Carriage Painting

A Series of Practical Treatises

ON

THE PAINTING OF CARRIAGES AND WAGONS, EMBRACING FULL DIRECTIONS FOR THE PRACTICAL EXECUTION OF ALL KINDS OF CARRIAGE AND WAGON PAINTING, INCLUDING STRIPING, LETTERING, SCROLLING, ORNAMENTAL WORK, VARNISHING, TRANSFER ORNAMENTS, APPLYING GOLD LEAF, ETC. :

Each Treatise is followed with Test Questions : : : for the Student : : : :

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PREFACE.

1. The subject matter of this volume, the fifth in the series of the red manuals "Carriage Painting," is really too complex to be fully detailed within the space of a small volume of the restricted number of pages as this is to be. There are a number of excellent treatises published on carriage painting, and outside of the gleaning and arrangement of the matter, and its presentation in the shape of lessons graded and paragraphed with questions at the end of each, each of which have corresponding numbers to the above paragraphs containing the answers to the questions asked, the author does not lay any claim to, and readily acknowledges that he has been greatly helped and inspired by the previous work of others, more especially by that of "Practical Carriage and

Wagon Painting'' by M. C. Hillick, whose presentation of the subject matter is masterly done. Much of the subject matter of this volume has been culled and re-arranged from that masterpiece of carriage painting literature and to a few others also, who had written up their experiences in some of the ''Trade Journals.''

F. Maire.

Carriage Painting

LESSON I.

PRELIMINARY.

2. Under the title of this manual is included a great deal. Heretofore, in the volumes of this series of trade manuals, the manner of using and doing painting has been from an entirely different standpoint—with an entirely different object in view, so much so, that much of it will have to be forgotten in order not to become biased and to have one's mind free to adapt the principles which govern "Carriage Painting."

Under this general name it must be remembered that it is not only the painting of vehicles drawn by horses, such as buggies, landaus, carriages etc. that it covers, but railway carriages, automobiles

and every form of vehicles known; therefore it has become one of the branches of painting which covers a field of vast importance.

The principles which lay at the foundation of carriage painting must be well understood in order to comprehend all the various operations demanded to produce good work. When these fundamental principles are learned thoroughly, it will matter little upon what scale they may be practically put into play—whether in an up-stairs shop over the wheelright's repair shop, or in large factory rooms or car shops. In the latter, every facility will usually be found at hand to do the work rapidly and freed of much of the annoyances usually connected with the small shop; but that is only a matter of convenience after all, for the work itself must be done in much the same fashion.

It will be the object of the next lesson to commence the study of the principles

which govern carriage painting, then of the material and tools needed in doing the work, then in the several methods of doing the work itself. As usual, the subject matter will be treated as much as possible by graduated steps, in order that it may be well understood by the student, and that he may become familiar with the various operations by easy steps.

Some of the finishing parts in carriage painting such as striping, scrolling, decorative painting and of sign work, are made separate trades, or parts of trades in all the large carriage shops. As each of these would require more space than can be spared in this manual in order to give them the most elementary survey, but little will be said regarding them with the one exception: that of striping, which every carriage painter should be familiar with. The study of ornament painting and that of signs will form a separate manual. There are some excellent books published

upon the latter in lesson form copiously illustrated—especially that of Atkinson's, and the student will do well to procure it.

As this manual is written principally for the use of students who wish to take up the painting of carriages in the smaller towns, either as a separate business, or in connection with general painting, to fill up slack times, the descriptions given for doing the work will be found more applicable to these smaller shops than to the large factories. In these everything being specialized, every advantage can be taken for doing the work quickly and safely, which cannot be done usually in the smaller repair shops—but the underlying principles are the same, and when well understood, the student would find no difficulty in understanding their application on a large scale, and while employed on general work he could not expect to acquire the speed of the men who are specialists, working on piece work; probably

he would soon acquire this extraordinary speed by practice if he took up some specialty.

Having outlined the manner in which the subject matter will be handled in this manual, the next lesson will take up the study of the underlying principles of carriage painting.

LESSON II.

REASONS WHY LINSEED OIL IS SPARINGLY USED IN CARRIAGE PAINTING.

3. The old adage heretofore preached from in former manuals, i.e. "*Oil is the life of paint,*" must be forgotten to a great extent, when it comes to carriage painting. Heretofore the surfaces covered with paint were stationary, motionless, and with the exception of floors, were not subject to abrasion. The worst enemies were from atmospheric conditions, and it was shown that linseed oil was a capital substance to use as a protection against these.

4. In carriage painting, the principal, and only use made of linseed oil is in the priming or foundation coats. No work which is not filled and made waterproof can be expected to stand any length of time, and few of the many make-shifts or short-cut methods of painting carriages which ignore a generous use of it—in the priming at least—can be depended upon for lasting results in the finishing coats.

5. The old time methods were very good, but were too slow for the fevered hurry of the present, so that it has been the aim of every man employed in carriage painting to devise some way whereby an hour or two could be saved in turning out finished jobs. This hurry has not always been advantageous to the durability of the finished work, even where the resemblance of the finished, to that of olden times has been preserved, but the workman's protests have not been able to check the demand for quicker work. Given good

material and a reasonable allowance of time, a medium course can be pursued in carriage painting, which will be found to give fair results, both as to a good looking finish or herein, the time required to do the same in.

6. Were it possible to produce such a surface as the fastidious taste of the day demands, with and by the use of linseed oil coats—there is no question but that the results would be far more durable than they are by the other methods, but this is impossible. So as said before, the use of it made in carriage painting must be restricted to the foundation coats. These are not confined to the one coat or first coat as in structural painting, and for this reason it is named foundation coats, in order that it may not be confounded with what is understood as priming in former manuals.

7. The middle coats used in carriage painting are used principally to produce at

surface and they might very appropriately be called surfacing coats. They should consist chiefly of material which has been mixed with such liquids as will allow of their being spread easily, and which must possess sufficient adherence as to bind the material it is mixed with into a hard drying mass capable of being leveled up to a smooth surface by rubbing down with pumice stones. These intermediary coats are best known in carriage work as "*filling coats.*"

8. When the filling coats have been perfectly leveled and smoother, then only do the coloring coats proper, commence in carriage painting. It is obvious that they should conform stricty to the composition or rather the elasticity of the compounds used in surfacing the work, for it is obvious that if the variation is any way noticeable the finishing color coats will surely crack from their inability to conform themselves to that of the surfacing coats under them.

At the present time while giving a general look over the scope of carriage painting it is not the purpose to inquire into the why and wherefore of things, as this will be done when that portion of the description of that part of the work is reached. The present synoptical viewing is merely indicative of the progressive stages through which a carriage passes before it is passed on to the repository.

9. Carriage work is frequently striped and ornamented. When this is done, it follows upon the last color coat, and when completed the jobs are ready for the varnishing, which completes all that the subject matter of this manual proposes to treat.

QUESTIONS ON LESSON II.

3. What is said concerning the use of linseed oil in carriage painting?

4. What use is made of linseed oil painting chiefly?

5. Wherein do present methods of carriage painting chiefly differ from the old?

6. What is usually understood by "foundation coats" in carriage painting?

7. What is the object and purpose of the filling coats?

8. What are the last coats of paint used in carriage painting called?

9. When is the striping and ornamentation done?

LESSON III.

MATERIAL USED IN CARRIAGE PAINTING.

10. It is proper before the study of carriage painting commences that the student be made familiar with the material, tools and appliances that are needed in doing the work. Therefore a short review of these will be made before proceeding to give the details of the various operations necessary to finish a job.

The material used in carriage painting is an important factor in the prosecution

of the work. As in other branches of painting it means that good material is necessary in order to obtain good results in the finish. It will not be necessary to go all over the details given in Volume III entitled "Colors" as to the derivation of each color used, and the reader is referred to that manual for more extended details regarding them. Some however, such as the fillers and varnishes which received little if any attention in that volume will be given sufficiently extended examination in this as their importance demands in connection with the subject matter.

11. As may be expected the blacks are the one color of most importance to the carriage painter. Lampblack in oil is used usually for the tinting of white lead in the foundation coats. It is sometimes used in compounding some of the proprietary named black as it is so very strong but on account of its dull gray black color it must be touched up with a good bone black, or gas black.

12 Gas black is extensively used in proprietary named blacks to doctor up poor blacks, or to compound with some cheap make weight material into a black which imitates the bone blacks in so far as covering properties, and strength of coloring matter goes and pretty nearly in jettiness of coloring, especially the ordinary sorts of bone blacks. By its use a fair black can be had at a lower cost than by the use of any other black pigment.

13. Ivory black, coach black, drop black are about one and the same thing—*bone black.* The finer qualities of this black are very good and are very intense in their jet tone, besides being clear and free of muddiness. They are sometimes improved by the addition of a small quantity of Prussian blue, but the finer qualities do not require it as it hurts them; in time it fades out, leaving the black to its own tone good or bad. These blacks are all of them rather deficient in opaqueness bone black

being considered a sem-transparent color.

14. The blue group of colors is used to a considerable extent especially in wagon and automobile painting. Prussian blue is seldom used solid, but some of its tints are sometimes. It is also used in compounding some of the green tints.

Ultramarine blues of various shades of both the opaque, and transparent varieties are mostly used for painting solid colors as being less likely to fade than Prussian blue.

