the wheel, so as to give the required elasticity and ease of movement thereto.

947. Horizontal Tin Expanding Canopy for Carriages, Boats, and Places.—T. S. Scowen, Allen-road, Stoke Newington. In further improving upon a previous patent the stem or standard for small carriages is made in one piece, in lieu of jointed standards, as described in the former patent, and other stems to be made telescopic with set screws. The head or centre of action where the ribs hinge in is to be made in one piece, with a hole in the centre for the purpose of receiving the end of the stem, in lieu of plates attached. A socket is attached to the carriage, with a hull for the stem of the canopy to pass through, and a set-screw is used to fasten or hold the stem of the canopy at any height required. There is also a socket with set-screws having an action similar in effect to the universal joint to admit of the canopy leaning forward or on either side; and there is also a socket and ferrule for the jointed stem, having corresponding clutches to prevent the stem twining round, each part of the stem being made fast, the one part to the socket and the other to the ferrule. The patentee make suse of tubular or ground ribs, the centre line or seam of the two halves of the canopy cut slightly sloping from the centre, so as to cause the edges to bow down, with a cord in the edge to keep it firm and in shape, in lieu of cutting angular slips out round the edges, and seaming them up as described in the previous patent. The cover is made in one piece with a slit from centre to edge to allow of the canopy folding. The patent, also, forms a canopy in the shape of a leaf.

AMERICAN PATENTED INVENTIONS.

August 30. (44,012) Sulky.—A. Miller, Angola, Ind.: I claim the elliptic spring, E, in combination with the rods, F F, adjustible boxes or guides, G G, and braces, J J, all arranged and applied to a sulky, substantially as herein shown and described.

(44,141) Removable Runner for Carriage Wheels.—Geo. A. Keene (Assignor to himself and Henry W. Moulton), Newburyport, Mass.: I claim, *First*, confining the runner, B, to the wheel by means of the block, C, straps, *g g*, and bolt, *h*, substantially as described. *Second*, the employment of the elastic pad or cushion, I, in combination with the wheel, block and runner, substantially as and for the purpose described.

September 13. (44,172) Improved Device for Shrinking Tire.—James Ferris and Wm. E. Bacon, Litchfield, Ill.: *First*, I claim the stationary and sliding bed, A C, in combination with the dogs, B D, and the concave upper surface of the bed, C, all constructed and arranged substantially as and for the purpose specified. *Second*, the lever, A, provided with the shaft, C, and eccentric pinion, F, in combination with the rack, E, and the right-angle straps, I I, attached to the beds, A C, and all arranged, substantially as shown, by operating the bed, C. [All *improvements* of this kind are frivolous and vain.]

(44,173) Improvement in Whiffle-tree Hooks. — Jeremiah Fink, Baldwinsville, N. Y.: I claim the link or ring, *a*, forming a broad bearing, to prevent the passage of the cleves or trace eye, when inserted in place, and jointed to the point, *b*, of the hook, and resting against the shank, in combination with said hook; the whole arranged and operating substantially as herein specified.

(44,218) Whip-Holder.—Charles L. Pierce, Buffalo, N. Y.: I claim a whip-holder having spring jaws, C, for the purpose and substantially as described.

Re-Issue. (1,768) Carriage Wheel.—Harmon G. Weibling, Denver City, Colorado [Date of first patent, Jan. 20, 1863]: I claim the application of friction rollers particularly imbedded in a groove in the under side of the axle or spindle upon which the wheel is placed, substantially as and for the purpose above specified. I also claim as my invention the application of the friction rollers, E E E, imbedded partially in the surface of the shoulder, H, and the nut, M, as and for the purpose described.

(44,338) Axle Lubricators for Carriages.—Clark Polley Scott, Ohio: I claim the combination with the hub, A, of the cylinder, *b*, cap, *c*, screw spindle, *e*, piston, *f*, and feather, *h*, operating substantially as and for the purposes described.

October 4. (44,511) Coach Lamps.—C. B. Brown and E. Andrews, Placerville, Cal.: We claim a coach lamp, having its case, A, of conical or flaming form, with a concave back, *a*, to receive a concave silvered glass or mirror-reflector, C, and provided box-like projections, D, at its sides, for glasses, *b*, to serve as lights, combined substantially as herein set forth.

(44,555) Harness Buckle.—George Purple, Wellington, O.: I claim the combination of the buckle frame, A, with the metallic piece, C, tongue, *b*, strap, B, and tug, E, when constructed and operated substantially in the manner and for the purposes described.

11. (44,643) Ambulance.—Edwin R. McKean, Washington, D. C.: I claim, *First*, the false bottom, B, constructed substantially as described, and supported on the rubber springs, *a*, or their equivalents. *Second*, I claim the roller, F, arranged to operate as described, whether the same may be attached to the false bottom, B, or to the bottom of the body, A. *Third*, I claim the stretcher, D, provided with the roller, E, and hook, *c*, or its equivalent, when constructed and operating as and for the purpose herein set forth. *Fourth*, I claim providing an ambu-

lance with a water vessel, having tubes so arranged that the occupants can supply themselves at pleasure. *Fifth*, I claim arranging a fan in connection with an ambulance in such a manner as to supply a current of air to the occupant. *Sixth*, I also claim constructing the sides of the body of an ambulance with vertical slats, having beveled edges, so that when such slats are closed they shall present a plain surface, both externally and internally, as shown and described.

CURRENT PRICES FOR CARRIAGE MATERIALS.

CORRECTED MONTHLY, BY MR. CHAS. WEEKS, FOR THIS MAGAZINE.

NEW YORK, Dec. 24th, 1864.

Apron hooks and rings, per gross, $2.50.
Axle-clips, according to length, per dozen, 75c. *a* $1.40
Axles, common (long stock), per lb, 12½c.
Axles, plain taper, 1 in. and under, $7.00; 1⅛, $8.00; 1¼, $9.00; 1⅜, $10.00; 1½, $11.00.
Do. Swelled taper, 1 in. and under, $8.75; 1⅛, $9.50; 1¼, $11.25; 1⅜, $13.75; 1½, $16.25.
Do. Half patent, 1 in. and under, $11.25; 1⅛, $13.25; 1¼, $14.75; 1⅜, $16.25; 1½, $18.25.
Do. Smith's New York half patent malleable iron box, 1 in. and under, $10; 1⅛, $12; 1¼, $14.
Do. Saunders' improv. taper, ¾ in., $13.50; ⅞, $14.50; 1, $14.50; 1⅛, $16.50; 1¼, $20.
Do. do. Homogeneous steel, ⅝ in., $16.50; ¾, $18; ⅞, $20.50; long drafts, $4 extra.

☞ These are prices for first-class axles. Makers of less repute, cheaper.

Bands, plated rim, under 3 in., $2.50; over 3 in., $3.
Do. Mail patent, $3.50 *a* $5.00.
Do. galvanized, 3½ in. and under, $1; larger, $1 *a* $2.
Basket wood imitations, per foot, $1.25.

☞ When sent by express, $2 extra for a lining board to a panel of 12 ft.

Bent poles, each $1.25.
Do. rims, under 1⅛ in., $2.25 per set; extra hickory, $2.50 *a* $3.50.
Do. seat rails, 50c. each, or $5.50 per doz.
Do. shafts, $6 per bundle of 6 pairs.
Bows, per set, light, $1.10; heavy, $1.25.
Bolts, Philadelphia, 20 per cent advance on list.
Do. T, per 100, $3 *a* $3.50.
Buckram, per yard, 50c.
Buckles, per grs. ½ in., $1.15; ⅝, $1.40; ¾, $1.70; ⅞, $2 10; 1, $2.80.
Burlap, per yard, 50c.
Buttons, japanned, per paper, 30c.; per large gross, $3.
Carriage-parts, buggy, carved, $4 *a* $5.50.
Carpets, Brussels, per yard, $3; velvet, $4.00 *a* $5.50; oil-cloth, 85c. *a* $1.10.
Castings, malleable iron, per lb, 23c.
Clip-kingbolts, each, 50c., or $5.50 per dozen.
Cloths, body, $6 *a* $8; lining, $5. (See *Enameled.*)

☞ A Union cloth, made expressly for carriages, and warranted not to fade, can be furnished for $2.50 *a* $3.50 per yard.

Cord, seaming, per lb, 45c.; netting, per yard, 5c.
Cotelines, per yard, $6 *a* $10.
Curtain frames, per dozen, $1.25 *a* $2.50.
Do. rollers, each, $1.25 *a* $1.50.
Dashes, buggy, $1.75.
Door-handles, stiff, $1 *a* $3; each drop, per pair, $3 *a* $4.
Drugget, felt, $2.
Enameled cloth, muslin, 5–4, $1; 6–4, $1.35.
Do. Drills, 5-4, $1.40; 48 in., $1.55; 5-4 A, $1.55; 48 in. A, $1.75
Do. Ducks, 5-4, $2; 50 in., $2.20; 6-4, $2.40.
Enameled linen, 38 in., $1.05; 5-4, $1.20; 6-4, $1.35.
Felloe plates, wrought, per lb, all sizes, 28c.
Fifth-wheels wrought, $1.75 *a* $2.50.
Fringes, festoon, per piece, $2; narrow, per yard, 18c.

☞ For a buggy top two pieces are required, and sometimes three.

Do. silk bullion, per yard, 50c. *a* $1.
Do. worsted bullion, 4 in. deep, 50c.
Do. worsted carpet, per yard, 8c. *a* 15c.
Frogs, 75c. *a* $1 per pair.
Glue, per lb, 25c. *a* 30c.
Hair, picked, per lb, 80c. *a* $1.00.
Hubs, light, mortised, $1.10; unmorticed, 75c—each, mortieed, $1.75.
Japan, per gallon, $5.75.
Knobs, English, $2 *a* $2.50 per gross.
Laces, broad, silk, per yard, $1.20 *a* $1.50; narrow, 15c. to 20c.
Do. broad, worsted, per yard, 50c.
Lamps, each, $20 *a* $30 per pair.
Lazy-backs, $9 per doz.
Leather, collar, dash, 35c.; split do., 18c. *a* 21c.; enameled top, 35c.; enameled Trimming, 33c.; harness, per lb, 75c.; flap, per foot, 28c.
Linen, heavy, a new article for roofs of coaches, $1 *a* $1.25 per yard.
Moquet, 1½ yards wide, per yard, $12.00.
Moss, per bale, 12½c. *a* 15c.
Mouldings, plated, per foot, ¼ in., 14c.; ⅜, 16c.; ½, 18c.; lead, door, per piece, 40c.
Nails, lining, silver, per paper, 12c.; ivory, per gross, 50c.
Name-plates.

☞ See advertisement under this head on 3d page of cover.

Oils, boiled, per gallon, $1.60.
Paints. White lead, extra, per 19 lb $5.00; Eng. pat. black, 35c.
Pekin cloth, per yard, $5.

☞ A very good article for inside coach linings.

Pole-crabs, silver, $5 *a* $12; tips, $1.60.
Pole-eyes, (S) No. 1, $3.10; No. 2, $3.30; No. 3, $3.60; No. 4, $4.85 per pr.
Sand paper, per ream, under No. 2½, $5.75; Nos. 2½ & 3, $6 25.
Screws, gimlet.

☞ Add to manufacturer's printed lists 20 per ct.

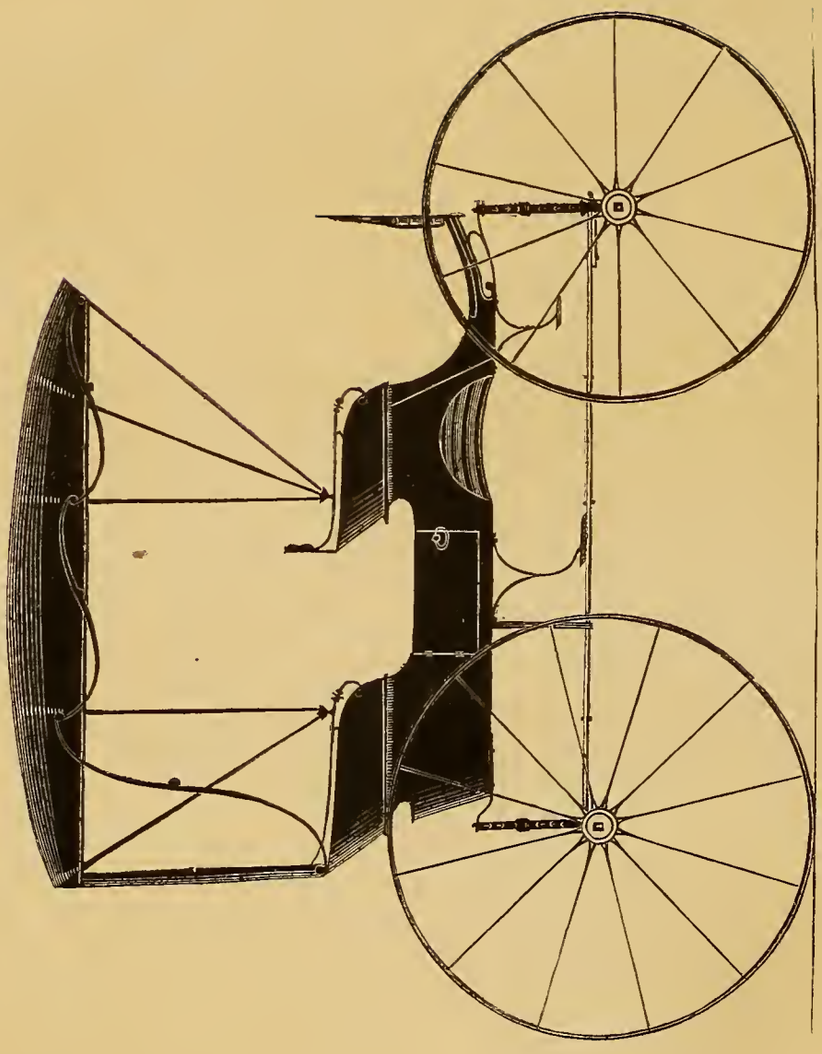
Do. ivory headed, per dozen, 50c. per gross, $5.50.
Serims (for canvassing), 30c. *a* 40c.
Seats, buggy, pieced rails, $1.75; solid rails, $2.50.
Shaft-jacks (M. S. & S.'s), No. 1, $3.25; 2, $3.75; 3, $4.00.
Shaft-jacks, common, $1.40 *a* $1.60 per pair.
Do. tips, extra plated, per pair, 37½c. *a* 56c.
Silk, curtain, per yard, $2 *a* $3.50.
Slat-irons, wrought, 4 bow, $1.12½; 5 bow, $1.25 per set.
Slides, ivory, white and black, per doz., $12; bone, per doz., $1.50 *a* $2.00; No. 18, $2.50 per doz.
Speaking tubes, each, $8.
Spindles, seat, per 100, $1.50 *a* $2.50.
Spring-bars, carved, per pair, $1.75.
Springs, black, 27c.; bright, 28c.; English (tempered), 32c.; Swedes (tempered), 35c.; 1¼ in., 1c. per lb. extra.
If under 36 in., 2c. per lb. additional.

☞ Two springs for a buggy weigh about 28 lbs. If both 4 plate, 34 to 40 lbs.

Spokes, buggy, per set, $4.20, or about 7c. each for all under 1½ in.

☞ For extra hickory the charges are 10c. *a* 12½c. each.

Steel, Littlejohn's compound tire, 1-8 & 3-16 thick, 6¾c. gold; 1-4 & 5-16 thick, 6¼c. gold.
Stump-joints, per dozen, $1.60 *a* $2.25.
Tacks, 10c. and upwards per paper.
Tassels, holder, per pair, $1 *a* $2; inside, per dozen, $5 *a* $12; acorn trigger, per dozen, $2.25.
Terry, per yard, worsted, $5; silk, $11.
Top-props, Thos. Pat, per set 70c.; capped complete, $1.50.
Do. common, per set, 40c.
Do. close-plated nuts and rivets, 75c.
Thread, linen, No. 25, $1.30; 30, $1.45; 35, $1.65, gold.
Do. stitching, No. 10, 95c.; 8, $1.15; 12, $1.28, gold.
Do. Marshall's Machine, 432, $2; 532, $2.30; 632, $2.60, gold.
Tufts, common flat, worsted, per gross, 20c.
Do. heavy black corded, worsted, per gross, $1.
Do. do. do. silk, per gross, $2.
Do. ball, $1.
Turpentine, per gallon, $2.75.
Twine, tufting, per ball, 35c.; per lb, 60c. to 75c.
Varnishes (Amer.), crown coach-body, $7; hard drying, $8; non-pareil, $8.
Do. English, $6.25 in gold, or equivalent in currency on the day of purchase.
Webbing, per piece, 70c.; per gross of 4 pieces, $2.60.
Whiffle-trees, coach, turned, each, 35c.; per dozen, $3.50.
Whiffle-tree spring hooks, $3 per doz.
Whip-sockets, flexible rubber, $4.50 *a* $6 per dozen.
Do. hard rubber, $9.50 per dozen.
Do. leather imitation English, $5 per dozen.
Do. common American, $3.50 *a* $4 per dozen.
Window lifter plates, per dozen, $1.50.
Yokes, pole, each, 35c.; per doz, $3.50.
Yoke-tips, extra plated, $1.75 per pair.



EXTENSION-TOP ROCKAWAY.—½ IN. SCALE.

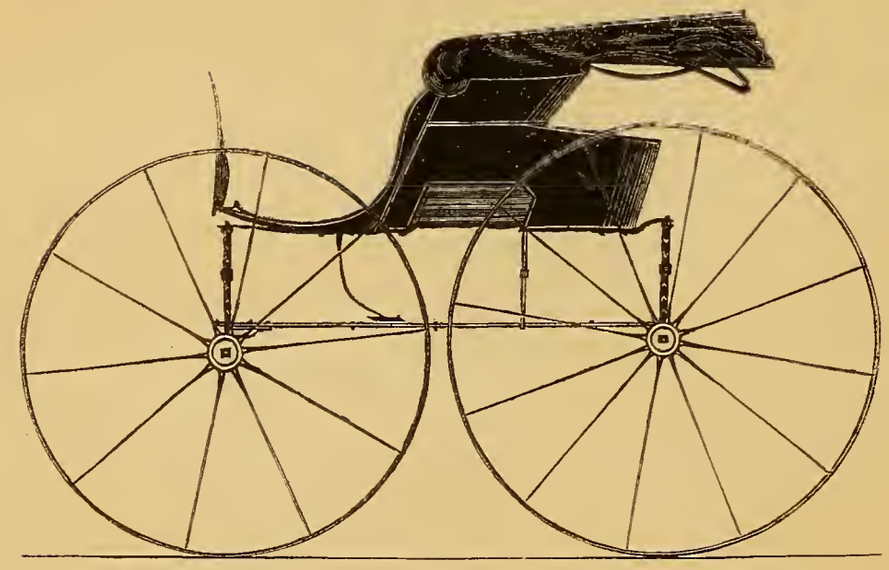
Engraved expressly for the New York Coach-maker's Magazine.

Explained on page 134.

GODARD BUGGY.—½ IN. SCALE.

Engraved expressly for the New York Coach-maker's Magazine.

Explained on page 135.



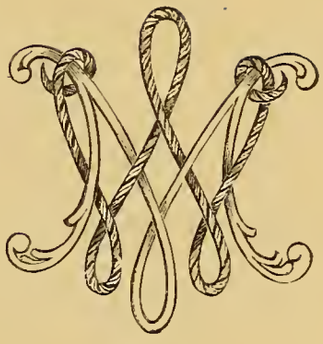
MANHATTAN BUGGY, No. 2.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 135.

J. D. S.

J. J. T.



M. W.

ORIGINAL MONOGRAMS.—½ IN. SCALE.

See remarks on page 139.

THE NEW YORK
CARRIAGE MAKER'S MAGAZINE

DEVOTED TO THE LITERARY, SOCIAL, AND MECHANICAL INTERESTS OF THE CRAFT.

Vol. VI. NEW YORK, FEBRUARY, 1865. No. 9.

Mechanical Literature.

WHY WOODEN AXLES ARE BETTER THAN IRON.

BY S. EDWARDS TODD.

There has been much said in years past, and the subject is still frequently discussed by practical men at the present time, inquiring why a wagon with wooden axle-arms will run easier than if they were iron. We have always contended—and still maintain the same opinion—that a wagon with iron axle-arms will run easier than if they were wood. But all practical theorists on this subject affirm, that *practice* and *extensive observation* are against the theory.

We had a long discussion, a short time since, with an old mechanic, now more than eighty years of age, who insisted that, "here is an instance in which *theory* and *practice* are diametrically opposed to each other." Moreover, he affirmed that he had investigated the subject thoughtfully, impartially, extensively, and philosophically, for the purpose of ascertaining why it is so, and that he had at last unraveled the mystery!

He then drew a rough diagram to explain *his* plausible theory, and we found it was just about as philosophical as it would be to dig a canal from here [the writer lives at Auburn] to New York, of a uniform depth, and maintain that when filled with water, the water would not run over the sides in the valley, should the canal descend one slope of a hill and ascend another, without any water locks. He likewise affirmed that he had known many good teamsters in a Western State, who were accustomed to use wagons—one of which had iron axle-arms, and another wooden ones—declare, that their teams would haul a ton of any material with ease on the wooden axles, while the same number of pounds on a wagon having iron axle-arms would require twice as much force to haul it as was necessary to haul the same load on wooden axles. He then related an instance which came under his own observation, of a carman, with whom he was personally acquainted, who was hauling about two tons of coal on a wagon with iron axle-arms, and his team became so exhausted by heavy drawing that they refused to proceed any further with the load. The same load was then placed on another wagon with wooden axle-arms, and the same team walked off with it with apparent ease. After hearing his explanations, and showing him that his reasoning was as unphilosophical as it would be for a man to affirm that he could lift himself up into a carriage by simply lifting by the straps of his boots, we gave him our explanation of this mysterious subject, in about the following language:

In gathering wooden axle-arms, country carriage-makers, for the most part, make them straight on the bottom—which is correct—and set them forward from one-sixteenth of an inch to six-sixteenths of an inch. The less the arms are set forward, the more easily a wagon will run. By this means they get their wagons with wooden axle-arms to run about right.

But the *iron* axle-arms are usually set by the blacksmith; and most of them know about as much about this branch of carriage-making as a common farmer does about navigation. Many of them think that the arms—whatever may be their length or size—must have a pitch downwards two, three, or four-eighths of an inch, and about the same set forward. Of course, this deflection and set forward causes the wheels to bind very much in two directions, and, as the load is increased, the difficulty is not only increased a little, but it is *multiplied*. This arrangement causes a wagon to move heavily—*to hang*—like a sleigh on bare ground.

ST. PETERSBURG CARRIAGE MUSEUM.

Among the buildings of interest in St. Petersburg is one specially devoted to the exhibition of carriages. A letter recently written from that Imperial city gives us a very interesting description of a portion of the very unique collection in the museum, which we hasten to lay before our readers.

The museum is situated in a new edifice in Great Stable-street, completed in 1861, and distinguished by a rather remarkable façade. The lower parts are occupied by the traveling carriages of the Emperor, the Empress, and some other members of the Imperial family. In the upper story of the museum, properly speaking, your eye is dazzled with the golden magnificence of state carriages. There those of the olden time, as well as the triumphal cars used on the coronation, commemoration, and celebration days of the living dynasty, are exhibited. Not to

speak of the bronze, the velvet, the silk, and the silver cloth, lavishly expended upon them, many are decorated with pictures by Watteau, Boucher, Gravelot, and other artists of note; and with that Asiatic sumptuousness peculiar to our grandees, the walls of a room which in reality serves only the purposes of a shed are hung with the most costly Gobelins, representing biblical and other scenes, and imported at various times and enormous expense. Not one room, however; there are six of them, besides the staircase, with silken pictures, smiling down upon the admiring visitor.

Let us be guided by the catalogue. It opens with some curious particulars on the Imperial carriage factory. Established in '21, it has never been excelled for the solidity and tasteful elegance of its productions. Year after year there are fifty new carriages of every size and quality turned out for the use of the Imperial family and the Court; from 1,000 to 1,200 are repaired or altered, according to the whim of the day; 100 sets of harness made, and from 400 to 500 cobbled and renovated. For this extensive business, carried on by and for the Emperor of all the Russians, are required no less than 250 hands, working with an engine of 16-horse power, and having at their disposal the assistance of as many more in case of need. This is a number which would do credit to the Sultan or the Great Mogul himself; though, as from 180 to 200 carriages are required on ordinary days to convey the court and the courtiers from one street to the other, of course a great many hands must be kept in constant activity to make up for the saving of so many feet. The annual cost of the establishment amounts to no less than 170,000 roubles, securing a saving of 100,000 roubles on the expenditure that would be incurred in having recourse to private enterprise.

Among the articles exhibited, one of the most interesting is No. 1 of the catalogue, a chaise *à deux*, presented by Frederick the Great to the Empress Elizabeth, in 1746. The coat-of-arms on the door, as well as the crown surmounting the top, are set in jewels. If as valuable as they look, they must be the price of a kingdom, or in these parts, where humanity is held cheap, of two. In 1856, this vehicle, buried in dust, and covered with cobwebs of succeeding generations of spiders, was picked out of the lumber-room in which carriages were laid up in those ante-museum times, and thoroughly refitted for the coronation of the reigning empress. The next carriage, also a two-seated chaise, was bought at Paris in 1762, and chiefly used by Paul I. In it the successor of the great Catherine is said to have taken his last drive before the fatal night which cost him his life. Then there are seven carriages of old pompous Catherine herself, the one with allegorical pictures of Love and Idyl, the gift of Orloff in the bright palmy days of his favoritism. Another, a complicated monster of wood, glass, and embroidery, is the work of the renowned Buchenthal, the *carossier du roi* [coachmaker to the king] in the luxurious times of Louis XV. This, too, was renovated in 1856 to appear in the coronation train, and by connoisseurs is regarded as an object of art rather than an instrument of locomotion. Herr Fröbel, who restored it for the use of a grateful Czar, if he was not actually made a count or decked with ribbon of St. Anne, has been ever since considered a favorite and a man who deserved well of his country. Of two other carriages of the Emperor Paul I., one is embellished inside by two excellent pictures of Boucher, set in mother-of-pearl, and worthy of a better fate than an ever-flitting existence from stable to street. The phæton presented by the King of Sweden, in 1777, to the then infant Grand Dukes Alexander and Constantine, is preferred by many to a much more modern article of the kind which Count Blome, the Danish Minister, was allowed to give to the Empress Maria Foedorovna in 1821. A caleche, a curious combination of the light and clumsy, Prince Orloff fetched from Germany seventy years ago, for his beloved but, alas, rather fickle Catherine. This, too, affords a sight of very creditable pictures to the occupant, and was refitted, along with many others, on the accession of the reigning couple. Of the *vis-à-vis* Catherine was wont to drive in with the protege of the hour, one—the gift of Count Tchernychcff, who meant to use it himself, but did not eventually—derives considerable value from some Chinese pictures of Boucher's, the only ones in that glaring and preternatural style done by the rococo artist.

But here comes a rarity of a different sort, having neither picture nor velvet, neither silk nor embossment to recommend itself. It is nothing, in fact, but a piece of ordinary wood, carriage shaped, and mounted with the coarse cloth worn by the Imperial soldiery. This vehicle was not only driven, but made with his own hands, by the great artisan-Emperor, Peter I.; the man who, while he did not disdain to learn the trades as a primary means of civilizing his subjects, pushed his frontiers on to the sea, and proved as able a warrior and diplomatist as he certainly was a carpenter and a smith. Of this carriage, everything, whether wood or iron, was planned and executed by Imperial hands. It is very like the ordinary vozok, now employed by country gentlemen, and, in the midst of the surrounding luxury, shows how economically the sire was obliged to live in order that his posterity might thrive and flourish.

A Russian locomotive museum would be but incomplete without sledges. There are twelve in all, of which five are of Catherine II. In later times, it appears, it has not been the fashion to have costly specimens of the kind. In his equipage, the Emperor is his whole majestic self, separated by an impassable gulf from the rest of the people; in the sledge, the real popular conveyance, he prefers simplicity to pomp, and homeliness to splendor. The winter, the most national of Russian seasons, he allows to convert him into a thorough Muscovite for the nonce, gliding about in a common sledge with fearful velocity, and showing himself, in point of ice and snow, the equal and fellow sufferer of his subjects. As he does not indulge in the pleasure very often, and his lady, I believe, has been hardly seen otherwise than on wheels these last twenty years, he can afford all the more easily to be a thorough Russian when stooping to a sledge. Another lion of the collection is a fly, or drojka, constructed by a peasant of the name of Jipinski, and presented half a century ago to the Empress of the day, by Prince Demidoff, the proprietor of the self-taught artist. By means of an ingenious mechanism each revolution of the wheels is marked on a plate, and the distance performed thus ascertained to an inch; the wheels in turning round make music, and playing airs, waltzes, and the like, treat the royal ear to its favorite strains amid the din and clatter of the street. Another set of carriages, the property of the late Empress, are quite a specialty as to getting in and out. That lady, having been in a very delicate state

of health for years, had to be conveyed from her easy chair to her carriage seat without moving foot.

Besides the five rooms devoted to these "monumental" carriages, five others are filled with saddles, *chabraques*, sets of harness, and other horse gear. But these must be described by some Hotspur, or other correspondent of the turf. On the landing of the superb staircase leading up to the story, are placed divans and chairs, covered with Gobelin cloth; and to fit the catalogue to the contents of the building, a masterpiece of the caligraphic art, bound in silk and tapestry, is deposited on a table in the front room. The building has been erected by M. Sadovnikoff, a Russian architect; but the carriage factory, though the hands are mostly Russian, is superintended by English and German managers.

MECHANICAL POWER AND FRICTION.

BY HENRY HARPER.

(*Continued from page* 102.)

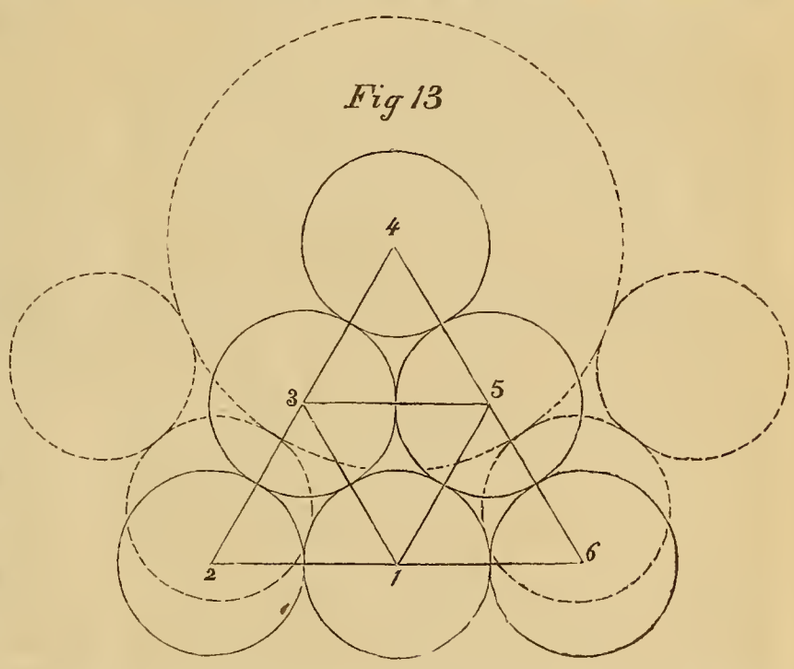
The cause why water rises and tumbles in waves above the level of the surrounding mass is found in the action of the lever-power, the same as that which causes a body of melted lead to rise above the equilibrium of the surrounding mass when its momentum is obstructed. The wind, or some other force, in acting upon a body of water, puts it in motion, although at first it is resisted by the inertia of the surrounding body, on which the wind has not acted. This as truly presents a resistance as the sides of the vessel that contained the melted lead did to the momentum of its mass, and it acts in the same manner with its lever-power in overcoming the resisting body, while raising itself above it with the levers contained in its atoms. The resisting power being overcome by the momentum of the other part, the latter joins with it to increase the wave, having, however, imparted to the momentum the resisting power of inertia which is developed in the raising of a large mass of water above the level in which gravitation has a tendency to hold it. The resisting power of the inertia in the mass would soon stop the onward progress of the wave, if the uneven surface presented on the water did not give the wind—which is the motive power—an additional power of acting upon that surface in proportion as the unevenness increased. In large bodies of water like the ocean, where the two elements have a sufficient power and space to act with their full scope, this unevenness of surface assumes a terrific aspect, which, with poetical license, we call "mountain heights."

That this tremendous demonstration of power, acting in opposition to the laws of gravitation, can be produced by no other power than the lever, will be recognized by the fact that the wind acts upon the water in a horizontal direction, while the lifting power is expended vertically, in opposition to gravitation.

The phenomena shown by boiling water in rising above its level is wholly traced to the action of lever-power as its sole cause. Almost all matter is expanded by heat and contracted by cold. Water in turning to ice is one exception to this general rule, the cause of which we have previously noticed; but when heat is applied to water, it expands like any other matter, from which law the power of the steam engine is derived. The agitation that water shows when exposed to heat is solely the effect of lever-power contained in each spherical atom. Precisely the same effect causes the blowing of the wind and the buoyancy in water (or the atmosphere) of substances less dense than their respective mediums.

If we suppose the circles in Figure 13, whose centers form the angles of a triangle, to be atoms of water divided in their centers, it will show the relative position that these atoms of water in a state of rest must lie to each other in order to assume the most compact form. That they do assume the most compact form while in a liquid state, and at rest, can be proven from the fact that experiments have shown that water is susceptible of but little compression. When they assume the shape in the figure below, the force that they would exert on each other would be in the direction of the sides of the triangle. This force would not create motion, because it would be evenly balanced on the centers of the atoms; and such is well known to be the state of water when it is left in a vessel unagitated. But should we apply heat to the outside of this vessel of water, that same fluid which has remained

Fig 13



passive is soon in a state of agitation, some parts rising above the equilibrium, and pitching from the outside of the vessel towards the center. This is caused by the atoms of water on the outside of the vessel in absorbing more heat than those in the center, consequently becoming more expanded. The even balance which they maintained before the heat was applied has now been destroyed, and they have commenced an action in opposition to the tendency of gravitation. This change from a state of repose to an active condition is certainly the action of some mechanical power incident to the change of its atoms from a regular to an irregular size. Let us suppose that the largest dotted circle in Figure 13 is an expanded size of the circle 4. It would present a surface subject to the action of the smaller circles as levers, wherever they touch the larger one. It could offer no resistance to the action of these levers, only by its weight, and that is not increased with the size, therefore it must be

propelled in an opposite direction to the side of the vessel where the heat is applied. As it rises from the lower part of the water to the top, other atoms are crowded into its place by the infinity of levers of which is is composed, until there is a complete commotion throughout the whole mass.

By confining this power for a time, until a sufficient amount is accumulated together, with the elasticity of the expanded atoms when concentrated on a single object, we produce the steam engine. The atoms of water and other fluids become so enlarged by heat that they are less dense than the atmosphere, and when they come in contact with that element they are acted upon by a succession of spherical levers of which it is composed, until the water is lifted in the atmosphere to a point of equal density with itself. By this lifting operation the atoms of water are removed from each to such an extent that their cohesion for a time is destroyed, which when restored produces dew, rain, or snow, and which is nothing more than that the water becomes too ponderous and dense for the levers to lift.

The same process of expanding particles of air by heat, produces winds by the action of the lever in forcing air horizontally into the place left vacant by the vertical ascension of the expanded particles. Thus, if in New York a concentrated amount of heat is brought to bear upon the atmosphere, the inequality of its atoms subjects it to the action of a lever-power, which lifts it up in opposition to gravitation, and the atmosphere of Wisconsin and the surrounding regions is forced into the places made vacant, creating the air currents we call winds. The atmosphere that ascends vertically, by some other combination of circumstances incident to the action of heat, is caught in an upper current, and from the same cause forced into an opposite direction, so that it is kept in a commotion similar to that of boiling water. That there are opposite upper currents of air in existence at the same time is a fact well authenticated by aeronauts.

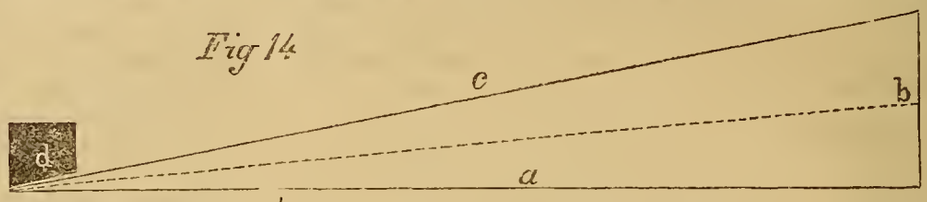
A like power raises smoke, and distributes it equally through the atmosphere, and which keeps it buoyed up until the heat is withdrawn, so that the atoms contract to a greater density than the atmosphere, when the power of gravitation overcomes that of the lever, and the particles then necessarily fall to the ground. The lever-power acting upon smoke, which has little if any cohesive attraction, and separating its atoms, has led many who have investigated the cause of its separating in the atmosphere, to give it a distinct attribute of "repulsive force," dividing the respective atoms.

The same course of reasoning has inconsiderately divided the actions of the different powers that we have investigated into three distinct mechanical powers, when in fact those three powers are but the different developments of one, that of the lever. The Almighty has established that as a mechanical power, which governs alike the atom and the universe in its physical formation. Every power-gaining machine necessarily adopts that in its formation, and the craft have embodied it in the machine called a wagon.

That other mechanical power termed the inclined-plane, can only be considered such when taken in connection with the lever. Separately, either in the form of a screw, wedge, or inclined-plane, it produces less power than that which is expended upon it. Calculations have been made upon this as a power, and acted upon in accordance with the so-called fundamental principle, that "what we lose in time we gain in power," and the reverse. I do not comprehend this as being a fundamental principle in any wise, and am certain that we expend more motive power on any form of an inclined-plane than we gain in lifting power.

First, let us examine what the power of an inclined-plane is, and what power can be derived from it. Figure 14 will represent one, taking the side *a* for a horizontal line, *c* for an inclined-plane, *b* for the height of the incline, and *d* for the weight to be lifted. If we apply the power at a right angle with the *b* line, it must be in a direction with the horizontal line *a*. The resistance to the power exerted is in lifting the weight *d*, and the friction, which is increased or diminished by the magnitude of the weight on the plane *c* and *a*. The power, when so applied, acts obliquely to the plane *c*, and in proportion to its obliqueness one part is expended in lifting the weight, the other part in overcoming the friction of *c* and *a*, which is the greater part. If the power is applied parallel to the line *c*, the obliqueness of the power comes on the line *a*, producing the same effect. Apply the power in the direction of the dotted line, and the obliqueness of the power would be divided equally on the two sides, which would be the action of the wedge, and would amount to about the same thing.

Fig 14



Of the two parts of the power divided, the greater part is that which overcomes the friction. If the friction is less, it will give way to the pressure of the lifting power, and fly back, so that the advantage otherwise gained by the inclined plane is lost. The effect of driving a wedge into a frozen log is such that it will often fly out in the operation. The same effect is often seen in the large wooden screws to a cider-press, for when the lifting power is strained to a greater tension than the natural friction on the screw, it gives evidence of the same by turning backwards, so that the lifting power gained by the lever in turning the screw is lost. If we insert a wedge under such weight as we can lift, we find it is much harder to crowd the wedge in so as to raise it than it would be to lift the weight without the wedge.

The use of either the wedge, screw, or inclined-plane is simply that they act as a support for the lever-power to rest upon after it has been gained, and as such is invaluable; but the calculation that any of those instruments increase the power in proportion to the space over which they move is simply an absurdity, for it is certain that they divide and neutralize the power conveyed to them, so that less than one-half is expended for the purpose of lifting the weight.

Driving a wedge into a log with a beetle, to split it, is simply another act of securing power after the lever has created it. In this case there is a powerful combination of levers, which the great Creator has divinely infused

into the physical construction of man, and is there governed by the intellect which is also embodied in that lever-power. When we see man grasp the beetle and raise it, first by bending and then straightening one arm, then by bending the other and straightening it, swaying the body backwards, and going through all the various evolutions more easily practiced than described—it is simply the act of creating power, of which the beetle for the moment becomes a reservoir for every particle. The next moment the power is imparted to the wedge, of which it retains perhaps two-fifths of the twenty hundred pounds created, which is the lifting part of the power—eight hundred preserved and twelve lost. Another blow accumulates in the same proportion—another, and another, and the solid log, which bid defiance to the puny strength of man's arm alone, begins to yield, and soon is rent in twain by the accumulation of lifting power.

Where power is so easily created, the loss is not a matter of so serious a nature, but it opens a wide field for human invention and improvement, until every particle of power that the lever creates is saved and converted to some useful purpose. A wagon is a lever-power, but how few of its constructors understand that fact, and how many less understand the principle on which that lever works! Until we are more generally educated in the nature of its power, we may bid a long farewell to the adoption of any general improvement in its construction; for the reason that we are working in the dark as to its nature, and are just as likely to adopt an unphilosophic as a philosophic change, under the specious name of improvement. If a real improvement is made, there are few capable of appreciating the principle on which it is established, and that TRUTH, which above all things is unchangeable, is subjected to the various freaks of fashion, and is the arbitrary director of witless mechanics—if I may be allowed to apply the term "mechanic" to one who is *only* a pretender, without understanding the first principles in that ennobling science.

But there is another power much neglected by the craft, which if properly understood would be of great value to them, and through them to the world at large. This is *a knowledge of mechanical power*, which to many before whose eyes these words will never come is a sealed book. This unfortunate circumstance places the craft far below the grade of respectability which otherwise they would be entitled to in the public mind, unless—as some would intimate—we are actually born to be "hewers of wood and drawers of water." Did we all act our part, we might soon rise above this debased condition, and the change would work like magic. Only start those idle minds in search of TRUTH! and when they find it they will discover a way provided where the mind, made vigorous by study in connection with practice, will germinate and grow for the benefit of mankind.

Manufacturers sadly neglect their own interest, if they do not act in this matter, and endeavor to awaken the sleeping jours. they have about them. As a proof of this, let me cite what must evidently be a familiar case in their own shops. Are not those workmen who take and read this Magazine worth much more to you than those who do not? (*To be continued.*)

TWO WAYS TO MAKE MONEY.

BY O. E. MILES.

IT would be refreshing to some of your Eastern readers to witness the operations of some of our Western wagon factories. Here we have the two extremes in mechanical and financial management in their sublime reality. One class of operations is conducted by men who have not only traveled, but have somewhere got the impression that the difference between order and disorder is a difference worth noticing, and who seem to have a similar and uncontrollable desire to *control* their own business; and having judged that order is more easily controlled than chaos, that their operatives, to give a profitable account of themselves, must know what to depend upon every day, especially pay-day, they are found governing themselves and their operations accordingly.

As the first great requisite to these ends, their whole capital and energy are devoted to the manufacture of one class of work, to the exclusion of every other. Two-horse wagons of two or three different grades, constitute the sole production of some immense establishments in Illinois, Michigan and Wisconsin. They look far enough ahead in their purchases of material never to get caught napping on a pile of green lumber. They *don't* patronize a retail paint or iron store, for the reason that they keep on hand, direct from the manufacturers of these articles, the best assortment of stock that can be found. They employ every operative whose duties will possibly admit of it, by the *piece*. They advance every piece of their work as far as practicable by machinery. They observe exact uniformity in the construction and painting of all their wagons.

Peter Schuttler, of Chicago, turns out of his shop eighteen finished wagons per day! the largest business of the kind in the West, and probably in the United States. The State Prison works of Jackson, Michigan, nearly reach the same number. One firm here (Aurora, Ill.) are making 1,500 wagons a year, and enlarging their works. A firm in Kenosha, Wisconsin, do a very large business in the same article; and many smaller shops in this section are working into the same style of business. The great bulk of work turned out by these large concerns is shipped to St. Joseph, Atchison, Omaha, Leavenworth, and other points on the Missouri River, and there sold. Nearly every one of the great migratory multitude who yearly take up the line of march for the western territories, travel by rail to the Missouri River, and is then and there a customer for one or more of these wagons, with which to complete his journey and pursue his vocation in his new home. The abundance and superior quality of Michigan, Wisconsin and Canadian oak, and the scarcity of this staple on the Rocky Mountain slopes, will tend to keep the manufacture of wagons and agricultural implements for that vast region in the Northwestern States, for a long period to come, at least till the iron and coal beds which underlie those territories come to be developed, when the timber will doubtless be transplanted thither to be made up; but until the slowly progressing lines of the Pacific Railroad bring these events to pass, it is difficult to calculate the magnitude which the business of furnishing wagons for that section may reach. I should

have mentioned that these large shops frequently step out of the usual routine to fill an order for Government work, and a kind of heavy freight wagon, quite similar to an army wagon, for the transportation of goods to Salt Lake City, the gold regions, and various other expeditions across the western plains.

I well recollect meeting, while on the return trip from Pike's Peak, in 1859, the expedition of Col. (late Gen.) Lander, consisting of an immense train of these ponderous vehicles, each one bearing a close resemblance to the Great Eastern on wheels. The train, headed by the Colonel, in a fine two-horse carriage, as it wended its serpentine way over the rolling prairie, presented a spectacle monotonous to a painful degree, but when they come to cross a slough is where the laugh comes in. They "double up," so as to have from twenty to thirty yoke of cattle to one "schooner," according to the width of the slough, so that by the time the wagon has reached it, the leaders have reached the opposite bank, where a foothold may be obtained. Their part in the performance is then to draw the balance of the team, and the wagon with its load of three or four tons, through the miry stream. The excitement in this last act runs high. The predicament of some of the rear cattle as they are dragged through the mud is often ludicrous. The demoniac yells of the teamsters form a harsh but fitting accompaniment to the rest, and the whole a getting-over long to be remembered.