15. The Brown group of colors is well drawn upon by the carriage painters. All the colors found in that group are used. The raw and burnt umbers and raw and burnt Siennas, and in rough stuffing some of the special earth browns called umbers are used, beside an endless variety of fancy named browns compounded from the above named colors mainly, and many others which have proprietary names. Van Dyke brown is sometimes used as a glaze and a

great variety of brown and reddish brown lakes are also used in glazing. The student must not think that all the carriage browns that he may see listed are distinct colors, in reality they are only tints compounded very much in the same manner as the same would have to be prepared for house painting only that for carriage work the colors must not be ground in linseed oil but in japan or varnish.

QUESTIONS ON LESSON III.

10. General remarks on material used in carriage painting.

11. What is said regarding the black group of pigments, especially about lampblack?

12. What uses are made of gas black?

13. What is said concerning bone blacks including ivory, coach and drop blacks?

14. What colors of the brown group are used in carriage painting?

LESSON IV.

MATERIALS USED IN CARRIAGE PAINTING CONTINUED.

15. The green group of colors is also largely made use of in carriage painting, but more especially in wagon and automobile work. Chrome greens in all shades; verdigris and Paris green for glazing, but more especially the very pretty greens (transparent) extracted from coal tar—some of which are excellent. In carriage painting proper nearly all the greens are compounded with blacks, and simply carry a cast of green the black predominating, such as the Brewster's greens, bottle and olive greens, which in addition to the black also carry some yellow in their composition. The green list carries also a large number of proprietary named greens; as each manufacturer chooses a different name for goods of their preparing, the list is too formidable for each group of color to

attempt to even do it a partial justice in the naming, therefore none such will receive any attention. It is an easy matter in the smaller shops to prepare and compound all such tints from stock colors and it will not cost as much as the carrying of the numberless tints that are offered for sale. In the large factories where jobs are turned out in large numbers and where each color must be "semper idem," it will be found best to have these special shades made up and prepared from a regular formula at the factory.

16. The red group of colors is also largely used from, in all branches of carriage painting. From the amaranth reds used in running gear work of buggies, etc., to the bright vermilions used for the same purpose in wagon painting to which may be added even the painting of the beds in that bright garb. Then in its more subdued shades as Tuscan reds in railway car work and in short reds, either bright or

subdued are indispensable to the carriage painter. The naming of the reds used by the trade is the naming of all the leading reds made; such as the English vermilions pale and deep. The numberless imitation vermilions known to the trade as Vermilion reds are more usually accompanied by a high sounding proprietary name. The various red oxide reds are better known as Venetian red, Pompeian reds, etc. The great variety of red or red brown lakes are used in glazing. Most of these are sold also under some proprietary name. As all dealers usually have color cards showing what the true color of the contents of a car looks like, it is easy enough to pick out the right color desired no matter by what name it may be called; especially if the dealer sells it under a guarantee of permanency.

17. It is hard to say which of the several groups of color is the most useful to the carriage painter; all the other groups examined were found useful, and indispens-

able, and now that the last group of the colored pigments is reached ("the yellow") it is found to be fully as useful and indispensible as the preceding ones. Either in a self color as in running gears of buggies carts and wagons, to the solid painting of railway cars on some systems, they occupy a very prominent place indeed. There seem to be no shades of it so bright but may be used for some purpose, and in the tints with white and other colors, the use made of the yellows is very great. The ochres enter largely in some of the tints made, and the chrome yellows in their various shades probably predominate the list. The transparent yellow lakes are also used for glazing to some extent.

18. The last group is the whites; there is much use made of them; no jobs are hardly ever painted in any color no matter which it is, but that white lead enters into at least the preparatory coats. It is used also largely in the painting of business

wagons, hearses, etc., in its self-color and in combination with other pigment in the preparation of a number of tints. It is used ground in oil when it is known as "keg lead," and hereafter when that name shall be used it means that kind of lead and it is ground in japan or varnish for paint- no other. Then there is the dry white lead used in making putty and surfacing. Then ing the jobs in its self color.

QUESTIONS ON LESSON IV.

15. What is said regarding the green group of colors?

16. What is said concerning the red groups of colors?

17. What is said regarding the yellow group of colors?

18. What is said about whites in carriage painting?

LESSON V.

MATERIAL USED IN CARRIAGE PAINTING—CONTINUED.

19. Under the heading of materials used in carriage painting must be included anything and everything useful in connection with the work, not merely as a paint but in preparing the way for it as well. This accessory material is as necessary in its place as is any of the other and should require as much attention and care in the buying.

20. Pumice stone—powdered in different degrees of fineness—the Italian is the best. The American being gritty will scratch worse. The lump pumice stone which should be also the Italian kind for the same reason.

21. Whiting or carbonate of lime is useful at times for many purposes which will be noted in the course of this manual but principally in the preparing of certain kinds of putty.

22. Chamois skins—which by the way are not Chamois skins but sheepskins tanned in a particular way—are also hard to get along without in carriage painting as they are useful in many ways, nearly all through the preparing and the finishing of a job.

23. Under this heading must be a long list of articles and material used in the decoration of vehicles such as gold and other metal leaves. Bronzes also of all colors and qualities, metallics and flitters also in all colors. Transfer ornaments of every kind. In short every thing that is ever used in the shop for the purpose of ornamentation.

THINNERS OR VEHICLES FOR COLORS.

24. It was stated at the beginning that but little linseed oil was used in carriage painting—but that little must be good and the best. The raw should invariably be used, as the object for which linseed oil is

used is partially defeated by the use of boiled oil.

25. Volatile oils. There can be no question as to which is the best to use where there is any choice at all possible, that is—"*Turpentine.*" It is head and shoulders above the petroleum, volatile oils, benzine, naphtha and gasoline. But of course where they must be used—they are, that's all.

26. Japans and other varnishes are used in both the filling up coats for rough stuffing, but the latter more especially in the coloring coats and finishing. Japans do not differ much from varnishes and under that name all kinds of liquid stuff is sold in the market which have nothing much in common but the name under which they are sold. The formulas for making them differ so much that it is really impossible to give a clear definition of them. In so far as carriage painters make use of them they are expected to bind the pig-

ments mixed with them, and to have but little elasticity at least no greater than that of the supervening coats. Most varnish makers prepare one for the purpose of the carriage trade which is sold under the name of "Carriage japan," this is usually to be depended on when made by a varnish house having a reputation to loose. Varnishes for the carriage painter's use are prepared with a view to suit his various requirements such as *"rubbing," coloring"* and *"finishing,"* each of which are again sub-divided into quick drying, medium drying and slow drying and again into elastic and non-elastic. There is a varnish prepared for any special use that the painter will ever have and the only trouble with him is to pick out the good ones.

In the course of the details of the work proper when the various operations are reviewed, the various kinds of varnishes to be used for each purpose will be named under the appellation given them by the

various manufacturers and which has now become universally adopted by them.

QUESTIONS ON LESSON V.

19. Some general remarks concerning accessory material?

20. What is said regarding pumice stone?

21. What is said of whiting or carbonate of lime?

22. What is said of chamois skins?

23. What ornamental material is used in carriage painting?

24. What oil is used in foundation coats?

25. What volatile oils should be used?

26. What is said of japans and varnishes?

LESSON VI.

TOOLS USED IN CARRIAGE PAINTING.

27. The tools used in carriage painting are not very numerous nor costly and must

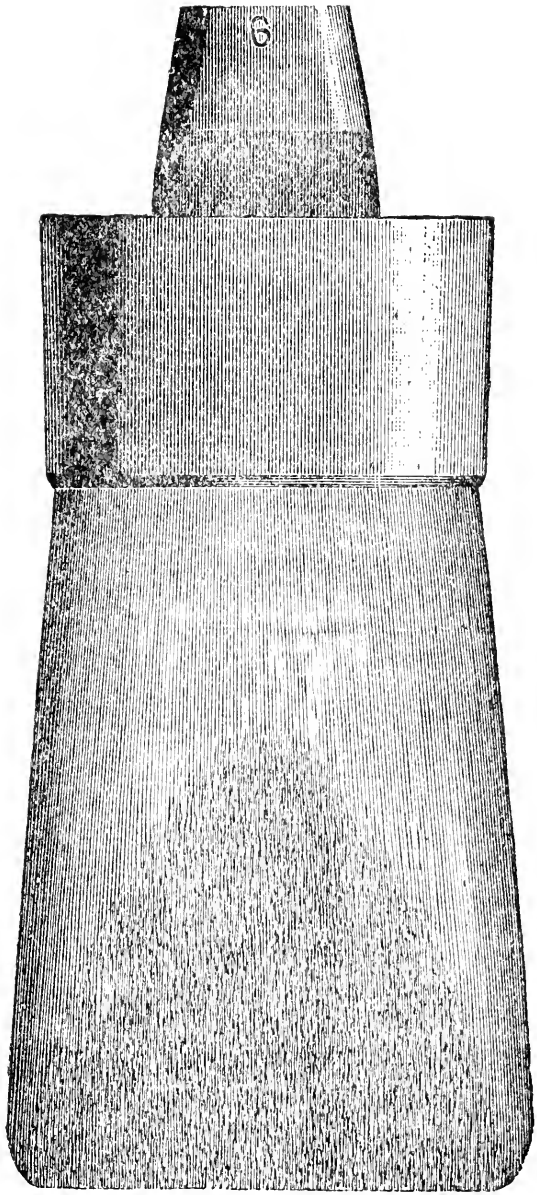

Fig. 1

OVAL CHISELLED VARNISH BRUSH

be kept separated from useful devices used in facilitating the work as these may vary greatly or be dispensed altogether if necessary—but the tools cannot, without some other ones which would have to take their place are used instead of them. The more important tools as may well be surmised are the "brushes" and these are made up of nearly all known variety of hair used in the art of brush making.