But to return from Pike's Peak to our subject. I was about to ask the attention of the reader to the difference between the plan of business we have imperfectly described, and the operation of custom shops as they are usually conducted. A stranger comes into a custom shop and inquires for Mr. Spokeshave. "That's my name, sir; what can we do for you?" The new customer wants a buggy, and names some new wrinkles (or some old ones outlawed) which he or his wife thinks will be just the thing wanted. Wants to know what it will cost, and *must* have it by July Fourth (four weeks less than half the time necessary to do a decent job of painting)—would like to have it sooner. The price is too high, but this is settled by a compromise which will insure exact justice to both, to wit: a mean job to the customer for his meanness, and a losing job to Spokeshave for his verdancy. It is hurried through, but with all the hurry in the wood-work, ironing and painting, the trimmer commenced his jubilee July first, and did not regain his perpendicular till July sixth, so that the job is not finished till the tenth, by which time Spokeshave learns by one of his friend's neighbors that he had purchased a buggy. The facts were that as he had watched the progress of his buggy, the variations he had dictated in its construction did not look as he expected, and as it was a little behind time, he had laid hold of this pretext to back out and purchase elsewhere. The variations referred to don't suit any other customer, and after standing in the show-room until the varnish gets *beautifully* cracked, it is traded for something that will not replace the material it was made of. Few carriage-makers who do a custom business will call this an overdrawn picture, or who have not had this and similar "drives" perpetrated or attempted upon them time and again by the farming community, whose industry and honesty have formed the fictitious fabric to so many a story. One more specimen of the shrewd management of the "honest farmer." He gets his work done for a year or two and settles up. During the time he has occasionally brought along a cheese, a quarter of beef or a load of wood, which he has failed to sell for cash because of its inferior quality. Spokeshave takes it off of his hands at a little above the market price for a good article, deals it out to his hands at the same price, thus being compelled to do injustice to his hands, and lose on his barter (he has already lost the time of handling it); but this is more than made up in the twenty-five cents a day more that his help costs him than they could earn where cash is paid. In his settlement with his sharp customer, several jobs appear to have been repaired twice. "That axle you first put in," says he, "broke down while on a walk, on a dead level road with an empty wagon;" and so with several other jobs. Well, he is a heavy farmer, breaks a great deal, gives the shop a large amount of work, and "we will let those things pass." Spokeshave's profits are out, his hands are poorly paid, but the "honest farmer" is "all sound." The majority of this proverbially honest class seem to think that every cent they can gouge out of a merchant or mechanic is a nail driven in the Temple of Justice. Per contra, I can bring ninety-nine mechanics who will testify that they have been far more fortunate in their dealings with business men than with farmers, where one can be produced who will take the opposite ground. Ignorance is losing its power as an argument for honesty, or any other Christian virtue, and it is time that mechanics commenced the cultivation of business habits in their rural customers, by holding on to their work till they receive its equivalent—the only equivalent known to business men—*money*. Not only this, but let them require payment strictly in advance, for every mechanical oddity, and every unfashionable article that they are called upon to make. Let all comers understand, that it is fully as just that they should trust in the ability of the mechanic to accomplish what he undertakes, as for the mechanic to take stock in their capricious notions. The interminable complications incident upon a custom business, as at present carried on, would vanish from before a few such regulations vigorously adhered to without fear or favor.

The wide difference we now see between such operations and the first herein described, would be at once reduced to a simple difference of magnitude; and immunity from these and kindred drawbacks, which have heretofore been classed among the exclusive privileges of capital, be henceforth recognized as the legitimate offspring of a business education.

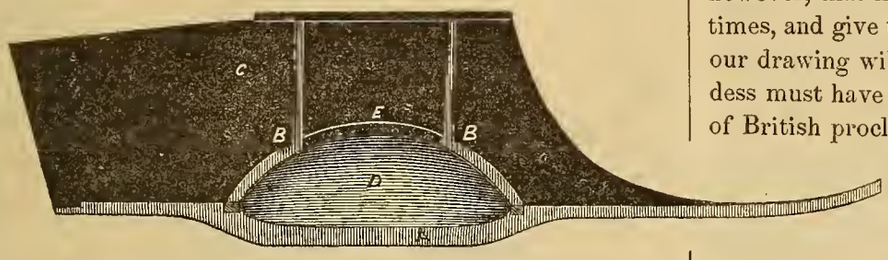
Pen Illustrations of the Drafts.

EXTENSION-TOP ROCKAWAY.

Illustrated on Plate XXXIII.

THIS drawing has been furnished us for the Magazine by Mr. H. Sargent, of Boston, who writes us that they are just beginning to make vehicles after this pattern, in that city. This shows an extension-top; but a top to the back seat only might be given, or, finished without a top, would look well. The construction of these bodies generally has so often been explained that we shall dispense with details, and give instead a few instructions in regard to the "cut-under" beneath the front seat.

In this, as in some other examples previously given by us, the "cut-under" is seen to be bowl-shaped. These "bowls" are a recent "institution," turned expressly for the purpose, of a peculiar form, from white-ash plank, three inches thick. When turned, the bowl is eighteen



inches in diameter at the brim, and one-half inch in thickness. For use, these bowls are sawed into two pieces, one so divided furnishing the material for two "cut-unders," or a buggy-body.

In order to throw a little light on a somewhat difficult operation, we give a diagram of an inside view of the side of a buggy, with explanations. *A* shows a bird's-eye view of the bottom-side; *BB*, the two crooked standards, or supporters; *C*, the side pannel; *D*, the convex side of the bowl (half sectional); and *E*, the rim of the bowl left in the turning of the same. This rim is let into that portion of the crooked standards *below B*, and fitted snug up to the outer edge of the bottom-side. This done, the job is completed by fitting on the side pannel, so as to meet the concavity of the bowl and hide the joint at the top, on the outside of the body. Our remarks refer to a buggy; but the same observations will apply to other vehicles—for instance, the extension-top rockaway, illustrated on this plate.

GODDARD BUGGY.

Illustrated on Plate XXXIV.

We are fully aware that in publishing this we are giving nothing new, it having been invented by the distinguished gentleman whose name it bears, some twenty years ago. But it is still a "big thing" in Boston, and no manufactory in that city would be considered complete without one or more bodies on hand, ready to meet an order. It is true there have been several improvements since the advent of the original one, and these, at the present time—as a visit to the different shops will show—are diversified in some little particular of finish, so as to meet the tastes of customers. We are told—and no doubt correctly—that these buggies are the most convenient and comfortable riding vehicles in use, affording ample room for stretching one's legs—another Yankee *notion*—as all the world knows. Our drawing was furnished, at our request, by Mr. Hayden Sargent, of the firm of Sargent, Brewster & Ham, of Boston.

MANHATTAN BUGGY, NO. II.

Illustrated on Plate XXXV.

Fashion's whims, when applied to buggies, have become so changeable that we find it extremely difficult to keep pace with them this season. We flatter ourselves, however, that in the present instance we *are* up with the times, and give the latest style of "cut-under." A look at our drawing will convince our readers that the fickle goddess must have lately taken into her service some genius of British proclivities, this and some other models proving such to be the fact. It is an attempt to amalgamate the American buggy and the English tilbury together. Although some of our buggies have put on many "foreign airs" the past years, conflicting with many of our American notions, still we are not disposed to find fault, if the public is pleased with them, and content ourself with the reflection that "there is no accounting for tastes."

Sparks from the Anvil.

PERCH-COUPLINGS DISSECTED.

(*Continued from page* 106.)

Having examined the original models of the perch-couplings, as patented by the Everetts and Haussknecht, we are satisfied that the latter has no legal foundation for the claims he is so strenuously and indefatigably urging against the members of the craft in different sections of the country. This opinion has still further been strengthened by the several defeats he has sustained whenever his suits have come before juries. No less than three have decided his claims groundless. The so-called patentee knows this as well as we do. It is only by making exceptions of the nature shown in the letter of Haussknecht—an extract of which was published in our last—that he succeeds in maintaining even a seeming claim. As long as he can keep his case in the courts, so long he will importune the public for damages. With this brief introduction we enter upon a critical examination of the entire subject.

We do not know when the caveat of the Everetts was first filed in the patent office—Haussknecht says it was on the 15th of November, 1850—but we know that their patent is dated December 15th, 1850; Haussknecht's model reached Washington seven days afterward; while Haussknecht's original patent is dated December 15, 1851, or one year (lacking one day) later. He claims to have filed his caveat on the 24th of October, 1850, which, if so, would give him the start of the Everetts in filing a caveat twenty-one days.* The only explanation extant

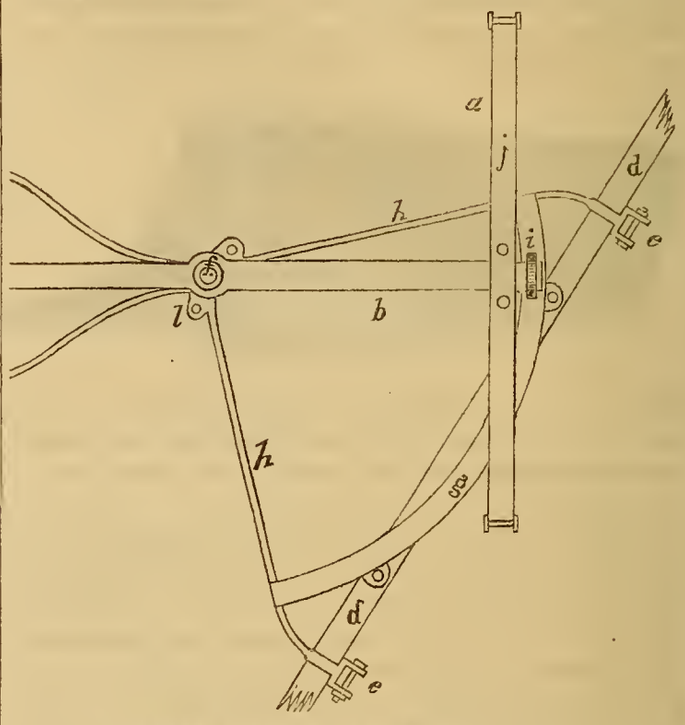
* Mr. Haussknecht has charged the Everetts with having had improper access to the Patent Office while his application was still pending, and having seen that they had copied his first model. As *his* model (see over) did not reach Washington until the 24th of December, 1850, and the Everett patent is dated December 17th, 1850, *seven days previous*, this story is effectually exploded. How can such assertions avail? Will any one, after examination of the two diagrams accompanying this article, accept such a lame explanation as sufficient in establishing a claim? If they can, let them *bleed*, they deserve it. According to the following memoranda from the Patent Office we find that Haussknecht's first application was rejected as interfering with the Everett coupling:

for this disregard of chronology in granting the Everetts a patent is found in a communication from Haussknecht. He says that he learned through the Hon. C. M. Ingersoll, that "when the Everetts' application was examined in the regular course of business, it became necessary to examine the caveats, and accordingly they were examined; but Haussknecht's was overlooked by accident of the officer having that duty to perform. The patent having been already granted to the Everetts, this office had not the power to recall it, and they [the Everetts] would not surrender it [theirs], and one patent having been granted by mistake, the error cannot be corrected by granting another." So then, if not the *original* inventors, yet the Everetts are the *original* patentees. That neither were the original inventors, we intend to hereafter show. For the present we place the two patents in contrast, with descriptions and illustrations, for the study of our readers.

The Everetts say, "We have a ball and socket joint at the center, on which the fore-axle turns, in place of the ordinary perch bolt, which is so liable to be bent or fractured when one wheel is passing over an obstruction. With the ball and socket joint, the axles can assume any position in relation to each other within reasonable limits, without causing any twisting or straining of either the perch or perch-bolt. . . . . What we claim as new therein, and desire to secure by letters patent, is the joint on which the fore carriage turns when placed in the rear of the fore-axle, in combination with the segment on which the end of the perch rests, substantially as described, for the purpose of allowing the carriage to be turned in a small space, without having the fore-wheels to run under the body, or interfering with the hind-wheels." It is worthy of remark that, in selling rights, the Everetts did not show their letters patent; but, instead thereof, "drawings taken from a carriage lately constructed."

Haussknecht tells us—not concerning his *second* patent of January 13th, 1852, but in relation to his *first* patent obtained December 16th, 1851, from the model of which we here present an underside view, as furnished us by the Patent Office at Washington—"What I claim as my invention and desire to secure by letters patent, is: first, the employment of segments C and D, and fifth wheels F G (or part corresponding thereto), attached as described; the one segment D, and fifth wheel F [this *fifth* wheel is evidently that useless one we read so much about], working on pivots between the front and hind axle, such parts acting in combination with I P, constructed substantially as shown and described, for coupling the movements of two axles or turning appurtenances, for the purpose set forth." While examining this question by comparing the two patents, the reader will bear in mind that the foregoing is Haussknecht's *original* patent on which he has never (to our knowledge) brought any suit for infringements up to this time—the patent on which he says the Everetts infringed. A critical examination shows that the Everetts patented "*the joint on which the fore-carriage turns, when placed in the rear of the fore-axle in combination with the segment;*" while Haussknecht's "patented segments," as the engraving illustrates, "*the one segment D, and fifth wheel F, working on pivots between the front and hind axle, . . . coupling the movements of the two axles;*" in our judgment, near enough alike to have defeated Haussknecht, had not that "mistake" accomplished it. The patent on which H. has so frequently sued and been defeated, we repeat, is his *second* patent, as illustrated and described on page 104. To show how others view the matter we give in this connection, an extract from a letter from Martin Benson, Mechanical Engineer and Patent Agent at Cincinnati, written in June, 1855:

"According to the dates of the letters patent, it is shown that E. & C. Everett's patent for carriage couplings was issued Dec. 17th, 1850, and G. L. Haussknecht's *original* patent Dec. 16th, 1851, and his second patent, in which he disclaims all the improvement worth anything, to get rid of an infringement on the Everett's patent, was issued January 13th, 1852. [See page 104 of this vol.] . . . Taking the dates of the two patents, the Everetts will



BIRD'S-EYE VIEW OF THE EVERETT COUPLING, PATENTED DEC. 17TH, 1850.

EXPLANATIONS.—*d* is the front axle; *b* the perch; *e* shaft-jacks; *f* the point on which the fore-axle turns; *l* one of the ball and socket joints (the corresponding one is shown opposite) connecting the radiating arms *hh* to the segment *g*; *i* the small friction roller; *j* the spring.

"No. 8648. Gustavus Haussknecht, of New Haven, County of —— ——, State of Connecticut.

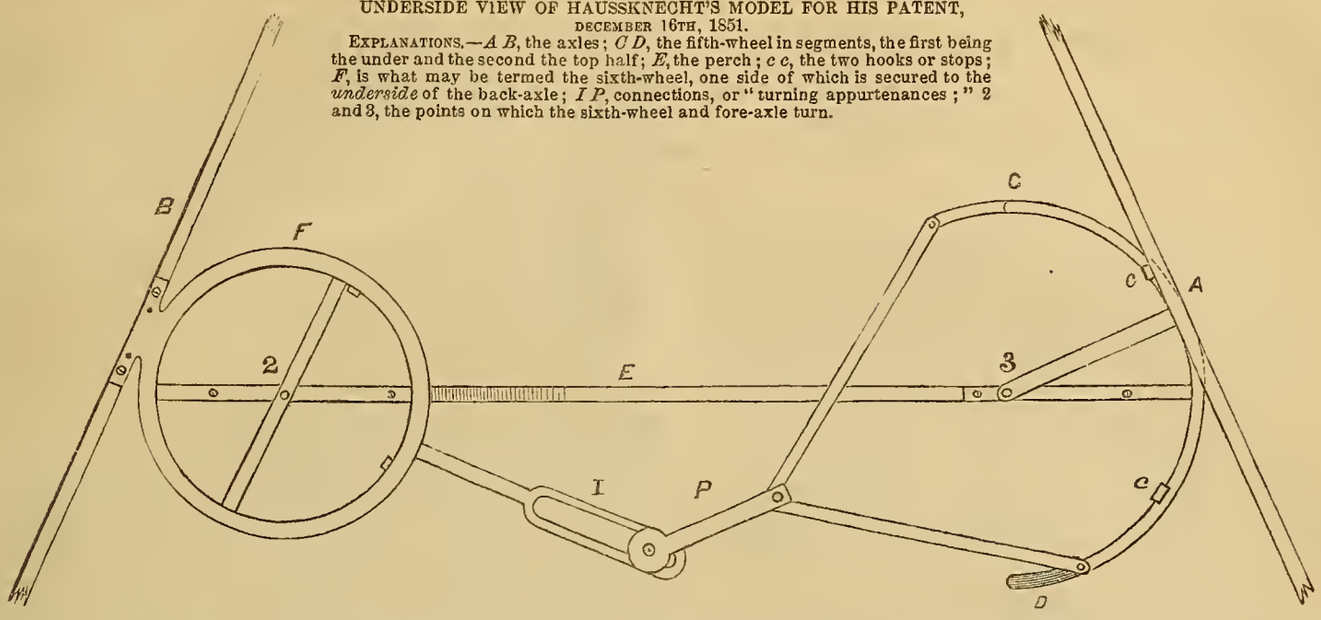
RUNNING GEAR OF CARRIAGES.

Received December 23d, 1850.
Petition "
Affidavit "
Specification "
2 Drawing "
3 Model 24. [*This was 7 days after date of E's patent!*]
Cert [ificate of] Dep [osit]
1 Cash $10.
Caveat, Oct. 24, 1850.
Examined (Cooper) Dec. 20th, 1851.
Issue R. C. W. Dec. 22, 1851.
Patented Jan. 13th, 1862.
Recorded vol. 47, page 76.
Interferes with patent to Edward and Charles Everett, Dec. 17, 1850.
Hearing 3d Monday in March, 1851.
Notice given Feb. 8, 1851.
Rejected Feb. 25, 1851.
Sp. and des. ret. to John Heans, May 12, '51. (See letter within.)
Sp [ecifications] re [turned] June 20, 1851.
Des. ret. " 27, "
Postponed July 5th, 1851.
Rejected " 14th, "
Old and new papers to applicant July 19, 1851.
Drawings to applicant July 23, 1851.
Letter to Browne Aug. 2d, 1851.

Such is the record, and yet on the 16th of December, 1851, H. got a patent. Was not this done through the influence of a political friend from the same district—Hon. C. M. Ingersoll—as a special favor from the Commissioner, contrary to law?

UNDERSIDE VIEW OF HAUSSKNECHT'S MODEL FOR HIS PATENT, DECEMBER 16TH, 1851.

EXPLANATIONS.—*A B*, the axles; *C D*, the fifth-wheel in segments, the first being the under and the second the top half; *E*, the perch; *c c*, the two hooks or stops; *F*, is what may be termed the sixth-wheel, one side of which is secured to the *underside* of the back-axle; *I P*, connections, or "turning appurtenances;" 2 and 3, the points on which the sixth-wheel and fore-axle turn.



appear the original inventors, and as to the similarity of the improvements, by taking the drawing left with G. W. Gosling, of Cincinnati (who purchased a right of Haussknecht, through his agent, Andrew J. Beaumont) [previously in the Everetts' employ]—and comparing the said drawings with the Everetts' patent, they are as much alike as two circles of the same diameter. But on sending to Washington and obtaining a certified copy of Haussknecht's patent [the model of which is given above], and comparing the drawings in the certified copy with what was sold to Gosling by said agent as Haussknecht's patent, it is found that there is no more resemblance between the two than there is in a square and round figure. . . . I will here take the liberty of cautioning the craft in purchasing Haussknecht's patent coupling to be careful that drawings representing the Everetts' patent are not substituted for Haussknecht's, as has been the case in the purchase made by G. W. Gosling. When purchasing a right, make a demand for the letters patent, or a certified copy, or have such drawings furnished you, as Haussknecht or his agent will be willing to swear to as being a true copy of those connected with his patent."

Both the first and second patents were deficient in strength about the fifth wheel, when "cramped," as the drawings will show. As a plaything for children the *first* effort might very well answer, but as an invention of practical utility, an *ingenious* failure. With good reason, then, he soon afterward puts in his "disclaimers," and never undertakes to charge "infringements" upon any one in this case since. That neither he nor the Everetts ever ought to have had a patent the following facts show:

In order to convince the public that theirs was "the real, genuine, original," the Everetts published the following certificate: "Quincy, Ill., March 18th, 1856. This is to certify that we have ascertained from inquiry of those concerned in the construction; from inspection of bills, drawings, and other papers—and partly from our personal knowledge, that a carriage with the coupling afterward patented by Edward and Charles Everett, was made under their direction in 1843; that the same vehicle is now in possession of Edward Everett, with the coupling as originally applied, which is substantially the same both in principle and construction as the same are now made, and according to the claim of their patent of Dec. 17th, 1850. The ball and socket joint, and the position of the stop in the rear of the segment instead of the point, being the only points of difference. HAYES, WOODRUFF & Co."

According to an act of Congress (section 6), passed in 1836, it is declared: "Application for letters patent should be made within two years after the first sale or public use of the invention." Again: Act of Congress (sec. 7), passed in 1839: "No patent is held to be invalid by reason of the purchase, sale or use, prior to the application for a patent, except on proof of abandonment of the invention to the public; or that such purchase, sale or prior use, has been more than two years prior to such application for a patent."

Edward Everett, over his proper signature, in 1855, says his "invention was made and first put in practice in this place [Quincy, Ill.], and well tested several years before a patent was applied for. I have now in use the identical vehicle to which the improvement was first applied, which now remains as originally constructed. It has the head-block resting on and sliding on the segments in the same manner as the coupling is now usually constructed. It also has a ball and socket joint, perch-bolt, and a stop piece to limit the motion of the fore-axle; but has not got a friction-roller. The above statements can be substantiated by many of my fellow-citizens, as well as by the mechanics who constructed the vehicle."

Assuming it to be a fact, as above certified to, then the Everett—the Haussknecht patent, too—had been in use *seven* years in Illinois before any application was made for a patent. What validity is there in such a patent? Evidently none. We expect to show hereafter that even prior to 1843, this same principle—the important one—the placing of the king-bolt in the rear of the front-axle—was in use.

We have received a number of letters in regard to the suits still pending and claims still made upon the craft, by Mr. Haussknecht, for infringements on what he calls his patent. To answer all in detail would tax us too much. We must, therefore, for the present, decline answering beyond the information we are furnishing in these pages.

Paint Room.

COLOR: ITS APPLICATION, ETC.

CHAPTER VII.

LET us now suppose a figure or pattern of a *yellow* color on a ground of its complementary *purple;* the effect would of course be that of augmenting the power of each, and perfect harmony maintained. The yellow being of its own nature, light and luminous, would have its power *as* light increased by the deep tone of its purple ground, as in like manner the purple ground would be deepened as well as enriched by the contact and contrast of the yellow pattern. In this case a due care is necessary that the ground be not however *too* dark, for in such case the great contrast of sudden dark and light would give an excessive lightness to the yellow, and thus deprive it of some of its power as a local color.

If on the other hand the purple ground were too pale, the yellow would be darkened, and partake somewhat of brownness in its undue strength. A due consideration of balance, therefore, must be given as essential to the harmony of the combination.

That both may be admitted in a degraded form must be admitted, but in such case the yellow would be deprived of its quality of luminosity, and would have a somewhat dirty hue. There is a certain purity of color in yellow ochre which may be used as a degraded hue, with less unpleasant effect than a ranker quality of yellow pigment lowered to the required degradation. Any yellow, however, when mixed with white, becomes colder, while it still retains its luminous power; and in proportion to the greater amount of red in the purple ground so it will appear colder, as on the other hand it will appear warmer and richer as the purple ground approximates to blueness.

As in the case of the red on the green ground, a border or line of white round the pattern will in a great measure destroy the effect of the contrast, though not in so great a degree as would be the case with the other two colors.

The place of yellow on a molded surface would be that of any small projecting bead or ornament, thus giving brilliancy to such salient parts.

In departing from the integrity of yellow, it may be observed that the tendency to greenness is—in most cases—less favorable than the approach to orange: in the first case a certain sickliness of hue obtains which is more difficult to balance in its complementary than would be the golden hue produced on the other hand by a slight tendency to redness, which the richness of added blue in the ground would make more luminous, as well as more solid.

We next proceed to the consideration of the third color, blue, as a pattern on a ground of its complementary orange. In the case of the first two colors juxtaposed as pattern and ground—viz., red and green—we were dealing in hues that were in their own nature half tones, the red being a middle tint, *per se*, the green being composed of a *dark* color and a *light* color, becoming half or middle tint by union.

In the last case, the yellow on the purple, we had to deal with a light upon a dark; the yellow being of its own nature a light color, the purple approximating to a dark color, being composed of a dark color and a middle toned one. We now have to deal with a naturally dark color on a ground of one naturally much lighter—the orange—which is to be our complementary ground for the blue pattern, being compounded of a light color and a middle tint color.

We have elsewhere spoken of the double—we may now say triple—capacity of the primary blue, that it may be said to maintain its integrity as blue, whether used as a dark, a middle, or a light tint.

It does not follow, therefore, that in our present arrangement of it as a pattern on a ground of its own complementary, we are obliged to consider it as essentially and *only* a *dark* color. Taking it, however, as such, the case is simple enough, and the effect will be more powerful the more closely we adhere to the most natural powers of the two hues. We should thus have a dark pattern on a light ground, and an extremely rich effect would be the result. Suppose now we propose to use the blue as a light pattern; in this case it will be necessary so to degrade or impoverish the color of the ground, as that the paleness of the blue shall not be outbalanced by the richness of the orange ground.

This may be done in two ways; first by degrading the orange—still maintaining its depth—to an approach to what is called fawn-color. This would be done systematically and in following out the theory of color by the addition of a little blue: in practice some brown, or black, or any dark pigment would doubtless be preferred. We should thus have a light pattern on a middle tint ground, sufficiently powerful to tell as a moderate dark.

The other method would be to pale the orange into harmony with the light blue, by the admixture of white, and we should then have a light pattern on a light ground; but though the effect would of course be less powerful, the difference of the two colors would be, by simultaneous contrast, sufficient for all the purposes of separation and clearness. A sweet but pale combination would be produced, but such as to require the utmost care in position with respect to other colors, in order that the just balance of key might be preserved.

With regard to the blue as middle tint, its power would be sufficient to bear out upon the orange ground, which would thus tell almost as a middle tint also, and the power of the contrast would be sufficient.

A white border or edging round the blue pattern would be useful for some purposes of combination with other colors, and may be more or less broad as occasion may call for; the broader the white line the less powerful the two colors so separated.

The place of blue is considered to be on plain or flat surfaces; and if alternating with white lines or pattern, either in its deeper or lighter tones, or varied by diaper, or scroll, or other pattern work of gold or gold color, has a rich effect.

Where a *small* pattern of white occurs on a ground of blue—or indeed of any other color—it has the effect of paling it generally, while at the same time it maintains its richness in a manner which would not be the case were the color made simply lighter as a flat tint.

A certain rich effect of texture or surface is produced by a pattern of two tints—a dark and a light—of the

same color, as of two blues or of two reds. In the case of two blues the same quality of blue produces the best results, the difference being that of merely lighter and darker: not so, however, in regard to reds where the one may be a warm, the other a cool red. With regard to yellow, the difference would not be sufficient as to dark and light, and it would be thus ineffeetive.

As the secondaries with the primaries, so the tertiaries with the seeondaries, as regards pattern and ground, but of eourse in a less positive degree; but here the greater differences of light and dark will come into operation as supplying the plaee of the greater differences of absolute color.

The eombination of the primary, secondary and tertiary colors may be best studied in the shawls and other fabrics of the Eastern nations, where the rankest oppositions, by union with beautiful assimilations of color, are made to produee an harmonious whole which it would be difficult to reduce to rule—or rather it would be difficult to explain the laws of; but that sueh laws exist in reference to them there can be no doubt, for they are the laws which nature herself has given us.

ORIGINAL MONOGRAMS.

Illustrated on Plate XXXVI.

Many of our friends have urged us to furnish them with a series of monograms; but, not estimating these as highly as some others, we have neglected to do so until now. The principal reason why they cannot be made generally useful is, they embrace certain letters which will seldom represent those wanted—or, in other words, they probably will seldom meet the requirements of a person wanting *his* initials put upon a carriage. They may, however, serve as examples in the art of eombination to such as choose to practice, and, on this account, we trust, prove of some value. Our examples are the original productions of the best artist in this line, in New York, to be followed hereafter by others, as opportunity offers.

Trimming Room.

LIGHT CARRIAGE TRIMMINGS.

We have very little change to note in the fashions connected with light work. It is a rare thing to see a buggy body trimmed with anything else than cloth in New York city, and this, too, must be of the finer and most expensive qualities. Sometimes, in eonsequence of the high price of all wool cloths, union is substituted as eheaper for head-linings; but sueh praetices are rather an exception than rule. In fact, much of that offered in the market as union cloth is of German manufacture and liable to soon fade. Such as take pride in having work show well with age, should be very careful and purehase only of responsible persons. We have known instances where some of our *great* carriage-makers have gone among the "dress goods" merchants, and bought linings unsuited to their needs, simply because they eould get them a little eheaper than of the regular dealers in earriage goods, and suffered in reputation in consequence. We very much doubt the policy of buying cheap cloths. These generally, if shrunk before using as they should be, are so much diminished thereby as to make them in the end the dearer article.

We have remarked that the New York made light-work is generally trimmed with fine eloth. Occasionally we still find patent leather weltings used in the eushions, &c. Sometimes we find a buggy in the Broadway Repositories in whieh leather is used in the falls in place of laee; but this in the mind of a city manufaeturer of to-day is in bad taste. The New York idea applied to earriage trimming is, neatness, plainness and riehness.

Our impressions are, that the high prices at which cloths are now held will not be maintained, the premium on gold having been very seriously affeeted by the sueeesses of our armies over the public enemies of our Union. We therefore recommend a little longer waiting before purehasing extensively imported goods.

MANIFOLD USES FOR LEATHER.

The old saying, that there is "nothing like leather," is amply verified in the thousand and one little articles of feminine deeoration which Madam Fashion has recently decreed for her daughters' wear. In my up-town stroll the other day, I paused before the tastefully arranged window of a faney store, wherein were displayed the usual miscellaneous eolleetion of ornaments, trimmings, ete., which go to make the sum total of sueh an establishment, and I thought as I noted how freely the material, leather, had been used in their construetion—O that mother Eve, as she perambulated Eden in her primitive garment of fig leaves, could have foreseen how skillfully her sons and daughters should eonvert the skins of such animals as those over which she held dominion, into the multitude of articles both useful and ornamental, which meet our eye on every side, and supply our needs at every step. Could she have seen the girdle, formed to encirele the slender waist of some fair damsel—the eoquettish little bow which fastens the collar of your fashionable belle, the trimming of her dress, the rosettes upon her hat, the buttons seattered in delightful confusion over her garments, or arranged in mathematical preeision, in rows containing twelve, eighteen, or twenty-four, as fashion and taste shall dietate, the gauntlet, to shade the delicate wrist, the bracelet, for its adornment, the anklet, to protect the ankle, the page to elevate the trailing skirts from eontact with muddy erossings, the reticule, the fan for subduing summer's heat—these, and many other ornaments too numerous to mention, and all made of leather, so embossed, and stitehed, and pinked and otherwise deeorated as almost to lose its identity, yet leather still, are additional evidence of the truth of the saying at the head of our paragraph.—*Shoe and Leather Reporter.*

Editor's Work-bench.

REVIEW OF TRADE.

As supplementary to our observations under this head on page 124, we remark that, while the operations of the Internal Revenue laws are all in favor of large manufaeturers and extensive dealers of established reputation, they fall with blighting foree upon the poorer manufaeturers of limited means. This has been the case during the past year. An unusual demand was found for family earriages, while the lighter kinds were less often ealled

for. As—in this country at least—a small proportion of the carriage-makers, only, undertake the building of the larger and heavier class of vehicles, the result is soon seen. While a few have done a good business, the larger proportion have accomplished very little. In many shops the sale of new light work has virtually ceased. The fall trade has been comparatively nothing.

As if this state of things had been foreseen, in order to maintain this one-sided business and make matters still more discouraging to the already disheartened, the tax-gatherer comes in for a large share of the profits on our jobbing. This, coupled with the tax imposed on new work, makes the distribution of it unequal, and in reality oppressive. We confidently think that, in many instances, the Government obtains the largest share of the profits. Some tell us: "O, you never fail in adding the tax to your bills." In our case this cannot so easily be done. Customers refuse to pay it, and plead that our profits must be large. They arrive at this conclusion by comparing the charges three years ago with the present, not considering that the bulk of material has more than doubled in price since. The result is that on a fifty-dollar job of repairing, the profits do not exceed—if they equal—those of former times; and three per centum of this—in many instances—is paid to the Government. With less amount of profit derived from business, and increased expenses in almost every department of housekeeping, how will the smaller shops be able to weather the storm? They cannot. Should this state of things continue, a great number of those educated to the business will be forced to relinquish it and seek other employment less burthened by taxes. We find many contemplating such a step already.

We see no reason why our business should suffer more than others, and therefore are in favor of a system of taxation mainly upon incomes. Properly devised, this would be more equitable, as one observes: "If luxuries and extravagancies are, under the operation of the law, easier to obtain by the rich than are the necessaries of life by the poor, the masses of the people will expect that a large proportion of the rich man's excess of gains shall be taken, before the amount necessary for the bare subsistence of the family of the man of small income shall be further encroached upon—and that Congress shall not respect more the unnecessary dollars of some than the food and raiment of others." The man whose income amounts to $100,000 a year can better afford to pay $50,000 of it to the Government than the man with $1,000 can $5. We are decidedly opposed to the taxing of business in any form, and especially in the form in which ours is. No doubt that the wealthy would demur at such a system of taxation as we advocate; but, while they have so much property to be protected, they ought to be willing to pay well for the protection, since, if not largely increased, their wealth is not diminished..

Our legislators ought to study history more closely. They will find that the heavy taxation in England, at the end of the eighteenth century, was so inimical to coach-making, that it drove more than one-half of those engaged in it into other business, in order to get a livelihood. It was only by repealing unjust laws that the business was saved from utter ruin. The same effects will be produced among us, unless the trade, in a body, importune Congress for relief, immediately. Others aggrieved, petition, why may not we?

LONDON ARTISANS' INDUSTRIAL EXHIBITION.

Since the article on page 110 was published, one of the Hon. Secretaries has put us in possession of the Prospectus and Rules of the London Operative Coach-makers' Industrial Exhibition, to take place during February, 1865, in the Hall of the Coach-makers' Company, 14½ Noble Street, Cheapside, London. This exhibition will afford the journeymen—we do not like the term "operative"—an opportunity for "illustrating, in theory and practice, their own ideas of design and construction; such specimens of skill being brought together in honorable competition, it is supposed will display the continued advancement of English coach-building, and tend to retain its supremacy in foreign markets, and thus benefit the British carriage manufacture."

As we received the documents just as we went to press with our January issue, we could do nothing more than make the simple announcement we did, leaving the subject to be noticed objectively, as supplying information for similar exhibitions, should such ever be undertaken in this country.

Among the articles for exhibition, it is proposed to show carriage-drawings in outline and colored, to a scale of ½ in., ¾ in., 1 in. and 2 ins. to the foot, of public and private carriages for home use, as well as those suited for the export trade, hospital carriages, railway carriages, and working drawings, showing construction of the parts; plans of machinery for facilitating construction, communication between passengers and guard on railroads in cases of accident from fire, etc., and the systematic arrangement of books in keeping accounts; designs for hammer-cloths, inside linings, carving, lamps, decorative chasings, including handles and heraldic ornaments, etc.; heraldic paintings, ornamental cyphers, monograms, devices, etc.; painting specimens of picking out, sham-caneing, panel striping, ornamental borderings, varnishing, polishing, harmony and contrast of colors, specimens of body and carriage-carving; improvements in framing and construction, combining utility, strength and lightness; springs; the application of wood to iron, so as to secure the utmost strength with the least possible weight; irons half forged and half filed, locks, hinges, joints, shackles, etc.; specimens of trimming, such as cushions, squabs, step facings, and other novelties, and specimens of harness.

In addition to models of carriages and machinery, improved tools, etc., the Prospectus invites loans of drawings, models and books illustrative of modern, mediæval and antique carriages, British and foreign state

carriages—construction, etc.—from all classes, as well as portraits of deceased British and foreign coach-makers. The Prospectus calls for everything calculated to furnish interest and instruction to artisans in the trade, which, if improved, as the committee design it shall be, must be of great benefit to the craft.

The judges will not be eligible to take prizes for the articles they exhibit, although prizes and certificates will be awarded in as large numbers as possible, and it is intended that every exhibitor shall have a memento of the exhibition. Special prizes will be given for special objects. In order to carry out this design, Mr. G. N. Hooper offers three guineas for the best drawing of a town barouche on under and C-springs, scale 1 inch to the foot; open to foremen, carriage operatives and apprentices. Also two guineas for the best drawing or model of a light hospital carriage to convey the sick poor; open to all comers.

Mr. G. A. Thrupp, another London carriage-builder, offers two guineas for the best stuffed and quilted carriage cushion in morocco leather; open to coach-trimmers only. Also two guineas for the best drawing in pencil, upon paper (half the full size), of an under fore-carriage for elliptic springs, of usual or original design; open to apprentices and improvers. Three bronze prize medals will also be given by the "worshipful Company of the Coach and Coach-harness Makers" of London.

EDITORIAL CHIPS AND SHAVINGS.

Expensive Horse Shoeing.—It is said that Nero shod his own horses with silver, and those of his empress with gold. If so, and shoeing was general, why have the sculptors, both Greek and Roman, of that period so uniformly left their equestrian figures unshod? Beckman tells us, on what authority we know not, that horses as well as asses had a sort of sock or sandal tied to the hoof, as a protection to the feet, and it is very probable that the story as told of the Roman Emperor is simply a fiction.

A New Omnibus.—Some of the foreign journals describe a new kind of omnibus, which is divided into separate well ventilated compartments, disposed in two rows, back to back, the passengers sitting alone, each in one compartment, facing the pavement on their respective sides. A small window, with a shutter on each side, puts in communication the contiguous compartments, if agreeable to both parties to converse. The compartments are fitted like first class railway cars. A portion at the back of the omnibus is left undivided, to contain four persons. A patent signal, or a bell, puts each passenger in communication with the conductor.

Extension of the Central Park Carriage-Drive.—The Commissioners of the Central Park have notified the public that an additional portion of the carriage-drive is now completed, from the Great Hill north to the gate at Sixth Avenue and One Hundred and Tenth Street, making the circular road perfect, and affording access to some of the most beautiful scenery to be found anywhere. Efforts have been made to preserve the originally rugged character of the landscape along the line; one remarkable feature in which has been the leaving an immense overhanging rock, weighing many tons, in its natural bed, frowning over the carriage-path.

Preservation of Wood.—The following method is used in Germany for the preservation of wood: Mix forty parts of chalk, fifty of rosin, four of linseed-oil, melting them together in an iron pot; then add one part of native oxide of copper, and afterward, with care, one part of sulphuric acid. The mixture is applied while hot to the wood by means of a brush. When dry it forms a varnish as hard as stone.

Hardening Timber.—A native of Russia has discovered a process by which timber, newly felled, may become so hard as to resist the influences of the most trying climate for an almost indefinite period. The most curious part of the invention is, that it does not involve the use of chemicals of any sort, such as steeping in creosote, etc., and that the process is applied to the tree while growing. The inventor is now making arrangements for the supply of his timber to railway contractors in England, and will not require any remuneration further than the amount which would be paid for ordinary timber, until the period shall have elapsed beyond which the ordinary railway sleepers, telegraph poles, etc., require to be placed. The best railway sleepers require renewing at intervals of from four to six years; but the inventor of the new process of preparing timber asserts that he will supply an article which need not be disturbed for fifty years.

Coach-Saving Engine.—About two hundred years ago, the Marquis of Worcester wrote a work under the title of "A century of the names and scantlings of such inventions as, at present, I can call to mind to have tried and perfected; which (my former notes being lost) I have, at the instance of a powerful friend, endeavored now, in the year 1655, to set these down in such a way as may sufficiently instruct me to put any of them in practice." This work was originally printed in London, in 1663, by J. Grismond, and will be found re-printed in the fourth volume of the Harlein Miscellany, from the 515th page of which our extract is taken, there numbered 19. This coach-saving engine is simply "a little engine within a coach whereby a child may stop it, and secure all persons within it, and the coachman himself, though the horses be never so unruly in a full career; a child being sufficiently capable to loosen them, in what posture soever they should have put themselves, turning never so short; for a child can do it in the twinkling of an eye."

This invention, as old as the time when carriages were first introduced into England, if indeed not earlier, seems to have been fully up to anything invented since in the same line. It would, however, have afforded us more satisfaction had the Marquis given us a detailed description of his plan.

The Saddlery Business.—As far back as 1850, there were in the United States nearly four thousand establishments for the making of saddlery and harness, employing a capital of over $4,000,000, consuming raw material to the amount of nearly $5,000,000 annually, employing over thirteen thousand hands, and producing annually over ten million dollars worth of work. This production was almost exclusively for home consumption, and very widely scattered over the whole country, though there are some few places, to which we shall refer hereafter, in which the business assumes an importance far above the average. The limited amount which is exported passes almost exclusively through New York. The exports from the United States of saddlery for 1862 were returned as $67,759, against an export of leather of $389,037, and boots and shoes of $721,206; but the large and profitable

home demand has amply supplied the place of any foreign market, to be obtained only by a competition with ruinously low prices. We find that in Boston the proportion of harness makers to leather dealers, in 1861, was forty-two to one hundred and one, and there were six dealers in saddlery hardware. In New York city, last year, there were twenty-eight dealers in saddlery hardware and one hundred and thirty manufacturers of harness and saddlery, while the State of New York showed 1,188 independent manufacturers in this branch of the business. Of this number Brooklyn had thirty-one, Buffalo twenty, Albany seventeen, Rochester eleven, Poughkeepsie seven, and the others were very generally scattered over the entire State. In nearly every instance, this large trade has enjoyed a season of prosperous activity since the commencement of our political troubles seldom equaled.

CURIOUS MIXTURE.—In volume two, page 294, of the Harlein Miscellany, is printed "An Elegy on the Death of Trade, by a relation of the Deceased," re-printed from a pamphlet published in 1698, in which occurs the following passage descriptive of the mourners attendant on that solemn event:

"There was Gun-smiths and Cuttle,
And Founders and Suttlers,
And Coach-makers a great many:
There were Coblers and Tinkers,
Those honest ale-drinkers,
And Shoe-makers, too, more than any."

CLEANING OIL STONES.—We take from the *American Artisan* the following recipe for cleaning oil-stones: Take potash, or pearlash, or saleratus, or borax, or any alkali, and put from half an ounce to one ounce in a half pint bottle, fill with soft water, cork and keep it for use. When wanted, pour as much upon the stone as will spread over the same, and let it stand until the oil is "cut," then wash it off. Try it; you will be able to hone as good as when the stone was new. I have found all oil-stones to become fouled and little or no "grit" after using awhile, though the best of oil is used. I think the steel which is cut off by use gives the oil a drying property, hence the stone is fouled, and takes twice the time to set an edge that it would to clean off and renew as the stone becomes dry. Water will not unite with grease, but it often happens that water-stones become fouled with oil from the using. The alkali unites with oil, a soap is the result, and this can only be washed off with clean soft water, and then fresh oil or water can be put on, as the case may require.

LITERARY NOTICE.

THE *Atlantic*, for January, begins the Ffteenth Volume of that invaluable periodical, with new type, and is as interesting as ever. The publishers assure us that the work was never so flourishing as now, having a monthly sale of 43,000 copies. Some of the best writers in America are engaged as contributors, and we are glad to find that their united pens are bringing to the enterprising publishers a reward commensurate with its intrinsic value and their outlay. We cannot imagine how any one can afford to be without this monthly visitor, when it can be had for the low price of $4 a year.

Our Young Folks, noticed in our December number, has also been received. We have read it entirely through, and find it equally as interesting as "Robinson Crusoe" appeared to us in our juvenile days. Price, yearly, $2. This and the *Atlantic* can be had together for $5. Boston: Ticknor & Fields.

The Coach-maker's Letter-box.

NEW BEDFORD, Mass., January 25th, 1865.

MR. EDITOR: *Dear Sir*—I am in receipt of your last issue of THE NEW YORK COACH-MAKERS' MAGAZINE, and I find it with its freightage of choice hints and unique designs, as fresh and original as ever. It is in truth the *omnium gatherum* of carriage culture. I—like many others—deem it an indispensable visitor. For seven years it has made its periodical visits among us, a priceless gem of mechanical literature. I cannot but feel a deep interest in its success, as it gives to the carriage-maker such an easy, cheap and interesting medium of social communication; and its worth will only be known to those whose privilege it is to enjoy it. Who can tell how the void would have been filled had it not been for the prompt and judicious foresight of its able Editor. I beg pardon for the personal allusion. [We blush while we forgive.—ED.] You will scarcely find a factory in the trade but what has received some mechanical benefit from its different departments.

I frequently ask myself, on the receipt of your journal, Is it not my duty, as one of the craft, to contribute something to the pages of such an able and interesting exponent of science, being a work devoted to the best interests of the carriage-maker? Surely it ought to be well patronized by the craft in a body. All its readers are the recipients of its varied theories and practical instructions; and as there must be a fountain—a source—from which to gather topics of interest; and the Editor—although he may be (as I know he is) diligent and untiring in his search for interesting subjects—cannot so well fill his pages without the contributions of the craft.