28. The heavy brushes used in carriage painting are usually made up from hog bristles and they are used for a number of purposes. Fig. 1 shows a metal bound chiselled haired (bristle) varnish brush. This brush is useful in many sizes and runs from 1.0 to 8.0. They are used in priming coats to lay color with and may also be used for laying rough stuff and for varnishing running gears and bodies of large wagon work which is not to be finished extra fine. They will be found useful for a wide range of work and with the great

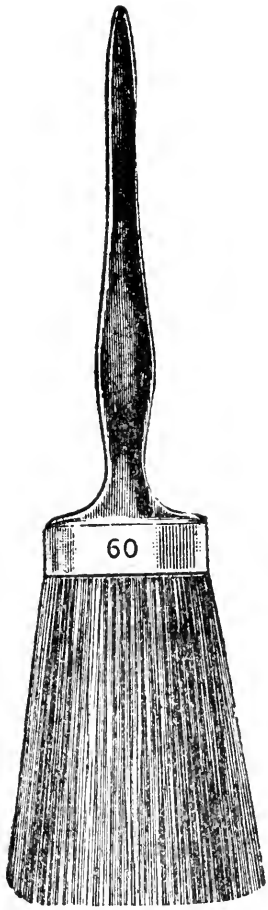

Fig. 2
ROUND PAINTER'S DUSTER

range of sizes will come as near being worthy to be called a universal tool as it

is possible to call a brush by that name in carriage painting.

29. Fig. 2 repesents a round painter's duster. There is no economy in buying a cheap one and a No. 1 white coach painter's duster will cost but little more than a cheaper one. These do the

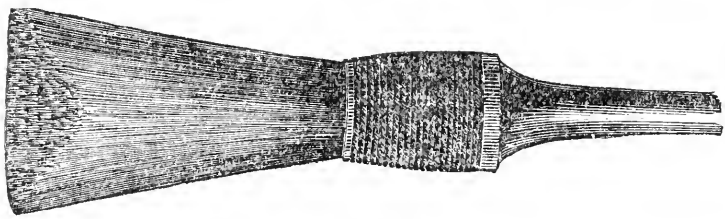

Fig. 3
COACH PAINTER'S SPOKE BRUSH

work so much better that it is foolish to buy any other.

30. Fig. 3 represents the coach painter's spoke brush. As the name indicates they are useful for spoke painting but not indispensable, as many carriage painters never use a specially constructed brush for that purpose.

31. Fig. 4 represents a flat varnish brush—these run in sizes from 1 inch to 4

inches in width by graduations of ½ an inch. They come also in single and double

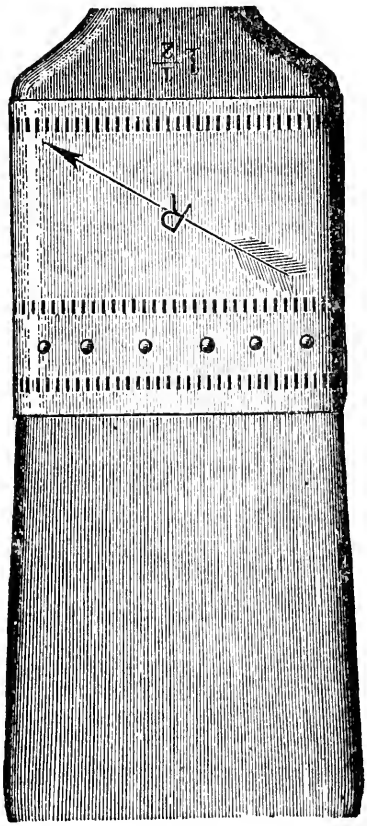

Fig. 4
FLAT VARNISH BRUSH

thickness and in all these same sizes and thicknesses in chiselled edge which are

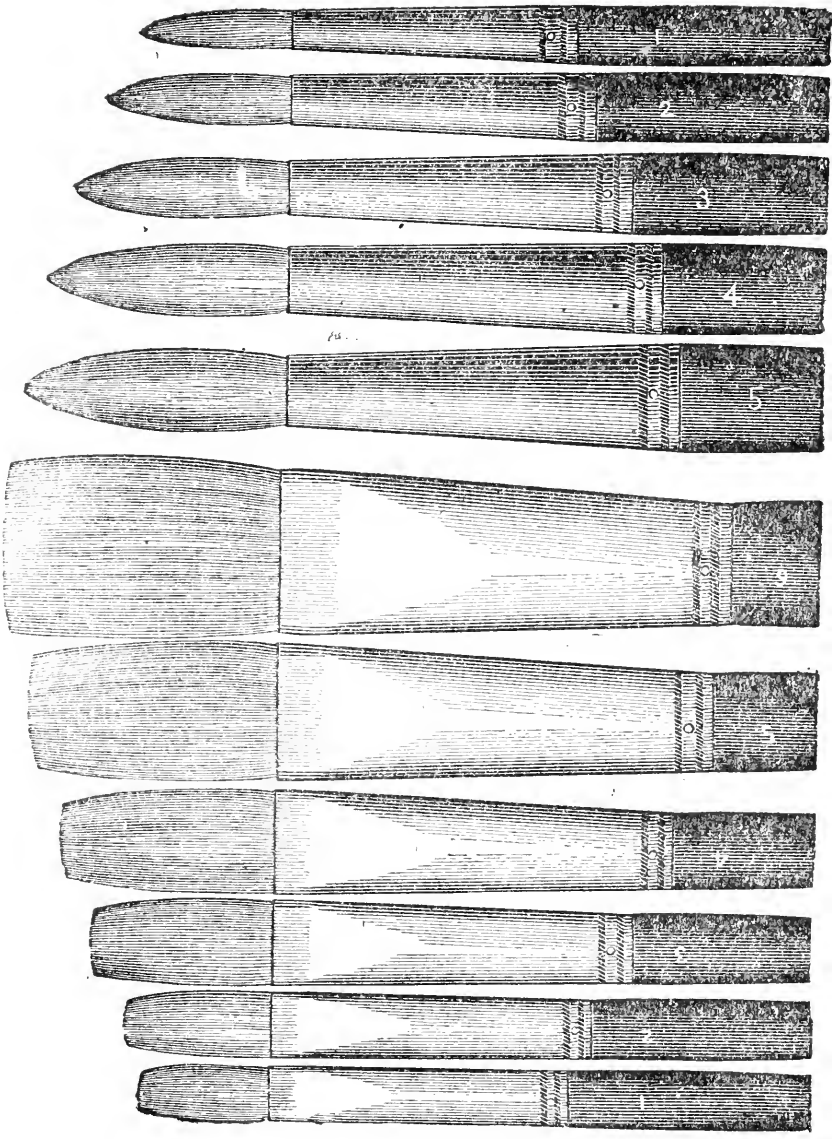

Fig. 5
ARTISTS' BRISTLE BRUSHES

usually preferable for most work. They are used for a number of purposes, and a

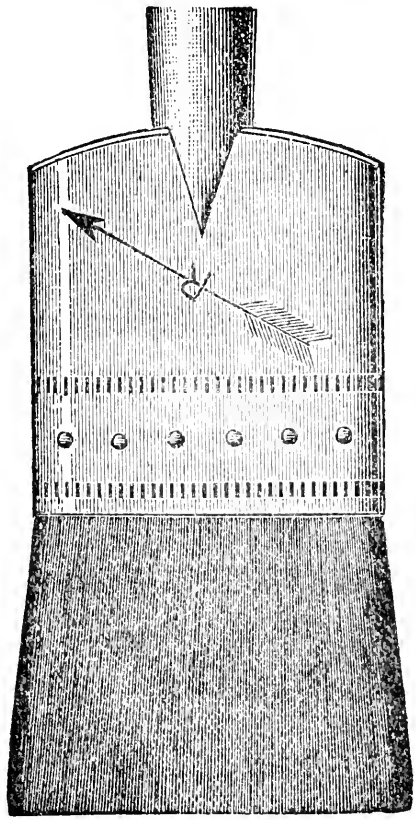

Fig. 6
FITCH VARNISH BRUSH

liberal supply of the various kinds will be found very handy. As chiselled edged

brushes are shown in Fig. 4 it will not be necessary to show the bristle varnish chiselled edge brush, as that indicates the shape fully as well.

32. Fig. 5 shows artists' flat and round bristle brushes. A few of these brushes come in handy in cleaning up and filling quirks and beaded seams. They are inex-

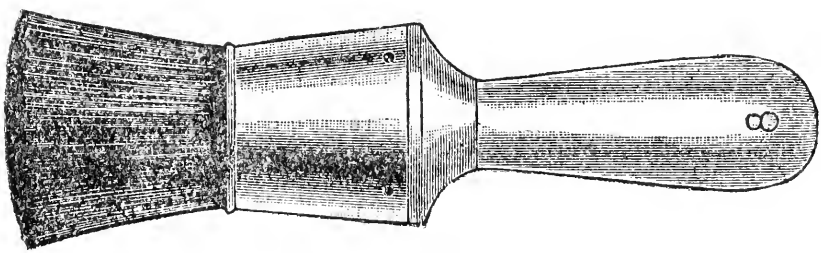

Fig. 7
BADGER HAIR, FLOWING BRUSH

pensive. They number in sizes from 1 to 12.

33. The finishing varnish brushes and the color brushes for the laying on of the coloring coats require finer and softer material than hog's bristles. Most of these therefore are made up from badger, bear, ox hair and camel's hair (so called) such

being better than the other for certain specific purposes. They lay color or varnish

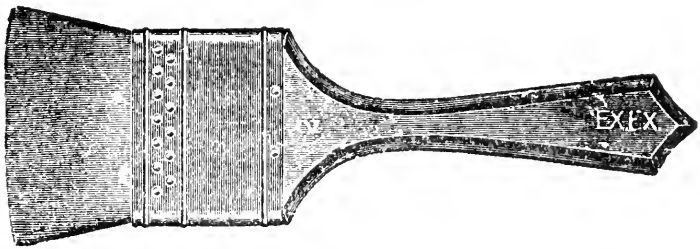

Fig. 8
CAMEL'S HAIR VARNISH OR COLOR BRUSH

much more smoothly and evenly than it is possible with a bristle brush. Fig. 6

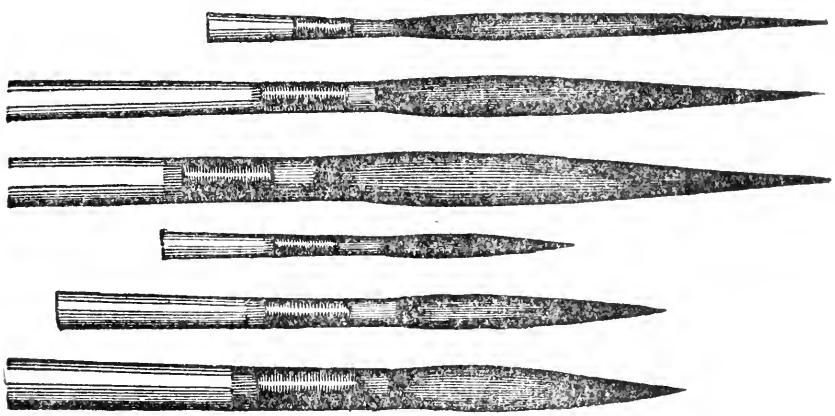

Fig. 9
STRIPING PENCILS

represents the fitch varnish brush. It is also made in bear's hair and sable. This

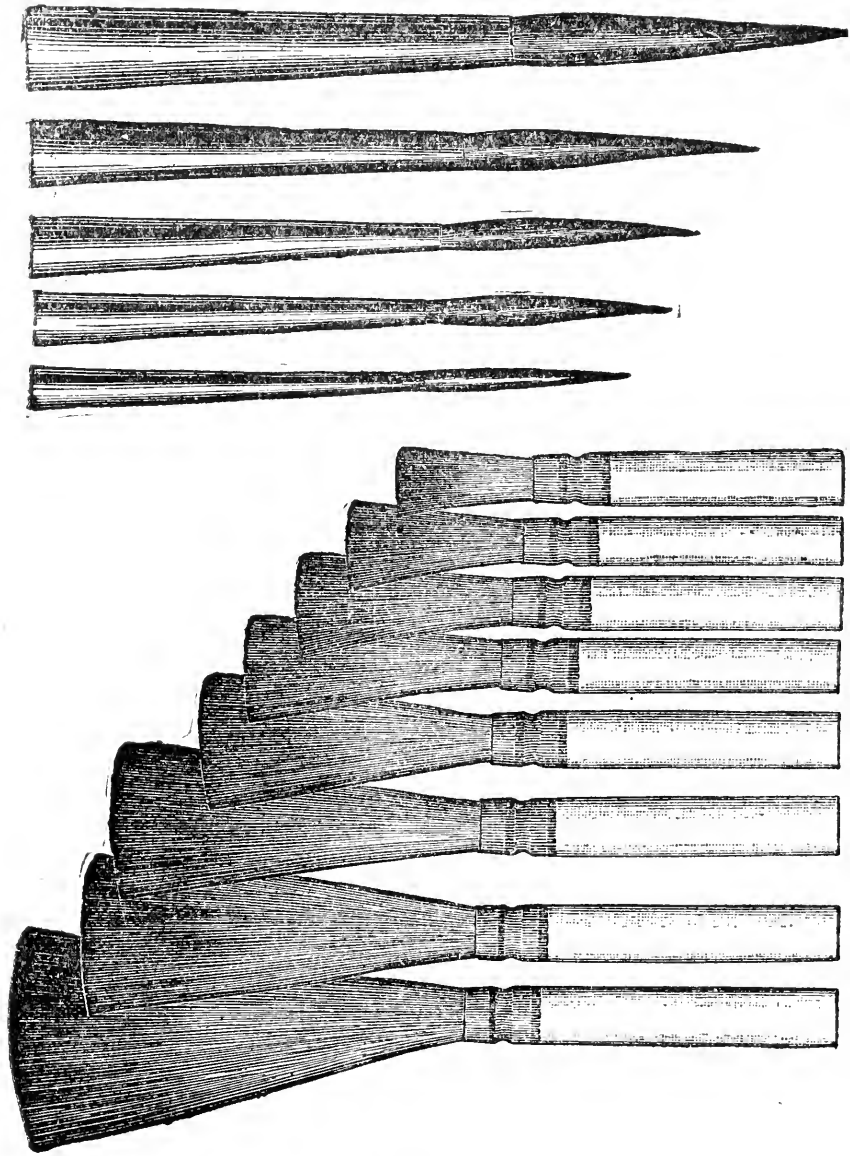

Fig. 10
LETTERING PENCILS

brush is chiefly used in laying varnish coats.

34. Fig. 7 represents the badger haired

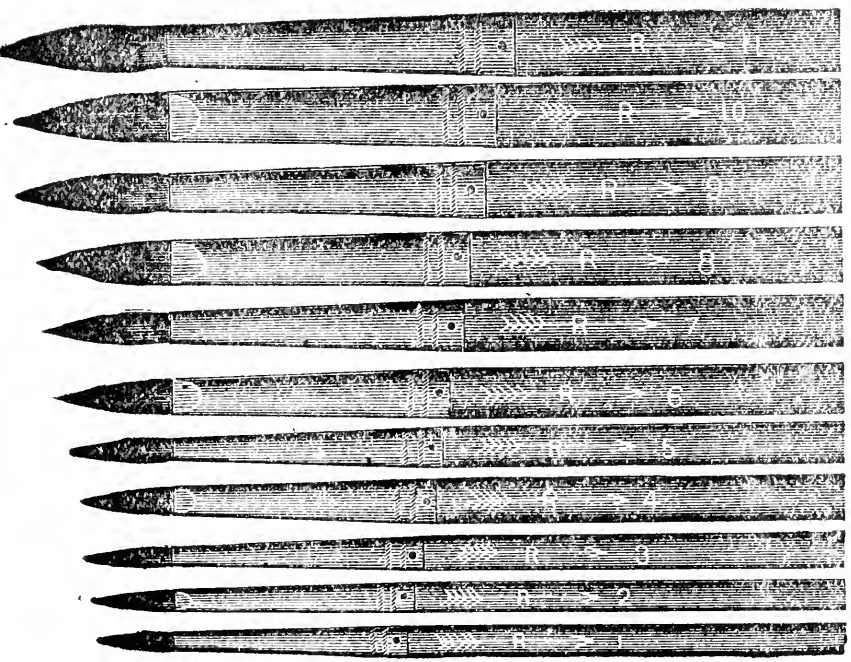

Fig. 11
ARTISTS' RED SABLE BRUSHES

varnish, or color brushes as it is used by some for both purposes.

35. Fig. 8 represents the camel hair varnish brush. This is also used for both

purposes of a coloring brush, or for laying varnish. (The finishing coats.)

36. Fig. 9 represents striping pencils. These may be made of either camel's hair, sable or ox-hair. Each of which being better than the other for use in light or heavy bodied colors: the sable brushes being more elastic are best in heavy colors.

Fig. 12
SWORD STRIPING BRUSH

37. Fig. 10 represents the lettering pencils. They too are made from either camel's hair, Siberian ox-hair, or red or black sable to be used in light and heavy bodied colors.

38. Fig. 11 represents flat and round red sable artists' brushes, which are used in the painting of ornaments for which they are indispensable.

39. Fig. 12 represents the sword striping pencil. By its use a stripe may be

made of various width, wide or narrow according to the amount of pressure given. They are best for the making of the finer stripes.

QUESTIONS ON LESSON VI.

27. General remarks on tools used in carriage painting.

28. What does Fig. 1 represent?

29. What does Fig. 2 represent?

30. What does Fig. 3 represent?

31. What does Fig. 4 represent?

32. What does Fig. 5 represent?

33. What does Fig. 6 represent?

34. What does Fig. 7 represent?

35. What does Fig. 8 represent?

36. What does Fig. 9 represent?

37. What does Fig. 10 represent?

38. What does Fig. 11 represent?

39. What does Fig. 12 represent?

LESSON VII.