The country through which this work is sent is progressive. Industry and intellect combined are striving for the culture of man. Although my writing may fall below the standard required for such a work, yet my aim is to induce others who can write to contribute generously and heartily to its advancement. Let all then, with willing minds and hands, subscribe largely and contribute freely whatever may be of intrinsic value to the carriage-makers.

B.

FOREIGN IMPROVEMENTS IN CARRIAGES.

Dec. 26, 1863. CONSTRUCTION AND IMPROVEMENT OF SAFETY CABS AND OTHER LIKE IMPROVEMENTS.—R. Walter, of City Road, London.

These improvements relate more particularly to that class of vehicles called safety cabs, and consist in a novel arrangement and construction thereof, whereby they are rendered more commodious and comfortable, also giving greater care and facility to the passengers during ingress and egress, the weight of the cab being equalized or distributed by the extra wheel, thereby preventing the uncomfortable oscillation or swinging. It is thus described: A strong vertical bar or rod is centrally situated between the shafts and immediately behind the splash board, and extends from the floor to the roof of the vehicle, giving greater strength and durability to the front thereof; to this vertical support or strengthening tie rod the doors of the vehicle are hung or suspended, which open outwards, and which form, when closed to the body of the vehicle, a square, curved or angular front. A further improvement consists in attaching, by means of springs to the

back of the cab and underneath the driver's seat, an intermediate or central wheel, effecting thereby greater steadiness, also equalizing the strain when any undue or surplus pressure is exerted behind the axle. *Not completed.*

Jan. 1, 1864. IMPROVEMENT IN WHEEL-CARRIAGES.—J. N. Nottingham, N. H. P. Gore, and A. H. A. Durant. The patentees claim the construction of the body of such carriages of a combination of a metallic framework or skeleton, with panels or filling pieces of wood, papier-maché, or other similarly light and suitable material (not being metal), as described.

Jan. 27. APPARATUS FOR AIDING OR ASSISTING PERSONS IN ENTERING AND ALIGHTING FROM VEHICLES.—S. Graffin, Harstone, Birmingham. This invention relates to the application of traveling hand-holds to the roofs and other parts of vehicles, such as railway carriages or omnibuses, and consists in the application of longitudinal rods or supports, on which are placed pulleys to run thereon. From the axes of these pulleys depend handles suitable for a passenger to take hold of and steady himself in walking along the vehicle, as in walking up the center of the omnibus, the passenger holding the handle while the pulley runs along the rod. When the handle is released it runs back to the position from which the passenger brought it, by reason of the inclination of the bar or support by which the pulley is supported. Instead of inclining the bars and causing the handles to return by their own gravity, india-rubber, or spiral springs, or cords with weights suspended over pulleys, may be employed to return the handles to their natural position when released by the passengers. In order that passengers may also assist themselves in the opposite direction, the patentee employs two bars and pulleys with handles, the one bar being inclined in the opposite direction to that of the other, so that the handles gravitate and travel of themselves to opposite ends of the vehicle.

May 4. IMPROVEMENTS APPLICABLE TO "DRAYS" AND OTHER WHEELED VEHICLES.—J. McDowell, Liverpool. This invention is chiefly applicable to "drays," or other two-wheeled passenger carriages, to prevent, or partially prevent, the jolting motion of the horse or other animal of draught attached thereto being imparted to the body of the vehicle, and consists in jointing the shafts a little in front of the rear end to the body of the vehicle, or to a scrolled stay affixed to the body and attaching to the rear end of each shaft a flat longitudinal spring, which may be linked to the body of the carriage, or to a C-spring attached to the stationary stay or to the body of the carriage. When these stationary scroll-stays are used it is preferred to form the inner ends thereof with cup ends to receive the front ends of the side springs of the vehicle. In lieu of the longitudinal springs at the ends of the shaft, the shaft itself may be sufficiently elongated to be immediately linked with the C-spring or to the body of the vehicle; or it may be connected with the upper and lower portions of the vertical C-spring by straps of india-rubber, or helical springs. When india-rubber straps or helical springs are applied, they may be connected to the body of the vehicle, in which case the C-spring or stationary stay, or both, may be dispensed with, by jointing the shafts to the fore part of the body of the carriage, and allowing the hindermost end of the shaft to extend sufficiently backwards to give the requisite play to the springs connected with the inner ends thereof. The second part of this invention consists in the construction of "drays" or other open vehicles in which passengers sit back to back, with a body having a scrolled back resembling the front, and jointing the back foot-board to the body of the carriage by a rule or table joint, so that the same may be turned up when not in use, and covering the underside of the joint with leather or other suitable material, to hide the opening, which would otherwise be visible when the hinder foot-board is turned up. By the use of the rule or table joint, the ordinary straps or chains used to support the foot-boards in such vehicles are dispensed with. The third and last part of the invention consists in fitting the front and back seats and the back rests, which are one frame with spring-lever catches, so that it can be readily moved backwards or forwards a given distance.

AMERICAN PATENTED INVENTIONS.

Oct. 11. (44,668) SPRING FOR CARRIAGES.—William Smith, Shrewsbury, Pa.: I claim the frame composed of the longitudinal beams A and A′, and end beams B and C, in combination with any desired number of slats G H H′ and I, passing through the said end beams, having oblong slats for the reception of pins *e*, and being connected together by any desired number of cross-bars J K L, all substantially as and for the purpose herein described.

(44,693) BUCKLE FOR HARNESS TUGS.—Richard Tattershall (assignee to himself and A. J. Bathin), Beloit, Wis.: I claim the frame A, provided or cast with the plates *c c d*, in combination with the clamp B, fitted in the frame A, as shown, and the lever plate C, provided with the eccentric projection D, fitted to the bar *e*, substantially as and for the purpose herein set forth.

18. (44,713) LOADING ATTACHMENT FOR HAY WAGONS.—L. M. Doudna, Elmira, N. Y.: I claim the rotating standard B, provided with the lever C, and placed at the rear of the wagon A, in combination with the hoisting rope D, and drum F, the latter being an adjustable shaft G, at the rear of the wagon, as shown, and all arranged substantially as and for the purpose set forth.

(44,727) SLEDS.—H. C. Hunt, Amboy, Ill.: I claim, *First*, the two rear runners B B′, provided with holsters D D′, provided respectively with a socket E, and a tongue F, fitted together and applied to the bed or platform A, of the sled, substantially as and for the purpose herein set forth. *Second*, the two feet runners G G, provided with semi-circular plates H H, and secured to the bolster I, by screws *f*; the bolster I, being provided with a rib *g*, having ends to fit into recesses H, and lap over the edges of said plates in the recesses, substantially as and for the purpose specified. *Third*, the bars J, composed of two equal longitudinal *h h′*, connected together by screws *i*, and applied to the front parts of the runners G G, with the draught rope K, fitted in, substantially as herein set forth.

(44,807) MACHINE FOR BORING WAGON HUBS.—Jacob Keitch, Rochester, N. Y.: I claim the combination of the adjustable revolving hub-head or socket H, capable of being set at any angle laterally, and the non-revolving feeding cutter-shaft B, the whole so arranged as to cut a tapering hole, substantially as herein described. I also claim the arrangement of the adjustable revolving hub-head or socket H, disk K, ring L, and centering screws and nuts *f g*, for centering and sustaining the hub while being bored, substantially as herein set forth. I also claim the threading cutter D, provided with the angular cutting points *m m′*, for producing the threads on the inside of the hub, substantially as described.

November 1. (44,908) CARRIAGE SPRINGS.—E. M. Wright, Wyandot, Kansas: I claim the combination of two or more elliptic springs, connected at their ends by free joints, as described, so that the inner auxiliary spring shall begin to act only when the outer spring shall have been pressed down to a certain extent, substantially as and for the purpose herein specified.

(44,910) Manufacture of Leather Cloth, Imitation Leather, etc.—Nicholas Szuelmey, Clapham Common, Eng. (Patented in England, Jan. 1, 1862): I claim the use of the substance called zopissa, in the manufacture of leather cloth or imitation leather, and in rendering linen, woolen or cotton fabrics water-proof. I also claim as my invention the compositions as above described, and the mode of making leather cloth or imitation leather, above described.

CURRENT PRICES FOR CARRIAGE MATERIALS.

CORRECTED MONTHLY, BY MR. CHAS. WEEKS, FOR THIS MAGAZINE.

New York, Jan. 21, 1865.

Apron hooks and rings, per gross, $2.50.
Axle-clips, according to length, per dozen, 75c. *a* $1.40
Axles, common (long stock), per lb, 12c.
Axles, plain taper, 1 in. and under, $7.00; 1⅛, $8.00; 1¼, $9.00; 1⅜, $10.00; 1½, $11.00.
Do. Swelled taper, 1 in. and under, $8.75; 1⅛, $9.50; 1¼, $11.25; 1⅜, $13.75; 1½, $16.25.
Do. Half patent, 1 in. and under, $11.25; 1⅛, $13.25; 1¼, $14.75; 1⅜, $16.25; 1½, $18.25.
Do. Smith's New York half patent malleable iron box, 1 in. and under, $10; 1⅛, $12; 1¼, $14.
Do. Saunders' improv. taper, ⅞ in., $13.50; ⅞, $14.50; 1, $14.50; 1⅛, $16.50; 1¼, $20.
Do. do. Homogeneous steel, ⅞ in., $16.50; ¾, $18; ⅞, $20.50; long drafts, $4 extra.

☞ These are prices for first-class axles. Makers of less repute, cheaper.

Bands, plated rim, under 3 in., $2.50; over 3 in., $3.
Do. Mail patent, $3.50 *a* $5.00.
Do. galvanized, 3½ in. and under, $1; larger, $1 *a* $2.
Basket wood imitations, per foot, $1.25.

☞ When sent by express, $2 extra for a lining board to a panel of 12 ft.

Bent poles, each $1.25.
Do. rims, under 1½ in., $2.25 per set; extra hickory, $2.50 *a* $3.50.
Do. seat rails, 50c. each, or $5.50 per doz.
Do. shafts, $6 per bundle of 6 pairs.
Bows, per set, light, $1.10; heavy, $1.25.
Bolts, Philadelphia, 20 per cent advance on list.
Do. T, per 100, $3 *a* $3.50.
Buckram, per yard, 40 *a* 50c.
Buckles, per grs. ½ in., $1.15; ⅝, $1.40; ¾, $1.70; ⅞, $2 10; 1, $2.80.
Burlap, per yard, 50c.
Buttons, japanned, per paper, 30c.; per large gross, $3.
Carriage-parts, buggy, carved, $4 *a* $5.50.
Carpets, Brussels, per yard, $3; velvet, $3.75 *a* $5.50; oil-cloth, 75c. *a* $1.00.
Castings, malleable iron, per lb, 23c.
Clip-kingholts, each, 50c., or $5.50 per dozen.
Cloths, body, $6 *a* $7; lining, $4.50 *a* $5.00 (See *Enameled.*)

☞ A Union cloth, made expressly for carriages, and warranted not to fade, can be furnished for $2.50 *a* $3.50 per yard.

Cord, seaming, per lb, 45c.; netting, per yard, 5c.
Cotelines, per yard, $5 *a* $10.
Curtain frames, per dozen, $1.25 *a* $2.50.
Do. rollers, each, $1.25 *a* $1.50.
Dashes, buggy, $1.75.
Door-handles, stiff, $1 *a* $3; coach drop, per pair, $3 *a* $4.
Drugget, felt, $2.
Enameled cloth, muslin, 5-4, $1; 6-4, $1.35.
Do. Drills, 5-4, $1.20; 48 in., $1.40; 5-4 A, $1.55; 48 in. A, $1.75
Do. Ducks, 5-4, $2; 50 in., $2.20; 6-4, $2.40.
Enameled linen, 38 in., $1.20; 5-4, $1.50; 6-4, $1.75.
Felloe plates, wrought, per lb, all sizes, 28c.
Fifth-wheels wrought, $1.75 *a* $2.50.
Fringes, festoon, per piece, $2; narrow, per yard, 18c.

☞ For a buggy top two pieces are required, and sometimes three.

Do. silk bullion, per yard, 50c. *a* $1.
Do. worsted hullion, 4 in. deep, 50c.
Do. worsted carpet, per yard, 8c. *a* 15c.
Frogs, 75c. *a* $1 per pair.
Glue, per lb, 25c. *a* 30c.
Hair, picked, per lb, 80c. *a* $1.00.
Huhs, light, mortised, $1.25; unmortised, $1.00—coach, mortised $1.75.
Japan, per gallon, $5.75.
Knobs, English, $2 *a* $2.25 per gross.
Laces, broad, silk, per yard, $1.20 *a* $1.50; narrow, 15c. to 20c.
Do. broad, worsted, per yard, 50c.
Lamps, coach, $20 *a* $30 per pair.
Lazy-backs, $9 per doz.
Leather, collar, dash, 36c.; split do., 18c. *a* 21c.; enameled top, 36c.; enameled Trimming, 33c.; harness, per lb, 75c.; flap, per foot, 27c. En. top, if over 60 ft., 42c.; under 60 ft., 35c.
Linen, heavy, a new article for roofs of coaches, $1 *a* $1.25 per yard.
Moquet, 1½ yards wide, per yard, $11.00.
Moss, per bale, 12½c. *a* 15c.
Mouldings, plated, per foot, ¼ in., 14c.; ⅜, 16c.; ½, 18c.; lead, door, per piece, 40c.
Nails, lining, silver, per paper, 12c.; ivory, per gross, 50c.
Name-plates.

☞ See advertisement under this head on 3d page of cover.

Oils, boiled, per gallon, $1.60.
Paints. White lead, extra, per 19 lb $5.00; Eng. pat. black, 35c.
Pekin cloth, per yard, $5.

☞ A very good article for inside coach linings.

Pole-crabs, silver, $5 *a* $12; tips, $1.60.
Pole-eyes, (S) No. 1, $3.10; No. 2, $3.30; No. 3, $3.60; No. 4, $4.85 per pr.
Sand paper, per ream, under No. 2½, $5.75; Nos. 2½ & 3, $6.25.
Screws, gimlet.

☞ Add to manufacturer's printed lists 20 per ct.

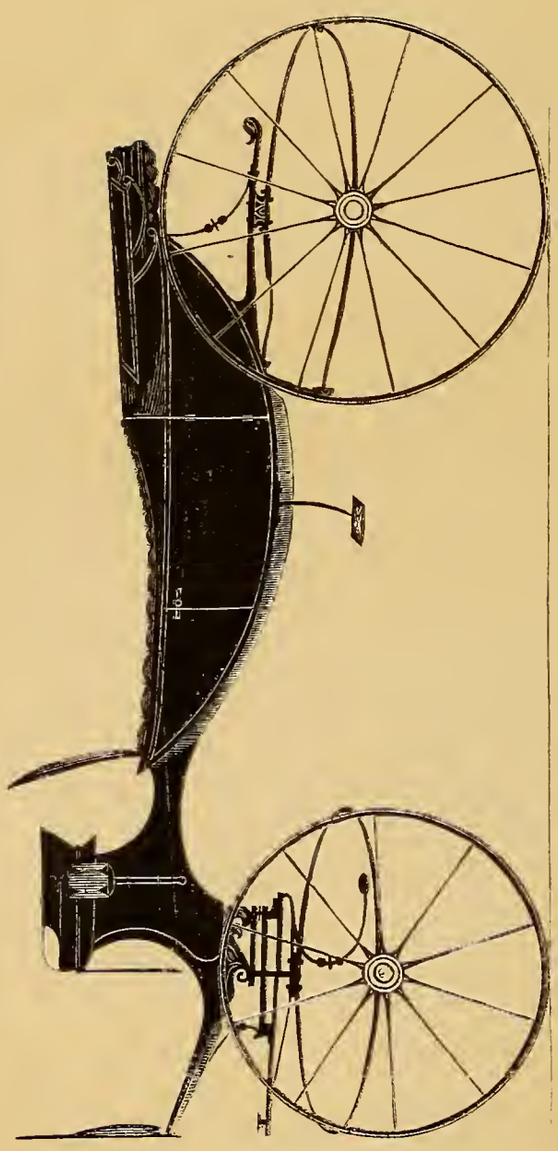
Do. ivory headed, per dozen, 50c. per gross, $5.50.
Scrims (for canvassing), 30c. *a* 40c.
Seats, buggy, pieced rails, $1.75; solid rails, $2.50.
Shaft-jacks (M. S. & S.'s), No. 1, $3.25; 2, $3.75; 3, $4.00.
Shaft-jacks, common, $1.40 *a* $1.60 per pair.
Do. tips, extra plated, per pair, 37½c. *a* 56c.
Silk, curtain, per yard, $2 *a* $3.50.
Slat-irons, wrought, 4 bow, $1.12½; 5 bow, $1.25 per set.
Slides, ivory, white and black, per doz., $12; hone, per doz., $1.50 *a* $2.00; No. 18, $2.50 per doz.
Speaking tubes, each, $8.
Spindles, seat, per 100, $1.50 *a* $2.50.
Spring-bars, carved, per pair, $1.75.
Springs, black, 28c.; bright, 29c.; English (tempered), 33c.; Swedes (tempered), 35c.; 1¼ in., 1c. per lb. extra.
If under 36 in., 2c. per lb. additional.

☞ Two springs for a buggy weigh about 28 lbs. If both 4 plate, 34 to 40 lbs.

Spokes, buggy, per set, $4.20, or about 7c. each for all under 1½ in.

☞ For extra hickory the charges are 10c. *a* 12½c. each.

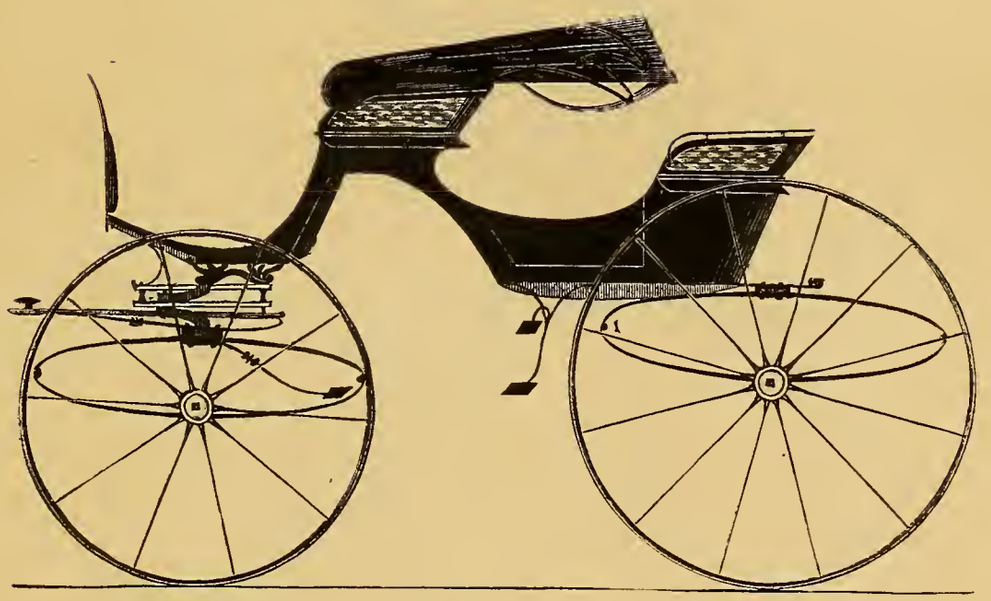
Steel, Littlejohn's compound tire, 1-8 & 3-16 thick, 6¾c. gold; 1-4 & 5-16 thick, 6¼c. gold.
Stump-joints, per dozen, $1.60 *a* $2.25.
Tacks, 10c. and upwards per paper.
Tassels, holder, per pair, $1 *a* $2; inside, per dozen, $5 *a* $12; acorn trigger, per dozen, $2.25.
Terry, per yard, worsted, $5; silk, $11.
Top props, Thos. Pat, per set 70c.; capped complete, $1.50.
Do. common, per set, 40c.
Do. close-plated nuts and rivets, 75c.
Thread, linen, No. 25, $1.30; 30, $1.45; 35, $1.65, gold.
Do. stitching, No. 10, 95c.; 3, $1.15; 12, $1.28, gold.
Do. Marshall's Machine, 432, $2; 532, $2.30; 632, $2.60, gold.
Tufts, common flat, worsted, per gross, 20c.
Do. heavy black corded, worsted, per gross, $1.
Do. do. do. silk, per gross, $2.
Do. ball, $1.
Turpentine, per gallon, $2.75.
Twine, tufting, per ball, 35c.; per lb, 60c. to 75c.
Varnishes (Amer.), crown coach-body, $7; hard drying, $8; nonpareil, $8.
Do. English, $6.25 in gold, or equivalent in currency on the day of purchase.
Webbing, per piece, 70c.; per gross of 4 pieces, $2.60.
Whiffle-trees, coach, turned, each, 50c.; per dozen, $5.50.
Whiffle-tree spring hooks, $3 per doz.
Whip-sockets, flexible rubber, $4.50 *a* $6 per dozen.
Do. hard rubber, $10.50 per dozen.
Do. leather imitation English, $5 per dozen.
Do. common American, $3.50 *a* $4 per dozen.
Window lifter plates, per dozen, $1.50.
Yokes, pole, each, 50c.; per doz, $5.50.
Yoke-tips, extra plated, $1.75 per pair.



CALECHE.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

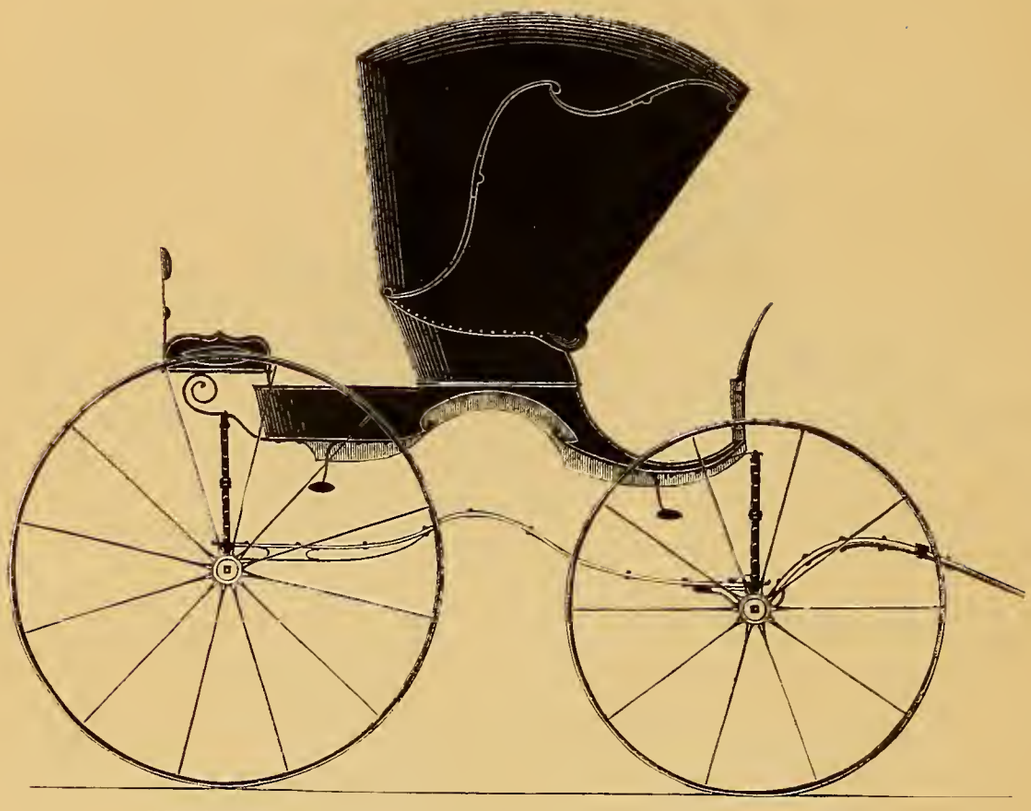
Explained on page 151.



FANCY PHAETON.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 151.



BROWNELL SERVANT-SEAT BUGGY.—½ IN. SCALE.

Engraved expressly for the New York Coach-maker's Magazine.

Explained on page 151.

E. M. S.

T. S. D.

T. H. W.

ORIGINAL MONOGRAMS.

See remarks on page 153.

THE NEW YORK
MECHANICS' MAGAZINE

DEVOTED TO THE LITERARY, SOCIAL, AND MECHANICAL INTERESTS OF THE CRAFT.

Vol. VI. NEW YORK, MARCH, 1865. No. 10.

Mechanical Literature.

VARIABLE VELOCITY; OR, THE INCREASE AND DIMINUTION OF VELOCITY.

BY S. EDWARDS TODD.

The proportion between the velocity of a body and its weight is a subject of vast importance to the tyro, particularly in practical agriculture and the affairs connected with it. In order to make the most economical disposition and appropriation of the force of his laborers and of his team, and to save the greatest amount of time, it is very important to know with what velocity both they and the machinery employed should move. There is a certain velocity necessary in almost every operation of the affairs of the farm and workshop, from which, if we increase or diminish, we do it at the expense of time, or labor, or of both. He who exercises the greatest economy in saving time, and makes the most judicious appropriation of his force, in performing a given operation, will, unquestionably, succeed best in whatever he undertakes.

When the force of either men or animals is employed to perform a certain operation, the muscles are fatigued. The fatigue thus produced does not depend entirely on the actual force employed, but, in part, upon the frequency with which that force is exerted. In accomplishing every piece of work, by muscular force, the exertion consists of two parts. One of these parts is the expenditure of the force required to drive the instrument or tool; and the other is the effort required in giving motion to the limbs of the man or animal, which produces the action. For example: a man, in driving stakes into the ground with a sledge, expends a certain amount of force in propelling the sledge against the stake, and a certain amount of force must first be expended in elevating the arms and sledge for the purpose of striking. Both of these operations produce fatigue on the muscles. If the sledge be a heavy one, the greatest part of the exertion will be required in striking. But if the sledge be rather light, the exertion necessary to raise the arms and the sledge, will produce the greatest fatigue on the muscles. It not unfrequently happens that, in performing certain operations, in which a very little force is required, if very frequently exerted, the muscles will be more effectually fatigued than when engaged in more laborious work. It is of first importance to adjust the weight of different tools, and the velocity with which they must be moved, so as to produce the greatest effect with the least fatigue of muscles.

There is a degree of rapidity in the action of the muscles of man, beasts and birds, common to each, beyond which, if the action of the muscles be pressed, the fatigue will soon produce complete exhaustion. If a man was to attempt to move his extended arms with the rapidity of the wings of a dove, he would be very soon exhausted. If a man was to move his legs, in walking or running, with the rapidity of a very little lad, the fatigue would be so great on the muscles as to soon produce exhaustion. The idea to be kept in mind in adjusting the velocity of a team drawing an implement from place to place, or in propelling machinery so as to give the correct velocity to the various parts of machinery, is to have every part move forward or revolve with a velocity which will produce the least fatigue on the muscles, and, at the same time, perform the operation desired with the greatest efficiency.

THE CORRECT VELOCITY FOR MACHINERY.

In adjusting the velocity for a buzz-saw, to be driven by a railway or endless platform horse-power, if the driving wheel be so small, and the pulley on the saw-shaft so large, that the horses must walk faster than their natural gait, they will very soon become jaded by performing a limited amount of labor. On the contrary, the driving-wheel must not be so large, and the pulley on the shaft so small, as to give a very high motion; because, in the latter case, very much of the available force of the horses will be lost in merely giving the saw a certain velocity, which is all they would be able to do when the saw was not in use. There is no danger in having a buzz-saw revolve with a very high motion, providing there is an abundance of available force to keep the velocity or motion up to such a point. This holds good, also, with respect to a cylinder of a thrashing-machine, and many other machines. Sometimes machines are geared to run with such a high motion, that it requires the force of another horse-power to perform a given operation, simply because the motion of some parts of the machine is much higher than is necessary.

THE NATURAL GAIT OF ANIMALS.

As we increase the velocity or speed of a team beyond a certain pace, we diminish their available force in moving

a load. On the contrary, we may not be able to avail ourselves of one-half of their force, because they are not allowed to move at their natural gait.

In performing operations with machinery, when the work is very light, it becomes necessary to increase the velocity in order to economize time, and to make a judicious appropriation of force. When the work is heavy and the force limited, the velocity must be *diminished* for the same reasons.

Were a man, in turning a fanning-mill, to attach the crank to the shaft that holds the fans or wings, the fatigue produced on the muscles would be so great in a few moments—if he gave the necessary velocity—as to cause exhaustion. In this case the fatigue, for the most part, would arise from the efforts put forth for the necessary motion of the man's arms, which made the fans revolve, and not from the expenditure of the force necessary to drive the mill. But by adding a system of wheels, so that the fatigue of the limbs producing the action is very much less than in the former case, and a little greater expenditure of force in turning the mill, the labor may be continued for hours with little fatigue. So with some kinds of corn-shellers, and a multitude of many other machines.

In some kinds of stump-machines where the capstan is used, and in the tackles, and in many other kinds of machines, the velocity is diminished for the sake of making the best appropriation of the force employed.

Good teamsters—if they are as illiterate as the beasts they drive—understand, too well to be told, that it is far better for their teams to take a load as heavy as they are able to draw, and move with their natural gait, than to take half of that load at once, making two journeys in the same period of time. This principle is too often lost sight of in many of the manipulations of the farm and workshop, where human force is alone to be exerted.

ELEVATING MATERIALS WITH MEN.

There is a vast amount of labor performed, where the force of men is employed, in carrying materials up-stairs or up inclined planes, &c., and it is well understood by those who have had any experience in the matter, that it is very laborious and fatiguing work for men to carry substances, on their shoulders or in their arms, to any considerable height. A man, whose powers of endurance are very great, will be able to carry a number of pounds, equal to his own weight, up several flights of stairs or a long inclined plane, for several journeys in succession, without very much fatigue; but those who ascend with a load on their shoulders, and descend empty, will be able to carry a number of pounds equal to but a small proportion of their own weight, when the labor is continued from morning till night.

M. Coulomb, who investigated the most advantageous load of wood for a porter to carry up-stairs, found, by experiment, that a man who walked empty up-stairs and stepped on a platform which descended with him, and thus raised an amount of wood almost equal to his own weight, could elevate as much wood into a high building, as four men could carry up the stairs in their arms, when they all labored ten hours per day.

Many farmers, as well as mechanics, could make a very practical application of this principle in raising corn ears or apples to the garret of a high house or barn, by having a rope over a pulley in the peak of the barn, and a large basket attached at one end of it and a small platform at the other end of the rope. Then, as he descends, he regulates his velocity by taking hold of the rope that holds the basket. This is a very easy and effective way to elevate grain or any other substances that must be carried aloft. In carrying brick and mortar up high buildings, one man would elevate as much by going to the top empty, and, by standing on a platform, thus allowing his weight to draw up the brick, as three men could carry up, in a day, in hods on their shoulders.

WAIFS FROM A COACH-MAKER'S PORTFOLIO.

Papers of some interest having recently been placed in our hands, by a literary coach-maker now retired from the business, which we deem of general interest to the craft, we take much pleasure in making them public.

I.—Playing Lawyer in the "Jarseys."

Nickumhauser, whose sneaking imps had discovered that some *green* "knight of the drawing knife" had, in an evil hour, been infringing upon his alleged claims, instigated by the Father of Lies, took it into his "noddle" to sue for damages in the sovereign State of New Jersey, with what success the reader will learn from the *running-gear* of our story. Now, none but a foreigner, or a simpleton, would ever expect to have justice done him in that quarter, especially since the last presidential election, when the sympathies of its people were so decidedly expressed in favor of Jeff. Davis and his bogus Confederacy. As every Knickerbocker knows, Jersey has always been hard on strangers, particularly the Dutch. But our hero, being a man of nerve, determined to go "over there," and play self-lawyer, having become decidedly disgusted with "the regular faculty," because, as he said, *they were all a set of rascals*. In this proceeding he only exhibited *weakness*, for who ever before heard of a lawyer's undertaking to sue any one on his own account? They generally know enough to avoid such mistakes.

Well—to come back to our story—the complaint was duly served, the answer put in, and a day set for a hearing, when Nick and the plaintiff's attorney met face to face in the august presence of a New Jersey judge, not far distant from the ancient town of Communipaw. But at this point Nick found himself in a dilemma. The judge, having ascertained him to be merely "a pettifog," ordered him to find some limb-of-the-law with a regular diploma before his cause could be heard, as no other would be allowed to *spout* in that court. All Nick's "sweet foreign accents" to persuade the judge to let him go on proved unavailing. At this stage, too, another difficulty presented itself. Nick being a "fureigner," the defendant's counsel motioned that he be required to give bonds to abide result of suit. This was the *hardest* cut of all, and ended in an adjournment of the case, and an order for our pettifogger to supply himself with the requirements of both cases. This he promised to do; but, instead thereof, appeared on the appointed day with a written speech, the object of which was to convince the judge that these *little* matters—hiring a lawyer and giving bonds—should be dispensed with, and his case proceed. Nick had not proceeded far in *his* argument before the stentorian judge cut him short off with the order "not to offer another word in that court until he found a lawyer and bonds," and immediately adjourned the court. This was many months ago; but we believe Nick has come to the decision

that justice has her eyes too far open for him to practice law in that sovereignty. So, at last advices, matters stood in *statu quo;* and he has gone to practice law in some locality where the courts are not particular in excluding graduates of the blacksmith-shop from law practice. So "the *fire* of his genius" has not yet, in this particular case, "made the pot boil" *over there.* When it does we intend to be there to report.

II.—Story of a Chaise.

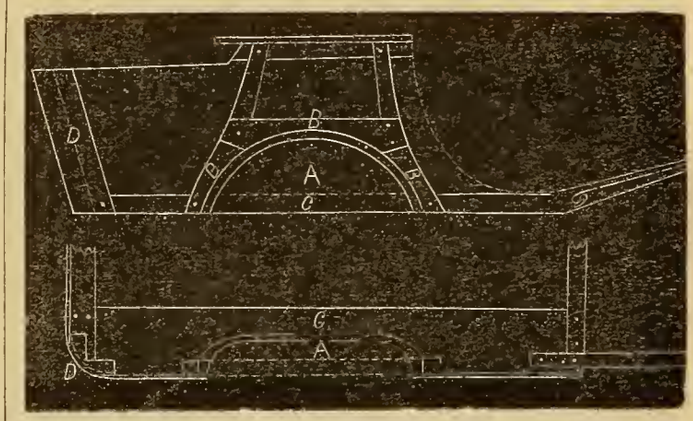
In olden time—say seventy years ago—
When Boston town was somewhat less than now,
There lived a Squire—an upright judge was he,
Whom good men loved, but rogues were pained to see—
Who kept his "shay"—a goodly "cheer" and strong—
A tale of which is now the burthen of my song.
This honest Squire—'twas thus the story run—
Had a *smart* boy, his mamma's "darling" son,
Joshua by name—and famed through all the town
For playing tricks on all the neighbors round.—
Indeed, 'twas said his match was never scanned
Until he met with youthful David Brand.
Now, David lived three miles adown the neck
(Where dwelt old Carver and his daughter "Beck").
For building chaises he was fam'd all o'er.
From Tri-Mountain City to Penobscot's shore,
His fame was dwelt upon by every lip;
And fortune favored this our "brother chip."
One Wednesday night, as Josh had done before,
He drove his chaise before old Carver's door,
Then hitched his nag securely to a tree,
While he "popped in" his Becky dear to see.
Our craftsman David saw the rival's shay,
Unguarded, quiet, standing o'er the way,
When, stepping up, he cut a "thorough-brace"
In two almost. This formed a weakly place
Where, should it part, Dave saw—'twas very plain—
Would put an end to courting there again.
* * * * * * * * * * * * *
The love-spent hours had quickly sped away,
And midnight ushered in another day,
When, hastening to his "shay," our hero sped
Along the road that did him homeward lead,
Unconscious he of any danger near
(Lovers, you know, must never harbor fear).
While passing o'er a rustic bridge he found
Something give way—*that* dash'd him to the ground.
Plump in a frog-pond full of mire and dirt,
Up to his knees he found himself begirt.
Wallowing in filth, in pain he stammered out:
"I wonder what this mischief's all about!"
Closer inspection brightened up his mind:
"This is a dirty trick, my earriage paid in kind."
Moral.—Let those who tricks on others play
Expect reward some other day.

III.—Model Puffing.

A rural carriage-maker having paid the half-starved editor of a village newspaper quite a liberal sum, considering the small means generally possessed by this class of mechanics, obtained as the reward the following *strong* puffing for his wagons: "It can't be done, as Sampson said when he got hold of one of Mr. Johnson's wagons with both hands, and couldn't budge it a hair. It took a strong power to overthrow the walls of Jerusalem, and Noah built a strong ark, and Sampson turned over the meeting-house full of people; but no such one-horse power can touch the wagons built by the above firm—for no doubt Sampson tried it, gave it up, had his hair cut, and went home 'dead beat.'" The reader will pronounce this notice a little strong; but, unquestionably, money is powerful, for it overcame Sampson himself in his day; indeed, there appears to have been a general *weakness* shown by mankind for the "stuff" ever since.

CONSTRUCTION OF THE DEMI-CUT-UNDER, AND THE BACK CORNERS OF BUGGIES.

The cut-under A is formed by getting a bowl turned to any desired depth—say three inches—and afterwards cutting it into parts to suit the size of the body to which it is to be applied. It is then fitted into the frame-work



Demi-Cut-Under Coal-Box Buggy, showing Construction of the Bowl and Round Corner.—¾ inch scale.

B B B, and bottom-side C. After careful gluing and nailing, the frame-work is ready to receive the panel. This panel should be properly fitted and glued on, likewise, over all, thus effectually hiding the joints. Our diagram shows an outside view of the frame-work, deprived of a panel, giving a different mode of construction of the cut-under from that illustrated on page 135 of this volume.

The accompanying diagram—in which at C is a bird's-eye view of the bottom-side—shows the manner of making the round corner D. A block about two and a half inches square is sufficient to make a good full round. This must be halved in on the side and back, so as to avoid showing the joint when finished. Having rounded off the outside to suit the fancy or taste, the inside may be trimmed out with a gouge, or round-faced plane.

MECHANICAL POWER AND FRICTION.

BY HENRY HARPER.

(*Continued from page* 133.)

Friction is necessary in the use of mechanical power; yet, under certain circumstances, it becomes an impediment which taxes all the faculties of the mind to overcome. It has been generally divided into two kinds: "sliding, and rolling friction." This classification throws a mystery over its nature, and is an admission that the simplicity of its operation is not comprehended.

There is one thing which the student of natural laws will notice, and that is, that the same principle is made to work out a variety of results; and, when those results are traced back to their origin, they are found to be generated from principles such as we have seen in mechanical power, and are legitimately derived from the lever. If this fact is not kept continually before the mind, we shall fall into the error of dividing the original

cause—which is but one—into as many kinds as we find there are manifestations which we cannot account for. By thorough examination, we find that where a principle exists it permeates all nature's works, and does not require such subdivisions as our finite minds would make.

The two kinds of frictions, as they are termed by many, are examples of this kind of folly, and have led to more absurd notions in overcoming it, by wagon-makers, than any other vagary ever broached. "Rolling friction" is said to be generated at the tread of our wagon wheels, destroying the motive-power that propels the wagon. It happens to be a fact that there is some friction created between the axle and axle-box in wagon wheels, destroying some of the motive-power; therefore, the mechanical doctor applies his remedy for the difficulty, both at the axle, where it exists, and at the tread, where it does not. At the axle, where it does exist, the remedy is as various as the ideas entertained in regard to friction. At the tread of the wheel, where that *nonentity* called "rolling friction" is supposed to exist, the practice is not so varied; but it is somewhat singular that the *remedy* should be *bona-fide* friction generated by making the wheels run partially sideways.

This sliding motion is obtained by setting the points of our axles a little forward, inclining the wheels to run together every time the wagon is moved. They are only prevented from approaching each other by the collars of the axles. Any one will understand that this oblique sliding of the wheel will create friction both at the bottom of the wheel and the collar of the axle, while the wheel is revolving. It is called giving the wheels "gather," and, so far as my knowledge extends, is practiced by four-fifths of the wagon-makers throughout the land. This practice is so general that the majority quote this as an argument in its favor. But this argument does not save us from the violation of mechanical laws, nor the consequences of the same. The sliding friction is entirely unnecessary in this case, while that which is classed as rolling friction is that which gives the lever of the wheel motion, and without which the wagon could not be used as a lever-power. Or, in other words, it is the power expended in working the lever, and which has been mistaken for friction, that destroys the motive-power.

The nature of friction, to some extent, has been ingeniously presented by one of our own craft (?), Mr. Robert Austice, an Englishman, more than half a century ago. The ideas he advanced have been but little regarded, perhaps from the non-philosophical character of that class of mechanics to whom they were principally addressed, more than from any fault on his part.

These different degrees of friction are generally (but not always) owing to peculiar configuration in the surfaces, as seen for instance in the inequalities of two surfaces rubbing together and interlocking the projecting parts, as illustrated in figure 1, page 26, Volume IV, of this Magazine. It is certain they would have to be unlocked or broken off to allow the two to pass each other. They are of a pyramidical shape, giving them greater strength to resist a strain; and the sides being inclined planes, favor their raising up and passing by each other. In opposition to this favorable circumstance is the degree of force by which they are held together, which generally consists in the weight. If the weight bearing upon them is so great that it will not yield enough to allow the particles to pass by each other, through the advantage given them in rising on an inclined plane, they must necessarily be broken off, and that produces what is called friction. The motive-power necessary to make the rubbing parts rise on an inclined plane, or to break off the inequalities of the surface, is counted as a loss in most machinery. From their pyramidical shape they derive a strength at the base, which is not maintained nearer to the point; therefore, although they may rise on the inclined plane at the base, they may yet break off nearer the point where the heft overbalances resisting strength. This is what is called polishing down the surface. There must be a time when the projecting parts are worn off even with the base; and this is termed a perfect polish, which we are all aware is obtained easier on some substances than on others. At this stage we leave the subject, until we have found a remedy in the case calculated to decrease the effects of friction on motive-power.

It has been suggested as a certain remedy for friction, that we reduce the surface of the rubbing parts. This suggestion has been carried out to the letter in wagon axles, and, as some suppose, with success. If this is so, the case presents a contradiction to all other practical experiment, as well as theory. If we suppose a wagon axle to have nine of these pyramidical projections on its bearing surface, and we reduce them to six by contracting the surface—as is usually done with axles and boxes in making the bearing come upon the ends, by taking it out of the middle space—we reduce the bearing surface one-third. What we effect by this process is changing the equality of the resisting, to the bearing power. Instead of breaking off a small particle from the points, the same pressure would wear down one-third more of the six pyramids, and that third, before breaking off, would offer the same resistance to motive-power that the lesser quantity from the whole number would have done. There is no gain in power, but a loss that tends to wear out the axle, by the increase of wear concentrated on one part of the axle and box. The correctness of this theory is fully borne out by practical results, which show that wagons with axles having bearings throughout the whole length of the arm, wear longer than those where the bearings are contracted. The wear, or friction, is the resisting power in machinery; therefore, where there is a great amount of wear in any part subjected to friction by rubbing the parts together, that indicates the amount of motive-power wasted. For instance, if a wagon axle is worn out quickly, it requires very little argument to satisfy a man of common sense that the wagon runs hard.

All wheels to railroad cars, wagons, etc., are levers for overcoming friction, as well as to lift loads up inclined planes; and, to accomplish this double office, the lever part is at different ends of a radius line to the wheel.

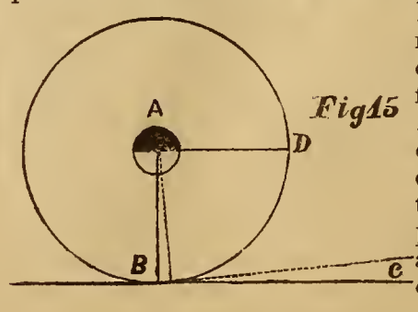


Fig15

For instance, figure 15 represents a railroad car running on a perfectly level track B C. All the power required would be that necessary to overcome the friction on the upper part of the axle A, and this would be concentrated mostly at

the upper part of the axle. To overcome this friction would require great power, as we have explained in saying that friction is not diminished by diminishing the rubbing surface; but this power is supplied in the leverage from A to B. This line, compared with the distance from the fulcrum to the rubbing parts, is a great lever-power, especially when connected with the compound levers of the lubricating matter, which we shall explain by and by. As the bearing falls perpendicularly upon the radius line A B, the friction would extend but a trifle on each side of that line; but, so far as it does extend, that distance, compared to the radius A B, is the amount that is gained to overcome friction. In geometrical lines a circle cannot touch a straight line at but one point, neither can a smaller circle touch within a larger one at but one point; but, where a larger one contains a great amount of weight, and is resting upon a small one, there will be a certain degree of flexibility that will make the larger one accommodate itself to the circle of the smaller one, which accounts for the bearing on each side of the radius line.