TOOLS USED IN CARRIAGE PAINTING CONTINUED.

40. Fig. 13 represents putty knives of various qualities. They are either rigid or flexible and may be beveled at the various angles.

41. Fig. 14 represents the wide scraping knives. They are indispensable to use in rough stuffing; in knifing in lead coats, etc. Some should be beveled. They are also the best tools to use in burning off paint from old jobs.

42. Fig. 15 represents the gasoline torch. This is of great use in all repair shops in order to remove the old paint and varnish from jobs to be repainted.

43. Fig. 16 represent a patented brush keeper which has projecting wires soldered on the inside upon which the brushes are fastened and suspended from. The cover is a protection against dust and dirt

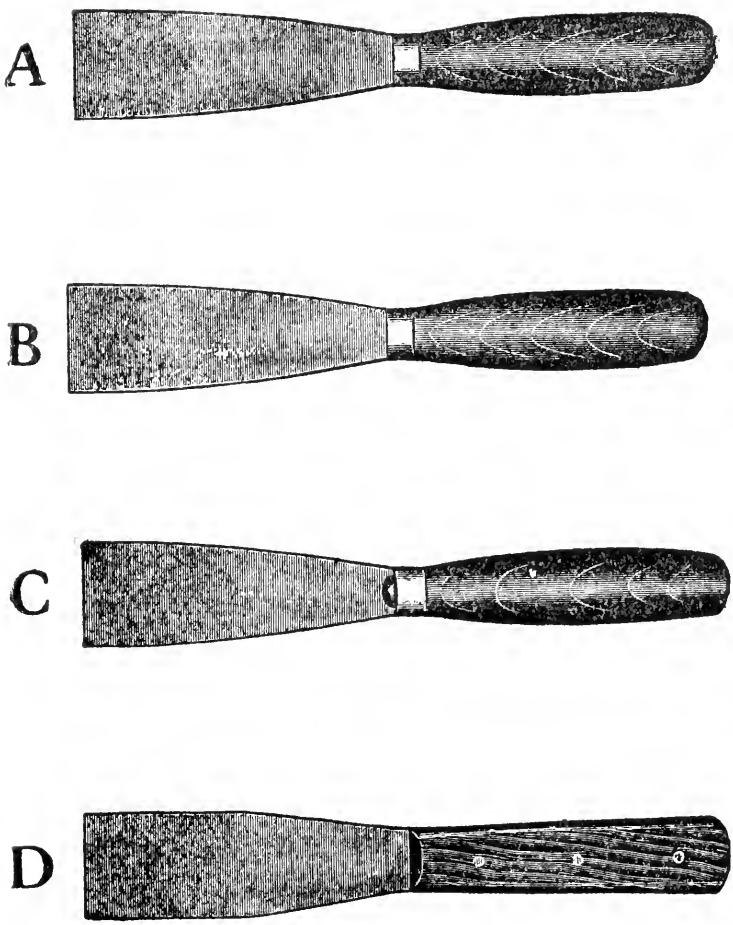

Fig. 13
PUTTY KNIVES

settling upon the brushes and the liquid of the keeper.

44. While the brush keepers are **under**

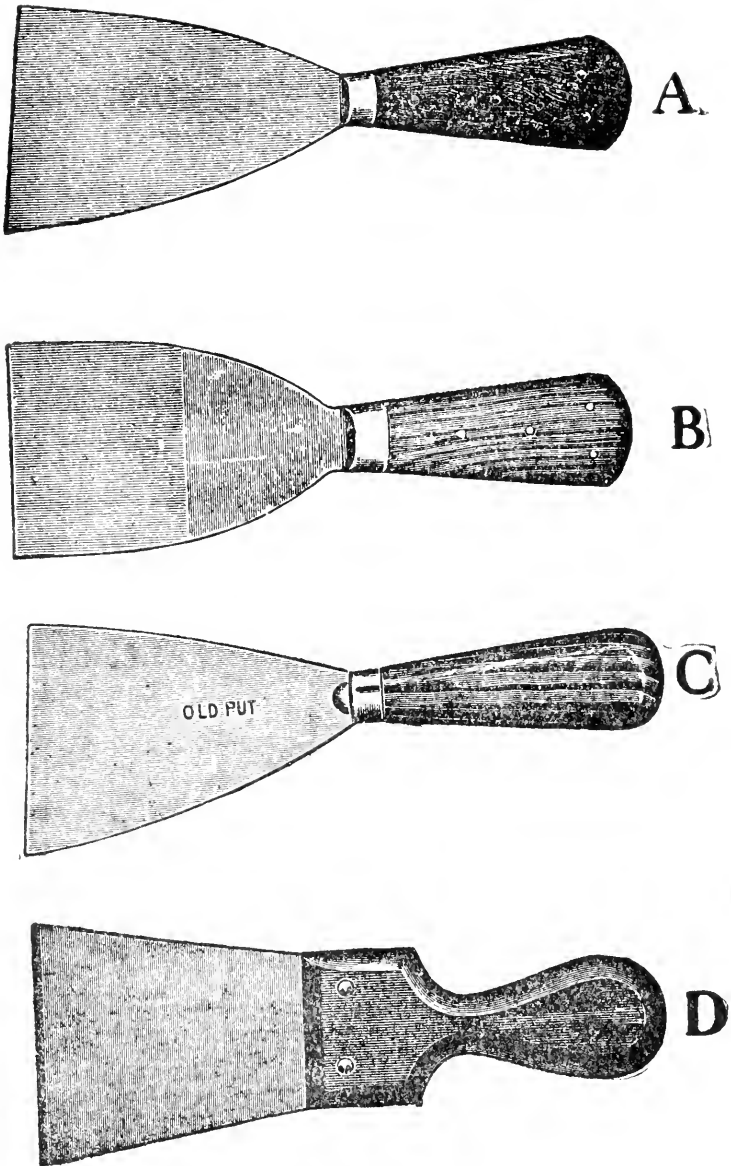

Fig. 14
WIDE SCRAPING KNIVES

consideration, it will be well to state that the one shown in Fig. 16 is merely suggestive, and any other which will keep the brush suspended and which will keep the dirt out will be found equally effective for use. Below is given an inexpensive way of making an individual brush keeper

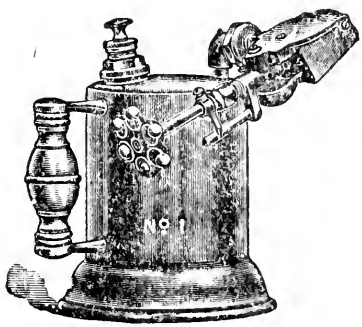

Fig. 15
GASOLINE TORCH

which will be found even better than the highest priced patented ones. Take any small tin can such as vegetables are packed in, have a bent wire soldered on to hang the brush upon the inside, fill it with the liquid desired and place it inside of a Mason fruit jar, place the cover upon it and you have an ideal keeper. As it is

much better and safer for each varnish brush to hang suspended in its own liquid, and as it requires a long time to clean them when they have been suspended in a different varnish or linseed oil, it will

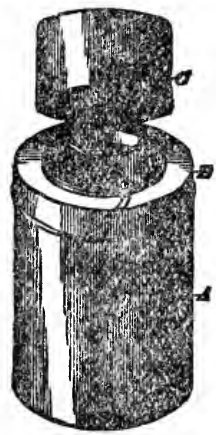

Fig. 16
BRUSH KEEPER

be seen at once the great advantage in having each brush by itself in an individual keeper.

45. Sponges. These are needed at nearly every turn in the various operations necessary in carriage painting. Great care should be used in selecting

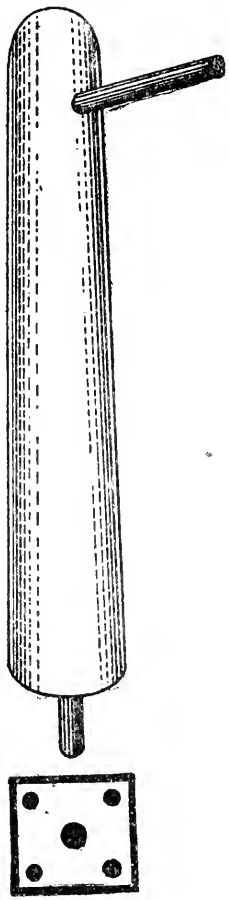

Fig. 17
REVOLVING WHEEL JACK

them as sometimes pieces of rock or grains of sand are to be found attached to them when they would surely mar and scratch

the work, therefore after wetting a new one, one should be careful to go all over it with the fingers in order to feel for such objectionable stuff and remove them. The sheep's wool variety is the only kind fit to be used.