The leverage which enables a wheel to rise on an inclined plane and lift the load is shown by a dotted line; and the dotted line drawn at right angles with this plane represents the radius, as seen in figure 15. The distance of one radius line from the other at B, compared with their length, gives the relative amount of leverage that the wheel has to ascend the inclined plane. Each acts and resists in proportion to their length, or as nearly so as can be represented by figures. The friction of the wheel on the plane propels the lever; and with a wagon wheel it is of no consequence whether the friction is more or less: no more of it will be used than is necessary to propel the lever. This is what has been miscalled "rolling friction," which motive-power is required to overcome. Its resistance to the motive-power is reduced in proportion to the leverage of the wheel. One pound of friction at the tread of the wheel will overcome, on a leverage, from fifty to one hundred pounds at the axle. The leverage gained in raising a load over obstacles and up inclined planes varies according to the height of the obstacle, or incline of the plane. On ordinary roads the gain of leverage would be such that one pound of draught would move about twelve pounds of the load. A wagon wheel always contains the same amount of leverage for overcoming the same obstacle, which is in accordance with its size and the size of the axle. It is prevented from using its lever-power to the utmost advantage by different grades of friction—unnecessarily created at the axle and the tread of the wheel—as, for instance, crowding the wheel sideways, and by unequal bearings on the ends of the axle arm, &c. A mechanic may bestow any amount of care on a wagon in its general construction, yet render it entirely worthless by not understanding true principles and avoiding unnecessary friction. The great difference in the draught of wagons made from the same pattern, of the same heft, and by the same mechanic—in the absence of other proof—would be sufficient to establish the fact that general principles have never been taught the craft.

There are some indisputable facts which seem to favor the idea that friction increases in proportion to the increase of the rubbing surface, which should be noticed. Sometimes the propelling wheels to locomotive engines have not enough friction on the rail to draw the amount of cars required; therefore, resort must be had to some expedient for creating friction. The heft of the locomotive is sometimes effectual, but that is limited by the relative strength of the rail. Throwing sharp gravel on the rail is another common resort, but the effect of that is also limited. A very ingenious way has been employed by an English mechanic, and used just sufficient to prove that in this particular case a greater bearing surface did create more friction. The driving-wheel was made with elastic springs on which rested an elastic tire. The weight of the locomotive flattened that part of the tire resting on the rail; as seen in figure 16. This figure represents an exaggerated view for the purpose of illustrating the surfaces of the wheel and rail coming in contact. The motion of the revolving wheel makes the power strike the rail nearer perpendicular to the pyramidal sides of the rough parts of the rail and wheel—as the curved lines from the center represent—which would be the side that would sustain the most strain, and at the same time would have the least power of glancing from the rough parts. In this case an additional power is given to the wheel in clinging to the rail, which corresponds somewhat with the number of projecting parts interlocking each other, before alluded to.

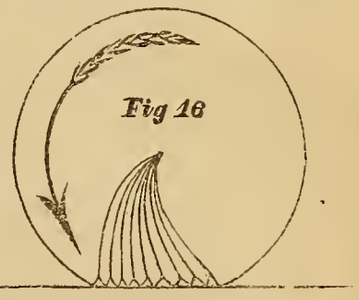


Fig 16

Experiments have proved to a certainty that where the power is applied parallel with the plane on which the rubbing surface moves, that the friction is not increased by the amount of the rubbing surface. Take a brick and draw it on a board, by a cord running parallel with the board, over a pulley, first on its side, then on its edge, and it is found that it requires the same amount of motive-power in each case to move it. If the power is applied obliquely to the surface, by lowering the cord towards the plane, more friction will be created, as may be seen by its requiring more power to draw the brick on the board; and, if it is obliquely from the plane, by raising the direction of the cord from the plane, less friction will be created, and less motive-power required.

These different results always have a cause, as in the case of the elastic car wheel, and in drawing the brick obliquely to the plane on which it moved, the irregularities of the surface brought in contact by power nearer a perpendicular with the sides, would account for increasing the friction and its requiring more motive-power. If the sides could be brought exactly perpendicular to each other by the power, there would be no chance for them to slide by each other; but they would necessarily have to be broken off, when the two parts were moved in an opposite direction. Upon the same principle, the nearer they approach to a perpendicular the more resistance they will offer, and the nearer they are to a breaking point; in other words, the more friction they create.

(*To be continued.*)

CARRIAGE-MAKING IN CONCORD, N. H.

We learn, from the Concord *Daily Monitor*, that the old firms of L. Downing & Sons and J. S. & A. E. Abbot, have been dissolved, and a new one formed under the name of Abbot, Downing & Co. The members of the new firm are J. Stephens Abbot, Lewis Downing, Jr.,

and Edward A. Abbot. Our cotemporary, in making the announcement, connects therewith a history of carriage-making, in Concord, for the past fifty years, a portion of which, being of general interest, we transfer to our columns.

In May, 1813, Lewis Downing, Senior, then a young man of one and twenty years, came to town from Lexington, Mass., and immediately opened a wheelwright shop on the spot now occupied by the first house this side of Dr. Carter's house, on the corner of Main and Washington streets. He had learned his trade of an older brother, who succeeded his father in the same business, in Lexington. After his apprenticeship of four years, he worked one year as a journeyman in Charlestown, Mass., before his removal to Concord. The capital with which he started business consisted of $125, seventy-five dollars of which was invested in a good set of tools. He commenced building common wagons with the body fastened down to the hind axle, then called Buggies. For the first year he worked alone. He usually made the wood work for two wagons, took them to the N. H. State Prison to be ironed—one wood work paying for the ironing of the other—and then painted them himself. For these wagons he found a ready sale at sixty dollars a piece. The first wagon he built was sold to the late Dr. Samuel Morrill of this city, the remains of which were in existence not many years since. After the first year, business so increased that he employed two hands, which number was afterwards increased according to the exigencies of business.

In 1815, he bought the house at the south end of Main street, where he now lives, then known as the "Duncan Estate," but it being subject to a lease, he did not remove there with his business until 1816. In the rear of the house he had a small shop, where the wood work and painting was done, the iron work still continuing to be done at the Prison, and by a Mr. Whitney, who had a blacksmith shop near where Francis N. Fisk's store stood, at the north end of Main street.

In 1825, he commenced erecting the shops near his house, which were destroyed by fire in the winter of 1849, and then owned by J. Stephens Abbot. For twelve years he manufactured only wagons, the style of which underwent several changes. The first attempt at a spring was a wooden one, reaching from the hind axle to the rocker, which was followed by the leather thoroughbrace and successive styles of elliptic springs.

In 1826, he commenced the manufacture of chaises, but did not have sufficient demand for them to make their manufacture a leading feature in his business. The first chaise he made was sold to Rev. Dr. Bouton, in 1827.

In 1826, he commenced the manufacture of coaches which have since made the name of Downing & Abbot famous the country over among gentlemen of the whip. That year he went to Salem, Mass., and hired J. Stephens Abbot, then a journeyman coach-body maker, who had learned his trade with, and was at work for, Mr. Frothingham, a somewhat celebrated coach-maker, to come to Concord and build three coach bodies. Mr. Abbot came to town on Christmas Eve, of that year, and made the first coach bodies ever built in New Hampshire during the winter and spring of 1827. The first coach was completed and went out of the shop in July, 1827, and was sold to John Shepherd. One of the remaining two was sold in Vermont soon after.

After completing his job with Mr. Downing, Mr. Abbot went to Framingham, Mass., and was about to form a business connection there, which the friendly counsel and advice of a tavern keeper with whom he stopped prevented. He then went to Providence, R. I., and worked a short time, but not feeling contented returned to Concord in the fall, and was taken in as a partner by Mr. Downing, Jan. 1, 1828. Coach building immediately became a leading feature of their business; and by reason of the lightness, durableness, and elegance of finish of their coaches, they soon made their way into every part of New England. It is worthy of remark here that while other carriages have undergone an infinite variety of changes in style, the Concord coach was so near perfection in its line, at that early day, that it has scarcely undergone any change in construction since.

In 1835, Mr. Downing sold his shops to Mr. Abbot, the firm renting them of Mr. Abbot, as it previously had done of Mr. Downing.

The partnership of Downing & Abbot continued until September, 1847, when it was dissolved by mutual consent, Mr. Abbot continuing business at the old shops, and Mr. Downing taking in his sons as partners, removing to new shops nearly opposite the Phenix Hotel, where they have continued business to the present time.

The carriage manufacturing business seems to have received a new impetus about this time, and probably the competition between the two establishments did much to increase the business of both. The Messrs. Downings commenced in their new shops with about thirty hands, and in a few years increased to eighty; they also started with four forges, which were increased to eleven in the shop, with two or three outside the yard. The settlement of California opened a large trade to them, both in coaches and carriages, and Lewis Downing, Senior, has twice visited that State to look after the business interests of the firm, and is well known in that young, vigorous and promising State.

In 1850, they commenced the manufacture of omnibuses, and built a large number which went to Philadelphia, and, as we remember, attracted considerable attention in the Quaker City, being escorted into the city by a band of music.

In the meanwhile Mr. Abbot extended his business in the South and West. In the winter of 1849 his shops were entirely destroyed by fire. He immediately replaced them with the present commodious and convenient shops.

In 1852, he took his son, Edward A. Abbot, as a partner, who has continued with him to the present time. As an index to the growth of their business, we would state that in 1828 the firm of Downing & Abbot had but four forges. At the present time, and for several years past, J. S. & E. A. Abbot have had twenty-four forges in operation in their shops, besides much smith work done outside of their yard. The hands in the shops have increased from seventy-five in 1847 to about two hundred men. At the breaking out of the rebellion, the Southern trade stopped, but new sources of demand have opened in Mexico, California, South America, Australia, New Zealand, &c., and even light carriages have been ordered for Ireland, Scotland and Prussia.

It may be asked what has given Concord coaches and carriages such a reputation? One cause, undoubtedly, is the thoroughness of the work done. The very best of

materials have been sought for, and the best skilled labor employed, and wisely so. A good workman could have employment as long as he pleased. There are men who have been in the employ of the Messrs. Abbot and Downing for twenty, thirty and even forty years. A large portion of the men employed have become permanent residents of the town, and own the houses they occupy. For several years past, one or the other of the establishments, and frequently both of them, have been represented in the Legislature, or city government by some of the employees.

The new firm contemplate erecting a large shop the coming season in addition to the ones at the South End. They will occupy a portion of the shops in the Downing Yard for the present. About five acres are covered with the shops and the lumber yards at the South End, and the motive power for the machinery is furnished by a fifty horse-power engine. The business will be continued in all the departments of Wood, Smith, Trimming and Painting as heretofore, and they will probably employ not less than three hundred men. The Office and Carriage Depository at No. 26 Central St., Boston, and No. 618 Battery St., San Francisco, will be continued. With the business experience, tact, skill and enterprise of the members of the new firm we doubt not that ample pecuniary success will crown their efforts, and satisfaction be afforded them in the reflection that they are contributing largely to the growth and prosperity of our beautiful city, by calling to their employ intelligent, industrious, enterprising, skillful and patriotic workmen.

Mr. Downing, Senior, retires from business, after active participation in it for nearly fifty-two years, and we think that we express the general sentiment of the community when we say that during that time, his integrity having never been questioned, he is entitled to be called Concord's best benefactor.

Pen Illustrations of the Drafts.

CALÈCHE.

Illustrated on Plate XXXVII.

This beautiful design is the production of one of the artists attached to this Magazine, and forms a fitting companion to the one on plate IX of this volume. No doubt it will find favor in the eyes of mechanics of correct taste. The American mode of construction may be seen on page 45, volume II; the English, on page 187, volume III.

FANCY PHAETON.

Illustrated on Plate XXXVIII.

We admit this to be a snobbish looking affair, and we could scarcely "keep in" after putting it in shape—an odd shape some will think—yet, all must admit that this is an original; a point not always so easily maintained. This vehicle is well calculated for those aristocratic pretenders (shoddies) preferring to hold the "ribbons" themselves, when driving out on the Avenue, accompanied by the waiter. The door in this instance is a mere sham, and, as in many other cases, in keeping with the shamocracy of some of the up-town aristocracy of New York. In a word, we consider our design just odd enough to meet the tastes of some odd people.

BROWNELL SERVANT-SEAT BUGGY.

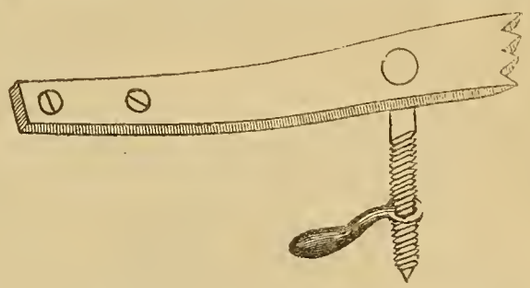
Illustrated on Plate XXXIX.

We have received, from Mr. G. G. Barker, of New Bedford, Mass., accompanying the design, the following note: "This drawing is original with myself, having been drafted by me, and a carriage made from it in Mr. Geo. L. Brownell's establishment, for Dr. May, of Oporto, Portugal. As you will see, it is round-cornered at the back end, with plank sides. The turn-over seat behind is a very good arrangement for either a servant or children. Observe that there is a step thrown back from the forward axle, it being more convenient to have two steps than one, because one would have to be so high on account of the cut-under. It gives me much pleasure to be able to send this to you, and you will be in the receipt of many more from time to time, as I find leisure."

Sparks from the Anvil.

BENCH HOOK.

This drawing of a bench hook has been communicated for the Magazine by Mr. J. B. Peek, of Columbus, Ohio.



He writes respecting it: "I have used it for fifteen years. I first saw it in Philadelphia. I think it is far better than the one illustrated in the March number of your Magazine for 1861, as it is not as complicated. It is made from a piece of spring steel, and, I think, the accompanying sketch will illustrate the shape of it. When made, it is let into the bench, and there fastened by two large screws at the end. A counter-sunk headed bolt passing through it, with a thumb screw on the lower one, lowers or raises it at will. By this means you can plane a board to $\frac{1}{16}$ of an inch; or raise the hook to $1\frac{1}{2}$ inches if required."

WELDING IRON BY HYDRAULIC PRESSURE.

Several experiments have lately been made in Paris by M. Duportail, in the workshops of the Western Railway, to ascertain whether iron might be welded by hydraulic pressure, instead of by the sledge hammer. The latter, indeed, has not a sufficient impetus to reach the very core of the metal, while continuous pressure acts indefinitely to any depth. In the experiments alluded to, M. Duportail caused two iron bars, an inch and a half in

diameter, and heated to the welding point, to be placed between the piston and the top of a hydraulic press. The bars were welded together by this means with extraordinary success, the iron being, as it were, kneaded together, and bulged out at the sides under the pressure. The action of the press was suspended when the part welded was brought down to the thickness of the bars. After cooling, the welded part was cut through, to examine the inside, which was found perfectly compact. To try it, one of the halves was placed under a forge hammer weighing 1,800 kilogrammes, and it was not until the third stroke that the welding was discovered.

STEEL AND IRON.

The difference between common iron and steel is in the carbon in the latter; but if iron be heated to a white heat and plunged in cold water, it becomes very hard. Mechanics take advantage of this in making axles and collars for wheel work, for it is easily filed and turned in a soft state, and afterwards hardened; this is most commonly practiced in the machine shop. Moulders who make wheels are often embarrassed by this chemical property in iron; for as the metal is poured in the mould of moist sand, the evaporation of the water carries off the heat, and cools the iron so quickly as to make it extremely hard. This is common in such portions of the metal as have to run the greatest distance from the aperture of reception. The only remedy for this is to have the sand as dry as possible, and as many apertures as are convenient. The harder the steel the coarser the grain—fine steel has the closest grain. A neat curved line and gray texture denote good steel; threads, cracks, bright specks, denote bad. The management of the forging may indeed modify these indications, and steel, good for some purposes, may be bad for others. Very small particles heated in a candle, are found to be perfectly hardened by whirling them in the cold air, and thin plates of steel, such as the needle of a compass, are hardened by being ignited and laid upon a plate of cold lead and quickly covered with another. "Case hardening" is that property of iron by which it becomes very hard on its surface. Articles of iron may be case hardened by smearing their surface with a paste of the prussiate of potash, then heating them to a red heat, and dipping in cold water. In making tools, the artist is directed by the color of the steel while heating. The different colors direct, in tempering, to a standard. When steel is too hard, it will not do for tools intended to have a very fine edge, because it will soon become notched, and if too soft, it will too easily bend. Purple is the color for gravers, or tools used to work in the metals; when the color appears in heating, it is immediately plunged in cold water; a very hard temper will be made, if the steel be taken at a yellow color and dipped. Blue is the color for spring and instruments for cutting soft substances, such as leather, &c.

Paint Room.

CANADIAN TURPENTINE.

Some months ago (see on page 75 of this volume) mention was made about Canadian turpentine as a new undertaking. We now learn from a cotemporary that the turpentine there manufactured "answers the purpose of the painter very well." Indeed, a leading house in the carriage-making business at Hamilton, C.W., has endorsed it as being suitable for carriage-painting in every respect, and thinks it will be equally good for any other work. This is obtained from the red pine, giving to the turpentine a peculiar flavor, different in some respects from that manufactured in the Southern States. As before observed in these pages, the article now in general use with us has quite a different smell from that formerly obtained, and, as we think, is much inferior in quality, very likely much adulterated with other ingredients.

HINTS TO COACH PAINTERS.

It not unfrequently happens, after a piece of work has had its second and third coats of varnish, and looked well at night, that the next morning the surface exhibits a dullness utterly at variance with the expectations it had previously so rationally excited. Conjectures are made upon the cause, and the conclusion generally settles it upon the inferior quality of the varnish. A little inquiry may correct this impression, for which purpose we may trace the work from the commencement. The workman, having finished cleaning off his panels, is impatient to have them colored as quickly as possible, which is done. These panels have been fixed to their places through the agency of fire and water. The grain of the wood, having suffered this disturbance of drying one side and imbibing water on the other, is immediately covered over with a succession of fluid paint, in which turpentine forms a conspicuous element: four coats of primary colors, thin and transparent; four coats of filling up, the composition of which is absorbents of the strongest character, litharge, ochre, gold size, and dry white lead. Water is again applied most amply in rubbing down; and when to all appearance dry, two or three preliminary coats of color; then three or four coats of the intended body color, generally prepared in turps, concluding with the varnish.

With so many absorbing elements underneath, laid on as fast as they dry, and on a surface of wood of which the grain had been opened and separated by the operation of bending, can it be wondered that its recesses should retain the volatile particles of each successive coat, and that, finally, the varnish should be drawn inwards by the powers of absorption under it, and thus lose that lustre, the characteristic of good varnish. The remedy for this is now to be found, and should seem to be this. Let the panels have time to become thoroughly dry, for the humidity to evaporate, and the grain to assume its fixed quality, before a coat of color is put on. Use the best ground lead and oil, and let each coat be well dry before the succeeding one is laid; let the filling up be well ground and well amalgamated, and when enough is put on, stand as long as possible before rubbing down; the time so required may be occupied by forwarding some other department of the work. After rubbing down, warm air, either natural or artificial, is requisite to expel the humidity, particularly round the grooves into which the water will penetrate, notwithstanding the oil lead used. Too frequently the panels are rubbed down between each coat of varnish, before they are sufficiently hard; in such case the varnish is literally rubbed off; in this much depends on its character, as well as the atmosphere in which it is used; and, as the process of polishing can be best performed on a good full surface of var-

nish, it becomes of importance that the quantity should not be diminished by either ill prepared panels or atmospheric influence. In every other branch of the business any defect or imperfection can easily be traced to the right cause; but in the painting department it is not so easy: many effects show themselves, and phenomena to baffle the most patient inquiry; but, in the hands of a skillful workman, ambitious of his good work, many defects may be avoided by study to improve and research for the cause.

MAKING CARMINE.

The following method of making carmine (the most beautiful red color) may be very useful to some of our painters who have to pay a much higher price for this material than it would cost themselves to make it. Take 9 ounces of the carbonate of soda, and dissolve it in 27 quarts of rain water, to which are added 8 ounces of citric acid. When brought to the boiling-point, 1½ lb. of the best cochineal, ground fine, is added, and then boiled for one and a quarter hours. The liquor is then strained or filtered, and set by to cool. The clear liquor is then boiled again, with 9½ ounces of alum, for about ten minutes, and is again drawn off and allowed to cool and settle for two or three days. The supernatant liquor is then drawn off, and the sediment which has fallen to the bottom is filtered and washed with clean cold soft water, and is finally dried by evaporating all the moisture. The result is fine carmine, which can be made into the finest red ink by dissolving it in a caustic solution of ammonia, adding a little dissolved gum arabic.

By the old plan of making carmine, no citric acid was used; the cochineal was simply boiled in soft rain water for two hours, containing a minute quantity of carbonate of soda, then allowed to settle, and treated by remainder of process described above. An improvement in the brilliancy of the color is obtained by adding about one-ninth part of the crystals of tin to the alum, using for this purpose a ninth part less of alum than the amount given above.

ORIGINAL MONOGRAMS.

Illustrated on Plate XL.

We, this month, again furnish our patrons with another installment of original monograms, designed expressly for our Magazine. As before intimated, these will prove useful, as lessons for study, in providing initials for the panels of customers' carriages, even should they not represent the exact thing wanted.

No doubt our readers were, last month (as we were), much amused at finding the monograms on plate XXXVI. represented as being on the ½ inch scale. By way of explanation, we would state that such was not on our programme—that it was added by the printer, and overlooked by us in reading the proof, until it was too late for correction.

Trimming Room.

THOUGHTS ON CARRIAGE-TRIMMING.

Modern trimmers have told us that carriage-trimming is yet in its infancy, notwithstanding all the seeming improvements of the past few years. How they arrive at this conclusion we are unable to tell, unless it be inferred from the little perceptible change made therein for the last century. Our own impression is, that so far as manipulation is concerned, our ancestors have left us but a small chance for improvement, except it be found in the variety and richness of modern fabrics. Hear what Felton said on this subject a century since: "The trimmings about a carriage, with which the cloth is ornamented, have, within these few years, been much increased both in quality and quantity. * * * That [the laces] which is most generally used, is made of worsted, with narrow silk stripes or lays, and is two inches and a half in width; from that it extends to three, three and a half, or four inches; but for extraordinary purposes, such as hammer-cloths, it will run to eight or nine inches. The quality and breadth make a difference in the price. It is frequently made of cotton mixed with worsted; and sometimes, for very superb carriages, it is made of silk only. There are other sorts of very narrow laces made, such as are made to seam the cloth with, or to cover the nailings; the one is called seaming, the other a pasting lace; the colors of which are made to match those in the broader patterns, but cannot form much of the figure, on account of the width. * * * Fringes have also been greatly improved upon, and, like the laces, are to be valued according to their width and quality; as also if ornamented with button-hangers, which are mostly put on them with a very good effect. The common width of fringe, including the gimp head, is five inches and a half."

Then there were some small trimmings, known as roses, to "go round the holes of the cloth where the hand-holders are placed," and "French strings," which were intended to hold the glass-strings. Silk fringes were seldom used, and, when used, were principally for the hammer-cloths.

Felton continues. "In a complete trimming there are three descriptions of holders or strings; viz., the hand-holders, the swing-holders, and the glass-holders or glass-strings, each of which is the same in value. These are called inside holders. There are, besides, outside footman-holders, which buckle on the back part of the body for the servant to hold by, sometimes used in sets (or four), and sometimes in pairs only. These holders are not always made of lace, but frequently of a strong wove worsted, called a webbing, in which only the colors, and not the figure, can be worked. These are the cheapest and most durable, but the lace-holders accord best with the other trimmings."

Close carriages, a century ago, were generally lined with light-colored cloths, and the open ones with dark or mixtures, as in our times. We are told that second quality of cloths were mostly in use, and tufted, as now. Two kinds of trimmings were adopted, one plain, the other "full ornamental," both of which are fully illustrated in Felton. Even the spring and festoon curtains are particularly mentioned, nets for parcels, and in fact almost every article known to us in lining our modern vehicles. He even mentions the "sleeping cushion," a fixture almost unknown to our builders. This he describes as "a thin cushion, faced either with leather or silk, stuffed with soft wool and quilted; they are occasionally added to the insides of close carriages, for the head or shoulders to incline against, and they are sometimes made faced on both sides with leather and silk, to be used alternately. Those for the back part are generally made of a smaller size,

extending only half the depth of the side one. They are usually bound with a narrow lace or silk ribbon, and fitted on with buttons or strings." Traveling by rail has about rendered these appendages last named a useless thing; but it proves, in connection with what we have before quoted, that our ancestors were not far behind, if not equal to us in trimming carriages. How often has the modern trimmer told us, when soliciting aid in this department of our editorial labor, "O there can be very little said, because there is nothing new in the business, and I can, therefore, do nothing for you." Making some allowance for a lack of literary taste in our trimmer friends, we fear that in this special department of our business we have merged into a second childhood—are, in a certain sense, merely fogy-trimmers. Will not some genius extricate us from these mechanical disabilities, and lead us to adopt something entirely new, in short, to completely revolutionize the business of trimming carriages?

NEW WHIP-SOCKET FASTENING.

Our readers will find Mr. E. Chamberlin's advertisement on the third page of our cover, describing and illustrating his new mode of fastening a whip-socket firmly to the dash of a carriage. We have seen it applied, and can confidently recommend it as the most effectual and perfect contrivance for the purpose yet invented. The engraving and letter-press so fully explain matters that we need only to recommend a careful perusal of his advertisement to fully post the craft.

Editor's Work-bench.

HIGH-HANDED DOINGS IN BROADWAY.

The monotony of a dull winter has been somewhat disturbed by a transaction of some interest recently enacted at midday, on Broadway, in this city. It will be remembered by many of our readers that the repository of the Messrs. Wood Brothers, 596 Broadway, was destroyed by fire in September last, and they forced to remove to other quarters. On the Broadway building they claim an unexpired lease of some three years yet to run, at $5,500 per annum, contending that sufficient of the building yet stood after the fire to entitle them to all the benefits of the terms of their contract, notwithstanding that the authorities had ordered the front walls taken down as unsafe. The lessees claim that they could store seventy-five carriages in the portion yet left on the rear after the fire.

In the meantime the landlord has erected a new building, and like many other owners of real estate, wishing to obtain a higher rent, had let the place to another party at $14,000 per annum. Into these premises, intending to fill them up, Messrs. Adams & Cone, of Harlem, had put four vehicles. Matters thus stood, the building not yet completed, when a strong party, of about fifteen persons, under the direction of the old firm, made their appearance, and took forcible possession of the show-room, on the 7th of February. Although the new firm had barricaded the door with a cumbersome vehicle, yet one who saw it says, "*That* went over in a short time, and the Wood carriages went in with a rush."

The scene now enacted is described as *interesting*—extremely so—and although we are in possession of the minutiæ, we forbear to give them, preferring to leave the matter to the imagination of our readers. Suffice it to say that both parties claimed possession of the building until near night, when, in an unfortunate hour, the representative of the new firm left the building for a short time, and on his return found the door shut against him. It is an old saying, that possession gives one nine points of the law in his favor, and in this instance the Woods seem to have this advantage, at least, for thus far they have set aside all the legal documents brought out for the purpose of ousting them from the premises.

As the matter now stands, the prospect is that the lawyers will have a nice job, and we opine that the Wood Brothers will be able to keep the matter in the courts until their lease terminates. Should they be defeated eventually, it may prove a serious affair. As lookers-on, however, the craft are deeply interested, and knowing this, we have taken special pains to give this transaction correctly. All things considered, this beats any "turnout" on the road!

AN EXPENSIVE AFTERNOON'S RIDE.

Having recently been called upon as a witness in a case where a customer was the defendant, in which some points of law were "ventilated," of interest to the public, we are induced to lay them before our readers, accompanied by facts. Preliminary to doing so, however, we would remark, that it is very fashionable among the *elite* of New York to take a ride of an afternoon in the carriage drives of our Central Park, and this is frequently done to so great an extent that we wonder that there are not more accidents than do happen in such a crowded thoroughfare.

In this case L. sues P. for $80 damages, &c., done to his buggy, on the 12th of January, 1865. The facts, as brought out on the trial, were these: L., the plaintiff, testified that "he was driving his buggy as usual in the Central Park, and became hemmed in by a crowd of vehicles, when, turning round, he found P.'s dog-cart pole laying across the back panel of his buggy. Very soon thereafter he heard something crack like the breaking of wood, and on examination found that in endeavoring to disengage his pole he had broken the back-board to my wagon near the corner, both vehicles still standing still. To my complaints P. made no reply, but immediately turned his horses' heads to drive off. I then drove up alongside of him and asked if he was not going to apologize, to which he made no answer, but tried to

escape. At my request a policeman stopped him, and coming up I asked him if that was the way he treated gentlemen. He apologized, and told me to take my buggy to his carriage-maker, and have it repaired, to which I agreed."

The result was, L. took his buggy to *his* carriage-maker, instead of that of the defendant, where he run up an expense of $20 for repairs to body of the buggy; $10 for revarnishing the running gear; $35 was added for "permanent detriment," and $10.50 for carriage hire during the time his buggy was repairing—$75.50 in all. To this extortionate demand P. tendered $10 as damages, at the same time protesting that he did not consider himself bound to pay anything.

Plaintiff's carriage-maker testified that he had been in business fourteen years, principally on light pleasure wagons, that in this instance the hind panel was broken, that to repair it *nicely* the body had to be taken all apart, new corner pillars put in, etc.; that the buggy cost $425 three months previously, and that it was depreciated in value by the injury full $25.

The defendant, being put upon the stand, testified that on the day referred to he was riding in the Central Park in a dog-cart, accompanied by his wife and man-servant, the latter occupying the back seat with his back to that of the defendant; that his vehicle was in the rear, quite close to that of the plaintiff's, his horse being on a slow trot, when the plaintiff stopped suddenly. The defendant held up as soon as he possibly could, and in so doing the pole of his vehicle was elevated above the hind panel of his neighbor, and when his horses came to a rest the pole fell, resting on the panel. When the plaintiff started his horses the pole-hook caused the damage complained of, which he repaid in abusive language on the spot. Defendant's servant corroborated this testimony in the main particulars.

In summing up, defendant's counsel contended that the plaintiff's damages were caused by his own carelessness, and that, in any case, it was accidental and unavoidable, and could be made good for $10, the amount they had already paid the plaintiff. The plaintiff's lawyer, on the contrary, contended that it was the duty of the defendant, as he had a servant with him, to have ordered him down, and raised the pole, not allowing it to rest one moment on the buggy, and that, not having done so, he ought to pay damages; that in the eye of the law, no man is obliged to look behind him in driving a carriage to see who may be in his rear, his business being solely to see that he does not run into some one ahead, and thereby do him an injury. The case ended in the judge awarding the plaintiff judgment for $32.50. This, added to the counsel fees, makes the afternoon's ride an expensive one in the end.

HISTORY OF AN EX-CARRIAGE-MAKER.

Some years since—about 1856—William L. McDonald started in Beekman street, New York, what he called a "Southern Carriage Manufactory." Subsequently he removed to Broadway, near Canal street; and afterward to 514 Broadway, where he was located at the time the rebellion broke out. It seems that the war ruined his business, and sent him adrift a confirmed partisan of the enemies of the Union.

In more peaceful times, when he manufactured carriages expressly for Southern consumption, he put forth "to Southern Merchants and Planters" the following preface to an illustrated catalogue of carriages, from which we infer the cause of his present action:

"In compiling the following pages for the information and convenience of his friends in the South, the subscriber has selected from his stock such styles only as are suitable to the tastes, and peculiarly adapted to the uses of Southerners generally, and which he has been enabled to do by long residence and personal observations in the South, and constant association with many of her leading merchants and planters, and to whom, as well as the merchants engaged in the Southern trade in New York, he can refer as to the honorable character of his establishment, and superior quality of his manufactures.

"The subscriber has already gained the reputation of making the best and most stylish class of work, and at the lowest prices of any of the manufacturers for the Southern markets, and it is his intention to continue his improvements, and each succeeding season to have his work more durable, finer finished, and cheaper, if possible, than heretofore."

Many of our readers will remember his "most stylish classes of work," strung along our streets, the laughing *stock* of every gentleman of good taste. But to our story: It appears that this renegade Southern Repository man was not only with Braine—by the way, this same pirate was advertised by us long ago as a defaulting agent for this Magazine—as one of the leading spirits in the capturing of the Chesapeake; the incendiary attempts in St. Albans and New York, and rebel agent in Canada, of which he is a native, and in many other disgraceful tricks to our injury.

It seems that McDonald was, for about ten years of his earlier life, the captain of a steamboat on the Mississippi River, where he was enabled to make "personal observations in the South," and form the "associations" which make him a rebel. When our subject shut up shop in 1860, he owed Mr. Green, a carriage-maker in Newark, N. J., a large sum of money. Pretending to be desirous of paying his creditors off, he tendered him his services, and when Mr. Green was appointed sutler to the Twenty-sixth New Jersey Regiment, the ex-Southern carriage-maker accompanied him into Virginia. When Mr. Green's stock of goods had been exhausted, such was his confidence in his assistant, that he sent him north to pur-

chase goods to the amount of $3,000. On his return to Virginia, instead of visiting Mr. Green, he deliberately drove the goods into the rebel lines, where they were, as a matter of course, "confiscated" for his own special benefit.

While at the rebel capital, as has since been ascertained, he lived in the greatest luxury on the proceeds of his plunder, affiliating with the leading rebels, and supplying them with all the information in his power as to the number and position of our forces, and other valuable facts. Meanwhile, having been released on a pretended parole, he came north, and while visiting his wife at Westchester, N. Y., he learned that his exploits had been divulged to our War Department, and that the detectives were on his track. Escaping, he shipped as a sailor on a schooner for New Brunswick, Nova Scotia, and succeeded in eluding the vigilance of the authorities. McDonald is now about forty years of age, and we hope that his activity will yet place him in our hands and he get his deserts—the halter. Such men deserve no mercy.

EDITORIAL CHIPS AND SHAVINGS.

Coach-Makers' International Union.—A Journeyman Coach-makers' Society, with the foregoing title, was organized on the 22d of February, in this city. The object, as declared by the Convention, is to benefit the journeymen throughout the country in a pecuniary as well as social and moral point of view. On the first day of the session, Wm. Harding, of New York, was elected Chairman, and J. D. Ware, of Philadelphia, Secretary. Delegates from Baltimore, Philadelphia, Wilmington, Albany, and New York, presented their credentials, resolutions in accordance with the spirit of the meeting being afterwards adopted.

On the second day, a committee having drawn up a Constitution for the Society, the same was adopted. By-laws were also framed, and the following gentlemen elected to office:

President, W. E. Richardson, of Baltimore; First Vice-President, W. S. Stimmel, of Wilmington; Second Vice-President, G. Brown, of New York; Secretary, J. D. Ware, of Philadelphia; Vice-Secretary, William Harding, of New York; Treasurer, James Conway, of Albany; Vice-Treasurer, G. T. Evans, of Baltimore.

Board of Appeals—Mark S. Reeves, of Philadelphia; Robert Webster, of Baltimore; James Webb, of New York; Daniel C. Jehle, of Philadelphia; and G. Brown, of New York.

On the third day, considerable miscellaneous business was transacted. Among the resolutions passed was one directing that the proceedings be published in pamphlet form. Another resolution was passed, requesting delegates to urge upon their respective Unions the necessity of seeing that the Corresponding Secretaries be prompt in communicating to the Secretary of the International Union such information as may be of interest in his locality, and to the trade generally. The Secretary is likewise authorized to publish a quarterly report of the state of trade, as reported to him by the Corresponding Secretaries, together with the financial reports of the local Unions, accompanied by such suggestions as he may think proper. On motion, it was resolved that the Annual Convention of the International Union be held in Philadelphia, on the first Wednesday in August next. Having, by a vote, tendered its thanks to the New York press for friendly notices, the Convention adjourned *sine die*, having been in session for three days.

Carriage Trade of San Francisco.—From the San Francisco *Mercantile Gazette and Prices Current* we learn that there were exported from that place 19 carts and 169 packages of carriage materials; to the Hawaiian Islands, 667 packages; to Victoria, 16 carriages and 1,220 packages of materials; to other countries, 7 carriages. From private sources we learn that the carriage trade the past year was extremely dull, the best New York city made selling as low as $225, and dull at that. After paying freights, insurances, commissions, &c., even with the premium on gold added, the business has proved unfavorable to Eastern shippers.

A New Invention to Raise Vehicles from Railroad Tracks.—We have been shown a model of a small wagon or truck which will be exhibited at the Merchants' Exchange, Pine Street, representing those now in use in the city, the design of which is to illustrate an improvement or a mode to extricate wheels of all kinds of vehicles when in the act of turning out or off the rail track. This is accomplished by a mechanical and novel device, by placing a wedged-shaped shoe or lifter on the track in front of the wheels, lifting them sufficiently high to clear the rail, thereby avoiding the danger of breaking and smashing wheels and axles, and injuring the horses. The mode of adjusting the lifters is simple and ingenious, and would well be worth a visit to inspect. The improvement has been secured at the Patent Office, and will be introduced to the public forthwith.

An old "Notion" Revived.—An English correspondent of the *Tribune*, says: "A French gentleman here has just patented a new invention for instantaneously releasing runaway horses from the traces of carriages, which I have seen tried in Hyde Park, and which appears to answer admirably. It consists of having the trace-buckles so made that the tongue can be drawn backward so as to clear the bar. This is accomplished by means of a lever moved by a strap, which passes up the harness-saddle and is continued over the horses back to the driver's seat. Should the horses run away with the carriage the driver has but to pull the strap, when the trace-buckles are instantly loosened, and the horses run free with all the harness except the traces, which remains attached to the carriage, the vehicle and its occupants receiving no injury. I commend M. Prioleu's patent to fast-driving Americans."

LITERARY NOTICE.

The February number of *The Atlantic Monthly* is an extremely interesting one. The most important articles are: "Our First Great Painter and his Works;" "Dr. Johns;" "Roger Brooke Taney;" "Needle and Garden;" "Garnaut Hall;" "The Pleiades of Connecticut;" "The Old House;" and "The Chimney Corner;" with reviews and literary notices for the month. As we have previously stated, the publishers of this interesting serial have secured some of the best writers of the day as regular contributors. Published by Ticknor & Fields, Boston, at $4 per annum.

The Coach-maker's Letter-box.

Boston, Mass., Feb. 2, 1865.

Mr. Editor—*Sir:* The sleighing season is now at its height, the roads are in excellent condition, and all that could be desired.

This is the sixty-second day of continuous sleighing, with the Bostonians, and which they have enjoyed exceedingly so far. Sleighs have been in great demand this winter, and they have sold readily at fair prices, and in large quantities. The dealers in the city have sold out almost everything in the shape of a sleigh—something very unusual.

Our carriage manufacturers have been very cautious in preparing for the spring trade. The unsettled condition of the market, with the prospects of an early peace, induces the manufacturer to keep his *made-up stock* as low as possible—to manufacture only as fast as ordered, so as to be sure of certain sales at the ruling rates of to-day. But the dealer has the game in his own hands to a certain extent, having a decided advantage over the manufacturer in times like the present; not being hampered with the taxes of the latter (which are legion), nor yet coming in contact with labor in its perplexing details since it has become migratory. He (the dealer) is fast becoming "master of the situation," because he can tell what his work costs him, which is more than the manufacturer can do at the present time, if he ever could.

In taking my seat in our cozy little office this cold winter morning, after divesting myself of sundry outside garments, which I find essential to comfort, as soon as I got thawed out, my nose took its natural color, and my ears would not stand pinching, I took up the morning paper, and under the various headings of "First Edition," "Telegraph from Washington," "Four days later from Europe," "Legislative Summary," &c., &c., I found some good things—a few gems—and considerable chaff. At last my attention was attracted by an item in the "Foreign News Department," which set me to thinking, but on raising my head in thought from the sheet before me, my eyes were directed to the frosted window, which gave point and method to my thoughts in a moment, as the beautiful sight burst upon my view. Last night the big square of glass in the office window was covered over with a frosted net-work of singular beauty, delicately traced by the icy finger and chilly breath of the Frosty King, in his midnight wanderings around our Northern homes. The delicately traced flower, the leaf, forest and mountain were plainly visible, as though he was showing how vain and impotent are the attempts of man compared with his, in imitating nature in producing the beautiful. Forms of rare beauty, that have no place, either in the real or ideal world, were scattered over the glass in rich profusion. But as soon as the sun mounted high enough in the heavens to throw his beams over the high buildings opposite, pouring into the window, came his rays of life and blessedness, the icy finger-marks of death though incased in forms of surpassing loveliness, were before my eyes, melted and vanished from view forever, before the king of day. Such is history in the great tide of humanity as it has ebbed and flowed up through centuries.

The system of Slavery, which some of the brightest minds have endeavored to clothe in garments of virgin purity, and even throwing around it the halo of divinity, and moving heaven and earth in its behalf—still it is passing away as surely and effectually as the sun is melting those fairy pencilings from my window pane. While I was thus musing I was suddenly aroused by the boom of artillery (in response to my own thoughts as the sequel will show), coming from Flag-staff Hill on the Common. The reverberation of these thunder notes, as they resounded through the city, caused many of our citizens to stop, thank God, and take courage. Gov. Andrew had ordered the bells to be rung and a salute of one hundred guns to be fired in honor of the passage of the "Constitutional Amendment."

> The bells are ringing out upon the silent air,
> Their tones of music beautiful to hear—
> And cannon, too, give forth a warning sound,
> In notes that make earth's tyrants quake with fear—
> But still the same is music to the freeman's ear.

Throughout every town and village in New England the same glad notes peal forth in honor of victory. Memories of the past—the landing of the pilgrims, the events of Bunker Hill and Lexington—all spring up in the mind. The hours, full of great events, pass by in solemn procession, burdened with the prayers, the supplications, and the blessings of millions. For long weary years have human sympathy and love been waiting in faith and hope for the dawn of a better day, when the nations shall dare to do justice to the oppressed, and proclaim freedom unto all the peoples of the earth. Those words spoken by the angels to the shepherds tending their flocks by night, on the hillsides of Bethlehem, more than eighteen centuries ago, "Fear not, for behold, I bring you good tidings of great joy, which shall be to *all people*," now ring out with a new meaning. What a poem is here; how full of harmony, and in which the Sons of God might join, singing as they did on the morning of creation, when "the morning stars sang together." Adieu,

Telemachus.

FOREIGN IMPROVEMENTS IN CARRIAGES.

May 12, 1864. Construction of Carriages.—C. Martin, Brentford. This invention relates to certain arrangements of mechanism whereby the heads of carriages can be opened and closed by the drivers thereof without leaving their seats. *Not completed.*

May 17. Certain Kinds of Carriages.—T. Wilson, Birmingham. In carrying out this invention the inventor makes the sides of the cab inclined to one another, so that the end at which the doors are situated is wider than the other end. By this construction greater room for entering the cab is obtained. The wider or entrance end may either be at the front or back of the cab. He makes two doors to the cab, the doors being situated at the wide end of the cab. The doors are not hinged to the sides of the cab, but to an upright forming the extreme end of the cab, and midway between the sides of the cab. The doors when closed form with each other a nearly right angle, and they form obtuse angles with the sides of the cab, against which they respectively shut. In opening the doors they are thrown outwards, and the cab may be opened from either side. When the doors are at the back of the cab, he connects with each of them movable steps or foot-plates, which are drawn out and closed by the opening and closing of the doors. When the doors

are at the front of the cab, the steps are stationary. The driver's seat is fixed at the back of the cab. When the doors are at the back, the driver has direct command of them from his seat; when they are in front, levers or handles working along the top of the cab enable him to open or close the doors without descending from his seat. *Not completed.*

May 18. Carriages to be Propelled by the Human Body.—A. Goodrich, Eglington-road, London. This invention consist chiefly in applying an improved arrangement of levers to a light cart or carriage body, and in the mechanism connected therewith for giving motion to the carriage or machine. In the front part of the body of the cart, in place of the ordinary seat, the inventor fixes a shaft, on which are placed—so that they may receive an oscillating motion from a person sitting thereon—one, two or three chairs, according to the size of the vehicle and the number of persons to be employed in driving it. On the back of each of these chairs is fixed one end of a vertical lever, the other end of which is connected, by means of a horizontal lever, to another vertical lever placed some distance in front of the body of the carriage, the lower ends of the levers being joined to the frame, so that they may receive a backward and forward motion. In front of these levers, and above the fore wheel or wheels of the vehicle, is an axle with one, two or three cranks, according to the number of chairs in the vehicle, and these cranks are connected by means of rods with the front vertical levers. The cranked axle carries at each end a large driving wheel, communicating motion, by means of a chain or band, to a pulley on the axle of the back wheels, for propelling the carriage. The backward or forward motions of the front vertical levers may be assisted by means of small hand levers attached to them. The vehicle may be turned round at will by means of a hand lever attached to the fore wheel, or wheels, as in the velocipede. A lever may be placed in front of the wheels for removing stones and other obstructions. *Not completed.*

June 3d. Fastening and securing Tires upon Wheels for Carriages.—F. Ashe, Manchester. This invention consists in forming upon the interior surface of the tire a rib or head during the process of rolling the tire, which is to fit into a groove or channel made in the periphery of the wheel. The tire being heated expands, so as to allow the said rib to pass over the wheel; and in cooling contracts, and fits the rib into the groove so firmly as to hold the tire in its place without the use of bolts.

CANADIAN IMPROVEMENTS IN CARRIAGES.

1854. Jan. 13. Seats to Sleighs, &c.—Edward D. Gingras, Quebec (carriage-builder). A new and improved apparatus for attaching seats to sleighs and other vehicles, either for winter or summer use.

1863. Sept. 12. Upsetting Tires.—Joel Smith, Haldinmand, Northumberland (blacksmith). A machine for shrinking or upsetting tires of wagons and other vehicles, called and known as Smith's Tire Shrinking Machine.

On the 26th of February, 1864, Norris C. Peterson, of Sarnia, and Gideon Huntington, of Norwichville, had both previously obtained patents on machinery designed for the same object as the above.

March 16. Boxing Machine.—Alexander McCarter, village of Walkerton, Bruce County (blacksmith). A new and useful improvement in boxing-machines for carriage and wagon wheels.

April 4. Carriage Heater.—Philip Taylor, Oshawa, Ontario County (watchmaker). An article for the heating of cutters and carriages, called Taylor's Cutter and Carriage-heater.

April 13. Coupling for Shafts.—François Xavier Pichette, Quebec (carriage-builder). A new and improved carriage shaft coupling.

June 4. Carriage Jack.—William James, South Norwich, Oxford County (yeoman and joiner). A new and improved carriage jack.

June 14. Axle and Box.—Israel Kinney, Oakland, Brant County (coach-builder). An improved box and axle, called Kinney's Anti-friction Box and Axle.

AMERICAN PATENTED INVENTIONS.

(44,826) Carriage.—Blaney E. Simpson, Boston, Mass.: I claim the application or combination of one or more auxiliary seats, movable bars or rests C, with a carriage seat, substantially in manner and so as to operate as and for the purpose specified. I also claim the combination of such an auxiliary bar or seat C, with the main seat and either or both the arm rests thereof. I also claim the arrangement and application of such an auxiliary seat C, with the arm rest of the main seat so as to be capable of being moved relatively thereto, and into either position with respect to it, substantially as hereinbefore described. I also claim the construction of one or more of such auxiliary seats or movable bars C, with one or more recesses or equivalents for receiving a part of another bar, or a projection from such bar, in manner and for the purpose set forth.

8. (44,925) Spring.—Henry A. Alden, Matteawan, N. Y.: I claim, *First*, the employment of concavo-convex plates fitted in pairs upon a spindle or axle in such manner as that the convex and concave surfaces shall be opposite, in combination with perforated vulcanized India-rubber disks mounted upon said spindle, when interposed between the said plates, and enclosed within their concavities, substantially as set forth. *Second*, in combination with concavo-convex plates fitted upon a spindle, as described, I claim indenting the plates along their circumference in such manner as to increase their elasticity to compression from the center towards the circumference, substantially as set forth. *Third*, in combination with concavo-convex plates fitted upon a spindle and indented along their circumference as described, I claim the use of vulcanized India-rubber disks interposed between said plates, in the manner and for the purpose set forth. *Fourth*, in combination with concavo-convex plates indented along their circumferences and fitted upon a central spindle, I claim the mode herein described, or its substantial equivalent, of locking the plates constituting a pair, in the manner and for the purposes set forth.

(44,968) Coupling Whiffle-Trees. — Milton J. Palmer, Homer, N. Y.: I claim the arrangement of the flanges F and G, in combination with the pivot E, the nut I, the standards A B C, the screws S S, in the manner and for the purpose set forth.

(44,983) Dumping Carts.—R. A. Smith, Philadelphia, Pa. (Antedated Oct. 25, 1864): I claim the body A, formed, hung to the wheels, and connected to the shaft, all substantially as and for the purposes herein set forth.

15. (45,118) Thill Attachment or Coupling.—C. W. Gage, (assignor to himself and James Northrup), Homer, N. Y.: I claim the combination of the jaws *b* and *d*, constructed as described, with the clip C, for the purposes set forth.

22. (45,130) Steam Carriage.—G. W. Barnett, Urbana, O.: I claim the driving wheel F, steam boiler H, and cylinders G, mounted upon the hinged frame D, in combination with the

truck frame A, all constructed and operating substantially as and for the purpose set forth.

(45,150) Carriage Wheel.—Walter K. Foster, Bangor, Me.: I claim the combination of the holding screw bolt *g* with the wheel and the tire contracting mechanism thereof. I also claim the combination of the series of tenons *i i i*, with the wheel and the tire contracting mechanism thereof.

(45,157) Odometers.—Austin D. Hoffman, Wayne, Mich.: I claim, *First*, the spring or brake H, employed in the described combination with the worm shaft E, of an odometer, to regulate its rotation. *Second*, I claim the double dial *d d'*, and gearing K L M N, arranged as specified in the described combination with the worm shaft E, and sprocket wheel F, of an odometer.

(45,173) Carriage Spring.—Charles P. Phillips, Syracuse, N. Y.: I claim the outside guide lugs *a* and *b*, so arranged as to operate in conjunction with the center bolts of leaf springs, for the purposes and in the manner specified.

(45,200) Ambulance Carriage.—Thomas Wilkins, Greenville, Ill.: I claim, *First*, an ambulance carriage having its front and rear axles A B, connected by an elastic bottom board C, with a frame E, resting on a cross-bar D, attached to C, with springs F F', steel or wood, interposed between them; the front part of the bottom board being hollowed out to admit of the cramping of the front wheels, and all arranged substantially as herein set forth. *Second*, The litters L, composed of frames M, with cloth *k*, attached, substantially as and for the purpose herein set forth.

29. (45,265) Carriage Springs.—R. W. Parker, Woburn, Mass.: I claim the springs C C, constructed with lowered ends and parallel, or nearly parallel, sides, attached at their ends to the front and rear bolsters of a carriage, and supporting the seat or body upon their sides between said bolsters, all substantially as herein shown and described.

(45,267) Horse Collars.—George F. Parsons, Baltimore, Md.: I claim the improved article of manufacture, the collar for horses, mules, etc., constructed of leather alone, of leather and the other materials of fabrics named, or of any suitable material, the different layers of the leather or other material being secured to each other by metallic rivets, as herein recited.

(45,279) Carriage Axle-Box.—Wm. Stechschult, Glandorf, Ottawa Post Office, O.: I claim an axle-box A, cast solid throughout, enclosing the projections of the linch-pins and the end of the spindle as applied in combination with the screw plug *d*, annular groove *c*, and linch-pins *f f*, constructed and operating in the manner, and for the purpose, herein shown and described.

(45,299) Harness Snap.—Charles H. Palmer (assignor to George Edwards), Newark, N. J., antedated Nov. 16, 1864: I claim the tongue constructed as described, and the combination of the spring therewith, in the manner and for the purpose set forth.

Dec. 6. (45,362) Paint Composition.—James Trippe, Orange, N. J.: I claim, *First*, The within-described composition for a white pigment, made of ingredients specified and mixed together, substantially as set forth. *Second*, Also the use of a deposit of silicia and alumina, or white clay, in the manufacture of white paint, substantially as described.

(45,367) Machine for Making Carriage Bolts.—J. Theodore Wood and Edward Cone Smith, Pittsburg, Pa.: We claim the use of feed rolls so grooved as to form the round shank and square shoulder of carriage bolts on the rod continuously, before the blank is severed from the rod, or the head formed thereon, in combination with suitable dies for pressing the shank and shoulder, and severing the bolt from the rod, and heading-tool for forming the head, constructed aud arranged substantially as described.

(45,378) Soap for Cleaning Harness, &c.—James E. Powell, Troy, N. Y., assignor to Samuel C. Glenney and Wm. E. Weeks: I claim the composition made of the ingredients, and in the manner substantially as above described.

13. (45,386) Stitching Horse.—Geo. F. Brockway, Washington, D. C.: I claim a stitching horse provided with folding legs, a reach and clamps, all arranged substantially as herein shown and described. I further claim the toggle, spring strap and treadle, and applied substantially as herein set forth.

(45,426) Pigment and Vehicle for Mixing Paints.—John M. Merryman, Indianapolis, Ind.: I claim the white clay paint pigment, and the solution of bichromate of potash in water, prepared and used in the manner, and for the purpose, as above described.

(45,457) Wood Bending Machine.—James N. Ray (assignor to himself and John M. Wheatley), Indianapolis, Ind.: *First*, In a wood bending machine, I claim the flexible groove formed by fixing upon the face of a plain strap of flexible metal, two rows of segments of any suitable material, so shaped as to form the walls of the groove, whilst the strap itself forms the bottom thereof, substantially as set forth. *Second*, I claim the combined use of the bending strap and back strap, substantially as herein set forth. *Third*, I claim the combined use of the clip, the perforated back strap, the rod G, the clamp and the wedge, as a means of holding the bent handle until it is cool and firmly set, substantially as herein set forth. *Fourth*, I claim the forms E, when attached to the head F, and used to tread upon the segments, or upon the straps outside the segments, substantially as herein set forth. *Fifth*, I claim the wrists I I, in combination with the forms E, when used to make such forms move horizontally, and to prevent them from rising from the bench in the act of bending, substantially as herein set forth. *Sixth*, I claim the combined uses of the head F, the forms E, and the follower D, substantially as herein set forth.

20. (45,519) Couplings for Carriage Shafts.—Timothy Pendergast, New Haven, Conn.: I claim a key constructed as described, in combination with an eccentrically-formed connection *E*, and coupling *C*, when arranged to operate in the manner and for the purposes specified.

27. (45,593) Modes of attaching Thills to Axles.—Edward Dugdale, New York City: I claim the thill iron *E*, provided with the clip *F*, and the flange *G*, and fitted on the arm *B*, of the axle between the two shoulders *C D*, with the inner part of the hub projecting over the flange, substantially as and for the purpose herein set forth.

(45,643) Truck for Transporting Casks.—M. L. Sendcrling, Jersey City, N. J.: I claim the bent or cranked axle *C*, or runners *D D*, and windlass *E*, in combination with each other and with the frame *A*, open at its rear end, substantially as herein specified.

(45,658) Wheelbarrow.—Jas. K. Van Kersen, Kalamazoo, Mich.: I claim the combined arrangement of the revolving box and folding head frame, substantially as and for the purposes herein set forth.

Jan. 10, 1865. (45,812) Coupling Thills of Carriages.—D. C. Breed, Lyndonville, N. Y.: I claim the eccentric bolt *C*, provided with cams *a a*, in combination with the jaws *b b*, thill hook *d*, and packing *E*, substantially as and for the purpose herein set forth. I also claim securing the eccentric bolt in place, when thrown back by means of the depression *g*, formed partially in the jaw and partly in the cam *a*, into which depression fits the rim *h* of the nut *G*, the whole arranged and operating substantially as and for the purpose herein specified.

(45,872) Device for shrinking Tire.—C. V. Statler, Wataga, Ill.: I claim the two bars *B C*, one, *B*, fitted in the bed *A* by a pivot bolt *c*, and the other, *C*, arranged so as to slide therein, and the two bars connected at their lower ends by one or more bars *D*, and provided above the bed with the dies *f f*, in combination with the clamps *F F*, pivoted to the bars *B C*, the spring *E*, and lever *J*, provided with the cam *K*, all arranged to operate in the manner substantially as and for the purpose set forth.

(45,874) Sleds.—Judd Stevens, Marengo, N. T.: I claim in connecting the bolster *C* with the way *a*, by means of the rounded bearing *c* fitting in the depression *b*, for the purpose of allowing a free turning or oscillating movement of the bob, and employing friction rollers *d f* to obviate the friction in the end movements of the bob, in adapting itself to an irregular surface, the whole arranged, combined and operating substantially as herein set forth.

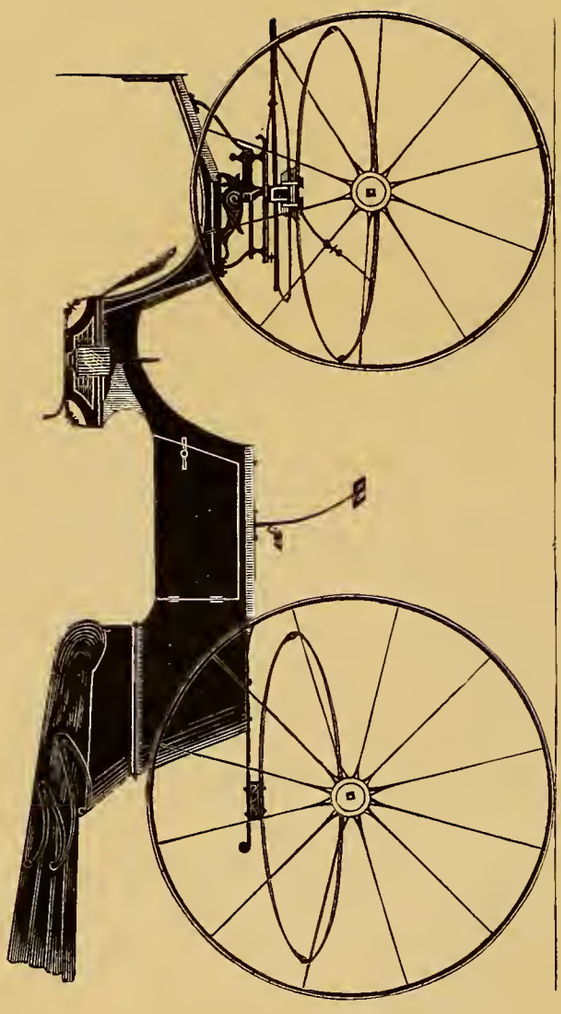
(45,880) Harness Saddle Tree.—Samuel E. Tompkins, Newark, N. J.: I claim the two bearings *A A*, connected together by a thin strip or plate *B*, made of convex form at their outer sides, to correspond to the shape of the back of the animal, and having a corresponding concave surface at their upper sides, when said bearings thus formed and connected together are provided with nuts *a* at their upper surfaces, to receive the turret screws *b*, and all used in connection with the metal jockeys *E E*, flaps *C*, and backboard *F*, substantially as herein set forth.

CURRENT PRICES FOR CARRIAGE MATERIALS.

CORRECTED MONTHLY, BY MR. CHAS. WEEKS, FOR THIS MAGAZINE.

New York, Feb. 3, 1865.

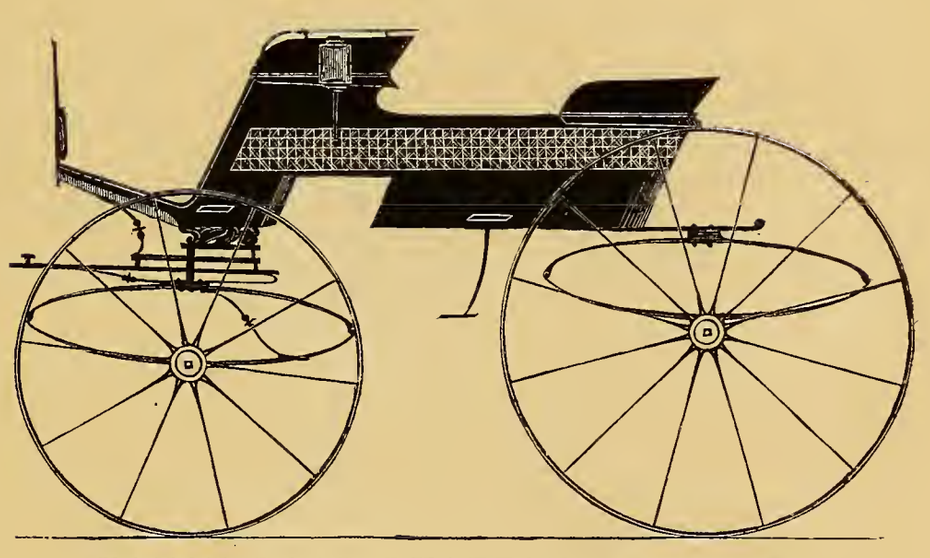
Apron hooks and rings, per gross, $2.50.
Axle-clips, according to length, per dozen, 75c. *a* $1.40
Axles, common (long stock), per lb, 12c.
Axles, plain taper, 1 in. and under, $7.00; 1⅛, $8.00; 1¼, $9.00; 1⅜, $10.00; 1½, $11.00.
Do. Swelled taper, 1 in. and under, $8.75; 1⅛, $9.50; 1¼, $11.25; 1⅜, $13.75; 1½, $16.25.
Do. Half patent, 1 in. and under, $11.25; 1⅛, $13.25; 1¼, $14.75; 1⅜, $16.25; 1½, $18.25.
Do. Smith's New York half patent malleable iron box, 1 in. and under, $10; 1⅛, $12; 1¼, $14.
Do. Saunders' improv. taper, ¾ in., $13.50; ⅞, $14.50; 1, $14.50; 1⅛, $16.50; 1¼, $20.
Do. do. Homogeneous steel, ⅝ in., $16.50; ¾, $18; ⅞, $20.50; long drafts, $4 extra.
☞ These are prices for first-class axles. Makers of less repute, cheaper.
Bands, plated rim, under 3 in., $2.50; over 3 in., $3.
Do. Mail patent, $3.50 *a* $5.00.
Do. galvanized, 3½ in. and under, $1; larger, $1 *a* $2.
Basket wood imitations, per foot, $1.25.
☞ When sent by express, $2 extra for a lining board to a panel of 12 ft.
Bent poles, each $1.25.
Do. rims, under 1⅛ in., $2.25 per set; extra hickory, $2.50 *a* $3.50.
Do. seat rails, 50c. each, or $5.50 per doz.
Do. shafts, $7 per bundle of 6 pairs.
Bows, per set, light, $1.25; heavy, $1.50.
Bolts, Philadelphia, 20 per cent advance on list.
Do. T, per 100, $3 *a* $3.50.
Buckram, per yard, 40 *a* 50c.
Buckles, per grs. ½ in., $1.15; ⅝, $1.40; ¾, $1.70; ⅞, $2 10; 1, $2.80.
Burlap, per yard, 50c.
Buttons, japanned, per paper, 30c.; per large gross, $3.
Carriage-parts, buggy, carved, $4 *a* $5.50.
Carpets, Brussels, per yard, $3; velvet, $3.75 *a* $5.50; oil-cloth, 75c. *a* $1.00.
Castings, malleable iron, per lb, 23c.
Clip-kingbolts, each, 50c., or $5.50 per dozen.
Cloths, body, $5.50 *a* $6.50; lining, $4 *a* $4.50 (See *Enameled.*)
☞ A Union cloth, made expressly for carriages, and warranted not to fade, can be furnished for $2.50 *a* $3.50 per yard.
Cord, seaming, per lb, 45c.; netting, per yard, 5c.
Cotelines, per yard, $5 *a* $10.
Curtain frames, per dozen, $1.25 *a* $2.50.
Do. rollers, each, $1.25 *a* $1.50.
Dashes, buggy, $1.75.
Door-handles, stiff, $1 *a* $3; coach drop, per pair, $3 *a* $4.
Drugget, felt, $2.
Enameled cloth, muslin, 5-4, 85c.; 6-4, $1.35.
Do. Drills, 5-4, $1.10; 48 in., $1.30; 5-4 A, $1.50; 48 in. A, $1.75
Do. Ducks, 5-4, $1.90; 50 in., $2; 6-4, $2.40.
Enameled linen, 38 in., $1.20; 5-4, $1.40; 6-4, $1.65.
Felloe plates, wrought, per lb, all sizes, 28c.
Fifth-wheels wrought, $1.75 *a* $2.50.
Fringes, festoon, per piece, $2; narrow, per yard, 18c.
☞ For a buggy top two pieces are required, and sometimes three.
Do. silk bullion, per yard, 50c. *a* $1.
Do. worsted bullion, 4 in. deep, 50c.
Do. worsted carpet, per yard, 8c. *a* 15c.
Frogs, 75c. *a* $1 per pair.
Glue, per lb, 25c. *a* 30c.
Hair, picked, per lb, 80c. *a* $1.00.
Hubs, light, mortised, $1.25; unmortised, $1.00—coach, mortised $1.75.
Japan, per gallon, $5.75.
Knobs, English, $2 *a* $2.25 per gross.
Laces, broad, silk, per yard, $1.20 *a* $1.50; narrow, 15c. to 20c.
Do. broad, worsted, per yard, 50c.
Lamps, coach, $20 *a* $30 per pair.
Lazy-backs, $9 per doz.
Leather, collar, dash, 36c.; split do., 18c. *a* 21c.; enameled top, 36c.; enameled Trimming, 33c.; harness, per lb, 75c.; flap, per foot, 27c. En. top, if over 60 ft., 42c.; under 60 ft., 35c.
Linen, heavy, a new article for roofs of coaches, $1 *a* $1.25 per yard.
Moquet, 1½ yards wide, per yard, $11.00.
Moss, per bale, 12½c. *a* 15c.
Mouldings, plated, per foot, ¼ in., 14c.; ⅜, 16c.; ½, 18c.; lead, door, per piece, 40c.
Nails, lining, silver, per paper, 12c.; ivory, per gross, 50c.
Name-plates.
☞ See advertisement under this head on 3d page of cover.
Oils, boiled, per gallon, $1.50.
Paints. White lead, extra, $20 per 100 lbs.; Eng. pat. black, 35c.
Pekin cloth, per yard, $5.
☞ A very good article for inside coach linings.
Pole-crabs, silver, $5 *a* $12; tips, $1.50.
Pole-eyes, (S) No. 1, $3.10; No. 2, $3.30; No. 3, $3.60; No. 4, $4.85 per pr.
Sand paper, per ream, under No. 2½, $5.75; Nos. 2½ & 3, $6.25.
Screws, gimlet.
☞ Add to manufacturer's printed lists 20 per ct.
Do. ivory headed, per dozen, 50c. per gross, $5.50.
Scrims (for canvassing), 30c. *a* 40c.
Seats, buggy, pieced rails, $1.75; solid rails, $2.50.
Shaft-jacks (M. S. & S.'s), No. 1, $3.25; 2, $3.75; 3, $4.00.
Shaft-jacks, common, $1.40 *a* $1.60 per pair.
Do. tips, extra plated, per pair, 37½c. *a* 56c.
Silk, curtain, per yard, $2 *a* $3.50.
Slat-irons, wrought, 4 bow, $1.12½; 5 bow, $1.25 per set.
Slides, ivory, white and black, per doz., $12; bone, per doz., $1 50 *a* $2.00; No. 18, $2.50 per doz.
Speaking tubes, each, $8.
Spindles, seat, per 100, $1.50 *a* $2.50.
Spring-bars, carved, per pair, $1.75.
Springs, black, 28c.; bright, 29c.; English (tempered), 33c.; Swedes (tempered), 35c.; 1½ in., 1c. per lb. extra.
If under 36 in., 2c. per lb. additional.
☞ Two springs for a buggy weigh about 28 lbs. If both 4 plate, 34 to 40 lbs.
Spokes, buggy, ⅞, 1 and 1⅛ in. 8½c. each; 1¼ and 1½ in. 8c. each; 1⅝ in. 9c. each.
☞ For extra hickory the charges are 10c. *a* 12½c. each.
Steel, Littlejohn's compound tire, 1-8 & 3-16 thick, 6¾c. gold; 1-4 & 5-16 thick, 6½c. gold.
Stump-joints, per dozen, $1.60 *a* $2.25.
Tacks, 10c. and upwards per paper.
Tassels, holder, per pair, $1 *a* $2; inside, per dozen, $5 *a* $12; acorn trigger, per dozen, $2.25.
Terry, per yard, worsted, $5; silk, $11.
Top-props, Thos. Pat, per set 70c.; capped complete, $1.50.
Do. common, per set, 40c.
Do. close-plated nuts and rivets, 75c.
Thread, linen, No. 25, $1.30; 30, $1.45; 35, $1.65, gold.
Do. stitching, No. 10, 95c.; 3, $1.15; 12, $1.28, gold.
Do. Marshall's Machine, 432, $2; 532, $2.30; 632, $2.60, gold.
Tufts, common flat, worsted, per gross, 20c.
Do. heavy black corded, worsted, per gross, $1.
Do. do. do. silk, per gross, $2.
Do. ball, $1.
Turpentine, per gallon, $2.25.
Twine, tufting, per ball, 35c.; per lb, 60c. to 75c.
Varnishes (Amer.), crown coach-body, $7; hard drying, $8; non-pareil, $8.
Do. English, $6.25 in gold, or equivalent in currency on the day of purchase.
Webbing, per piece, 70c.; per gross of 4 pieces, $2.60.
Whiffle-trees, coach, turned, each, 50c.; per dozen, $5.50.
Whiffle-tree spring hooks, $3 per doz.
Whip-sockets, flexible rubber, $4.50 *a* $6 per dozen.
Do. hard rubber, $10.50 per dozen.
Do. leather imitation English, $5 per dozen.
Do. common American, $3.50 *a* $4 per dozen.
Window lifter plates, per dozen, $1.50.
Yokes, pole, each, 50c.; per doz, $5.50.
Yoke-tips, extra plated, $1.75 per pair.



EXTENSION-TOP PARK PHAETON.—½ IN. SCALE.

Engraved expressly for the New York Coach-maker's Magazine.

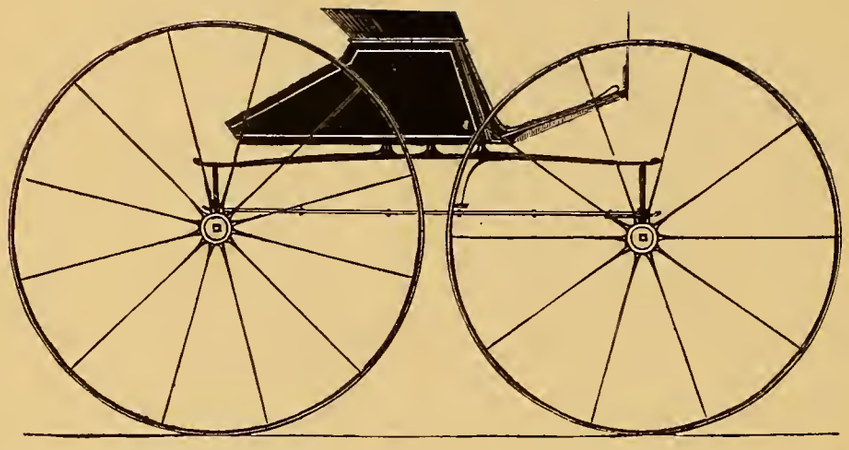
Explained on page 166.



FANCY ROAD PHAETON.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 167.



MANHATTAN SIDE-SPRING BUGGY.—½ IN. SCALE.

Engraved expressly for the New York Coach-maker's Magazine.

Explained on page 167.

Respectfully Yours
Henry Harper

Engraved expressly for the New York Coach maker's Magazine.

April, 1865.

THE NEW YORK
COACH-MAKER'S MAGAZINE

DEVOTED TO THE LITERARY, SOCIAL, AND MECHANICAL INTERESTS OF THE CRAFT.

Vol. VI. NEW YORK, APRIL, 1865. No. 11.

The Coach-Maker's Portrait Gallery.

BIOGRAPHY OF HENRY HARPER, ESQ.

(WITH PORTRAIT.)

To the craft nothing can be more interesting than the biography of one of their own number; and although in this instance there may not be any incidents of an extraordinary character, still, our readers will be pleased to hear something of the gentleman who has so faithfully and ably contributed towards making this publication both interesting and valuable to them.

HENRY HARPER, whose history we are about to narrate, was born in Harpersfield, Ashtabula County, Ohio, March 13th, 1813, and consequently is now about fifty-two years of age. The father of our friend, William A. Harper, was one of five sons, who, with his parents, originally from Harpersfield, Delaware County, New York, emigrated to the then far West, and settled in the wilderness in the State of Ohio, in 1798. The grandfather of Mr. Harper, whose name was Alexander, was one of three brothers who left Connecticut in 1768, and settled in Delaware, New York, as before stated, it being then a frontier wilderness. Theirs was the first tract of land from the crown granted to individuals in that vicinity. A tract of land contiguous to this was granted to Sir William Johnson, agent for the British North American colonies, in 1670. During our Revolutionary War the sons of Sir William and the Harpers having antagonistic prejudices, were opposed to each other in the strife which ended in the separation of the United States from the mother country. John Johnson, and his renowned ally, the celebrated Indian chief, Brandt, were matched against Alexander Harper, the grandfather of our subject, in a number of skirmishes, he being commander of the frontier forts the Indians being foiled and beaten.

Mr. Harper's father, who was an energetic, honest, and kind-hearted man, and much respected during his lifetime, was by profession a blacksmith. This circumstance, however, presented no obstacle to his being elected a representative to his State Legislature at different times, besides holding other offices of trust in the county where he resided. While engaged in some public works that turned out disastrously, he died in the year 1828.

The subject of our brief sketch was the second of three boys, having one sister older and three younger. The cares of the fatherless family, as far as the female branch were concerned, devolved upon Henry at an early age, when inexperienced; but he tells us he "discharged this responsible duty to the very best of his ability." He further says, "I had some of the real friends of my father, who had during his lifetime shared in the hospitalities of his big heart, who did not forsake me in this time of trial. These were not so numerical but that I can name them. They were the Rev. John Hall, Rector of the Episcopal Church at Ashtabula, Ohio; Platt R. Spencer, Esq., author of the Spencerian system of writing; my mother's brother, Israel A. Robinson, Esq., and A. R. Chase, Esq., brother of the late Secretary, now Chief Justice of the United States. Most of these assisted me in obtaining an education, in which I was always backward. Another class of persons unwittingly did me a greater service by the hard rubs they bestowed upon me. Every faculty of my mind was taxed to match them, and it was strengthened by the exercise given to it. My education was merely a smattering of grammar, book-keeping, astronomy, and natural philosophy.

"At a mechanical education I spent four years, under the instruction of Aaron Whitney, of Conneaut, Ohio, in painting. After my apprenticeship terminated I worked four years more as a journeyman, in perhaps twenty different places, in New York, Ohio, Michigan, Illinois, &c., mostly at carriage and sign painting, which then commanded a liberal price. My mother's health now became so poor that it was necessary that I should give her my personal attention. This put an end to my wandering life, and I settled down for a few years in my native town. Here I had a distant relative, Joshua O'Daniels, who had been born blind, and who, from my earliest memory, had taxed the reading powers of his friends, occupying one person's time nearly all the while. This had made him familiar with almost every department of history and science. His life of nearly three score and ten years was spent as the invited guest of those who were desirous of being instructed and amused from his versatile mind. At his request I took him an inmate of my family, and from him I learned many facts in science, useful to me since, if not to others also.

"My occupation as carriage-painter has presented me with many subjects for inquiry as to the real cause in the

difierence so often seen in the draught of carriages, although constructed apparently so nearly alike that the eye could never detect any difference between them. All acknowledge that some fault exists here, yet, if the cause has been discovered by any person, it has not yet been explained to the comprehension of the craft so as to make it scientifically available. To my own mind there appears a reason, which, if the craft understood, would produce results in the draught of a carriage as mathematically correct as in any other department of mechanical science. I have labored to make those results known, and in a few cases with perfect success, by giving arbitrary rules for the government of others, although they may not fully understand the philosophy on which it is based. This, however, may prove but a temporary advantage, soon lost sight of unless the craft get them firmly fixed in their minds—established upon a scientific basis. The loss of labor from imperfect draught in most of the wagons built in the United States, when reduced to figures, would amount to more than sufficient to have paid the expenses of our government from the commencement, up to the time the rebellion broke out. This is a subject worthy of all the care the craft may bestow upon it, many of whom will not give it a thought, except where that thought has a clear and undoubted connection with dollars and cents. Now, unless they change their course, ignorance must triumph over science, as it has heretofore done, and a merely external show, for decades to come, be considered the ultimatum of mechanism in that useful machine—the wheel carriage."

Our readers will join with us in testifying to the ability our friend has shown in the articles contributed to our pages for the three or four past years, and, no doubt, have appreciated them. If there be any so lost to science as to have derived no benefit therefrom, it is no fault of his, but an additional proof "that none are so deaf as those who having ears yet will not hear." It is, however, some satisfaction to know that posterity will do us justice, and that we have striven to perform our duties.

The axle gauge and scale, to which, in a roundabout way, it is presumed our friend alludes in the foregoing extract, will be found illustrated and described in the fifth volume of this Magazine, to which, for particulars as to its usefulness, the reader is referred. May he long live to benefit his fellow men, is the sincere wish of the writer.

S.

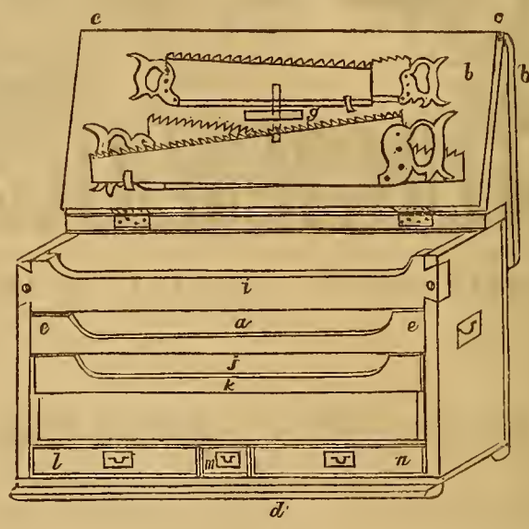
Mechanical Literature.

CARRIAGE-MAKERS' TOOL CHEST.

BY O. E. MILES.

Herewith your readers are presented with a perspective view of a wagon-maker's tool chest, upon the same plan with one which I constructed while a tramping jour., and which accompanied me in my rambles for a number of years. Its place is *on the work-bench*, at the rear end, and answers the purposes of chest and cupboard. Scores of mechanics have seen and admired it, some of whom have copied it, and all agree in the verdict that it is a decided hit in the two essentials of compactness and convenience.

The cut is on the scale of three quarters of an inch to the foot. The bottom, back, and ends are similar to those of any chest, but the lids and internal arrangement are very different. The front upper corners of the ends are



secured by a front piece *i*, dovetailed into each, as shown. The top is permanently closed for about six inches from the back side. The remainder of the top and the front are closed by a folding lid, the operation of which is clearly shown in the cut; the lid *b* of course closing the front side. A grooved strip, placed under the hinge joint, conducts away the water which may get through it. The edges of the lids are bound with band iron, which is formed into joints at the corners *c c*. The lid *b* forms a flush joint with the projecting sill *d*, into which the bolt of the lock passes. It is also furnished with two small iron projections on the inside, which close into the seats *e e*, and thus prevent the lids from raising up. Thus much for the outside of the chest and its fastenings.

The saws are disposed upon the inside of the lid by simply resting them upon hooks, as shown. The iron *g*, which turns on a pivot, as indicated by the dotted lines, keeps them from falling off when the lid is closed. The upper compartment corresponds in depth with the width of the front piece *i*, a floor extending from its lower edge to the back. Upon this floor are arranged the large flat files, mortising and boxing chisels, braces, rotter, &c. Above these fits a loose tray, not shown in the cut, resting, when the chest is closed, on cleats, so as to just clear the aforesaid tools, but is raised out and rests on the front *i*, and the gutter below the hinges, when the operator is at work, so that the tools on and under it are perfectly accessible. This tray contains the drawing-knives, squares, rule, gauges, and some other tools most frequently used. Going downward, in our description, we come to the drawers *j k*, which run on projections, shown on the ends of the chest. The drawer *j* is for firmer-chisels and gouges, which are arranged on a loose board, which rests near the top of the drawer at the back side, and on the bottom at the front side. This board is ribbed up and down to keep the tools in their places, which are laid in with the handles outward. The space under this board, at the back side, may be put to any convenient use. The drawer *k* is for boring tools. Bits are placed with the cut outward, on a slanting board, as in *j*, ribbed to keep them in position. Beneath the bit-board may be kept

augers, all fitting one handle. The front side of these two drawers is cut out as represented, so that a chisel or bit may be seized upon without moving the drawer. Under the drawer *k* is a space four inches deep, the whole width and length of the chest, for planes, which are slid into this space on the side just far enough to be out of the way in work hours, and when the chest is to be closed they are shoved clear back, which leaves ample room for the hand-ax, mallet, and some other things. Under this compartment and separated from it by a floor of thin stuff, are the three drawers *l m n*, which complete the arrangement. The drawer *l* is subdivided into a number of small bins for nails, screws, brads, &c.; *n* is for small files, brad-awls, cold-chisels, punches, &c. The front half of the small drawer *m* is occupied by the oil-stone, which just fills it. The back part of this drawer makes a choice place for some other purpose. When it is drawn half way out the oil-stone is in position for use.

MECHANICAL POWER AND FRICTION.

BY HENRY HARPER.

(*Continued from page* 149.)

If a brick is drawn on a board with the object in view of wearing it through by friction, it is plain that the lesser surface would wear through as much quicker than the greater as it is less, although it does not create any more friction. This same fact is fully established in the wear on wagon axles. If the bearing is thrown more upon one end of the axle arm and box than the other, by a wrong pitch of the arm, the end of the arm and box on which the heft is mostly concentrated wears out first. Upon the first trial, if all other conditions are equal, that wagon would require but little more draught than one whose bearings were equal throughout the arm; but a trifling amount of inequality is sufficient to create a difference of wear, increasing the inequality of bearing as it progresses, so that the axle and box are continually drawing in an element for their destruction, which, when it has arrived at a certain degree of strength is aided by another destroying element—heat; the two in conjunction will wear out an axle in a remarkably short space of time. Sometimes half a day is all that is required, and from that to three years of constant use may be necessary to destroy an axle; but this ultimate result is as certain to take place before the wagon is worn out, as it is certain that the other parts will wear one-half as long as they ordinarily do.

As we have before said, the difference in draught is slight at first, but increases as the friction and wear increase, and as the wagon grows older. At this stage the wagon is worth nothing; for the extra motive-power that it requires would more than pay for the use of a good wagon. Wagon-makers have made but little improvement in making the draught easier for the last fifty years, on what may be called general philosophical principles. Some improvement has been made in hardening the metal bearings, and I believe that is all. Let us go into any livery-stable where they have a collection of carriages made at different factories in the United States, and ask of the proprietor his experience, and he will say that the axles and axle boxes of all carriages are the most perishable from wear of any other part of the carriage. That some will wear away sooner than others, and that in every case different degrees of friction are always followed in exact ratio with different degrees of draught. Those which wear out the fastest always require the most motive-power to draw the same amount of weight.

If proof is wanting to show that the craft have never had any definite principle taught them making friction on axles uniformly equal, the fact that its members are continually boasting of their own superior skill in setting is sufficient. What would be thought of a mechanic who boasted that he could measure two feet with a two-foot rule more exact than another, or that he could strike a more perfect circle with a pair of compasses than another? Of course he would be laughed at, because such questions are reduced to mathematical certainties, and suitable instruments have been so long in use that no one can tell who invented them. But they certainly were invented, and have been of inestimable value in the arts and sciences. It is equally certain that an instrument has been invented which will give wagon-makers perfect control over the set of their axles, rendering them mathematically correct in pitch, according with the ever-varying dish of the wheel, so that in every case the bearing will be perfect. All reasonable assurance is given that the instrument is what it pretends to be—mathematically correct—and that it proves itself so. It would seem that such an invention would be universally adopted by the craft, but it is not. Why is it not, will be asked with some degree of surprise by him who has felt the inconvenience arising from unnecessary friction in his wagon. It is important that the foregoing question should be candidly answered, and if I am mistaken, or in want of proper knowledge myself on the subject, it will be the imperative duty of any person who can to expose my ignorance in a public manner, so that public benefit may be derived from it.

The reason why we are not exact in setting axles, is, first, because no mathematically correct way has, until now, been known. In the second place, the eye is so easily deceived that the most expert cannot, with the eye alone, detect slight defects until after the carriage is sold and the defects become manifest by use, showing the inequalities of wear. There are many pretensions to skill; but different results, such as we have noticed, prove that nothing uniform is derived from that pretended skill. When this appears, the pretender claims that there is such difference in the softness of the metal bearings that one end of the axle or box must wear out first in spite of skill in setting. But it is well known that soft brass boxes wear better than hard iron, which is a sufficient answer to this excuse. If, then, there are so many conditions of iron to contend with, and no uniform result, then the skill should be devoted to the quality of the bearing material, instead of the set of the axle. This would do away with any claims to skill from the carriage-ironer.

The second reason—that which deprives the purchaser of any positive knowledge as to what the draught of a wagon will be before he has used it—is another apology for bad running wagons. Desire of success in business is so strong a passion that few of us would acknowledge our defects, even though we thought there was a probability of their existence. In setting axles, a good hand at guessing may hit the exact mark once in a thousand times, and yet selfishness will set that one possibility of being right against nine hundred and ninety-nine probabilities of being wrong.

Some say that they do not set their axles by guess,

which probably is the case; but it is questionable in my mind whether they succeed any better. I have some knowledge, derived from observation in different places, and have received some light from carriage-making literature, all of which leads me to think that their practices—with the single exception I have referred to—are so incorrect and unpracticable that a large majority of manufacturers who understand this, discard them altogether and work by guess.

The new invention is an instrument whereby an uneducated mechanic can instantly solve an intricate problem in geometry. The angle to the dish of the wheel is compared with the angle of the taper to the box, and if one exceeds the other that excess is used for the pitch to the under side of the axle. The scale tells whether the pitch should be up or down. If the angles are equal no pitch should be given either way. The gauge, which forms a pattern to try the axle by, is so arranged that the difference or equality of the angles may be transferred to it without the possibility of a mistake. It does not take any longer to calculate the pitch of the axle so that the bearing will be directly on the end of the spoke, when the wagon is on level ground, than it does for a cooper to calculate the diameter of the circle for a barrel-head. A miscalculation is equally as fatal to the value of a wagon as it is to a barrel. Unfortunately it cannot be detected as readily in the one as in the other case.

The old Troy stage-coach, which, above all other carriages, had great care bestowed upon them (to avoid friction), by the most competent workmen of the times, is a fair illustration of what the consequences are of losing sight of those true principles of mechanism necessary to be understood and acted from. When first built—I believe it was about forty-five years ago—it was customary to make wheels more dishing than now, and by general consent they were acknowledged to be stronger in consequence. This required, in order to make the bearings of the axles equal, that the top of the wheel should stand out from the body on an angle equal to the dish. The width of the body required room between the wheels sufficient to allow them to be hung on the thorough-braces, and not sway against the wheels. The tread of the wheels required them to be brought together so as to correspond with the track. All these conditions favored a large dish to the wheel.

In the first use of the old coach the repairs required to the axles, in consequence of friction, were hardly worth mentioning, compared with that of a later date; but eventually the wear and draught increased so much that stage proprietors found themselves obliged to substitute something that had less draught. The only remedy proposed by the craft was a lighter coach, and accordingly they built a substitute about one-fourth lighter, with a differently constructed body, narrower, and enough longer to contain the same number of passengers. In sections where stage-coaches are still used the new style has so completely superseded the old one, that tens of thousands of dollars worth of old coaches are now laid aside as useless. About twenty are within sight of where I am writing, and have been for the last eight years.

The cause of all this difficulty with the old coach is traceable to a gradual change of fashion in the dish of the wheel, causing a greater inequality in the bearings on the axles and more friction. These axles would frequently wear out in six months. It was said they were too heavy for four horses, yet a full load, including the coach, would weigh only about forty hundred. There are many cases where a single horse, in a perfect draught wagon, has been known to draw a greater load, day after day, at least half as far as the regular trip made by stage horses.

This case—the stage-coach—shows the damage the public sustain in compromising mechanical principles to senseless fashion. Originally considerable dish to the wheel agreed with the necessity of having the wheels stand out from the coach body. The wheels were made dishing, as mechanical laws required. In after-time this coincidence was lost sight of, and in an evil hour mechanics conceived the idea of making wheels without any dish. Coach-makers, following fashion to a great extent, were under the necessity of setting the wheels to a certain angle outwards that did not in any respect correspond with the fashion of the dish. This threw an undue proportion of the bearing on the shoulders of the axle, which increased the friction in that part and wore it away. As a consequence—with an inequality of wear on one end of the axle and box—the pitch outwards at the top increased still more with the dish of the wheel. The draught of the coach so increased that repairs to the axle were necessary. The owners of the coach became aware that motive-power cost them money, and that they were not getting enough to compensate for the outlay. They first tried increasing their fares, but these would not pay for the continually increasing wear and waste of motive-power. Next, mechanical skill offered a remedy in the form of a new coach, made about five hundred pounds lighter. There is no mechanical skill about this new coach—increasing power of leverage or in convenience for passengers—it is barely a reduction of friction, which is partly attained by making it lighter. The improvement is more the result of accident than mechanical science. The straight wheels, which make them weaker, are retained. That is sufficient proof of obsequiousness to an unmechanical fashion.

The body, being narrower, required the wheels to stand in something of a corresponding position to give it a symmetrical look. It would not require as much room between the wheels, and the wheels would look better standing more upright, seem to be the reasons employed for getting the bearing more equal on the ends of the axles, and consequently an easier running coach. As the new coach stands, taking into consideration its imperfection—unnecessary friction—and the old coach, made perfect in that respect (as I know it can be), will have easier draught than the new kind, notwithstanding its lighter proportions.