46. Fig. 17 represents a wheel jack. It is simply an upright piece of wood into the top of which an inch hole has been bored and a piece of wood perfectly round has been driven. Upon the floor another inch hole is bored and a square piece of flat iron is screwed on; in the center of this iron a hole should be made to correspond to the one in the floor and the two should come together. In the bottom of the upright a piece of iron rod should be driven leaving the end out a few inches. This end can then be put into the hole in the floor and the upright wheel jack will be ready to hang the wheels upon while being painted. They can be revolved to any desired position. There are many forms of

them in use and the principle upon which they work is capable of being adapted in various ways. It is a matter of small

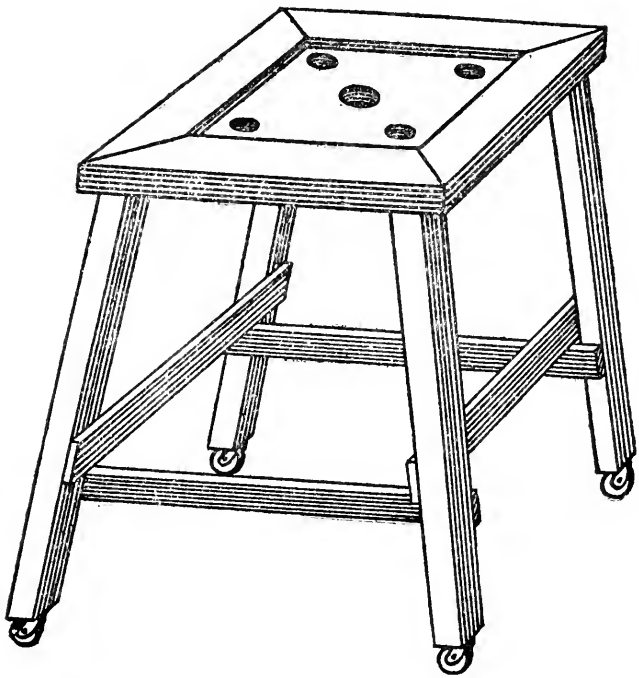

Fig. 18
BODY TRESTLE

moment and it is more one of convenience to the painter as to which he may adopt.

47. Fig. 18 represents a handy body trestle upon which to rest bodies while be-

ing painted. As with the wheel jack there can be no cut and dried standard. Each shop usually has an equipment of its own to facilitate the handling of this class of work. The principal idea being that there be no projecting pieces sticking out to come in the way of the painter doing the work and in some shops ordinary carpenter's horses are made use of for the bodies to rest upon.

48. In some of the large shops, they have a number of conveniently arranged tilting devices—which also rotate so that bodies can be painted. at many angles These are handy and they will naturally suggest themselves to the operator.

QUESTIONS ON LESSON VII.

40. What does Fig. 13 represent?
41. What does Fig. 14 represent?
42. What does Fig. 15 represent?
43. What does Fig. 16 represent?

44. Describe how to make an inexpensive brush keeper.

45. What kind of sponges should be used in carriage painting?

46. What does Fig. 17 represent?

47. What does Fig. 18 represent?

48. What other devices will be found useful as body trestles?

LESSON VIII.

PREPARING NEW JOBS FOR PAINTING.

49. New wood will be found usually pretty open, especially oak—full of pores which must be filled up and effectually sealed against any possible action of air and moisture, for if this is not attained fully in the priming coats, it will be too late to try to do so in any subsequent coats. As it was seen in Vol. 1 the function of priming is very important and should not be slighted. If this is considered of prime importance in house

painting, how much more so then is it to be in carriage painting.

The constant motion, wear and tear to which all kinds of vehicles are subjected, requires that the foundation for the superstructure of the painting proper for all kinds of vehicles be they wagons, buggies, carriages, automobiles or railway cars, should receive the utmost care, for if this is not properly attended to, no amount of first class work done over it—*can possibly stand.*

50. It is usual to take the woodwork to the blacksmith shop to have all the iron parts put on before the same is primed. No matter how carefully this work of the fitting on of the iron is done, it will be found that the wood will be soiled by grease and other undesirable dirt, and it is principally for this reason that the ironing should be done before the priming in order to give one a chance to remove it before the priming is done.

51. To prepare the job for priming, good care must be had to clean it and about as good a way to do so as there is, will be to take some No. 1 sand paper and go over it carefully, being careful not to cut through or to remove any angular parts which are intended to show on the carriage parts. Should the job be soaked up with lard oil in spots, it will be necessary in order to insure perfect safety, to put some strong solution of sal soda or lye over it, let it stand half an hour, then wash it off carefully and rinse with clean water in order to remove all traces of the alcaline matter from the wood as it might otherwise injure the oil used in the priming.

52. The bodies should be carefully dusted and cleaned. They will not require as much sand papering as the carriage parts of the running gears, as there are much more numerous ironings on the latter, especially on the wheels and there is

but little need of the blacksmith soiling bodies with greasy marks at least.

53. There are a number of ways in use for priming carriage jobs, but the ordinary mortal had better beware of them. Many of them are so called "patent" and all of them supposed to hurry up the process of turning out a job quicker than the old fashioned method of "lead and oil," but the latter can always be depended upon to do the job while the others may or may not, with the chances usually being that they will not.

Lead assimilates unto itself a considerable quantity of linseed oil which it turns into a linoleate lead soap, and which makes an ideal primer, sinking into the pores and anchoring the whole of the priming coat securely by its numerous rootlets which are the result of the penetration of the oil into the pores. As linseed oil does not evaporate but on the contrary absorbs oxygen it swells slightly after it is applied

and thus completely fills up the openings, sealing them up effectually against any atmospheric action.

54. There is some difference in opinion as to what really is the best primer and as to the proper thinning of it. This no doubt, is mainly on account of the quicker drying of it. All are agreed, however, that white lead ground in oil is good. This sort of lead is best known to the carriage trade as "keg lead," to distinguish it from other forms of lead used, such as "dry lead"—"lead ground in japan or varnish" and "knifing lead," which is used in surfacing and which can be bought ready prepared for use or made up in the shop as desired.

The priming should not be very thick, just enough pigment to color up the oil to which may be added enough lamp black, to tinge it to a slate color. A little good drying japan may be added in damp non-drying weather, and when it is very cold

and the oil is any way sluggish, a small quantity of turpentine may be added. This will in no wise hurt it, as it will render the oil more penetrating and really a greater quantity of oil can thus be forced into the pores, than it would be possible under the unthinned condition—but this is true only in cold weather.

Some like to add a small quantity of good French ochre to the lead. This is all right enough if a silicate ochre is used, as that is of itself a good filler, as *silica* is the basis of nearly all the hardwood fillers. As much as one third of this kind of ochre can be used to good advantage with the white lead in preparing the primer for carriage painting.

The above will suffice in order to enable any one to prepare a good primer, and with the further advice of using only the raw linseed oil and under no conditions to be tempted to substitute boiled oil for this, the reader will now be ready to go on with

the application of the priming and lead coats, which follow in the next lesson.

QUESTIONS ON LESSON VIII.

49. What is required in preparing new woodwork for painting?

50. Should woodwork be ironed before painting?

51. How should woodwork be treated after the ironing?

52. How should ironed jobs be cleaned up?

53. What is the action of the priming coat?

54. What pigments and thinners are best used in priming?

LESSON IX.

THE PRIMING AND LEAD COATS.

55. The application of the priming coat requires really more care than skill. The job should be well cleaned and dusted, and

it is hardly necessary to caution against this operation being performed in a place where it is or is likely to be subjected to dust or dirt to fall upon it. The priming should be evenly given to all parts of the wood and should be well rubbed in, not only to the parts that are to be in sight, but to the undersides as well, in short to every part, in order to stop any atmospheric action upon the wood.

56. The lead coats as they are called, are the preparatory coats which are given to a job before the coloring coats for the carriage parts, or the rough stuffing preparatory to the coloring coats to be given to the bodies.

57. To the running gears, the lead coats should be properly called the "surfacing coats," as these are never rough stuffed, and the coloring coats are applied directly over them. The same may be said also of business wagons, panels, etc., which are also sufficiently well surfaced

by that operation of one of the lead coats called "knifed in" lead coat—of which more will be said further on.

58. Where the work is to be "rough stuffed" before receiving the coloring coats, the proper way to apply the "first" lead coat is to take keg lead and thin it with turpentine and raw linseed oil, "half of each." The above thinning produces an eggshell gloss, and while it is good—it is too slow to suit the average carriage shop now days, so to hurry it up and to produce a harder coating (less elastic), the quantity of linseed oil is reduced and that of turpentine enlarged, so that the drying will be quicker. This should be applied rather thickly, but should be well and very evenly brushed out.

59. The second lead coat is best known to the carriage painter as "flat lead," as it should contain but the least possible quantity of linseed oil in the thinner, and it should dry without lustre or gloss. A

large tablespoonful of linseed oil will be sufficient for a quart of mixture which is to be thinned with the turpentine sufficiently to be applied. Use only a camel's hair flat brush for this purpose, as a bristle brush will not lay it smoothly.

60. The *rub lead* coat. In the former directions given for first and second lead coats, the supposition is that the job is to be surfaced, levelled up, etc., by the rough stuffing process to be hereafter described, but for running gears and jobs which are not to be so prepared, there is no better way known, than to give them what is known to the trade as a "rub lead" coat. This may be prepared from a good "keg lead" especially ground and prepared for the carriage trade, or prepared from dry white lead thinned with ¾ linseed oil, ¼ turpentine, colored to a light slate color and run through a paint mill. The above is more applicable to the large shops than to the small ones, these will

find the former way better. The lead should not be too thin, but sufficiently to brush out fairly with a bristle brush. After it has been applied, it should be left to set for 15 minutes, then the operator should proceed to "rub" it in all over the work, with the palm of his hand. It requires a longer time to stand before coating over with a second lead coat, than with "first lead" as described before, but it is far better and produces a fine surface for second lead. This second flat lead should not be given before two full days after the application of the first.