A peculiarity common to friction is, that it always generates more or less heat. Where there is no heat created by rubbing substances there can be no friction. Thus, if a cannon ball is forced with power against a target so as to flatten it, it will become instantly burning hot. Force a ball of putty against an object with the same force, and it will not be more than perceptibly warm; yet, by adding continued force—as pounding with a hammer—it will become quite warm. Mechanical science has availed itself of the phenomenon in many cases, and applied it to useful purposes, and in other cases avoided the consequences when they would be injurious. In the earlier use of the gun, powder was ignited by a lighted match—by the inconvenient match-lock. Subsequently the more convenient flint-lock was invented, making use of a general law to produce fire. It was simply forcing a hard flint against steel in such a way that it would strike a

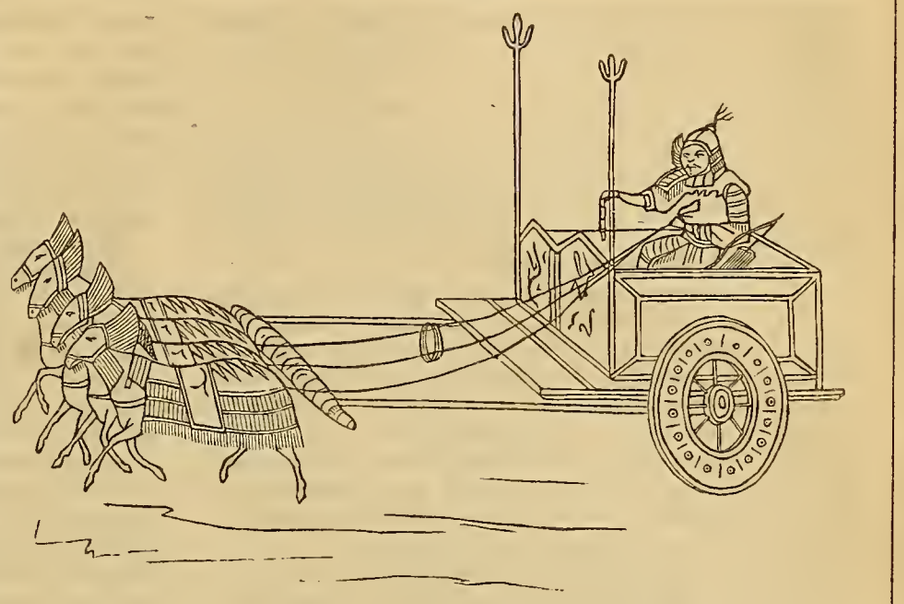
glancing stroke, thereby scraping off a fine shaving from the steel. In separating this shaving of steel from the main body sufficient heat was created to burn the steel, a spark of which, coming in contact with the powder, exploded the charge in the gun. Steel is much better for this purpose than iron, because it has greater cohesive power, and another reason is, it will ignite at a much lower temperature than iron. It will be noticed by a person filing a saw by candle light, that the filings, coming in contact with the flame of the candle, will burn like powder—full as quick. This is partly owing to heat generated in separating the particles of steel with the file, which, coming in contact with the flame of the candle, receive additional heat and burn up; and is partly owing to the fact that it burns at a lower temperature.

The invention of flint locks was a natural suggestion from an every day occurrence—striking fire by bringing steel in contact with stone; but the cause of this phenomenon was unknown for many years between its invention and that of the percussion-lock, where fire is produced by the same law governing the flint-lock. The percussion, which now supersedes the flint-lock, produces fire on the same principle—generating heat by separating particles held together by cohesion. Friction matches are a similar invention to the percussion cap, and are governed by the same law. If common friction matches are exposed to the heat of the sun in a warm day, combustion will ensue. This is the secret—the combustion of the friction matches is by friction, and the percussion cap by percussion. Both are formed of substances igniting at a low temperature of heat compared with other substances. Separating these particles by friction is enough to produce the heat required to ignite them. That separating matter does produce heat to a certain extent can be proved: Take a bunch of matches and expose them to heat—nearly enough to ignite them—then break them apart, and it will be found that breaking the composition encrusting the ends will produce enough additional heat to ignite them. On the same principle, heated saw-filings will burn in the flame of a candle as quickly as powder. In both cases it is only adding the necessary amount of heat to matter already charged with nearly enough to produce combustion.

(*To be continued.*)

OLD WAGONS AND CARRIAGES.

Almost every farmer, in the early part of his practice, is tempted to buy second-hand wagons, old carriages, etc., from their cheapness; but if he keeps a correct account of the bills for repairs by the blacksmith wheelwright, painter and others, he will soon discover that the first wear of the carriage is the cheapest. Thus a new Rockaway will frequently run two, three or four years, with scarcely a repair; and if well cared for, will seem to be almost as good as new; the next three years will develop rather a different state of things. Those who have most experience, find it to their advantage to sell their old carriages before they begin to need repairs. A carriage, like a carpet, may be worn for a long time in good order, but as soon as either show wear, they are well sold at half their cost.—*Working Farmer.*



AN IMPERIAL TEA CART.

On page 25, volume I., of this Magazine, we took occasion to show our readers that the Chinese had very little use for pleasure carriages, and, besides, that, were they ever so much inclined to adopt them, still, the streets of their principal cities were sufficiently narrow to prevent it. Notwithstanding our former remarks, we have very recently stumbled upon a drawing, by a Chinese artist, of which the above is a copy, going to prove that they cannot be altogether ignorant of wheeled vehicles. But, whether this is designed to represent an imperial tea express cart, or the pleasure "turn-out" of "the Brother of the Sun," we are at present unable to say. We hope, however, to be able to clear up this important point next month, should the translator of the descriptive letter-press do his duty, and redeem the half dozen promises he made to give us possession of the facts in time for this number.

LONDON CABS AND CABMEN.

The London cabmen complain bitterly of the marked decline of their custom, both by day and night; and they seem puzzled sufficiently to account for this. It seems easy enough to do so, however; but, in the first place, it is worth while to glance at the way in which the cab business of the metropolis is generally managed.

A large number of cabs belong to or are worked by the railway companies, and many others belong to proprietors who have large sums invested in cabs and horses. These public carriages are numbered and inspected by the police. The horses are required to be of fair quality. As drivers, some men are needed for night, and others for day duty. The day cabman commonly begins work about nine o'clock in the morning, and returns to the stables about twelve o'clock at night. The night cabman commences about six o'clock in the evening, and continues at work until about nine o'clock on the following morning. Thus the London streets are never without cab accommodation. Each horse and cab are lent to a cabman, who is expected to pay to the proprietor, at the end of his day or night work, a sum of 7*s.* 6*d.* or 8*s.*; and this must be paid whether the driver has earned as much or not. De-

fieiency in the estimate sum he must make up, or, on failing to do so, he is liable to be sent for a term of confinement to a felon's prison.

Although the eost for horse and cab for the day or night is, in many instances, from 7*s.* 6*d.* to 8*s.*, we have heard that, in some cases, the charge for a night cab is 7*s.* 9*d.* in the summer, and part of the spring and autumn. At this time of the year, towards Christmas, the eharge for a night cab is only 5*s.* 9*d.;* but at Christmas the price per night comes to 7*s.* 9*d.* again.

The railway cabs are charged to the men at a higher rate. At the Great Northern, for instance, the sum which the men have to make up for the loan of a horse and cab from nine o'clock in the morning to about twelve o'elock at night, is—for horse and eab, 11*s.* 6*d.;* to be paid at the yard, 3*d.*, and for rail, 6*d.;* in all 12*s.* 3*d.*

At a recent meeting of the cab-drivers, it was stated that the number of men employed in eonnection with cabs is over 40,000. From this it will be seen what a large and important matter the cab business is.

The history of many a cabman would make eaeh a curious book. Most of them have been unsueeessful in other pursuits of life, and have taken to the driving of eabs as a last resouree. They must, however, be men of fair character.

At all times eab ranks are under police supervision; for the watermen, as they are called, are nearly all superannuated policemen who are under the control of the Scotland-yard eommissioners. For the most part, the night eabs, &e., are in worse condition than those used during the day. Some of them, notwithstanding the regulations, are dilapidated earriages, with very sorry horses; and some of the drivers would barely pass muster in the day-time.

The cabmen eomplain of the harshness of their treatment by the eommissioners; of over eharges for straps and other matters, respecting which we have had no opportunity of making inquiry; as well as of the difficulty which there often is in paying their masters, even without taking into account what is necessary for the support of themselves and families. There can be no doubt that the cabmen lead a hard life; and we know of no more seemingly miserable kind of employment than that of the night eabmen, who, in fair weather and foul, in the depth of winter as well as at other seasons, are exposed for so many hours in the open air. It must also be admitted that these men are sharply looked after, and that some of the regulations are severe. This, however, has been in a great measure caused by the former extortion, ineivility, and other misconduct, of many of the men themselves. But there has, of late, been a marked improvement in the manners of cab-drivers; and we are glad to hear that there have been established among them provident institutions, and that there is a large attendance on Sunday and other leetures, &c., whieh are given for the advantage of this elass.

As we have already said, the men at present eomplain of especially hard times. One man, for example, says he has driven for fifteen hours during eaeh of three days; and, instead of profit, he has had to make up more than 5*s.* of defieieney at the yard. Another man who worked during three nights, states that one night he was defieient in the amount of his master's money; on another he had 9*d.* over for himself; and the next night he barely got enough for the horse and eab hire. Similar aceounts are given by others. One, we recollect, complained that he had been on the stand from six P. M. till one A. M., when the writer of this engaged him from a printing-office home, and that during all that time he had not earned a single penny, and had not tasted anything; and that every shop being shut by the new regulations, he must fast till four o'clock, although he had then the means of obtaining refreshment.

As regards the night cabmen, the badness of trade has been eaused by the elosing of the Haymarket and other night houses throughout London, many of whieh were places of infamous resort; and although the measure is bad for eabmen, it is in other ways of excellent effect. But, besides this, there are other agencies whieh help to lessen the demand for cabs: one of the most important is the opening of the Metropolitan railways. Among the thousands who daily travel by the Underground Railway to the city and the other stations, a large number would have used eabs; but few think of doing this when they can travel so well and so quickly, either a long or short distance, for so small a sum as two pence or three penee; and when the system of the Metropolitan Railway is completed, it is probable that the demand for cabs will be still further lessened. There will soon be railway eommunieation for passengers and luggage between the various railway termini; and a glanee at any of those plaees, on the arrival of trains, will show how immense is the present cab traffic, and how materially that traffic will be reduced when the new lines are finished and in working order. The day may come when poor cabby will be as rare an animal as the mail-coach man.

At the time of the International Exhibition, eabmen made a great deal of money, and many new earriages were sent upon the already erowded ranks; when the extra demand ceased, but few were withdrawn, and this generally made it worse for the men. Of late, too, the omnibuses have begun to work several new suburban and other lines, a cireumstance whieh materially affeets the demand for eabs.—*The Builder.*

Pen Illustrations of the Drafts.

EXTENSION-TOP PARK PHAETON.

Illustrated on Plate XLI.

The sketeh for this drawing was communicated to us by Mr. J. B. Peek, of Columbus, Ohio. He says, "I think there are some original points about the front of this carriage; at least, I have seen nothing like it, exeept the one I have just finished in the shop of the Messrs. Booth, who are so well pleased with it that they have ordered one dozen built immediately. This arrangement makes the neek appear lighter than in the ordinary construction. The eut in the neek is the width of the rocker or sill, and the half-round panel is fastened to a block on the inside of the roeker. The top is put on without any shifting rail. In the end of the seat I put some French imitation of basket-wood." For this last article, see Mr. Volkert's advertisement on the eover to this number of the Magazine. We cheerfully weleome

Mr. Peek's communication, and hope to hear from him soon again.

FANCY ROAD PHAETON.

Illustrated on Plate XLII.

We claim for this drawing some originality, and think it will meet the wants of the progressive and enterprising portion of our subscribers. As we have elsewhere observed, so in this case, the sham-caneing does much in relieving the broad panels of this class of vehicles. There are several points that might be pointed out as novelties, but which we shall leave the mechanic to detect for himself. The close observer of the times, who may visit the great thouroughfares leading into this city, on any pleasant afternoon, will not be able to detect any declension in the pomp and parade usually there exhibited, in consequence of the civil war now going on, nor find any special economy used in the expense of equipage.

MANHATTAN SIDE-SPRING BUGGY.

Illustrated on Plate XLIII.

In this example the readers of this Magazine have a drawing of the very latest coal-box out. It will be seen that the tail-end is getting "smaller by degrees, and beautifully less," when compared with the original as given in these volumes. The seat at the ends, as also the front pillars, are made projecting from ¾ to 1 inch beyond the side panels. The white lines to the side panel are designed by the engraver to represent a small half-round moulding. When well got up, this makes a very light and tasty buggy, and will doubtless win favor in the eyes of the sporting *élite* of New York and other cities.

Sparks from the Anvil.

THE ACID TEST FOR IRON.

There are hundreds of instances in practical life when it is of the utmost importance to quickly form an accurate estimate of the quality of a sample of iron or steel. A suitable testing machine is perhaps a hundred miles off. Even with such an apparatus within reach, the operation of testing the breaking strength and elongation of the specimens is tedious and expensive, and is always a matter requiring much delicate manipulation, more especially when dealing with specimens on a small scale. Recourse is perhaps had to the old blacksmith's test for wrought-iron. A nick is cut on one side of the bar with a cold chisel, and it is bent over the edge of an anvil. Bundles of leaden-gray fibres are held to indicate a good tough, soft iron, and other appearances at the fracture are taken as showing a cold-short, or a hot-short, or a harsh, hard iron. It is evident that the whole operation is most uncertain in its results. Skillfully manipulating the bar, and bending it slowly, can often show a fibrous fracture in a comparatively inferior material. On the other hand, a few heavy sudden blows will often break off short a very good fibrous bar. If anything be proved with respect to iron, it is that what is termed a crystalline fracture may be obtained from any bar, however "fibrous," if it be only broken suddenly. We are, therefore, driven to observe the appearance of the fracture itself, and of the longitudinal arrangement of the fibres, or, more properly speaking, the arrangement and kind of the hammered or pressed down crystals of which a forged or a rolled bar in reality consists. There are certain difficulties in doing this. In the first place, the mere skin of oxide which forms itself on the external surface of a bar while cooling in the air, effectually masks the appearance and arrangement of the fibres when viewed longitudinally. To file down or cut off this skin in the lathe, would greatly distort and change these appearances, and the abrasion and compression exercised during these operations would fill up the interstices and structure we wish to observe. For it is quite certain that upon, *cæteris paribus*, the size and arrangement of the crystalline fibres, depends the quality of wrought iron. The fracture of highly refined iron, Bowling or Low Moor, for instance, shows a mass of small crystals like those in refined sugar. Coarse bad iron is always indicated by the appearance of large crystals, appearing to the greatest perfection in the center of the bar. A piece of puddled bar shows a confused woolly mass of fibres. And, lastly, a tough piece of, perhaps, No. 3 bar, would show the fibres carefully combed, or freckled, or beaten out, into a series of fibres, running parallel to the longitudinal length of the bar. Of course, all these appearances are infinitely varied, in accordance with the infinite variety of makes and qualities. But the joint products of the elongations into the ultimate breaking strengths will be found to be in very close accordance with the molecular structure; that is to say, the real working qualities will be found to closely correspond with the way in which the bar has been manufactured. According to this, a skillful and practiced examination—perhaps aided by a lens—of the fracture ought to show us very closely the quality of the iron.

The appearance of fractures has indeed been, from time immemorial, a means whereby practical men have been guided in their estimation of iron. There are, however, several circumstances that in many cases interfere with a good examination of the internal structure in this way. Certain impurities, such as silicate of protoxide of iron, are worked up with it. It is also evident that a true longitudinal view cannot be obtained of the fibres without some means of clearing them, which means should, at the same time, not interfere with, or alter their position to one another. If, therefore, instead of mechanical means, we have recourse to chemical agency, we have what is wanted in this case. Now, this plan of using an acid solution in order to fully develop to the eye the external structure of iron, was actually proposed and carried out by the late Professor Daniell as long ago as 1817. It was used in practice, within our own knowledge, some seven years ago. Mr. Kircaldy, however, appears to believe that he has made a new discovery in proposing this means for developing the structure of iron, but it is evident that Mr. Kircaldy's surprise is uncalled for, "that such a simple mode as that just described, of examining the texture of iron, had not occurred to any of those individuals who have ex-

pressed their opinions for and against the supposed change from a fibrous to a crystalline structure." The action of the acid is also not merely confined to clearing away the "surrounding impurities," it, at the same time, fully develops the crystals, as different facets are influenced by a greater or less extent by the action of the acid. As Dr. Percy says, in his late work on Iron and Steel: —"After fusion, iron is highly crystalline, and even a small button, weighing only an ounce or two, may present, on fracture, large, bright cleavage planes, and its surface will always exhibit distinct crystalline markings when slowly acted upon by dilute hydrochloric or sulphuric acids. *This etching action is not, as some might suppose, due to the interposition of foreign matter symmetrically diffused through the mass.* Many examples of the apparent development of structure by the action of solvents might be mentioned. *The crystalline structure in all such cases pre-exists, and is merely rendered manifest by the etching process.* Different faces of the same crystal are found to be attacked in different degrees by the same solvent; and Professor H. Rose informed me long ago that an excellent illustration of this fact was presented by a crystal of quartz when exposed to hydrofluoric acid. Similar faces were acted upon with equal intensity. But what is true of quartz, which is rhombohedral, would not necessarily be true of iron, which is cubical, unless the crystals of the latter presented original and derived faces, as in the cubo-octahedron." The action of the diluted acid would be more especially valuable in exposing the longitudinal arrangement of the fibres. Not merely to wrought-iron but also to steel and cast-iron, may this plan of developing the structure be applied. There can be no doubt that it would throw great light upon many questions, both of a practical and of a more purely scientific description. We should probably find that some of the chief qualities of Bessemer iron and steel are due to the equable and even structure acquired by fusion. This would appear from a consideration of Professor Daniell's paper, which is admirable of its kind, and is one of those that, as Bacon says, deserve to be "chewed and digested," and "to be read wholly, and with diligence and attention." In this paper "On the Mechanical Structure of Iron developed by Solution, and in the combination of Silex in Cast-Iron," published in the second volume of the extinct Quarterly Journal of the Sciences and Arts, Prof. Daniell says:—"Although mathematical solids were not discovered by a solution of iron, yet a difference of structure was plainly discernible in the different varieties submitted to the experiment, which is well worthy of attention. A cube of *gray cast-iron* of a granular fracture was immersed in diluted muriatic (now known as hydrochloric) acid. When the acid was separated, it was taken out and examined. The size of the cube did not appear to be at all diminished, owing to a soft, spongy substance which had not been acted upon. This was easily cut off in large flakes with a knife. ....." The texture of the iron, of course, could not be learnt from this covering; but the metal, having been submitted to repeated solution, the quantity of residuary matter gradually decreased, and the surface being scrubbed with a brush, was found to be covered with small irregular ridges, which, when examined with a magnifier, presented the appearance of bundles of minute needles.

A mass of *bar-iron*, which had undergone all the operations of puddling and rolling, was next submitted to the experiment. When the acid was saturated, it presented the appearance of bundles of fasces, the fibres of which it was composed running in a parallel and unbroken course throughout the length. At its two ends, the points were perfectly detached from one another, and the rods altogether so distinct as to appear to the eye to be but loosely compacted. We here see the effect of working and of successive heats on the arrangement of the crystals, and, as a consequence, on the ultimate strength of the bar. A merely puddled bar would have shown a compressed mass of fibres; and an infinite variety of qualities would lie between these two extremes. The description by Professor Daniell of his highly worked bar finds a close counterpart in the appearance of "very fine and straight long hairs or threads lying closely together," found by a late observer in a bar of the same kind.

The next subject of examination "was a specimen of *white cast-iron* of a radiated fracture. The first thing worthy of remark was that it took three times as long to saturate a given portion of acid as the two preceding specimens. Its texture, when examined, differed very much. It appeared to be composed of a congeries of plates, aggregated in various positions, sometimes producing stars upon the surface, from the intersection of their edges. It exhibited altogether a very crystalline appearance, but no regular fascets were discernible.

"A small bar of *cold-short iron* was next selected; it was exceedingly brittle, and its fracture presented bright and polished surfaces much resembling antimony. Its texture, however, when subjected to solution, proved to be fibrous, but not so perfectly so as the first specimen of bar iron. The course of the fibres was very much broken, the acid having dissolved out small cavities which cut them short. It was a square bar, and the alternate sides were more acted upon than the others, so that the fibres would appear to have been flattened." How much significance there is in the fact that cavities can be excavated in cold-short iron by immersion into diluted acid! A rod of *hot-short iron* presented at the end of the operation a densely compacted mass of very small fibres, perfectly continuous. The congeries were twisted, but the threads preserved their parallelism.

A portion of a gun-barrel was submitted to the experiment. The metal was remarkably free from particles of an extraneous nature. The texture proved to be fibrous, but the threads were not regular or straight. They were generally disposed in waved lines, and the whole together was very compact. We here see one of the reasons that a "twist-welded" gun barrel is stronger than a common "skelp-welded" barrel. The twist allows the extra strength always found in the direction of lamination of a plate to be employed in resisting the circumferential tension caused in the barrel by the explosion of the powder. A similar advantage is gained in spirally welded or in spirally riveted boilers. A mass of steel just taken from the crucible in which it had been fused was subjected to the action of muriatic (hydrochloric) acid. It was of a radiated texture, the upper surface being marked with rays which proceeded from the center to the circumference. It was readily acted on by the solvent, and when withdrawn, presented a highly crystalline arrangement. It appeared to be entirely composed of very bright and minute plates, which reflected in every direction. The *laminæ* were very thin, and there was not order discernible in their mutual positions. A specimen of cast-steel which had been subjected to the action of the tilting hammer, of a very fine

granular fracture, was next examined. It was not easily acted upon, even by strong muriatic acid, and it required the addition of a small quantity of nitric acid to effect its decomposition. When the acid was saturated the metal presented a compact appearance; nothing of a fibrous structure was visible; but in one or two places, where the acid had acted with most energy, it had detected the edges of *laminæ*, which appeared to form plates of the extent of the whole surface.

The blade of a razor of Wootz steel presented the same appearance, differing in nothing except three large notches in the back at right angles to the edge.

The blade of a razor of an inferior description presented a fibrous texture of waving lines. Deep notches in the back, similarly placed, were likewise visible in this. It was sufficiently evident, that the fibrous texture of the razor was owing to the admixture of the iron, and to the imperfection of the process for converting it into steel.

A bar of steel of an even granular fracture was broken into two. The two pieces were heated in a furnace to a cherry red. In this state, one of them was plunged into cold water, and the other allowed very gradually to cool by the slow extinction of the fire. They were then both placed in muriatic acid, to which a few drops of nitric acid had been added. The last was readily attacked, but it required five-fold as much time to effect the saturation of the acid as the first. When the solvents had ceased to act they were both examined. The tempered steel was exceedingly brittle, its surface was covered with small cavities, like worm-eaten wood, but its texture was very compact, and not all striated. The untempered steel was easily bent and not elastic, and it presented a fibrous and wavy texture. There cannot be a doubt about the great value, if properly carried out, of the acid test. It will expose, as we have ourselves noticed, in a most remarkable way, the texture of a slab fagoted up out of different qualities and kinds of iron. Any defective welding together of the parts was at once shown forth in tell-tale lines, and the different numbers of the iron composing the fagot were clearly indicated. The facility and ease of manipulation of this test, and the small cost at which it can be carried out, ought to render it of frequent adoption by the practical man; while to those who strive to pierce below the surface of things, it might afford a means of arriving at the truth of many obscure questions with regard to the structure, and consequent value, of iron.—*Mechanics' Magazine.*

Paint Room.

VARNISHING CARRIAGE BODIES.

In a business letter from a correspondent we find the following questions, which being of general interest, we answer publicly for the benefit of others in like circumstances.

"I would like to know what kind of varnish brushes are used in your city for finishing bodies, especially those with large panels. I have one two and a half inches wide, made up of fitch hair, the hairs being about an inch long; but sometimes I have trouble to get a clean finish. How should the varnish be used to prevent its running down, be it mixed with turpentine; and how heavy should it be laid on? Will you please give me some information, and, if there be another kind of varnish brush used, you will please send me one."

Your varnish brush of fitch-hair is good for body-work—three inches wide is better—but care should be taken to have it perfectly clean before using. There are instances where the varnish is dirty of itself; but, we think, more frequently the trouble arises from dirty varnish rooms and dirty brushes. Some persons are so careless that when they put away their varnish brushes, they throw them into open tubs with others for painting, or into varnish waste already thickened by the atmosphere and dirt. For all varnish brushes an air-tight tin can should be provided, with wires across to hang them on, and then immersed in *clean* varnish, in such a way as to just cover the hair portion. A painter cannot use too much care in this particular. Again, carelessness often allows dirt to accumulate around the nuts, joints or undersides of bodies, during the different rubbings down. This, if not carefully washed off, gets into the brush, and is worked into the job, completely ruining it. English varnish is often used by our Western friends as soon as it has arrived—by express, it may be. This is imprudent, as it has such a violent shaking in transmission that it will require a week at least to settle before it is fit to spread. *A can of varnish should always be kept closely corked, and no turpentine ever put in after it is once made.* It is ruinous to do so, and no wonder such turpentine-adulterated varnish "runs down." Most painters prefer bear-hair brushes for varnishing carriage-parts for reasons apparent to every practiced workman. When practicable, choose still, clear days for varnishing—some of the country varnish rooms will not permit a clean job on any other.

A NEW VEGETABLE OIL.

A new vegetable oil, obtained from the seeds of the cotton plant, is just being introduced into commerce. Cotton seed seems to contain about 20 per cent. of it, and the quantity readily obtainable on the great scale for pressing the seeds, after they have been first crushed, then finally ground, and then heated to from 170 deg. to 190 deg. Fahr., reaches from 15 to 18 per cent. of the weight of the seed. Cotton seed is at present very much cheaper than linseed, and the cake left after the oil has been expressed from cotton seed, is very little inferior to linseed cake in respect of richness in nitrogenous and fat-forming elements. Dr. A. Adriana, who has carefully examined the oil of cotton seed in Professor W. A. Miller's laboratory, at King's College, London, describes the crude oil as being fitted to yield both hard and soft soap, of excellent quality, and well adapted to replace linseed-oil in dark-colored paints and varnishes, and in the manufacture of printing ink. He seems, also, to suspect that various dyes may be obtainable from the crude oil. The refined oil, he states to be almost pure oleic acid, equal in taste and odor, to the best olive oil, and admirably suited for lubricating machinery, for burning in lamps, and even for pharmaceutical purposes.

VEHICLES OF PAINTS.

Oil is the common vehicle employed for paints, and it is undoubtedly the best; it has, however, some defects requiring correctives. Thus drying linseed oil, which is made by boiling it with some metallic oxyd, &c., has such an affinity for oxygen as to promote chemical union with it and the coloring pigments, and thus ultimately destroy the beauty of their color. There are many delicate and beautiful colored pigments which cannot be employed with oil in paint, without suffering injury. This is the case with chrome yellow, verdigris, gamboge, and a number of the lakes. But there is a very useful corrective for this deteriorating quality of the oil, that is pure beeswax. It was the principal vehicle of the ancient painters before oil painting was invented, and some of the old paintings exhibit a freshness of color perfectly wonderful. Wax is a powerful antiseptic, has great preservative powers, and it would be well to apply it as the first coating for canvas designed for oil paintings. Wax added to painters' varnishes tends to prevent them cracking, the latter being an evil which has destroyed the beauty of many excellent works of art. It is said that the famous Titian painted on a red ground, and imbued his canvas at the back with beeswax dissolved in oil; this may account in a measure for the enduring brilliancy of his colors. It has also been asserted, on the other hand, that Sir Joshua Reynolds used a great deal of wax with his colors, and it is well known that their beauty has been very short lived, and his paintings have all become very faint. But it has also been denied that he used wax as a vehicle, because it is the most unalterable of unctuous bodies, and would have preserved his colors. Bleached wax is easily dissolved in hot oils, both volatile and fixed; it is not changed by exposure to the atmosphere, and is but very feebly acted upon by the strongest acids. Its appropriateness, therefore, as a vehicle for paints is self-evident.

Oils contain a considerable portion of glycerine, which is a hydroscopic fat, and prevents unprepared oils from drying. It has been found that some metallic oxyds possess the quality of combining with the glycerine in the oil, and rendering it susceptible of readily drying in the atmosphere. The oxyd of lead, sulphate of zinc, and the oxyd of manganese, boiled with oils, communicate to them great drying properties, and for this reason oils treated in this manner are called *drying oils*, and are in common use.

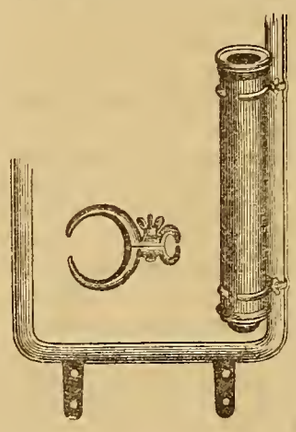
Some works written by incapable authors recommend the use of both sulphate of zinc and the acetate of lead mixed together for making drying oil. These two metallic salts, when brought together, produce two new compounds by double decomposition, namely, the acetate of zinc and the sulphate of lead, and the oil is restored to its original condition. The acetate of zinc should never be employed in paints because it is a bad dryer. Few painters, we suppose, are aware of the foregoing action.

Fixed oils, even those which are bleached, when exposed to the air, become rancid, yellow, and acquire an acid reaction. They absorb oxygen from several pigments, but this, in a great measure, is prevented by the use of wax or a little resin, such as gum shellac. Many persons mix shellac varnish with common paint in order to render the latter less expensive, because a considerable quantity of water can be added to the varnish and combined with the paint, owing to the alkaline agent employed to dissolve the gum. Thus, if we take three ounces of the bicarbonate of soda, and place it in three pints of soft water, it will dissolve a pound of gum shellac by boiling, thus making a lac varnish. To this is usually added half a pint of alcohol and two quarts of soft water, and it is then mixed with common oil paint. For inside work it will answer well, but it should never be applied to the outside of buildings, because it cannot resist atmospheric influences like paint which contains only boiled oil and a pigment. Gum shellac varnish made with the carbonate of soda does not stand the action of rain so well as shellac varnish for which alcohol has been employed as a solvent. It should, therefore, never be used for any work exposed to water or the weather.

Trimming Room.

WHIP SOCKETS.

Great improvements have been made in this department of carriage-trimming within a few years, so great indeed as to have about taken the socket entirely out of the trimmer's hand. Formerly, this article gave, in making, a subject for experiment in stitching to the younger apprentice. It must be confessed that some of these apprentice-made articles were rude looking things, neither round, oval, nor square, and illy fitted for the purpose intended. Should the bottoms not fall out—a frequent occurrence—yet the first time the passenger was caught out in a storm, the socket would most likely get wilted and droop, like some "roosters' tails," after submission to a like ordeal. Indeed, this comparatively *little thing* gave the carriage-builder more trouble with his customers than any other matter of the same size about a vehicle. Even since the India-rubber improved socket came into use, it was as much, if not more, difficult to make a socket maintain an upright position, as it is to keep a man on his "pins" after having guzzled down too large a portion of "liquid fire."



We predict that leather will very soon be a useless article, as far as whip sockets are concerned, and Chamberlin's fastenings to India rubber the only favorites.

CEMENT FOR LEATHER.

With marine glue before us, at least in reports, it would be strange—if any slowness were strange—that shoes and other things made of leather should not have the benefit which cement and solders give to articles made of wood and metal, but should still be made with the flimsy fastening of thread, with holes often so cut by the awl as to weaken the leather fully a third. Even when the shoemaker uses cement to save himself trouble, it is common paste, and is softened by the moisture of the foot, and soon fails to hold the lining stuck in by it, and often becomes offensive. What is wanted is a cement or glue that is as strong as leather, and will adhere readily, and will not chemically change. With such a cement, finer sewing would suffice, if sewing could not be entirely

dispensed with. This is a great want; and if it can be supplied a great fortune will be the reward—provided there be an intelligent business management of the invention. Our rising school of practical chemists will do well to observe whatever substances seem to possess the properties required, and to consider what combinations may produce the desired effect.—*Artisan.*

HOW TO KEEP RATS FROM HARNESS.

The following remarks upon this subject, we copy from the *American Agriculturist* for March:—"One correspondent says, Take about a tablespoonful of good cayenne pepper, and mix it thoroughly with every quart of oil used. This will prevent the rats and mice from knawing the harness, and also prevent horses and colts from chewing their halters. Another, signing himself 'Saddler,' writes, Aloes incorporated in oil, will prevent rats and mice from injuring harness; four ounces to one gallon of oil will suffice. John Griest, of Jay County, Indiana, says, Thirty years ago a Dutch neighbor of mine told me, I could prevent rats eating my harness if I would put a small quantity of pine tar in the oil, but not much, as it would cause the dirt to collect. I think I have not used as much as a tablespoonful to a quart of oil. When I did so, my harness was not troubled, and when I neglected it for a year or two, they were badly eaten. L. S. Lichtenwallner, of Lehigh County, Pennsylvania, uses a gill of tar to the quart of oil. C. Schutt puts a teacupful to two quarts; and C. has a rat-terrier dog."

Editor's Work-bench.

BUSINESS MATTERS.

We have no disposition to appear either ill-natured or censorious, but in some instances find it extremely difficult to refrain from "blowing up" those whom it may concern, when troubling us with business questions; expecting, as a matter of course, that we must answer them, simply because of the editorial relation we sustain to the craft. Many correspondents—some of them have never subscribed a dollar in support of this Journal—are seemingly under the impression that having enlisted in the public service, we are, as a matter of course, in duty bound to do all the business they may require at our hand, and take our pay in the *pleasure* a benevolent act is supposed to afford. If such is their expectation, we take this opportunity to undeceive them. For this purpose—that we may be understood—we now proceed to "define our position."

We frequently receive letters from a distance, requesting us to name some good house dealing in carriage-materials, to which it will be safe to send money, and safe to deal. There are two good reasons why we cannot comply with such requirements. The first is, we will not in this manner advertise those *short-sighted* manufacturers and dealers who refuse or neglect to advertise in our columns, while better firms do. The second—and in our mind the most weighty reason—is, we make it a part of our business to purchase goods for the trade, on which we expect to make a small percentage, which costs our friends nothing. This helps to pay some of the outlay involved in publishing the Magazine.

Sometimes we get orders with directions to purchase and send the goods by express, the bill to be collected on delivery. This class of persons are very frequently "short" when the goods arrive, and in such case they are either returned to us, with a large bill of expenses, or we must loose the use of our capital until our customer "raises the wind." All such orders, where the parties are unknown, we hereafter decline filling. Those who would have their orders promptly filled must send the "needful" along, and *enough* of it, too, to cover the purchase. Should they send a little over, they will find the change promptly returned by mail. On amounts exceeding ten dollars, with the money in hand, we can in some cases save five per cent. when buying. This advantage we invariably allow for the benefit of our customers, and it is surely worth to them some effort to obtain.

When sending their orders, some neglect to describe in detail the goods they want. For instance, they tell us the size of the spoke, leaving to us the studying out of the proportions of the hub and rims in a wheel. This ought never to be done, because we have not the time to do it, and, if we had, our judgment as to proportion *might* seriously conflict with that of another. Details should always accompany an order.

We would impress upon the minds of our readers the fact that we—in these days of sudden change in prices—are never posted fully, except it be once a month, when making up our prices current. Consequently, at other times, when the price of some simple article is asked, before we can answer it we may have to post off some three miles, at an expense of twelve cents for city rail-car fare, and the waste of an hour's time. To reimburse us in such cases, we sometime since adopted a rule requiring all non-subscribers to enclose twenty-five cents fractional currency in their letters, when not on business connected with the Magazine. Some still omit compliance with these terms: as a natural consequence, their letters are doomed to help fill up our waste basket. We claim to be an adept in figures, but we have never yet found it profitable to work for nothing, at our own expense. We have much more to say on this subject, but for want of space must defer it for the present.

CARRIAGES AND THE REVENUE TAX.

Once more our Congressional sages have been "tinkering" the revenue laws, which, as originally made in 1862, were to remain in force three years. It appears that they did not get *force* enough into the document as it came from

their hands in the first attempt, and they have, therefore, annually been *patching* it up until now they have done their work—about *forced* every honest carriage-maker to think of quitting the business. Having succeeded in confining the manufacture to a few favored establishments, it would seem as though they had now turned their attention to the destruction of those who make it their business to live by repairing carriages. Consequently, instead of 3 per centum, they have fixed the tax for the next year, commencing with this month, at $3\frac{6}{10}$—$3.60 on the hundred—where the repairing increases the value of the vehicle ten per cent. or over. New work pays the old rate of tax—five per cent.

Materials are taxed under the new law as follows: Steel in bars not less than $\frac{1}{4}$ of an inch in thickness, valued at 7 cents per pound or less per ton, $6; when valued above 7 cents, and not above 11 cents, $10 per ton; and when valued above 11 cents, $12.50 per ton. Iron in bars, rods, bands, hoops, &c., which have already paid a duty, pays an additional duty of $2.40 per ton. Rivets exceeding one-fourteenth of an inch in diameter, and nuts and washers, not less than two ounces each in weight, and bolts exceeding five-sixteenths of an inch in diameter, $5 per ton. Where these have already paid a duty of not less than $3 per ton, an additional duty of $2 only is demanded. Enameled, patent and Japanned leathers are taxed 6 per. cent., except where such have already been assessed in the rough; in this case the 6 per cent. duty is required only on the increased value by the manufacture. Paints are taxed 6 per cent., except white lead, which is taxed, per 100 pounds, 42 per cent. Linseed oil is taxed 6 per cent.; spirits of turpentine, per gallon, 20 cents; and varnishes, 6 per cent. Glue is taxed 48 cents per gallon. A comparison of the above rates on materials with those of the former session of Congress, as detailed on page 12 of this Volume, shows, that although when considered in detail a difference is seen, yet upon the whole it amounts to about the same thing. The only articles free of duty, appear to be hubs, spokes and felloes.

The tax to our customers who use pleasure carriages, will be on those valued at $50, and not over $100, including the harness, $1; over $100, and not above $200, $2; over $200, and not above $300, $3; exceeding $300, and not above $500, $6; above $500, $10.

The above, we believe, is a fair statement of the changes made by the late Congress, so far as they apply to the manufacture and repair of carriages. We had hoped that instead of imposing upon us new hardships, they would have relieved us of some of the more odious embarrassments under which former legislation had placed us. Our law-makers show, by their continued action, that at least, they have very little pity for us, or any special regard for our pecuniary interests. Our *luxurious* business must *bleed* for the public good—such is "manifest destiny"—we must submit as best we may.

RULES FOR A CARRIAGE MANUFACTORY.

In our late wanderings in the West, we came across the Rules we give below, hanging up in the office of a carriage-manufactory, and deeming them useful and worthy of an extended circulation, we are induced to give them publication in our columns, for the benefit of the public.

"Order is Heaven's first law."

Rule I.—Ten hours is a day's work. All time worked over ten hours will be duly paid for, and all time lost must be deducted, except in cases where helpers and apprentices are working as helpers; they are to have their coal charred and fires ready for work at 7 o'clock A. M.

Rule II.—Apprentices must have their fires made and shops swept out, ready for work, by 7 o'clock, and to put in the work and shut the shops after the bell rings for quitting. Apprentices are to pay their own doctor's bills, and be charged for every day's lost time.

Rule III.—All workmen working by the piece or job will be expected to work the regular hours, making as much over time as they please, by working dinner hours, or as late and early as the shops are open.

Rule IV.—When a workman is employed by the day, he sells to his employer ten hours of time for a stated sum of money, and he has no right to idle *that* time away. If he takes the money for his time, the workman is bound to return a reasonable and fair day's work.

Rule V.—Extra wages, or night work, will be, by special arrangement with the proprietor or foreman. Workmen are requested not to use the materials of the shop for their own purposes, or make articles for themselves without permission from the proprietor.

Rule VI.—Peddlers, loafers, idlers and drunkards will not be permitted in the shops. Workmen are requested to dismiss them promptly should they intrude.

Rule VII.—Workmen are requested to avoid idle conversation during working hours. Neglecting work and passing from one part of the shop to another for the mere purpose of talking, cannot be allowed. Quarreling and indulging in obscene and profane language must be avoided.

Rule VIII.—Smoking during working hours will not be allowed. Workmen are requested to be very careful when smoking during the dinner hour.

Rule IX.—The foreman is requested, and it is a part of his duty to report any repeated violation of the above Rules. No alteration or change will be allowed without the consent of the proprietor.

Rule X.—The comfort and prosperity of the workmen, as well as the proprietors, will be greatly increased by quiet and strict attention to business and the above

rules, during working hours, and by strict attention to the interests of the shop.

Finally.—On the prosperity of one depends the welfare of the other. The two (workmen and employer), are necessary to each other. When one prospers, so does the other. To this end, the proprietor will, when necessary, quietly discuss any question connected with the interests of both, and will at all times be glad to serve them, when not inconsistent with the interests of the establishment.

MOTION DEFINED.

Motion, in mechanics, means a change of position, or a change of place; and is effected by the force or power with which one body acts upon another. Motion may be either *high* or *low*, *swift* or *slow*. High and low motion is applied, usually, to bodies which merely change their position, by turning on an axis; and swift and slow motion is applied to bodies, or substances, which *change places*.

A man, or an animal, moving from one place to another, goes with a *swift*, or a *slow motion*; and when machinery is in operation, the motion is said to be *high* or *low*, according to the rapidity with which the various parts revolve on their axles.

When a circular saw, or the cylinder of a thrashing machine is made to revolve three or four thousand times per minute, the motion is very high; and when they make only one thousand revolutions per minute, the motion is low—perhaps too low for performing the work well.

No inanimate body has power to put itself in motion, nor to bring itself to rest, when once put in motion. A stone hurled through the air would always continue to move, if it met with no counteracting force to bring it to rest; and a grindstone set whirling, or any other machinery set in motion would never stop, if there were not some force acting upon it, which is equal to the force that put it in motion. Motion and rest are matters of indifference with all kinds of bodies.

The *rapidity*, *speed*, or *swiftness* with which a body moves from place to place, or turns on its axis, is called its *velocity*. When a body, in moving from place to place, passes over an equal number of yards in equal times; and when a body turns on its axis a given number of times every minute, the velocity is said to be *uniform*.

When a body continues to move faster than it did when first put in motion, the velocity is said to be *accelerated*. When an impetus is given to a body, and it continues to move slower, until it comes to rest, it is said to have a *diminished* or *retarded velocity*, as when a top is made to spin—although it may revolve for an hour; because, it continues to revolve slower, until it comes to rest.

When a bullet is discharged from a rifle, perpendicularly, into the air, it has a *uniformly retarded velocity*, until it reaches a point, where the force of gravity and its projecting force just balance each other; and it stands, in mid air, for an instant, motionless. In its return, it has a *uniformly accelerated velocity;* because, it passes over equal spaces in equal times. A bullet discharged from a rifle, perpendicularly, will pass over the same spaces in the same time, in returning to the earth, that it did in ascending; and consequently, its momentum would be the same, at any point, in ascending or descending.

EDITORIAL CHIPS AND SHAVINGS.

Museum of Italian Carriages.—A curious building is being erected adjoining the museum of Cluny and the ruins of the Roman palace of Thermes, in Paris. It is a covered arcade, the arches of which will hereafter be filled in with glass. The walls are composed, like those of the old palace, of alternate courses of brick and stone, and the roof is covered with tiles cut in geometric forms. The intended application of the structure is the formation of a collection of Italian carriages of the sixteenth century, and probably others. There are three curious vehicles now in an adjoining museum, which will form a part of the new department.

Management of Restive Horses.—A correspondent of a country journal says: I have a valuable mare of very high spirits. Last fall she began to be restive about starting, so much so that it was dangerous to drive her single. She was impatient to start, and if held in would rear and pitch about, sometimes throwing herself down. Finding the matter becoming serious, I undertook to cure her, and succeeded perfectly. The modus operandi is this: Let the driver have the entire charge of her, and take pains, by gentle usage and kindness, to be on good terms with her. When she is to be driven let him harness her himself, talking and patting her during the process. When all is ready, go to her head and stand, without holding her, if possible, till everything is in the buggy but yourself. Now, holding the lines, step back a pace or two. She will probably start; if she does, pull her up without a jerk; speak kindly to her as soon as she is still. If she backs up or rears, hold her by the head, but don't strike her. Repeat the process until she is mild enough to stand still, and take that time to get in. Now if you order her to start, she will probably make more trouble; wait, therefore, till she is ready—you can tell by watching her ears—then give her the word and let her go. By pursuing this plan a few weeks a radical cure may be effected; this, at least, is my experience. One very important point is, never on any account use any severity with a horse of that disposition; it can never do any good, and is almost sure to do hurt. It should be remembered that while it is never necessary to give up to a horse, it is very often advisable to humor them.

Scene in a Railway Car.—Just as one of our outward-bound train of cars—says the *Boston Journal*—was about to move from the depot, an elderly gentleman, of high respectability and character, entered one of the cars and upon looking round for a seat, saw one with a lady in it, and politely inquired if the vacant seat was engaged. She replied snappishly that she had no more room than she wanted, whereupon he, being a quiet, modest gentle-

man, retired, and some one offered him a seat. The selfishness of the lady was noticed by many of the passengers, and exeited much indignation. Shortly after a gentleman occupying a seat in the back part of the car, approached that part of the seat nearest the passage-way. He then very quietly took his umbrella, and passing it over the lady, placed it in the corner near the window. He next very deliberately raised one foot above her crinoline and put it down beyond her, near the window, and then dragged the other after him and took his seat, amid the laughter and applause of the passengers, who were watching the operation. In a short time, the seat in front of them was vacated, and this interesting lady who was, by this time, the observed of all the passengers, moved and occupied it alone, leaving our friend of the umbrella to himself. In a few moments more a large, heavy man, weighing some two hundred and fifty, and who seemed disposed to teach the lady a second lesson, planted himself by her side. By this time the passengers were convulsed with laughter at the expense of our heroine, who was obliged to submit to the contraction not only of her crinoline, but of her whole person, for the remainder of the journey. Possibly she learned that politeness and courtesy are expected of *ladies* as well as of gentlemen.

Winter Scenes in Montreal.— A correspondent writing from Montreal, Canada, says the snow now lies three feet deep. The streets are full of sleighs, and the street cars are on runners. Walking up Great Street and James Street to-day, I could but mark the un-American characteristics of the people. Sleighs with heavy robes, drawn by horses bedecked with bright tassels and silver bells, shot by with their shouting drivers and gay company; sleds drawn by dogs on the walks; boys and girls with skates or snow-shoes; the passers all dressed in furs and talking loudly; glad life ringing out everywhere, until the clear air throbbed with the chiming of bells and laughter—made me feel and realize that a gulf wide as the Atlantic separated me from the worn and thoughtful people treading American cities.

The English on Whitewood.—A constant reader writes to the London *Engineer*, from Liverpool, and says: "There has been some hard white timber shown to me here which goes by the name of 'Whitewood,' in long lengths, and running from 18 to 24 inches square, that I am told is very durable. It is an American wood, and is, I think, cypress." The editor of the *Engineer* differs from his correspondent, and thinks it not very durable, which is directly in opposition to the information given to the querist by other parties. Since the blockade running business has been "shut down upon" by our victorious armies, we trust our Liverpool cousins will turn their attention to this new subject—the question—"Is the American *Whitewood* durable timber?" Science demands an immediate settlement of this question?

Help for Fallen Horses.—A London cotemporary says that when a horse in shafts falls down he nearly always falls with some or all of his legs under one of the shafts and his body over the other, and there is the greatest difficulty in getting him up again, in many cases the weight of the loaded cart being thrust forward and pinning the horse to the ground. If the shafts, however, were fastened by bolts and pins to the cart, they could easily be removed, and the cart drawn back by a few bystanders, who could easily preserve its equilibrium, and then the horse could easily get up.

Another Novelty in Cabs and other Carriages. —"A Patent Carriage Company, Limited," has been formed in Birmingham, England, for the purpose of bringing into use sundry novel improvements. The frame-work is of angle iron, welded. By using this several inches of space are saved, and added to the accommodation. The panels, which in ordinary cabs are of wood, in these new ones are of papier mâché. The paper resembles leather, but is stiffer and very tough. Every part of a cab usually of wood, indeed, is in this instance, made of paper. The springs are beneath the body, which brings the wheels five inches nearer than in the ordinary vehicle, yet also gives additional room in the width. The windows run along the roof on the inside, and draws down like a sash; and there is a sash door, which may be pushed down and coils itself below the body of the vehicle.

FOREIGN IMPROVEMENTS IN CARRIAGES.

June 27, 1864. Improvements in Carts and Conveyances, Wagons for Commercial, Agricultural and Railway Carriages.—H. Stevens. These improvements in carts for commercial, agricultural and military purposes, consist in their construction so as to obtain more space for goods, and less draught to the horse. To effect this, the inventor places the axle through the body of the cart or vehicle, and carries the weight below, instead of, as heretofore, above. The front part of the body is so arranged that the horse is brought back close to the axle, with covered space over his back, so that the weight is equally balanced when laden, and in case of the horse falling, the weight of the cart cannot press on him, as the stays on the bottom will come in contact with the ground first. The shafts are placed through the body which carries the weight, and does away with traces, the horses pulling direct from the shaft. To prevent the horse from running away when left alone, he places a length of small copper wire, rope, or leather strap under the shaft of the cart or vehicle, leading from the beam or stock of the wheel to the horse's head, and made good to the lower part of the bit in the mouth; when the horse moves forward, the revolution of the wheel will wind the wire rope round the nare, and pull the horse back on his haunches. *Patent abandoned.*

July 28. Apparatus for Breaking Horses.—J. Newsome, Greenock. This apparatus consists of a girth or belt of leather, or other suitable material, attached to the saddle, and passing under the belly of the animal in the ordinary manner. To the upper part of the girth there is fixed on each side of it a spring lever, and into the lower part of these levers there is inserted a pair of spurs, while on the side of the levers opposite to that on which the spurs are placed, eyes are formed, into which passes the end of a rope or cord, which also passes through other eyes fixed in a metal plate at the lower part of the girth underneath the animal's belly. To this rope or cord is attached another rope or "lunge," which the breaker takes in his hand when in use. The mode of operating with this apparatus is as follows:—The apparatus, in combination with a saddle, is strapped on to the animal to be broken in. The breaker takes hold of the cord or lunge, which may be of any suitable length, and stands at

any convenient distance from the animal; and, by pulling this cord or lunge, the spurs fixed to the ends of the spring levers are caused to impinge upon the animal's sides in the same manner as is done by the legs of a rider.

August 1. Adjusting the Load contained in a Drag, or other Two-Wheeled Vehicle, to the Back of a Horse.—P. H. Moore, Patricroft, near Manchester. In one arrangement of his invention the patentee fixes to the front of the seat a bracket, carrying a screw working in a nut fixed to the cross-bar or cross-frame of the vehicle; and he attaches to the top, bottom and sides of the seats, anti-friction bowls or rollers, running on metal rods or plates fixed to the body of the vehicle, so that when the screw is turned, the seat can be moved backwards or forwards with great ease, and thereby balance the weight of the load.

August 10. Folding Carriage Step.—J. Grice, Jr., Birmingham. The patentee claims effecting the folding and unfolding of carriage steps by means of parallel jointed bars or levers which in their motion always preserve their parallelism. Secondly, fixing the ribs on which the step joints of folding carriage steps are made on the underside of the steps, the ends or parts on which the joints are formed passing through holes to the upper sides of the steps, as described.

AMERICAN PATENTED INVENTIONS.

Jan. 3, 1865. (45,699) Wagon and Carriage Brake.—Lewis C. Carpenter, Lancaster, O. (Antedated Aug. 19, 1862): I claim arranging the lever B horizontally, and making the weight upon it roll or traverse on a bar, substantially as described for the purpose specified. And in combination with the lever R, and weight or roller S, I claim the link W, lever N, and shaft L, and roller X, substantially as described.

(45,715) Self-Loading Hay Cart.—Erastus Holt, Wheaton, Ill.: I claim the rake N, having its bar O, provided between arms P P, which are attached by pivots to the sides of the body A of the cart, in combination with the shafts F, cords or chains *h h*, lever K, and the arm I, or its equivalent, all arranged substantially as and for the purpose herein set forth. I further claim the bar G, pivoted between the arms E E, at the sides of the front end of the cart body, in combination with the arm I, at the rear of the draught-pole H, and the bar J, attached to the shaft F, all being arranged to operate in the manner substantially as and for the purpose specified.

(45,761) Ash Cart.—Robert A. Smith, Philadelphia, Pa. (Antedated July 21, 1863): I claim a cart having a receptacle composed of permanent side D, and permanent ends D′ and the tilting or dumping-box G, hung or secured to a shaft F, and constructed and applied to the permanent portion of the receptacle, substantially as and for the purpose herein set forth.

(45,888) Thill Attachment.—R. B. Willis, Rochester, N. Y.: I claim the combination and relative arrangement of the set screw *s*, frictional plate *a*, and the thill iron *B*, with the bolt *b*, and jaws *D*, of the clip, the parts being constructed as and for the purposes shown and described.

31. (46,092) Obtaining Spirits of Turpentine, Oil, Rosin, and other Products from Pine Wood.—A. H. Emery, New York City: I claim, *First*, Passing a current of ordinary steam over and through the wood into a condenser in the manufacture of spirits of turpentine, rosin, &c., from pine wood. *Second*, I claim in the manufacture of turpentine, resin, etc., directly from pine wood, subjecting the steam, either ordinary or superheated, to a pressure while it is in retort and passing therefrom into a condenser.

(46,118) Tire Shrinking Machine.—John A. Lloyd, St. Paul, Minnesota: I claim, *First*, constructing the logs B B, with horizontal and vertical key seats, so that the article to be secured may be pinched either upon its horizontal or vertical surfaces at pleasure. *Second*, in combination with the bed-plate A of a machine for shortening tires; the lever D, lugs B B, and keys C C, substantially as described, and for the purpose set forth.

(45,123) Drilling-Machine.—Warren Lyon, New York City: I claim, *First*, the arrangement as herein shown and described, of the levers I L, drill arbor D, with weight F attached, the counterpoise M, on lever L, and the rod N, for the purpose specified. *Second*, The projection *n*, and sheath *p p*, on the face or upper side of the bed-plate P, in combination with the slide R′, screw S, and the adjustable arm Q, to which the bed-plate is attached, all arranged substantially as and for the purpose set forth. *Third*, The bracket C, with the bearings *a a*, attached, when used in combination with the drill arbor D, and its concomitant parts, as herein shown and described.

(46,176) Ears Paint Can.—Charles F. Brand (assignor to Harris Brothers & Co.) Philadelphia, Pa.: I claim combining the slips *a a*, with the ears D D, of paint cans, substantially in the manner and for the purpose above described.

February, 21. (46,468) Harness Snap.—Horace Harris, Newark, N. J. (Antedated Feb. 12, 1865): I claim the extension of the spring A, in combination with the knob C, and the hook B, for the purposes herein shown and set forth.

(46,478) Drilling Machine.—Isaac S. Lauback, New York City: I claim, *First*, combining and uniting the two adjustable brackets Q and W, by means of the adjustable connecting rod *r*, fitted with one or more universal joints, the one of said brackets to be combined with the driving head, and the other with the spindle head of the machine, substantially in the manner described for the purposes specified.

(46,489) Harness Saddle Tree.—Oliver B. North, New Haven, Conn.: I claim, *First*, A metallic saddle-tree for harness, composed of the jockeys, cantel and seat, cast in separate pieces, and united together substantially in the manner and for the purpose described. I also claim casting a stud upon the underside of the seat for the purpose of uniting said seat to the cantel without passing rivets or screws through, which interfere with and mar the plating or japanning, as herein described. I also claim uniting the check-hook to the tree by passing the shank of the hook under the bow of the jockeys, and above the frame, and uniting it by the stud or pin *f*, and the screw and nut *g b*, or their equivalent devices, substantially as herein described and represented.

(46,501) Machine for Holding Hubs while being Bored.—Peter Schutler, Chicago, Ill.: I claim the application of a screw-ring D, which is provided with clamps *c c c*, to a holder C, which is applied to a rotating shaft B, substantially as described.

(46,523) Carriage Wheels.—Joseph Goodman, Blackfriar's Roads, Eng. (assignor to Charles P. Button, New York City): I claim the disc I, with conical central bars J, in combination with the grooved disc L, and its central openings *a*, and with the spokes C, and felly or tire D, constructed and operating substantially as herein described, so that by screwing the two plates together, the spokes are forced out to a uniform distance from the centre and securely clamped.

(46,526) Tuyere.—J. R. Harrington (assignor to Agnes V. Harrington), Brooklyn, New York: In combination with the box A, provided with the projection *a*, and tube *a* 3, I claim the back B, provided with the tube *b* 3, when the same shall be combined and operated in the manner and for the purpose specified.

March 7. (46,623) Attaching Sleigh Bells to Straps.—W. E. Barton, East Hampton, Conn.: *First*, the metallic seat having a recess conforming to the boss of the bell, a hole for the coupling screw to pass, and impinging surfaces on the leather side to keep the seat in place substantially as described. *Second*, in combination, the bell with short boss and screw hole, the metallic seat strap, and coupling screw substantially as described. *Third*, in combination, the coupling screw flaring washer strap, metallic seat and bell substantially as described.

(46,663) Passenger Register.—Edward Hacket, New York City: I claim the roller E, provided with a spiral groove *g*, and marked with alternating figures and ciphers placed in a spiral row, to operate in combination with the slide *i*, and with the

hinged step A, sliding rod B, and weight C, or its equivalent, in the manner and for the purpose substantially as set forth.

CURRENT PRICES FOR CARRIAGE MATERIALS.

CORRECTED MONTHLY, BY MR. CHAS. WEEKS, FOR THIS MAGAZINE.

New York, March 25, 1865.

We have very little change to note in our market report this month, the early day at which we go to press making it impossible. The manufacturers of springs and axles have notified dealers that there will be some reduction in price made on the 1st of April; and no doubt many of the items in our list will also be much cheaper in consequence of the fall in gold, particularly those of foreign importation. For this season of the year, sales of carriages are very dull here, and we advise that our friends postpone their purchases of stock until the inflated prices asked for goods give way, and more reasonable rates return again, which cannot be far distant.

Apron hooks and rings, per gross, $2.50.
Axle-clips, according to length, per dozen, 75c. *a* $1.40
Axles, common (long stock), per lb, 12c.
Axles, plain taper, 1 in. and under, $7.00; 1⅛, $8.00; 1¼, $9.00; 1⅜, $10.00; 1½, $11.00.
Do. Swelled taper, 1 in. and under, $8.75; 1⅛, $9.50; 1¼, $11.25; 1⅜, $13.75; 1½, $16.25.
Do. Half patent, 1 in. and under, $11.25; 1⅛, $13.25; 1¼, $14.75; 1⅜, $16.25; 1½, $18.25.
Do. Smith's New York half patent malleable iron box, 1 in. and under, $10; 1⅛, $12; 1¼, $14.
Do. Saunders' improv. taper, ¾ in., $13.50; ⅞, $14.50; 1, $14.50; 1⅛, $16.50; 1¼, $20.
Do. do. Homogeneous steel, ⅝ in., $16.50; ¾, $18; ⅞, $20.50; long drafts, $4 extra.

☞ These are prices for first-class axles. Makers of less repute, cheaper.

Bands, plated rim, under 3 in., $2.50; over 3 in., $3.
Do. Mail patent, $3.50 *a* $5.00.
Do. galvanized, 3½ in. and under, $1; larger, $1 *a* $2.
Basket wood imitations, per foot, $1.25.

☞ When sent by express, $2 extra for a lining board to a panel of 12 ft.

Bent poles, each $1.25.
Do. rims, under 1⅛ in., $2.25 per set; extra hickory, $2.50 *a* $3.50.
Do. seat rails, 50c. each, or $5.50 per doz.
Do. shafts, $7 per bundle of 6 pairs.
Bows, per set, light, $1.25; heavy, $1.50.
Bolts, Philadelphia, 10 per cent advance on list.
Do. T, per 100, $3 *a* $3.50.
Buckram, per yard, 40 *a* 50c.
Buckles, per grs. ½ in., $1.15; ⅝, $1.40; ¾, $1.70; ⅞, $2 10; 1, $2.80.
Burlap, per yard, 50c.
Buttons, japanned, per paper, 30c.; per large gross, $3.
Carriage-parts, buggy, carved, $4 *a* $5.50.
Carpets, Brussels, per yard, $3; velvet, $3.75 *a* $5.50; oil-cloth, 75c. *a* $1.00.
Castings, malleable iron, per lb, 23c.
Clip-kingbolts, each, 50c., or $5.50 per dozen.
Cloths, body, $5.50 *a* $6.50; lining, $4 *a* $4.50 (See *Enameled.*)

☞ A Union cloth, made expressly for carriages, and warranted not to fade, can be furnished for $2.50 *a* $3.50 per yard.

Cord, seaming, per lb, 45c.; netting, per yard, 5c.
Cotelines, per yard, $5 *a* $10.
Curtain frames, per dozen, $1.25 *a* $2.50.
Do. rollers, each, $1.25 *a* $1.50.
Dashes, buggy, $1.75.
Door-handles, stiff, $1 *a* $3; coach drop, per pair, $3 *a* $4.
Drugget, felt, $2.
Enameled cloth, muslin, 5–4, 85c.; 6–4, $1.35.
Do. Drills, 5-4, $1.10; 48 in., $1.30; 5-4 A, $1.50; 48 in. A, $1.75
Do. Ducks, 5-4, $1.90; 50 in., $2; 6-4, $2.40.
Enameled linen, 38 in., $1.20; 5-4, $1.40; 6-4, $1.65.
Felloe plates, wrought, per lb, all sizes, 28c.
Fifth-wheels wrought, $1.75 *a* $2.50.
Fringes, festoon, per piece, $2; narrow, per yard, 18c.

☞ For a buggy top two pieces are required, and sometimes three.

Do. silk bullion, per yard, 50c. *a* $1.
Do. worsted bullion, 4 in. deep, 50c.
Do. worsted carpet, per yard, 8c. *a* 15c.
Frogs, 75c. *a* $1 per pair.
Glue, per lb, 25c. *a* 30c.
Hair, picked, per lb, 80c. *a* $1.00.
Hubs, light, mortised, $1.25; unmortised, $1.00—coach, mortised $1.75.
Japan, per gallon, $5.75.
Knobs, English, $1.75 *a* $2 per gross.
Laces, broad, silk, per yard, $1.20 *a* $1.50; narrow, 15c. to 20c.
Do. broad, worsted, per yard, 50c.
Lamps, coach, $20 *a* $30 per pair.
Lazy-backs, $9 per doz.
Leather, collar, dash, 36c.; split do., 18c. *a* 21c.; enameled top, 36c.; enameled Trimming, 33c.; harness, per lb, 75c.; flap, per foot, 27c. En. top, if over 60 ft., 42c.; under 60 ft., 35c.
Linen, heavy, a new article for roofs of coaches, $1 *a* $1.25 per yard.
Moquet, 1½ yards wide, per yard, $9.00.
Moss, per bale, 12½c. *a* 15c.
Mouldings, plated, per foot, ¼ in., 14c.; ⅜, 16c.; ½, 18c.; lead, door, per piece, 40c.
Nails, lining, silver, per paper, 12c.; ivory, per gross, 50c.
Name-plates.

☞ See advertisement under this head on 3d page of cover.

Oils, boiled, per gallon, $1.50.
Paints. White lead, extra, $20 per 100 lbs.; Eng. pat. black, 35c.
Pekin cloth, per yard, $5.

☞ A very good article for inside coach linings.

Pole-crabs, silver, $5 *a* $12; tips, $1.50.
Pole-eyes, (S) No. 1, $3.10; No. 2, $3.30; No. 3, $3.60; No. 4, $4.85 per pr.
Sand paper, per ream, under No. 2½, $5.75; Nos. 2½ & 3, $6.25.
Screws, gimlet.

☞ Add to manufacturer's printed lists 20 per ct.

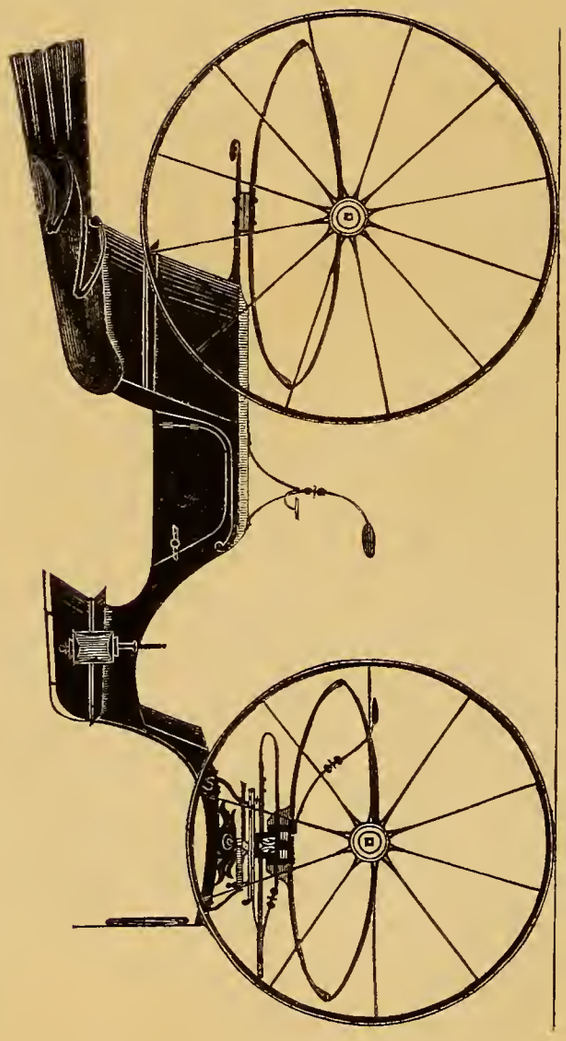
Do. ivory headed, per dozen, 50c. per gross, $5.50.
Scrims (for canvassing), 30c. *a* 40c.
Seats, buggy, pieced rails, $1.75; solid rails, $2.50.
Shaft-jacks (M. S. & S.'s), No. 1, $3.25; 2, $3.75; 3, $4.00.
Shaft-jacks, common, $1.40 *a* $1.60 per pair.
Do. tips, extra plated, per pair, 37½c. *a* 56c.
Silk, curtain, per yard, $2 *a* $3.50.
Slat-irons, wrought, 4 bow, $1.12½; 5 bow, $1.25 per set.
Slides, ivory, white and black, per doz., $12; bone, per doz., $1.50 *a* $2.00; No. 18, $2.50 per doz.
Speaking tubes, each, $8.
Spindles, seat, per 100, $1.50 *a* $2.50.
Spring-bars, carved, per pair, $1.75.
Springs, black, 28c.; bright, 29c.; English (tempered), 33c.; Swedes (tempered), 35c.; 1¼ in., 1c. per lb. extra.
If under 36 in., 2c. per lb. additional.

☞ Two springs for a buggy weigh about 28 lbs. If both 4 plate, 34 to 40 lbs.

Spokes, buggy, ⅞, 1 and 1⅛ in. 8½c. each; 1⅛ and 1¼ in. 8c. each; 1½ in. 9c. each.

☞ For extra hickory the charges are 10c. *a* 12½c. each.

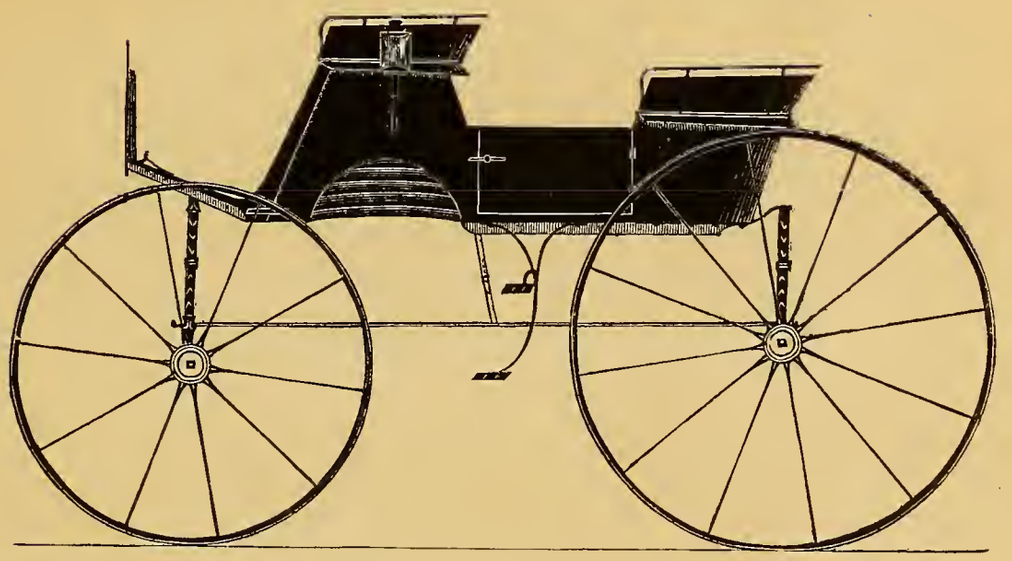
Steel, Littlejohn's compound tire, 1-8 & 3-16 thick, 6¾c. gold; 1-4 & 5-16 thick, 6½c. gold.
Stump-joints, per dozen, $1.60 *a* $2.25.
Tacks, 10c. and upwards per paper.
Tassels, holder, per pair, $1 *a* $2; inside, per dozen, $5 *a* $12; acorn trigger, per dozen, $2.25.
Terry, per yard, worsted, $5; silk, $11.
Top-props, Thos. Pat, per set 70c.; capped complete, $1.50.
Do. common, per set, 40c.
Do. close-plated nuts and rivets, 75c.
Thread, linen, No. 25, $1.30; 30, $1.45; 35, $1.65, gold.
Do. stitching, No. 10, 95c.; 3, $1.15; 12, $1.28, gold.
Do. Marshall's Machine, 432, $2; 532, $2.30; 632, $2.60, gold.
Tufts, common flat, worsted, per gross, 20c.
Do. heavy black corded, worsted, per gross, $1.
Do. do. do. silk, per gross, $2.
Do. ball, $1.
Turpentine, per gallon, $2.25.
Twine, tufting, per ball, 35c.; per lb, 60c. to 75c.
Varnishes (Amer.), crown coach-body, $7; hard drying, $8; non-pareil, $8.
Do. English, $6.25 in gold, or equivalent in currency on the day of purchase.
Webbing, per piece, 70c.; per gross of 4 pieces, $2.60.
Whiffle-trees, coach, turned, each, 50c.; per dozen, $5.50.
Whiffle-tree spring hooks, $3 per doz.
Whip-sockets, flexible rubber, $4.50 *a* $6 per dozen.
Do. hard rubber, $10.50 per dozen.
Do. leather imitation English, $5 per dozen.
Do. common American, $3.50 *a* $4 per dozen.
Window lifter plates, per dozen, $1.50.
Yokes, pole, each, 50c.; per doz, $5.50.
Yoke-tips, extra plated, $1.75 per pair.



TILBURY PHAETON.—½ IN. SCALE.

Engraved expressly for the New York Coach-maker's Magazine.

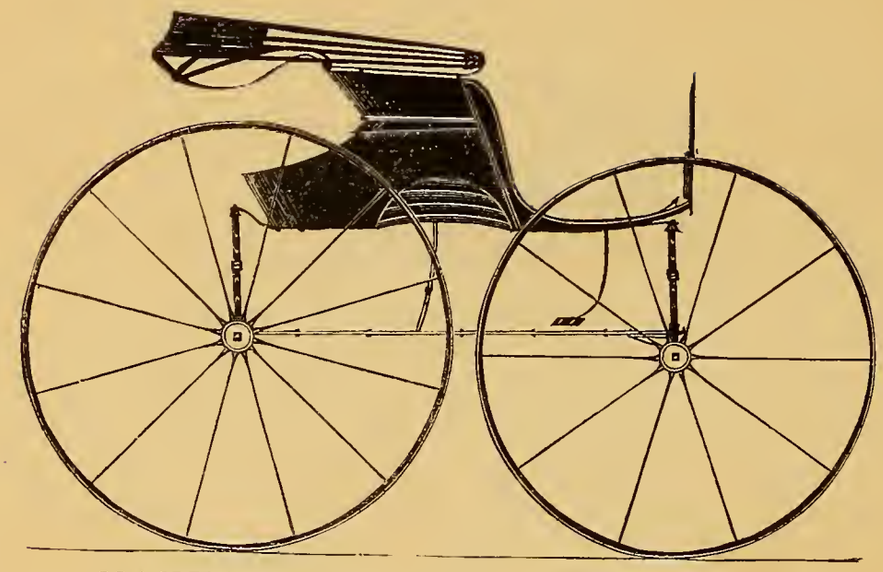
Explained on page 181.



DRAG-FRONT PHAETON.—½ IN. SCALE.

Designed expressly for the New York Coach-maker's Magazine.

Explained on page 181.



MANHATTAN BUGGY, No. 3.—½ IN. SCALE.

Engraved expressly for the New York Coach-maker's Magazine.

Explained on page 181.

DEVOTED TO THE LITERARY, SOCIAL, AND MECHANICAL INTERESTS OF THE CRAFT.

Vol. VI. · NEW YORK, MAY, 1865. No. 12.

Mechanical Literature.

THE TIREVILLE MISCELLANY;

BEING SELECTIONS FROM THE PRIVATE JOURNAL OF JOHN STILLWAGEN, ESQ.

BY THE EDITOR.

(*Continued from page* 82.)

Some persons are so habitually unreasonable, that it is trying to one's patience to have any business with them. Of this character I found James Crossgrain, a self-styled gentleman, which latter term is too frequently appropriated to themselves by a certain class with no better claims than that in the eyes of the world they are *men of means;* in other words, moneyed men, and able to live without labor. Many such—not all—have very little charity for those about them who are obliged to "earn their bread by the sweat of the brow," rather regarding them with contempt, particularly should such be mechanics. Perhaps, in many instances, these prejudices have been strengthened by reading Johnson's definition of the word as given in his Dictionary. It is, however, some satisfaction to us, as mechanics, to find that in this country, at least, *caste* is fading away before the light of civilization.

Jan. 30, 18—. Hired a journeyman painter this day, under the express stipulation on my part that he was to have "steady work." Agreed to begin in the morning of the next day (Friday) which he did, and worked until Saturday night. At that time I settled with and paid him for the two days' labor, with the express understanding that he would be on hand at seven o'clock, Monday morning, without fail. Monday morning came around, and he *failed* to be "on hand." Wondered what could be the matter. Found on inquiry that my "steady hand" had taken too much *medicine* during the Sabbath. "That's what's the matter!" I needed his services very much, so I went after and found him—unsteady, overcome with trouble. In conversation he "allowed" he was very sick —"very sick, indeed, boss"—but promised me faithfully that he would be "all right," and at his work on Tuesday morning. Tuesday came, and so did Wednesday, but it was nine o'clock P. M. before he was "steady" enough to begin *his* week's work, telling me then that I would find him steady thereafter. Poor fellow! Paid him off again on Saturday night, when he went immediately to the nearest gin-mill and took "medicine," which *threw* him into another fit of sickness, from which he never—*recovered* his position in my shop.

Feb. 3*d.* Sallied out this morning on a collecting tour. My first visit was to Mr. Bankrupt, with a bill amounting to $37.28. As this gentleman had always insisted upon my rendering all bills for repairing on the first day of each month, I was somewhat surprised at receiving an invitation to call again, when I should be paid. Called again, however, and again—the twenty-fifth of the month came round, and so did I, and got—more curses than coppers. After this concluded to strike out a new course. Went and ordered a "shingle" painted and lettered, "Terms—All Jobbing done in this shop must be paid for before it is taken away." Intended at the time to stick to them, but alas—how *weak* some men are! The very next customer (he being an old one) took his carriage without a word concerning payment, *and I let him do so*, because I feared if I stopped him, he would never come back again.

March 10*th.* Was called upon this day by Petroleum, who had taken a fancy to a new Phaeton I had just finished, which was standing in my repository. For this he made the *liberal* offer of $500, the same being worth at least $700, he telling me at the same time that he could have one from my Shintown neighbors at that figure. This I told him I could not well credit, the sum named being much less than the first costs of building. He even went so far as to bet $100 he was offered one for that sum. I declined any such proposition at the time, from principle, and learned afterwards that he had not even asked the price of my neighbor's phaeton. I have no doubt he intended to deceive me with the idea that he could get a better bargain elsewhere than he could at my shop, and thus by working upon my jealousy, induce me to sell cheaper. He, however, missed his mark in this instance, for it is an established rule with me to judge of the value of my own work from a data of my own.

March 13*th.* A circumstance of some importance, to me at least, recently took place, which has greatly tried my patience. I sometime ago sold a dealer a new buggy, which after having put his "plate" upon, he sold as being one of his own manufacture. Not long after this the customer was out on the road, where his horse became

frightened and ran away with the buggy, seriously damaging it. This misfortune induced him to "turn it in" to the putative builder, at a low figure, for a new one, paying a difference of course. So far I had no reason to complain, but afterwards the buggy was returned to my shop with injunctions to "have it repaired so as to look as good as new," which being done, was afterwards sold again as new. Soon after it had been sold a second time, one of the perches "gave out." This affair was reported to the dealer, who then stated that the vehicle was not his manufacture, "but one of Stillwagen's," thus fastening the imperfections of "a runaway with job" upon me, to shield himself from odium, thereby damaging my reputation for good work. When these facts reached my ear of course "the cat was let out of the bag," and the dealer branded "a cheat." The trial to me consisted in the fact that Mr. Dealer had committed a breach of good manners in selling a *runaway* wagon as a new one, and then to shield his wickedness, throwing all the blame upon me, to the disparagement of my reputation as a good builder —of which I felt extremely jealous. Of course I had *to blow* the dealer to defend my reputation, and felt myself perfectly justified in doing so.

MECHANICAL POWER AND FRICTION.

BY HENRY HARPER.

(*Concluded from page* 165.)

This phenomenon (heat) is traced in every case where cohesion is interfered with so as to change the position of matter, whether cohesion is destroyed or not. For example, take a piece of tough iron of the size of a pea, and lay it on an anvil and strike it hard enough to flatten it. In changing its shape, heat is produced to such an extent that it will burn your fingers. Examine the iron and it will appear as cohesive as ever, but it is evident that every particle of matter has changed its relative position. The same phenomenon is observed when a cannon ball is fired against a solid body with force to change its shape. Heat is still more apparent in turning tough iron. The instant the shaving is severed from the bar, it is heated to such a degree that water must be applied to prevent it from communicating heat to the chisel coming in contact therewith. Observing this shaving, it will be found that it is the only part in which the cohesion of matter is interfered with, *and it is the only one that generates heat.* The bar is heated from the simple separation of cohesive matter on its surface, barely perceptible, and is soon absorbed by the main body. A continued separation and absorption of heat, as in constant rubbing, of course, would accumulate enough to heat the bar throughout its whole length; but this is not the case in turning iron, so long as it remains whole. The chisel does not generate any heat, so far as can be observed, but the heat destroying its temper, is absorbed from the shaving. The shaving is agitated in every part by the resistance to the chisel, so that all matter is removed from the place where cohesion held it, before it was separated from the bar. It instantly becoming hot, communicates heat to other substances coming in contact with it. It is heated by the same laws that ignite steel shavings separated by the flint in a flint-lock.

There have been various theories put forth antagonistic to the one here presented, by some whose opinions are entitled to great respect, yet it has never been considered a settled question, except by those who are carried away with "one idea." Such cannot comprehend the results that their theories practically carried out would lead to.

Prof. Tyndall, F. R. S., in a course of lectures lately delivered before the Royal Institute, London, undertook to demonstrate that heat was convertible from motion, and motion from heat. Thus, if we fire a cannon ball at a target with sufficient force to stop its motion, it will become sissing hot; therefore, the conclusion is formed that the motion of the ball by being resisted, is converted to heat. If the foregoing is a true conclusion, it will be of great importance, and many new inventions could be based upon the invariable laws of nature. One invariable and undisputed law is, that when a body is once put in motion, that it has no power of itself to resist that motion. Therefore a shell put in motion from a cannon will become heated by the time the motion is stopped, whether it was stopped by the less solid medium of the atmosphere and gravitation, or the more solid sides of a ship; in either case it will require no other provision for exploding it than the convertibleness of motion to heat. Explosion would be a certain result in every case where the velocity of the shell generates heat sufficient to ignite the powder, and that could be graduated, as in the case of friction matches, with a certain degree of precision. The theory being incorrect, no practical inferences can be drawn from it, yet it has been received with considerable applause in certain quarters; and, it is common to hear it referred to by scientific men as a settled question. Mr. Joule, F. R. S., in a letter to the "Philosophic Magazine and Journal," asserts his claim in "having been the first to give decisive proof of the correctness of this theory." No merit can be claimed by the originator of so absurd a thing.

Having given our reasons for this phenomenon in heat, let us now apply it to our subject—carriage axles—where it has been found to operate in so many different degrees, every one of which indicates a different degree of draught, and a corresponding degree of wear on the axle and box. The heat and wear is not always in proportion to the heft of the load. If it were so, all wagons would be alike in draught that were alike in lever-power. Nor is the difference to be attributed to the different qualities of the metal, for we often see one wheel wear out its axle, while others of the same wagon and same material, remain uninjured either by heat or wear. It confirms the supposition that we commenced with, that friction is the interlocking of irregular parts of rubbing surfaces, and which breaking off at the points, affects their cohesion so as to create heat. This phenomenon we always find in new machinery until the parts are broken down to a polished level surface. There must be a time when those particles are leveled to a uniform surface, so that there can be no further breaking off, consequently no friction, no heat. In my mind such is the case. Then why should it require power to move rubbing surfaces under such circumstances? The power to overcome is not friction, but the working of a lever that nullifies friction by keeping the two surfaces apart, the same as when we move heavy weights on rollers, and thereby avoid friction. Although we save friction, yet it requires power to work the lever rollers. This power, as we have before noticed, has been miscalled "rolling friction."

If two surfaces are made to exactly fit each other so that there are no intervening spaces between them, cohesion makes them one solid mass, as in welding iron with iron; but the difference in the configuration of the two kinds of metal is enough to exclude cohesion, as we find in the case of brass and iron. If an attempt is made by two surfaces to cohere, the rending the cohesion apart would create heat. Therefore, iron axles are less liable to heat running in copper, brass or Babbit metal, than in boxes of iron. Particles of lubricating matter are employed to keep the surfaces apart, which being round, consequently act as levers. They have a certain amount of resisting power, which, if enough are united, will resist the pressure of the load put upon them, but if the bearing surface is contracted beyond its capability for resistance—such as throwing a large proportion of the heft on either extremity of the axle—as is often the case in setting axles, these round particles will be crowded from their place to some part of the axle where there is not so great a pressure. As soon as they are crowded from their place the two surfaces come together. The parts yielding to the pressure brought upon so small a surface, indent themselves into the vacant spaces of each other. The rubbing motion which the revolving wheel makes on the axle breaks off the parts indented into each other, producing heat as quickly as the spark struck from steel by the flint. This heat, by a continued repetition of the same act, accumulates to such a degree that it burns the lubricating matter as fast as the heat extends, leaving nothing to keep the two surfaces apart. At this stage it is certain that cohesion commences where the two parts are of iron; but which would not be the case if they were of different kinds of metal with parts which had no natural tendency to cohere. The fact has often been demonstrated and no reason given for it, that different kinds of metal work together with less friction than homogeneous kinds, which fact perfectly coincides with the theory here laid down. Yet all that is gained by it is the avoidance of cohesion, which, in the case of a wagon, is just as effectually prevented by making the bearings equal at the extremities, and throughout the axle arm. The first may be remedied by giving the axle a pitch corresponding with the dish of the wheel, producing an average equal bearing; the latter by making the axle and box uniform on its bearing surface, from one end of the axle and box to the other. I know the latter is contrary to the rules laid down in philosophical works on this subject, all of which say, that "by reducing the bearing surface the friction is reduced." This erroneous conclusion has been formed from the fact that diminishing the size of the axle increases the power of the wheel, and without the understanding that the wheel is a lever-power, and that diminishing the size of the axle increases the leverage, they could come to no other conclusion.

If wagon axles and boxes could be used without creating friction, it would still require motive-power to move the wagon, yet that power would be reduced to simple leverage. This would be the case where there was no wear on the axle or box, and the nearer we come to that point the nearer perfect the draught will be. There is an important step to be taken, and an important test about to be given which will show that wagon-makers have nearly overcome friction in wagon axles.

It has been ascertained that under certain circumstances wagon axles have very little perceptible wear, while the tire and other parts of the wagon are being completely worn out. Manufacturers who have witnessed these facts are willing to warrant their axles fully equal to this test. I think it would not be safe to warrant one in a hundred of the wheel-carriages that have heretofore been built. Such perfection in the wear of an axle is so strange an occurrence that a great proportion of the manufacturers will not believe a word of it until confronted with men of skill and means who are warranting every vehicle they sell fully equal to this test. That it has been done in some cases ought to be sufficient proof to the reflecting mind, believing in the uniformity of natural laws, that it can be in another.

The use of lubricating matter in preventing friction has been misunderstood by those who have attempted to explain its nature and office. It is said that it acts by filling up the cavities of the surfaces rubbing against each other, thus making them slide easier over each other. Such is not the case. It acts by forming a complete barrier between two well polished rubbing surfaces, and preventing them from touching each other. It acts to the greatest advantage when it is of a liquid nature—when its atoms are round—just as we can move two large rubbing surfaces easier where the intervening spaces are filled with shot. The shot would roll as the two surfaces moved in opposite directions. In the same way the particles of round lubricating matter roll. Both are lever-powers, as all round substances, large or small, always are. In one case the lever is made apparent to our vision by its form; in the other it is made apparent by its mechanical power. The one is as conclusive a proof of its real nature as the other.

When we have come to the conclusion that all mechanical powers are governed by the same law, we shall know very well how to arrange them so as to operate with the greatest efficiency. We will not then narrow down surfaces, so that there will be less room for the shot between the two rubbing surfaces; but, on the contrary, preserve as much surface as possible for as many shot as may be laid upon that surface, one tier deep only. Curiously arranged recesses for shot to fall into, diminishing the number of bearings in the rubbing surfaces will not be made with an idea of their falling out of these recesses, to be brought into position at some other time. Another thing, it ought to be known, that carbon acts upon shot so as to injure its spherical shape, and therefore care should be taken to exclude it from the shot, or we should employ spheres of the same size, made of metal that carbon or any other gaseous substance would not affect, for upon that depends the lever-power. If we act understandingly, we must do the same with lubricating matter on axles. Maintain as much bearing surface as possible, and make the bearings equal on the extreme ends of the axle. If we do not, the tendency of the spherical matter will be to leave the parts that have the greatest bearing, and settle where there is the least, leaving the surfaces to rub together on the part that has the greatest bearing, introducing friction and its concomitant ally, heat, which often wears out an axle in a few hours, and at best, is sure to do it long before the other parts of the wagon fail.

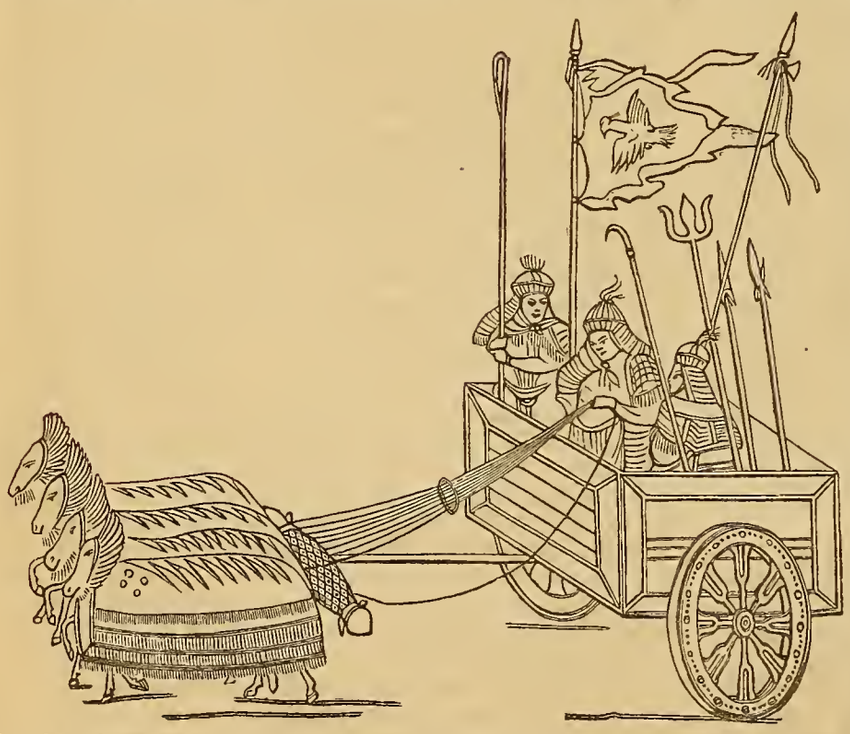
Again, we must choose lubricating matter that experience teaches us will the longest resist the action of oxygen on spherical atoms. We know that oxygen does not annihilate atoms, yet every-day experience shows us that it destroys the lubricating qualities of matter. This

could only be done by changing its spherical shape, which destroys its lever-power. Experience has shown us that some kinds of oils will stand rubbing longer than others, although they do not work any easier when first applied. When we know that the particles are easily destroyed, there is no conclusion that we can form, other than that the change is in the mechanical power of the atom, caused by a change of shape in some kinds of oil quicker than in others.

In conclusion, wherever we see a power expended, produce a greater effect than the power, we may be well assured that it is in accordance with mechanical laws, and if it produces a less effect—either by friction or any other cause—it is expended in opposition to mechanical power. Wheel vehicles are power saving machines, the mechanical effect of which, if not understood, disqualifies us for constructing them. We may make a wheel or a body, and yet, in reality, be no more *a mechanic* than the man who chops down the tree of which they are made. There is study before us, which neither this nor the next generation is likely to exhaust. The beauty of this study is, that there are no by-paths. If we understand mechanical laws, our course will be progressive, otherwise our energies are spent in the intricate wanderings of a blind philosophy.

ANCIENT CHINESE CHARIOTS.

In the eleventh century the Chinese had acquired a great degree of ability in the construction of chariots. A drawing of those used by the kings in their great festivities has been preserved. It has something of the antique appearance which is observable in the bas-reliefs representing Greek and Roman Chariots. It was drawn



by four horses abreast: an officer of second rank, whip in hands, drove them, while the coachman, in the chariot, held the reins. The king sat on his left, this being the side of honor. The functions of royal coachman were then of much consideration. Some of the king's chariots had but two wheels, while others had four: they were entered at the front, this part of the chariot being frequently covered with the skin of a tiger or some other wild animal.

"The ancient sovereigns of China," says Guignes, "had still another chariot which they called *tching*. It was drawn by sixteen horses, which fact served to show their superiority. They also used this word to distinguish the house of a prince, by the expression of one hundred sixteen-horse chariots (*pe-tching*), a prince not being allowed by law to own more than sixteen hundred horses. For the same reason one thousand sixteen-horse chariots (*tsien-tching*) designates the royal house. In those ancient times, eight hundred families of the community were obliged to furnish one sixteen-horse chariot with three captains, equipped with casque and shield, and twenty-two foot soldiers."

We have given two drawings representing two of the above described chariots, one of which appeared on page 165 of this volume, which, for reasons there stated, we took to be an "imperial tea-cart," a slight mistake it seems.

QUEEN VICTORIA'S HORSES.