61. Knifing in lead coat. This coat is used on carriage parts to the exclusion of the rough stuff coats used for the surfacing of bodies, and is also used for surfacing business wagons, etc. Color manufacturers prepare it so that it can be used by thinning only, but many of the large shops prepare it as wanted from dry white lead, 2 parts, and keg lead 1 part, thinned with

rubbing varnish and japan with a little turps. It will be well to add enough color to the knifing in lead toward the shade of the finishing color, in order that it may cover better over it. It may be applied with a bristle brush and afterwards the whole surface should be gone over with a wide putty knife, in order to force the knifing lead to all parts and to afterwards remove the surplus lead, leaving only that which is required to give a job the proper leveling of the surface. If the job has been properly done, there will be but little need for much sand papering in order to fit it for subsequent operations.

QUESTIONS ON LESSON IX.

55. How is the priming to be applied?

56. What is said of the lead coats in general?

57. What is the object of the application of the lead coats to the running gears?

58. How should the "first lead" coat be given?

59. How should "second lead" coat be prepared and applied?

60. What is the "rub coat" and its object?

61. What is the "knifing lead" coat and its object.

LESSON X.

PUTTYING AND PREPARING OF PUTTIES.

62. Putty and puttying plays a very important part in carriage painting, and as to whether it has been properly attended to and the right sort of putty used, will make or mar the looks of a job. The novice in carriage painting is very apt to slight this operation and to think that too much stress is given it, but there is not half enough given it in this manual intended for beginners, and if this unattractive part of the trade can be grafted

into the student, so that he will appreciate its importance, then the space given it will not have been wasted.

63. There is no one single sort of putty that can be said to be an all around putty, that can be used for all purposes for which putty is used. Each and every kind has a different function to fulfill, and must be prepared accordingly. There is one kind of putty which is in universal use and which comes nearer to filling the use of a general putty, the formula of which is given below and which is called formula No. 1, and to which reference will be made as putty No. 1.

64. Formula No. 1. Dry white lead—knead this with a thinner, composed of half rubbing varnish and half japan—to the proper consistency. This will come as near filling the purpose of a general putty, as it is possible for one to be made for such a purpose.

There are some who substitute keg lead

in various proportions in combination with the dry lead. A small percentage of it is no doubt good for several special purposes, but the formula given is as good as any.

65. Formula No. 2. Keg lead, 1 part; whiting, 2 parts; thinner to be composed of equal parts of varnish and raw linseed oil, mixed to a stiff paste for use. This putty is to be used on old jobs which are badly splintered and rough edged. It will dry tough and will not flake off. It cannot be sand papered, however.

66. Formula No. 3. For deep holes—whiting mixed with raw linseed oil and japan, equal parts. Then into this mixture, mix plush woof. Drive a small head tack or two in bottom of hole, and then fill in nearly level of the surface with this putty. Slash a couple of openings into it with putty knife to quicken the drying, and in due time level up with regular No.

1 putty—(From Hillick's Practical Carriage and Wagon Painting.)

67. Formula No. 4. Dry lead, 3 parts; plaster of Paris, 1 part; knead into proper consistency with equal parts of quick rubbing varnish and japan. This is intended for use upon shallow cavities. The combination dries hard and quick. It will be found valuable in repair shops.

68. Formula No. 5. Finely ground pumice stone, 3 parts; dry lead, 1 part; mix to a working condition in thick glue. Apply the putty so that it will show some above the surface. After 10 hours, rub down with lump pumice stone and raw linseed oil. The above is made especially for filling expansive shallow dents upon a carriage surface—(From Hillick's Practical Carriage and Wagon Painting, also the following:)

69. Formula No. 6. Dry white lead, 2/3; keg lead, 1/3; rubbing varnish and

japan equal parts; mix, and into this mix the woof or fine pickings of velvet or plush.

The above putty is especially intended to be used around glass in heavy carriages.

QUESTIONS ON LESSON X.

62. What is said of puttying in general?
63. What about the several kinds of putty?
64. What is putty No. 1?
65. What is putty No. 2?
66. What is putty No. 3?
67. What is putty No. 4?
68. What is putty No. 5?
69. What is putty No. 6?

LESSON XI.

PUTTYING AND SANDPAPERING.

70. In the previous lesson, formulas were given for the preparing of various kinds of putty used in carriage painting, but nothing was said concerning their ap-

plication. In the following paragraphs are given a few directions which will be found useful for the purpose, and which if followed up, will make for good work in that line.

There are few operations in the carriage painting trade which require more care, and, where the lack of it is more likely to produce mortification to the feelings of one who has neglected to properly perform his work.

71. The following four reasons given by Hillick, are so well calculated to give the reader the "pith" of good advice in puttying that the same is copied verbatim:

1. Never putty on the priming coat.

2. Putty all work as smooth as possible. It is economy, and increases the chances of doing and producing first class work.

3. Always avoid puttying a crevice, depression or cavity in the wood, or a joint between two pieces of wood that is subject

to diverse forms of resistance. The wrenching and twisting of the vehicle will loosen the putty and eventually eject it.

4. In puttying over nails, plugs, etc., press the pigment firmly into the hole, filling just level with the surface and carefully slick up all surplus putty.

The above if followed up, will not lead the novice astray. To the four rules given, may be added a caution to the beginner not to overdo his work by leaving a hill where none is wanted. Do not use more putty than "*just enough,*" but not too little. There is but one time to do it right.

72. *Sandpapering,* means a great deal in carriage painting. It is required at every step and after every coating, in fact even previous to any coating at all, befor the priming coat is applied. It is a pity that it is so but it can't be helped. The dirt and dust resultance from its use could very well be spared, but the leveling up due to its careful use is one of the

sine qua non, to which is due the fine finished mirror-like appearance of the job, and the dirt produced by its use, must of course be looked upon as the thorns in the rose bush and removed, or neutralized as best it can.

73. For the smoothing up of the woodwork and afterwards of the priming coat, No. 1 sandpaper is the proper size. The lead coats require ½ sandpaper, especially for first lead. The second, or dead lead, requires 0 sandpaper. One should be very careful not to cut through on first lead, and while the rubbing must not cut to the bare—it must be gone all over the work, but carefully. The second lead coat will only need a light going over, especially, if it has been put on with a camel's hair brush carefully.

What has been said regarding first lead and second lead coats, will apply to rub lead, and knifing lead coats as to the proper size of sandpaper, but in some cases a

size larger may have to be used; it will all depend upon the condition of the work.

74. Mouldings, sharp edges, etc., require the same careful going over as stated above, and some more besides, as it is very easy to cut through them to the bare wood, a thing which must not be permitted. While nothing has been said heretofore, as to the proper time to dust, this is very important and should never be omitted after each sandpapering. It is of the first importance and to be carefully attended to and to make doubly sure, had better be gone over again just previous to the next coating.

QUESTIONS ON LESSONS XI.

70. What is said concerning the application of putty?

71. Name over the four rules given for good puttying.

72. What is said about sandpapering in a general way?

73. What sizes of sandpaper are best to be used over the various coatings?

74. How should sandpapering be done over mouldings and sharp edges?

LESSON XII.

ROUGH STUFFING.

75. *Rough stuff* hardly indicates its real character by the name it carries. While of course some of the material it is composed of may be rough, yet its manipulation and application requires anything but slovenliness or carelessness. On the contrary, very much care must be exercised at every stage of the operations necessary to conduct it to a successful termination. When the object of rough stuffing is stated, the student cannot but see that, unless it is well performed, its usefulness for the purpose will be defeated, i. e., that of perfectly leveling up of the surface. The giving it that hard mirror-like face upon which to color and

finish the job by varnishing. If this perfect smoothness is not produced by this rough stuffing application, it will not be produced later by any subsequent application, of either paint or varnish.

76. There are a number of substances which are used to good advantage in the preparation of rough stuff—they are mostly earth colors, or substances of rather coarse atomic formation, which contain more or less silica in their composition, nearly all are the better for being compounded with white lead.

The thinner used is usually rubbing varnish and japan. Turpentine being used to thin the mixture to the proper working consistency.

77. The following formulas for preparing rough stuff, are taken from Hillick's. There is a good variety of them, and the directions following each will give the student a good knowledge of their various peculiarities.

Formula No. 1. "To 3 lbs. of any American filler, add 1 lb. of keg lead. Beat well together; then reduce to a thick paste with rubbing varnish and japan; after which reduce to a working consistency with turps. This is a safe one coat per day stuff."

78. Formula No. 2. "Equal parts of filler (except English), and keg lead, by weight, reduced to a heavy paste in quick rubbing varnish and japan, and then cut to the proper working consistency by turpentine. Two coats per day may be safely applied with this stuff."

79. Formula No. 3. "5 lbs. of filler (still excepting English filler); 2½ lbs. keg lead; 1/3 elastic rubbing varnish; 2/3 japan. This is a stuff for heavy coach work. Apply a coat every 72 hours. Do not rub out under 3 weeks."

80. Formula No. 4. "(A London formula), dry white lead ground stiff in turpentine, 1½ lbs.; ochre or English filling, ground stiff in turpentine, 4 lbs.; mix the

two and add keg lead, ½ lb.; add 1 pint of japan gold size, and about ½ pint of the bottoms of wearing varnish. Reduce this with a little turpentine if necessary. This is a very durable and elastic stuff."