Perhaps the best horses in the possession of her Majesty are the dappled-gray ponies used for the highland excursions of herself and family; and apparently the Prince of Wales has taken up the taste, as he is found driving the same class of gray colts—models of their kind. There are certain horses in the royal stud, however, which are unique; for instance, the cream-colored horses which are employed on State occasions by the sovereign. These animals, first introduced by the Hanoverian kings, are a special product of Hanover and the adjacent countries. The breed is kept up most religiously in England at the Hampton Court establishment. These horses look small in contrast to the great gilt coach they draw; but in reality they are tall, scarcely one of them being less than 16½ hands, and they are proportionally strong, as the state-harness for each horse, with all its furniture, does not weigh less than two hundred weight. These Hanoverians are in fact the last representatives of the old Flemish horses, once so fashionable. They are slow and pompous in their action, as befits horses destined to serve royalty on State occasions. Some of them still in use are upwards of twenty years old; but they take life easily, airing themselves in the riding-school in the mornings, and once a year or so doing the heavy work of taking the old gilded coach with its august burden from Buckingham Palace to the Houses of Parliament, and back, and then relapsing for a twelvemonth into laziness and oats. The preparation of the royal equipage for a grand State occasion is a real sight. The tails of all the royal studs being properly adjusted (why should not horses of fashion, like their mistresses, wear false hair?), they are with some little

trouble harnessed, for many of them are entire animals, and their mode of life inclines them to wax fat, and kick against the pricks. And now comes the important operation of mounting the State coachman on his box. This is by no means done with a spring and a jump; on the contrary, it is a very solemn and laborious affair. There must be no haste, no jesting; otherwise the magnificent posy in his button-hole will be displaced, and all the powder shaken out of the prim curls of his periwig. A ladder is procured, and he mounts to his seat at the top of the large vehicle, and there he sits, a perfect "bright poker" of a coachman, the postillions being really in command of the animals, in conjunction with the state-grooms who walk beside them. It would certainly be a curious thing to estimate the costs of these annual parades, as far as horse-flesh is concerned—what their keep, and stabling, and exercising comes to—the whole stud we mean, out of which the eight are selected for the two hours annual work. Certainly that short jaunt must cost something like £1,000 an hour.

At the Hampton Court establishment, all the Arabs and other horses presented by the Eastern princes to her Majesty are kept. It is really almost as expensive as presenting elephants to the sovereign to send her these noble breeds; it is not etiquette even to give them away, and they are never put to any use, or killed when getting old. Theirs is a true life of ease; they are served by the most experienced grooms, have every want attended to, and live on in the free enjoyment of life, until they are called away to that bourne from which no quadruped returns.

Pen Illustrations of the Drafts.

TILBURY-PHAETON.

Illustrated on Plate XLIV.

We have the pleasure this month of introducing to the notice of our readers a much improved design of a very popular vehicle—one of the most stylish now in vogue. This drawing presents the principal features of the Tilbury in the back quarter, being made very round in the corner, the broad-pillar terminating in an elongated scroll under the side door. In other respects the drawing differs very little from those previously given, and therefore calls for no further remark from us.

DRAG-FRONTED PHAETON.

Illustrated on Plate XLV.

We have combined in this design "all the latest improvements," and as we think, succeeded in produeing a very pretty and tasteful draft. The bowl, as our readers are aware, is one of the new "kinks" in American carriage building, but we take this opportunity to say to those who have written us on the subject, that furnishing them to the trade is not in our line. They are not manufactured in New York, nor kept on sale. When the manufacturers get liberal enough to see their interest in advertising, we may take hold of the business. Until that time comes round, we judge that the consumption will be "limited." *Verbum sap.*

MANHATTAN BUGGY, NO. 3.

Illustrated on Plate XLVI.

Some little change has been made in the Manhattan Buggy, since issuing our October number, as a comparison with that will show. This change is chiefly seen in the curving of the back end of the side panel on the top of the body. We do not consider this much of an improvement, and think the change is attributable to some whim in the manufacturer rather than to good taste. The valance around the seat, projecting beyond the panel, we have endeavored to show by tinting. This is used in nearly all the fashionable buggies now built. New York made buggies of this description sell from $400 *a* $500. None but "hard up" or *retiring* manufacturers would for a moment entertain a thought of selling for less.

Sparks from the Anvil.

PERCH-COUPLINGS DISSECTED.

(*Concluded from page* 137.)

To some minds these perch-couplings have been an inexplicable riddle, in no inconsiderable degree mystified by the fact that A. J. Beaumont was at different times engaged in selling patent-rights for both the Everetts and Haussknecht. In connection with this circumstance, we have been told of instances where one of the parties, in pursuing his speculations, has been involved in some ludicrous positions not very pleasant, the recital of which we omit here. Edward Everett writes in August, 1855:—"A. J. Beaumont was until last year acting as my agent in selling rights to use our patent coupling; but, finding that he had been making extensive sales which he had not reported to me, nor had accounted for the proceeds, I withdrew his power of attorney. He is a defaulter to me to a large amount. I had furnished him with a model buggy of my own eonstruction, to illustrate our improvement, and I am informed that he is using this very model, without alteration, to sell rights for Haussknecht." This buggy was used in selling rights for Everett, in this city and vicinity, as we know from personal knowledge and inspection, having purchased the right to make them ourselves.

Soon afterward, it appears, Beaumont entered the service of Haussknecht for about one year, for on the 9th day of April, 1856, Haussknecht gives the following notice to carriage-makers:—"Whereas, A. J. Beaumont of New Hope, Pa., has been appointed as my lawful agent to sell patent-rights, notice is hereby given that the power of attorney has been revoked, for breaking contract. All parties having purchased any right or interest in my Letters Patent, of A. J. Beaumont or his substitutes, or of a Mr. Schenc, will find it to their own interest to forward certified copies of such deeds to the subseriber or patentee, and have the same recorded at the Patent Office, as A. J. Beaumont is no longer engaged as my lawful attorney, nor any of his substitutes." At this period Haussknecht's resi-

dence was in Connecticut. It was while selling rights for Haussknecht, to G. W. Gosling, of Cincinnati, that, as is alleged, Beaumont furnished drawings of the Everett couplings, as substitutes for the one sold as Haussknecht's.

A great deal has been said about these couplings having been illustrated and described in Ure's Dictionary, previous to obtaining the patents we have under consideration. Although—after our showing—this is a matter of little consequence; yet candor compels us to say that a diligent search has produced but feeble evidence of any such facts. The following is Ure's story: "Mr. Gibbs, engineer, and Mr. Chaplin, coach-maker, obtained a patent, in 1832, for the construction of a four-wheeled carriage which shall be enabled to turn within a small compass, by throwing the axles of all four wheels simultaneously into different positions. They effect this object by mounting each wheel upon a separate jointed axle, and by connecting the free ends of the fore axle by jointed rods or chains, with the pole and splinter-bar in front of the carriage."

Mr. Adams, in his "English Pleasure Carriages," published in 1837, has a plan by which, instead of placing the perch-bolt or turning center, as is commonly done, over the front axle, he places at a convenient distance *between* the hind and front axles; so that, when turning the carriage, the front wheels, instead of turning beneath the body, as is common, turn outside of it, and the driver's seat turns with them; thus giving him a perfect command over his horses in all positions, instead of the usual dangerous plan, which renders a driver liable to be pulled off his seat by a restless horse in the act of turning.

Mr. S. D. Law, of this city, has the photograph of a wagon made in Connecticut some years ago, which appears to embrace the very principles contended for in these perch-couplings. There are other evidences of prior invention, which would seem to justify any one—even after setting aside the three verdicts before named—in refusing to pay away their moneys in the form of damages without much reflection.

A country correspondent has furnished us with the copy of a letter he has received from Mr. Haussknecht, since his latest defeat in Cincinnati, going to prove that the indefatigable so-called inventor of the perch-coupling is not yet inclined to "surrender" his claims. We do not exactly understand what Mr. H. means by using the word "ignorance" as applied to Mr. B. It certainly cannot be that Mr. Benedict is ignorant of *his* personal rights, for he has been a constant reader of this Journal, where no doubt he keeps himself posted. Others might imitate him to advantage. We give the letter *verbatim et literatim, etc.*

No. 358 Canal St
New York Decbr. 13, 64.

Dear Sir!—I would advise you that I am about preparing bill of complaint agst you to file in the U S. Court of your district to give you a chance to save costs.

Please inform me by a line wheter you wish to save costs or contest the claim, you will know that ignorance is no defence in equity, and that I am entitled to all damages I may have sustained by your ignorance of the matter in reference to Everett's patent and violation of my patent.

Respectfully Yours
G. L. Haussknecht.

Chas. Benedict Esq.

WEIGHT OF DIFFERENT SIZES OF IRON.

This table will be found very useful in determining the weight of wagon-tires without weighing:

Square Iron.		Round Iron.		Flat Iron.		
Size.	1 ft.	Size.	1 ft.	Thick.	Width.	1 ft.
Inch.	lbs.	Inch.	lbs.	In.	In.	lbs.
1/4	0.2	1/4	0.2	1/4	1	0.8
3/8	0.5	3/8	0.4	1/4	1 1/4	1.1
1/2	0.8	1/2	0.7	1/4	1 1/2	1.3
5/8	1.3	5/8	1.0	1/4	1 3/4	1.5
3/4	1.9	3/4	1.5			
7/8	2.6	7/8	2.0	1/4	2	1.7
				1/4	2 1/4	1.9
				1/4	2 1/2	2.1
1	3.4	1	2.7	1/4	2 3/4	2.3
1 1/8	4.3	1 1/8	3.4			
1 1/4	5.3	1 1/4	4.2	1/4	3	2.5
1 3/8	6.4	1 3/8	5.0	1/4	3 1/4	2.7
1 1/2	7.6	1 1/2	6.0	1/4	3 1/2	3.0
1 5/8	8.9	1 5/8	7.0	1/4	3 3/4	3.2
1 3/4	10.4	1 3/4	8.1			
1 7/8	11.9	1 7/8	9.3	1/4	4	3.4
				1/4	4 1/4	3.6
				1/4	4 1/2	3.8
2	13.5	2	10.6	1/4	4 3/4	4.0
2 1/8	15.3	2 1/8	12.0			
2 1/4	17.1	2 1/4	13.5	1/4	5	4.2
2 3/8	19 1	2 3/8	15.0	1/4	5 1/4	4.4
2 1/2	21.1	2 1/2	16.7	1/4	5 1/2	4.6
2 5/8	23.3	2 5/8	18.8	1/4	5 3/4	4.9
2 3/4	25.6	2 3/4	20.1			
2 7/8	27.9	2 7/8	21.9	1/4	6	5.1
3	30.4	3	23.9	3/8	1	1.3
3 1/8	33.0	3 1/8	25.9	3/8	1 1/4	1.6
3 1/4	35.7	3 1/4	28.0	3/8	1 1/2	1.9
3 3/8	38.5	3 3/8	30.2	3/8	1 3/4	2.2
3 1/2	41.4	3 1/2	32.5			
3 5/8	44.4	3 5/8	34.9	3/8	2	2.5
3 3/4	47.5	3 3/4	37.3	3/8	2 1/4	2.9
3 7/8	50.8	3 7/8	39.9	3/8	2 1/2	3.2
				3/8	2 3/4	3.5
4	54.1	4	42.5	3/8	3	8.8
4 1/8	57.5	4 1/8	45.2	3/8	3 1/4	4.1
4 1/4	61.1	4 1/4	48.0	3/8	3 1/2	4.4
4 3/8	64.7	4 3/8	50.8	3/8	3 1/2	4.8
4 1/2	68.4	4 1/2	53.8			
4 5/8	72.3	4 5/8	56.8	3/8	4	5.1
4 3/4	76.3	4 3/4	60.0	3/8	4 1/4	5.4
4 7/8	80.3	4 7/8	63.1	3/8	4 1/2	5.7
				3/8	4 3/4	6.0
5	84.5	5	66.8	3/8	5	6.3
5 1/8	88.8	5 1/8	69.7	3/8	5 1/4	6.7
5 1/4	93.2	5 1/4	73.2	3/8	5 1/2	7.0
5 3/8	97.7	5 3/8	76.7	3/8	5 3/4	7.3
5 1/2	102.2	5 1/2	80.3			
5 5/8	107.0	5 5/8	84.0	3/8	6	7.6
5 3/4	111.8	5 3/4	87.8			
5 7/8	116.7	5 7/8	91.6	1/2	1	1.7
				1/2	1 1/4	2.1
6	121.7	6	95.6	1/2	1 1/2	2.5

TO REMOVE RUST FROM STEEL.

Cover the steel with sweet oil, well rubbed on. In forty-eight hours rub with finely-pulverized unslaeked lime, until the rust disappears.

Paint Room.

SURFACE PAINTING.

When it is intended to finish a piece of work with a perfect surface, it is to the employer's interests to be convinced that the painter starts upon an unexceptionable foundation; to know that the body-maker has done his duty to the work before it leaves his hands; to be satisfied that there is a sufficient frame-work in the body to keep the panels in their proper place, so that they will not go in hills and hollows, and be subject to every change in the weather; also to be sure that sufficient strength is left in the panels where it is actually needed. All this is foreign to the painting branch, and yet it makes a great difference to the look of the work when completed. The body-maker can do much towards helping the painter to bring his work to a satisfactory state of completion; and when he has performed his part, it then lies with the industry and skill of the painter, and the patience of the employer to obtain satisfactory results. It is very reprehensible to allow an incompetent workman to give the first coat of priming; and it is still worse to use the first pot of paint you can lay your hands on, without having any regard to its fitness for the work you use it to. It is very desirable that you should know and have confidence in your priming; to have it of a proper consistency, and to spread it with good suitable brushes, paying strict attention to such places where the paint is liable to remain on thicker than others. Presuming the body-maker has done his duty, and you have *good* surface to begin with, endeavor to *keep* it. A few minutes' labor spent in sandpapering between each coat of lead, and having the filling well ground and evenly laid on, will go far towards retaining it. Having a strict regard to puttying up the holes and imperfections contributes its portion towards a perfect finish. The hole should be neatly stopped, and no more putty used than what is actually needed. The "hard-stopper" and filling should be compatible with each other in their adhesive qualities, so that the pumice-stone takes off as much of one as of the other. To use very hard drying putty, and easy rubbing filling, rubbing down with soft pumice-stone, makes the putty liable to protrude above the surface, which often escapes the observation of the painter until it is too late to apply the remedy.

The practical painter can appreciate the importance of having a body properly rubbed with block pumice-stone; this, and the cleaning-off of a body after it is rubbed, if slovenly done, help to retard instead of forwarding the work. Proper attention to the mouldings and corners at this stage of the job is all-important, and a clean dusting previous to laying the next coat is very desirable. Good paint stock throughout always proves the cheapest at the end, and from this time until the job is finished particular attention should be paid to that point. Lead should always be fresh ground for facing, as the least "fatness" subjects the stone to clogging, and as it makes but a few minutes' difference whether you grind your lead coarse or fine, take the necessary trouble, and prepare it with as great a nicety as though it were some valuable color. Be sure you thoroughly understand the quality of the stock you use, and if you have any doubt about its not drying to your satisfaction, a small piece of sugar of lead, with about three minutes' labor, will remove it, and you meet your labor the next day with a confident feeling that you did *your* duty to it.

Presuming the reader is engaged in a factory where a system is carried out of having every branch executed at the proper time, the body should now have gone through the process of "hanging up," and the painter is called upon—in looking over the imperfections of the rubbing—to repair the damages inflicted by the negligence of the blacksmith. The damage done to the surface is, perhaps, serious and aggravating enough to induce you to think of committing a breach of the peace; but the careful manufacturer, who takes a pride in building good work, will do well to see that no unnecessary trouble is given the painter through the want of a little precaution on the part of the others.

After a piece of work has been faced, the painter is then in a position to judge how the surface will look when finished. If it now be to your satisfaction, endeavor to keep it so; if not, exert yourself to bring it up to your best wishes. Be sure you lay a proper foundation coat for the color you intend to paint, being mindful that it will dry and get perfectly hard before you wish to apply the next coat. Get a solid color with as little paint and as few coats as possible. Brush out your color well. Never use quick drying color if to be avoided. Use raw oil and turpentine, with sugar of lead as a dryer as much as possible, and gold size as sparingly. Never put on any kind of paint "heavy," so that brush marks are perceptible after it is "laid off." Rather give two thin coats than one thick one. Upon no consideration whatever put one coat upon another which you are not sure is perfectly hard and dry; if you do you surely ruin your work. Always prefer to get a solid color without mixing varnish with it, especially if you have good pale varnish. When striping out the mouldings with black, use as little as possible; it is, perhaps, the most treacherous color used, if not properly applied. Keep your black japan air-tight, and the brushes hanging in the can. Rather thin it with a little turpentine than destroy your surface with getting brush marks upon it. Let both the first coats of japan and varnish be somewhat thinner than those to follow—for the first coats of varnish are the foundation of the remainder, similar to the priming, being the foundation for the filling. The cost in labor in having to give work an extra coat through having imperfect varnish brushes, and in having to use turpentine to wash out brushes, when changing color, through not having a sufficient quantity, amounts to more than the uninitiated can conceive.

The foundation for obtaining a good surface upon panels is *labor*, and without you are generous with this indispensable requisite, you can never produce good and creditable work. It is very essential that this maxim should be observed from the beginning to the end in carriage painting. Be as particular in getting each coat of varnish clean, as though it were the last, and rub each coat with equal nicety. In rubbing varnish it is very important to have the requisite conveniences—good sponges and leathers; the pumice-stone properly ground, and so kept that there is no fear of any injurious matter getting into it. A sufficient supply of water, and easy of access, contributes greatly to the painter's convenience. A clean shop is indispensable to a good surface, and a distinctly understood system of keeping the varnish brushes, invaluable. Each man should have two sets of

brushes, and he alone should be responsible for keeping them clean and in proper order. When rubbing for the last coat, be sure every nib is rubbed out, as by not allowing them to remain you save much labor. Take a pride in saying you are competent to wash off a body preparatory to its being varnished, because the success of the last coat of varnish is divided between the work being well washed and well varnished. Some workmen prefer a bristle dust-brush, others a soft camel-hair blender, others a damp silk handkerchief, others moisten the hands with a little oil, and pass them over the surface; either of these are good if the *varnisher* has *confidence* in them —but be careful, if your body be well washed, do not add more dust to it by endeavoring to take some away.

There are certain objects and examples which cannot be taught or described—we think varnishing may safely be placed in this catalogue. Nothing but practical experience can make a good varnisher. Items like the above may serve to remind those who have a desire to be proficient at their trade, of their negligence in small details, which accumulate until they are the means of taking away all credit due to their calling. Carriage painting is an art worthy to be placed by the side of other mechanical sciences which claim for themselves more artistic merit than the followers of this trade in their modesty lay claim to; and it is greatly to be regretted that there are many who claim it as their occupation, who cannot appreciate its beauties and merits.

THE MANUFACTURE OF LEATHER CLOTH.

The manufacture of leather cloth as a substitute for Morocco leather, was commenced in the year 1849, in the city of Newark, U. S. The first specimen of it seen in this country was exhibited in 1851. The Americans have had the merit of producing many labor-saving machines and articles of domestic convenience, and many of them are becoming increasingly known and extensively adopted in this country. It is certain that this article of leather cloth has superseded the use of leather for many purposes to which the old material has hitherto been applied, besides being put to uses for which leather is wholly unsuitable. Messrs. Crockett, the inventors and patentees, commeneed the manufacture of leather cloth in England in 1855, and their factory was an old workhouse, situated in one of those dreary, unpicturesque marshes at West Ham, in Essex, a locality somewhat famous for its insalubrious manufactures. The firm was known as the "Crockett International Leather Cloth Company." In 1857 Messrs. Crockett surrendered their business to a company formed under the title of "The Leather Cloth Company Limited," which purchased the entire European business.

The new company, with a paid up capital of £90,000, and having Mr. A. Lorsont as their managing director, began the enterprise with great energy. They creeted substantial and extensive premises, which cover ten acres of ground, employing upwards of 200 men. They produce daily 1,000 pieces of 12 yards long and 1½ yards wide, or 15,000 square yards; sufficient, if laid end to end, to reach from their factory to the warehouse in Cannon Street West—a distance of seven miles.

It will be evident that an article intended to resemble leather should be pliant, supple, and not liable to peel off or crack. These excellencies are to be attained by the peculiar ingredients of the composition with which the cloth is covered, and the method of applying it. On entering the factory, our attention was first directed to the boiling room, in which there are 12 furnaces, with a large cauldron over each for boiling linseed oil. This process is attended with considerable danger from the liability of the boiling oil to generate gas and explode; hence, a man is stationed at each cauldron, stirring gently the boiling mass and watching a thermometer inserted in it, and which at the time of our visit stood at 580°. The oil is supplied to the boiling house by pipes from an adjoining building, where there is a huge tank with nine compartments containing 3,200 gallons each, or 28,000 altogether, amounting to 122 tons of oil. The boiling oil, being allowed to cool, is conveyed on a tramway to the mixing-house, where, in a puddling machine, it receives several other ingredients, the principal ones being lampblack and turpentine, which being mixed into a composition is ready for use.

The cloth to which this composition is applied is known by the name of "greys," or unbleached cotton. It is of a peculiar manufacture, and made expressly for the company. The store room is a spacious building, and will contain an immense stock; at present it has 25,000 pieces, or 300,000 yards. Here the cloth is calendered, and cut into lengths of twelve yards. The two ends of each length are sewn together to make it endless; two sewing machines are in constant operation at this work. The pieces are then removed to the "milling" rooms, so called because they contain the mills in which the cloth receives the composition. These mills are rough looking wooden structures, having a drum at one end, and a roller at the other, over which the cloth is passed, and then tightened by a crank and wheel at one end. A large frame-knife, or scraper, is then dropped down close to the cloth, a measured quantity of composition being laid on the cloth along the edge of the knife, the mill revolves, and the cloth receives as much of the composition as can pass under the edge of the knife. The piece is then carried to the heating room adjoining, and hung up on the rack to dry till next morning.

There are on the premises six milling rooms, with three mills in each, and having three men attendant upon each mill. The adjoining rooms for drying are heated by three rows of pipes laid along the wall. These pipes, during the day, are at a temperature of about 130°. The temperature is increased towards the evening and during the night to 160°, and it is the duty of the watchman to open the doors for ventilation and cooling, preparatory to the men resuming their work for the next coating.

Of course, in a building so greatly heated, and having so much inflammable material within it, the danger of fire is imminent; but every precaution has been taken which prudence could dictate. The building is fire proof, the floors are of metallic lava, and the roof, which is flat, is of the same material. A large pipe runs up the outside wall by the partition which divides the drying rooms, into each of which runs a branch pipe with a valve, which can be worked from the outside. A deluge of steam can, by these means, be poured into the rooms in a few minutes by day or night. There are fourteen fire plugs around the buildings, on the main of the East London Water Works, with hose and turncock at hand, so that ample means of extinguishing fire exist on the premises.

But to return to the manufacture. The coating being thoroughly dry, the cloth is then taken to the "rubbers,"

whose business it is to remove all inequalities from the surface, and make it perfectly smooth. This is done by the "rubbing machine" (an ingenious contrivance of Mr. Eagles, the manager), by which the cloth is made to pass between two rollers revolving in opposite directions. These rollers are covered with pumice stone, and do the work completely and expeditiously, which, till lately, was done by hand at great expense of labor. The "coating" and the "rubbing" being repeated four, and in the case of heavy goods, five times, the cloth is ready for the "painters." The "painting rooms" contain machines similar to the "mills"; but, instead of the drum, they have a roller at each end, over which the cloth passes slowly, and a man at each side supplies the paint, "meeting each other half way." Dependent partly on the colors, and partly on the article to be produced, is the number of coats of paint to be applied. Sometimes two will be sufficient; at other times four are necessary. The last coat receives several applications of a peculiar elastic enamel, composed chiefly of copal varnish, to protect it from the action of the atmosphere.

At this stage of the process the edges of the cloth are rough and have to be trimmed, and the seam by which the ends are sown together has to be cut. This is done by a machine called the "guillotine"; and we now follow the cloth to the "grainer." This latter, and to the ordinary leather cloth, finishing process, is done by a remarkably beautiful iron machine, having two rollers, the upper one being of polished iron cut obliquely on the surface, the other one of paper. Between these two rollers the cloth passes twice, and receives its external resemblance to morocco leather. There are six machines used for this finishing process, and others for embossing from the small diamond to the large mediæval pattern. The latter consumes much more time in passing through the machines. The cloth is now stamped with the trade mark, labeled, and rolled up ready for transmission to the warehouse in Cannon Street West.

On looking at the pieces when finished, one is struck by the extreme cleanness of the inner side after passing through so many soiling operations; this is owing to the practical skill with which the men handle the cloth, and to the agility with which they remove it from the several machines, and carry it to the drying rooms. While watching the process, we thought that in many respects, it was similar to the tanning with sumach, from the leaves and stalks of the *Rhus coriaria*, by means of which skins are made into morocco leather. As the leather cloth can be made permanently soft and elastic by the oily matter combining with the texture of the cloth, as it does with the fibres of the skin, the imitation is complete and successful.

There is another room in this establishment, specially interesting to the artist, where the cloth is printed in gold and colors, in designs which are really chaste and beautiful, and which, when used for the furniture and hangings, adorn rooms with something of oriental splendor. Here, too, there are table-covers with floral borders, rich in color and choice in grouping, with centre pieces, which, as specimens of decorative art, are very effective. Many of these will be displayed at the International Exhibition, and, we doubt not, will excite both surprise and admiration.

The mixing room is a kind of *sanctum* of the manager's, and we suppose that from the skill with which the colors are prepared arises much of the excellence of the company's manufacture. In a room adjoining, there are sixteen color-grinding mills, constructed on the American principle, and worked by machinery, as indeed almost everything on the premises seems to be. The machine which sets all in motion is a high-pressure double cylinder engine of 50-horse power made by Woods, of Halifax. There are three immense Cornish boilers by Hill, of Heywood, which have been tested to a water pressure of 130 lbs. to the square inch, and represented 60-horse power. One of these is sufficient to work the engine by day, and heat the drying rooms by night. We observed that, by the generosity of the company, a part of their premises had been given for the use of the Fifth Essex Rifle Volunteers; the drill room and armory are magnificent apartments, such as are seldom seen devoted to such a purpose.

A writer, in a very useful work on the "Manufactures of Great Britain," asks somewhat triumphantly, "What substitute could be found for leather? a substance at once durable and elastic, affording protection from wet and from cold, capable of being formed into innumerable useful articles, and susceptible of a high degree of ornament, and supplying lining to our carriages and covers to our books." This book was published in 1848, under the direction of the "Committee of General Literature and Education"; and now, in 1862, we have a substitute answering all the requirements here specified.

As to protection from wet and cold, the whole American army is equipped with leather cloth in the shape of capes, leggings, and knapsacks, our upholsterers can vouch for its durability and elasticity. The useful articles into which it can be made, and the degree of ornamentation it can receive, are becoming every day more manifest. We line our railway, our street carriages, and our hats with it; and as to our books, if they are not covered with it, they ought to be. Truly our progress in art and science is defying all prediction as to what we may not accomplish, and rendering obsolete many of our familiar proverbs, and none more strikingly so than that "there is nothing like leather."—*Mechanics' Magazine.*

Editor's Work-bench.

CLOSE OF THE SIXTH VOLUME.

We close the sixth volume of this Magazine with this number, and with it ends the larger proportion of subscriptions to the work. We hope we have succeeded in making it entertaining enough to induce a renewal of the most of them at an early day. Indeed, we intend to wait a little while before entering on the publication of another volume, to give its friends a chance to express their feelings in this matter by the alacrity in which they send in their names and pay in advance.

There is no diminution in charges observable as yet among the paper dealers or printers, consequently we cannot reduce our terms below the present price—five dollars—and receive back our expenses of publication, even should we (as we have done for the last four years) labor for nothing and board ourself. There are a great

many who are deeply interested in having the Magazine go on, and will be pained if it is suspended. We hope these will bestir themselves, and see how many names they can obtain for the coming year, as on this, in a great measure, depends our future action. Should we discontinue we know of one class—the blood-suckers (humbug patentees)—who will greatly exult, and no doubt find many more victims than they will if we go on and expose their nefarious business as a warning to the public.

In conclusion, we have to say, that we are not dependent on this publication for a livelihood, and therefore are led more by the pleasure it affords us to edit, and the usefulness we believe it accomplishes, to go on, than by any expectation of making money out of it. This will account for the independent and outspoken manner in which it has been conducted. We have always tried to do the right thing and to compel the vicious to do likewise—especially that class who may with propriety be termed enemies to the craft. Awaiting the action of our friends—if sufficiently encouraged we intend to continue, and in such a contingency promise, as in the past, to use our best efforts to satisfy an enlightened and fastidious public. We hope our friends who have not yet bought the back volumes of THE NEW YORK COACH-MAKER'S MAGAZINE, will do so soon, as we have reduced the price, and have but few left. Unless the present opportunity is embraced to secure them, it may be lost forever.

PERCHES—RULE FOR LAYING OUT.

As understood by carriage-makers, the word "perch" designates the *pole* extending from one axle to another. We have used the word as more usually employed among European mechanics. The more expressive American term "reach" is far better. Perch literally means a pole for fowls to roost upon, but reach means to grasp, to reach out the hands and grasp, used here as grasping two axletrees, and really holding them together—*reaching* to and grasping both firmly. We know it has become *fashionable* to make certain kind of carriages without perches, to fit them for short "cramping"; but this is done at a great sacrifice of strength and efficiency, and must, from the very nature of circumstances, always be so. This omission of the perch is, we believe, of French origin, if we may be allowed such seeming contradiction in terms as to allow that a thing omitted has an origin.

An old English author tells us that, "in general, a perch-formed carriage measures nine feet two inches for a chariot, and nine feet eight inches for a coach; but, in a crane-neck carriage, on account of the bow for the wheels to pass under, the measure in a chariot is nine feet six inches, in a coach ten feet," which length appears *long* to us. Our old author Felton gives a particular description of the perch of his time, which we extract for the benefit of the curious reader. "The perch is the main timber of the carriage, which extends through the hind and fore spring transom, or bars. By it the principal part of the upper carriage is supported. The hinder part is supported and united to it by means of hooping two extending timbers, called wings, on the side. The fore end is fixed or united to the perch by means of a strong piece, hooped at the top, and framed through the fore transom, called a hooping piece; but some carriages have a horizontal wheel,* the same as the crane-neck carriages, and these have no hooping piece to the perch, but are secured by means of side-plates. Those on the general principle have, at the bottom in front, a flat piece left extended, called a tongue, which goes through a large mortise, in the fore-axletree bed, and through which the perch-bolt passes; its use is to keep the fore-axletree bed steady in its place.

"Sometimes the perch is made of a bent form, called a compass perch, for the purpose of admitting the body to hang low, to form a more agreeable line to the shape thereof. Those perches are of a very ancient form, but are now revived with considerable improvements upon their original shape. When the carriage is intended for a whole or horizontal wheel, the perch has no hooping piece, but is bolted by the plates at each end to the inside of the transoms.

"Plating with iron the sides of perches is a great improvement, and is now most generally done, and always must be to those compass perches, if required to be light in their appearance, as the size of the timber is so much reduced by cutting them to this shape.

"To the straight or compass perch, iron plating on the sides is a great addition, as it will admit the timbers to be so much reduced that a sufficient strength is preserved though but half the usual size; the plates, as fixed edgewise to the sides of the perch, will support ten times more weight than if flatwise on the bottom, which is the method of plating a perch in the plain or common way; and many of those carriages which are made up for sale have even the bottom plate omitted. But the certain consequence of this superficial method is the sinking or settling of the perch, whereby the carriage is contracted quite out of its form, to the great injury of it, both for use and appearance, and there is no remedy but by a new one."

Among us, too little attention is paid to the correct formation of this important part of the carriage. When only one perch was employed, there might have been a

* The time was when such a thing as a fifth-wheel had no existence. In the light of other days, then, the common expression, "as useless as a fifth wheel to a coach," had some meaning; but as used now by some of our most popular authors, only serves to show their *ignorance*—to prove that their knowledge on many subjects is merely superficial.

little more excuse for this neglect; but, in this enlightened age, with two perches, there is not, nor ought there to be, any apology whatever. The chief reason why so many perches are broken is that they are not constructed level with the fifth-wheel. That we may in some degree remedy this defect, we present the following explanations:

In the first place, the height of the front and back wheels should be determined. We will suppose in this case, that they are respectively three and four feet, one foot difference. For our purpose we want half of this, six inches, this being the difference when the measure is taken from the ground to the center of the hubs, all that concerns our plan here. Next, we must know how high the top side of the mortise in the back axle is from a plane or ground line. This ascertained, we must find out how high the top of the front bed is from a plane, add to this the thickness of the fifth-wheel plates, and the hight the top of the mortise is in the head-block. These all determined, add whatever inches remain to drop this line to a level, and to these inches add the six, being in all, say five inches as the difference. Now, draw two parallel lines five inches apart on a board, the upper line determining the face of the back end tenon, and the lower one that for the front, or head-block tenon. Great pains should be taken to have all fifth-wheels perfectly level, unless, as in a few exceptionable cases—which the mechanical mind will select—they are a trifle higher in front. A fifth-wheel highest at the back-side is a great evil, and can never be anything else, bending the perch in a vital spot and grinding the plates out in a very short time in use. Evidences of this may be seen in full one quarter of the vehicles now running. This should not and need not be so. A very little arithmetic and a few minutes time will suffice to give to this very important part of a cariage a certain mechanical correctness, and perhaps to the builder a fame which will in the end fill his pocket-book, as our friend Scott says, "to plethoric dimensions," a *consummation* desired by all mechanics, but seldom accomplished by carriage-makers, in this age.

CITY GOSSIP.

The party that so summarily took possession of the premises 596 Broadway, as narrated in our Journal last month, still hold them, watching night and day lest they be unceremoniously visited with the same treatment they have bestowed upon their neighbors. We learn that this matter is yet before the court, and undecided. Meanwhile the Messrs. Adam & Cone have rented the first floor and basement of the fine building recently erected on the north-east corner of Great Jones Street and Broadway, at the yearly rental of twelve thousand dollars. As a location for a carriage emporium, in our judgment, this building is not surpassed by any other in the city, except it be that occupied by Messrs. Brewster & Baldwin, on the corner of Tenth Street and Broadway, a little further up town. We learn that our friends, whose factory is located in Harlem, intend to keep on hand a good assortment of carriages of their own make. Having acquired a reputation for building good work, this firm commence business under favorable auspices. We hope they will be successful.

Mr. John C. Ham, who once boasted that he had the largest "warehouse" in the United States, has taken possession of the first floor of the building recently occupied by the unfermented bread company, on the corner of Fourth Street and Lafayette Place, where he finds a convenient location, but wanting the advantages supplied by Broadway. He has more doorway display than we are accustomed to see in these times of restrictive room and high rents.

The premises—620 Broadway—lately occupied by Messrs. Quimby & Co. have lately been taken by a new firm, that of Messrs. Tomlinson, Demarest & Co., to be occupied as a carriage repository. We presume this house will be supplied with carriages principally from the manufactory of our friends, the Messrs. Tomlinson, Miner & Co., located in Bridgeport, Connecticut. Mr. Miner was formerly of the firm of Miner & Stevens, and has earned the reputation of being a first-class mechanic.

DEATH OF PRESIDENT LINCOLN.

Little did we suppose, while visiting our beloved Chief Magistrate, last autumn, that we so soon should be called upon to mourn his loss. But so it is. Abraham Lincoln, the late good and merciful and honest ruler of this Republic, has closed forever his eyes in sleep—that sleep which knows no waking. It is not a foreign enemy who has done this; but one of our own household—he has fallen by the hand of one who had every reason to believe that his victim entertained the most merciful feelings towards the South of any other individual in the entire North. Eternal curses be upon the head of him who has done this! And let all the people say, Amen!

But what mean these emblems of deep mourning now drooping from every window and above every doorway throughout the land? Do they not exhibit outwardly the heartfelt sorrow deep within the national breast? Does it not say to every lover of freedom, Let us resolve, with united voice, that "as the Lord liveth and we live," slavery, the cause of the assassination of our second Washington, shall die also!

Abraham Lincoln was born the 12th of February, 1809, and died by an assassin's hand at 22 minutes past 7 A. M., April 15th, 1865, in the 57th year of his age. We have neither space nor inclination to enter upon a recital of the public acts of the great man whose death we all mourn. We may safely entrust his character and his public acts to the hands of the impartial historian, believing that they will not suffer.

AMERICAN PATENTED INVENTION.

March 7, (46,680) WHIP SOCKET.—John Lake, Haydenville, Mass.: I claim, *First*, the spring B, placed within the socket, and arranged substantially as and for the purpose set forth. *Second*, the plate C, with the spring D, underneath it, arranged with the lower part of the socket to operate substantially as and for the purpose specified. *Third*, the securing of the socket to the dash board by means of the springs E, substantially as shown and described.

CURRENT PRICES FOR CARRIAGE MATERIALS.

CORRECTED MONTHLY, BY MR. CHAS. WEEKS, FOR THIS MAGAZINE.

NEW YORK, April 24, 1865.

Apron hooks and rings, per gross, $2.00.
Axle-clips, according to length, per dozen, 75c. *a* $1.40
Axles, common (long stock), per lb, 10c.
Axles, plain taper, 1 in. and under, $7.00; 1⅛, $8.00; 1¼, $9.00; 1⅜, $10.00; 1½, $11.00.
Do. Swelled taper, 1 in. and under, $7.50; 1⅛, $8.75; 1¼, $9.50; 1⅜, $11.25; 1½, $14.00.
Do. Half patent, 1 in. and under, $10.00; 1⅛, $11.25; 1¼, $13.25; 1⅜, $15.00; 1½, $16.25.
Do. Smith's New York half patent malleable iron box, 1 in. and under, $10; 1⅛, $12; 1¼, $14.
Do. Saunders' improv. taper, ¾ in., $12.00; ⅞, $12.00; 1, $12.00; 1⅛, $13.00; 1¼, $15.
Do. do. Homogeneous steel, ⅝ in., $15.00; ¾, $15; ⅞, $16.50; long drafts, $4 extra.
☞ These are prices for first-class axles. Makers of less repute, cheaper.
Bands, plated rim, under 3 in., $2.50; over 3 in., $3.
Do. Mail patent, $3.00 *a* $5.00.
Do. galvanized, 3½ in. and under, $1; larger, $1 *a* $2.
Basket wood imitations, per foot, $1.25.
☞ When sent by express, $2 extra for a lining board to a panel of 12 ft.
Bent poles, each $1.25.
Do. rims, under 1⅛ in., $2.25 per set; extra hickory, $2.50 *a* $3.50.
Do. seat rails, 50c. each, or $5.50 per doz.
Do. shafts, $7 per bundle of 6 pairs.
Bows, per set, light, $1.25; heavy, $1.50.
Bolts, Philadelphia, 10 per cent advance on list.
Do. T, per 100, $3 *a* $3.50.
Buckram, per yard, 25 *a* 40c.
Buckles, per grs. ½ in., $1.15; ⅝, $1.40; ¾, $1.70; ⅞, $2 10; 1, $2.80.
Burlap, per yard, 30c.
Buttons, japanned, per paper, 30c.; per large gross, $3.
Carriage-parts, buggy, carved, $4 *a* $5.50.
Carpets, Brussels, per yard, $2 *a* $3; velvet, $3.75 *a* $4.50; oil-cloth, 75c. *a* $1.00.
Castings, malleable iron, per lb, 23c.
Clip-kingbolts, each, 50c., or $5.50 per dozen.
Cloths, body, $4.50 *a* $5.50; lining, $3.50 *a* $4. (See *Enameled.*)
☞ A Union cloth, made expressly for carriages, and warranted not to fade, can be furnished for $2.50 per yard.
Cord, seaming, per lb, 45c.; netting, per yard, 5c.
Cotelines, per yard, $4 *a* $8.
Curtain frames, per dozen, $1.25 *a* $2.50.
Do. rollers, each, $1.50.
Dashes, buggy, $1.75.
Door-handles, stiff, $1 *a* $3; coach drop, per pair, $3 *a* $4.
Drugget, felt, $2.
Enameled cloth, muslin, 5–4, 65c.
Do. Drills, 48 in., 95c.
Do. Ducks, 50 in., $1.45.
No quotations for other enameled goods.
Enameled linen, 38 in., 75c.; 5-4, $1.00; 6-4, $1.20.
Felloe plates, wrought, per lb, all sizes, 28c.
Fifth-wheels wrought, $1.75 *a* $2.50.
Fringes, festoon, per piece, $2; narrow, per yard, 18c.
☞ For a buggy top two pieces are required, and sometimes three.
Do. silk bullion, per yard, 50c. *a* $1.
Do. worsted bullion, 4 in. deep, 50c.
Do. worsted carpet, per yard, 8c. *a* 15c.
Frogs, 75c. *a* $1 per pair.
Glue, per lb, 25c. *a* 30c.
Hair, picked, per lb, 55c. *a* 80c.
Hubs, light, mortised, $1.25; unmortised, $1.00—coach, mortised $1.75.
Japan, per gallon, $5.75.
Knobs, English, $1.50 *a* $1.75 per gross.
Laces, broad, silk, per yard, $1.20 *a* $1.50; narrow, 15c. to 20c.
Do. broad, worsted, per yard, 50c.
Lamps, coach, $20 *a* $30 per pair.
Lazy-backs, $9 per doz.
Leather, collar, dash, 34c.; split do., 18c. *a* 21c.; enameled top, 34c.; enameled Trimming, 33c.; harness, per lb, 75c.; flap, per foot, 27c.
Linen, heavy, a new article for roofs of coaches, 90c. per yard.
Moquet, 1½ yards wide, per yard, $9.00.
Moss, per bale, 12½c. *a* 15c.
Mouldings, plated, per foot, ¼ in., 14c.; ⅜, 16c.; ½, 18c.; lead, door, per piece, 40c.
Nails, lining, silver, per paper, 12c.; ivory, per gross, 50c.
Name-plates.
☞ See advertisement under this head on 3d page of cover.
Oils, boiled, per gallon, $1.35.
Paints. White lead, extra, $18 per 100 lbs.; Eng. pat. black, 35c.
Pekin cloth, per yard, $5.
☞ A very good article for inside coach linings.
Pole-crabs, silver, $5 *a* $12; tips, $1.50.
Pole-eyes, (S) No. 1, $2.20; No. 2, $2.90; No. 3, $3.10; No. 4, $4.50 per pr.
Sand paper, per ream, under No. 2½, $5.75; Nos. 2½ & 3, $6.25.
Screws, gimlet.
☞ Add to manufacturer's printed lists 20 per ct.
Do. ivory headed, per dozen, 50c. per gross, $5.50.
Scrims (for canvassing), 20c. *a* 30c.
Seats, buggy, pieced rails, $1.75; solid rails, $2.50.
Shaft-jacks (M. S. & S.'s), No. 1, $2.75; 2, $3.25; 3, $3.50.
Shaft-jacks, common, $1.40 *a* $1.60 per pair.
Do. tips, extra plated, per pair, 37½c. *a* 56c.
Silk, curtain, per yard, $2 *a* $3.00.
Slat-irons, wrought, 4 bow, $1.12½; 5 bow, $1.25 per set.
Slides, ivory, white and black, per doz., $12; bone, per doz., $1.50 *a* $2.00; No. 18, $2.50 per doz.
Speaking tubes, each, $8.
Spindles, seat, per 100, $1.50 *a* $2.50.
Spring-bars, carved, per pair, $1.75.
Springs, black, 24½c.; bright, 25½c.; English (tempered), 30c.; Swedes (tempered), 33c.; 1¼ in., 1c. per lb. extra.
If under 36 in., 2c. per lb. additional.
☞ Two springs for a buggy weigh about 28 lbs. If both 4 plate, 34 to 40 lbs.
Spokes, buggy, ⅞, 1 and 1⅛ in. 8½c. each; 1⅛ and 1¼ in. 8c. each; 1½ in. 9c. each.
☞ For extra hickory the charges are 10c. *a* 12½c. each.
Steel, Littlejohn's compound tire, 3-16, 11½c.; 1-4, 10½c.; heavier sizes, 10c. currency.
Stump-joints, per dozen, $1.60 *a* $2.25.
Tacks, 9c. and upwards per paper.
Tassels, holder, per pair, $1 *a* $2; inside, per dozen, $5 *a* $12; acorn trigger, per dozen, $2.25.
Terry, per yard, worsted, $4; silk, $9.
Top-props, Thos. Pat, per set 70c.; capped complete, $1.50.
Do. common, per set, 40c.
Do. close-plated nuts and rivets, 75c.
Thread, linen, No. 25, $1.30; 30, $1.45; 35, $1.65, gold.
Do. stitching, No. 10, 95c.; 3, $1.15; 12, $1.28, gold.
Do. Marshall's Machine, 432, $2; 532, $2.30; 632, $2.60, gold.
Tufts, common flat, worsted, per gross, 20c.
Do. heavy black corded, worsted, per gross, $1.
Do. do. do. silk, per gross, $2.
Do. ball, $1.
Turpentine, per gallon, $2.50.
Twine, tufting, per ball, 35c.; per lb, 60c. to 75c.
Varnishes (Amer.), crown coach-body, $7; hard drying, $8; non-pareil, $8.
Do. English, $6.25 in gold, or equivalent in currency on the day of purchase.
Webbing, per piece, 70c.; per gross of 4 pieces, $2.60.
Whiffle-trees, coach, turned, each, 50c.; per dozen, $5.50.
Whiffle-tree spring hooks, $3 per doz.
Whip-sockets, flexible rubber, $4.50 *a* $6 per dozen.
Do. hard rubber, $10.50 per dozen.
Do. leather imitation English, $5 per dozen.
Do. common American, $3.50 *a* $4 per dozen.
Window lifter plates, per dozen, $1.50.
Yokes, pole, each, 50c.; per doz, $5.50.
Yoke-tips, extra plated, $1.75 per pair.