81. Formula No. 5. "(M. Arlot's formula). Grind separately, dry white lead with spirits of turpentine and do the same with unwashed yellow ochre; then mix the two pastes in the proportion of ¾ of white lead and ¼ of ochre. Allow the mixture to be exposed to the air, or to a gentle heat, in order to evaporate the excess of liquid, and add gradually small portions of good drying oil, taking care to stir and beat the mixture well with a brush, as in distemper painting. The paste thus acquires more body. Concerning this stuff the author adds: It is possible with this composition to give 3 coats in one day's work, but after the last coat, we must wait 48 hours for drying."

82. Formula No. 6. "English filler,

3 lbs.; keg lead, 1 lb; rubbing varnish ½; japan, ½; mix to a stiff paste. Thin to a working consistency with turpentine."

83. Formula No. 7. "English filler mixed with rubbing varnish, ½; japan, ½; thinned with turpentine. Probably English filler has but few if any equals, and certainly no superior, as a rough stuff pigment. It polishes down very closely and compact as to texture, giving a glass-like non-porous surface. It requires less lead than other fillers, because of which property it was specially mentioned as excluded from formulas 2 and 3. It does not surface down as easily as some of the American fillers do, a fact which has probably limited its use largely."

The above give all the varieties needed from the quick and hard to the slow and elastic, and will fill all the needs of the trade.

QUESTIONS ON LESSON XII.

75. What is rough stuff?

76. What material is used in preparing rough stuff?

77. What is the composition of formula No. 1?

78. What is the composition of formula No. 2?

79. What is the composition of formula No. 3?

80. What is the composition of formula No. 4?

81. What is the composition of formula No. 5?

82. What is the composition of formula No. 6?

83. What is the composition of formula No. 7?

LESSON XIII.

HOW TO DO THE ROUGH STUFFING.

84. Many have an idea that it does not matter so much about what kind of a tool

a person may use in applying the rough stuff, as it has to be rubbed down and leveled up, any way. There could not be a greater mistake made in this regard. The smoother and the more even the rough stuff is applied, the greater is the chance of turning out a first class level surface, with the least number of coats and the less rubbing. Therefore, a good springy, nearly new bristle brush will be much better than a worn out one which will make brush mark ridges in applying it.

85. In applying it to the work, care must be given that it be evenly applied with as little waste of time as possible, as all quick setting colors can be worked level only before they commence setting, therefore there will be no time to commence a long winded tale, nor stop to listen to one, but from the time the application is commenced until completed, every brushful must go on without unnecessary intermission to the termination of it. Each

coat should be laid off in a different direction from the one preceding it. If it has been laid off the long way, then the next one should be laid off cross ways to it.

86. Unusually four coats of rough stuff will be found sufficient to rub, but while the coats should be applied a little heavier than ordinary paint coats usually are, yet they should in no wise be so heavy as to make their even application an impossibility, and it will be best to give the job an extra coat of rough stuff if it is needed, than to risk putting it on too heavy

87. The rub coat is a thin coat of rough stuff coats in order to act as a guide-rest of it. It is applied over the other rough stuff coats in order to act as a guide coat for the rubbing. Being of a different color it serves to indicate to the rubber that he has cut through, to the real rough stuff under it. It is by no means an indication that the work is perfectly leveled,

however, but of this the next paragraph will give more details.

88. For rubbing down the rough stuff, provide some good pumice stone blocks or some of the made up grit German rubbing blocks, some good chamois' skins and sheep's wool, sponges, with plenty of clean water in clean vessels. While the German blocks may do, the natural pumice stone makes the most trustworthy blocks for fine work. The lightest in weight for their size are the best. They should be sawed across the face and filed level, and occasionally receive a dressing in order to maintain them level.

89. Rubbing rough stuff requires care, and to a certain extent skill. The surface to be rubbed should be kept wet, but not unduly so. The motion of the hand should be forward and backward, never in a circular, uneven stroke. If the surface of the panel is bordered by a moulding, the edges joining the moulding should be done

first, in order to avoid coming in contact with them if done at full length strokes, which would be likely to knock against them and mar them or break the stone, which will make grit and dirt hard to clean up.

The novice can tell when the stone is cutting just right, by the way it adheres to the surface, and if the least atom of dirt gets in between the stone and the surface being rubbed, he can tell in a moment that there is something wrong. The stone at times accumulates gumminess, which prevents its even cutting, it should be looked after often, and cleaned in order to have it always in good condition.

90. After the rubbing has been done satisfactorily, it should be carefully washed off and afterward dried with the chamois skin.

QUESTIONS ON LESSON XIII.

84. What tools are required to apply the rough stuff?

85. How is the rough stuff applied?

86. How many coats of rough stuff are usually needed?

87. What is the "rub coat?"

88. What material is required for rubbing rough stuff?

89. How is the rubbing done?

90. How should the rough stuff be afterward cleaned up?

LESSON XIV.

THE COLOR COATS.

91. The coloring of a job after it is out of rough stuff, as it is called after it has been rubbed and cleaned, is a matter which to a certain extent is governed by fashions and fads, and also by the kind of vehicles and the use they are intended for. The

subject matter of this manual covers everything in the vehicle line of painting, from an ordinary delivery wagon, on through all kinds of pleasure vehicles, automobiles, to the finest of passenger cars. So not a single one of the pigments in use by decorators and artists, but are drawn upon for some of the work turned out by the carriage painter; more than that there are a number of colors which are used exclusively by him. These of course are mainly proprietary colors—but they are seldom if ever used by other painters.

92. Each color requires a different treatment, usually from any of the others, or at least has some peculiarities which require that it should receive a special treatment, therefore the colors of each group will be reviewed under their various grouping, and where any of them have peculiarities requiring explanations, these will be given under such headings.

93. As frequently even a difference has to be made in the manner of applying the various colors, the proper way of doing this will also be noted in the reviewing of the various colors in a group.

THE BLACK.

94. The Black group is one of the most useful of all to the carriage trades, either by the use of its self color, or in the use made of it in combination with other colors to produce dark tints, etc. The black group gives more uniformity in the various uses made of its several members, than any of the other groups, and the manner of applying the color coats is nearly uniform for all of them.

95. The directions given below for applying colors of the black group will also apply to most of the other groups, which are of an opaque, or at least of a semi-opaque nature. The pigments of the black group which are used in the finishing color

are not of the most opaque sorts. The best of them, the Ivory or Coach blacks are really only semi-opaque, so that an extra good covering is anything but an indication of good quality, but rather that the color has been doctored up with carbon black.

Therefore if one coat of color cannot be made to cover as perfectly as desired, then two coats should be given. Never try to force the covering of a semi-transparent color by giving an extra heavy coat, it will be impossible to brush it out free of brush marks. Let the color be thinned sufficiently to brush out smoothly.

The colors should always be ground in japan, and thinned with turpentine, with the addition of sufficient varnish to bind it so that it will dry out soft and velvety. The only brush to lay color is a camel's hair flat brush.

The above directions are given for new work. It is the practice now, however, to

give the color coats in color and varnish, as it is much safer and less troublesome.

QUESTIONS ON LESSON XIV.

91. What is said of the color coats?

92. Why have the painting explanations been grouped according to the color groups?

93. Are all colors applied alike in carriage painting?

94. What is said of the black group of colors in a general way?

95. How should the colors of the black group be applied?

LESSON XV.

THE BROWN GROUP.

96. The Browns are used mainly in wagon painting, but occasinally some people even desire it used on vehicles, and especially so in automobiles. Most of the browns are easy colors to handle. Some

require a ground color, then color as noted in the blacks, followed with color and varnish of which nothing is said in that group. This coat is mixed with varnish and turpentine and should show up quite glossy after drying. It holds up well and makes a good lasting job.

97. All the transparent browns including the Van Dyke browns are better for having a ground coat prepared and applied for them. A preparatory coat prepared from coach black, chrome yellow and red, will make a very good imitation of it, or any of the Vienna umber browns, and when glazed over with the colors themselves, produce nice effects, and can also be given with one coat of color, followed by one coat of color and varnish.

98. Vienna brown is greatly used in the painting of carriage bodies and automobiles, it requires a ground color of deep Indian red, then paint over it one coat color, and one coat color and varnish.

99. London smoke is a dull brown chiefly used in solid one-coat work, as it covers very well and will look solid, unless the thinning is greatly overdone. It is mainly used on running gears.

THE BLUE GROUP.

100. The ultramarine blues are the principal ones used in the work of the carriage painter. It gives most beautiful effects and certainly is very pleasing to the eye. The best results from their use are obtained by preparing ground for them, and using the ultramarine blues as a glaze over these grounds in color and varnish, as all glazing colors should be given and applied with an inch and a half badger color brush. All manufacturers prepare grounds for their ultramarine blue, and these come in three shades, pale, medium and deep.

101. There is often a necessity for the carriage painter to prepare his own grounds. These are made up from Prussian

blue and a good white lead ground in japan, or from keg lead from which the oil has been extracted by stirring up with turpentine, letting it settle and pouring out the liquid. A most thorough and intimate mixing must be made of it, or it will show up streaky, or specky. The above advice will apply to all compounded colors. It is very much harder to combine all parts of color together into a homogeneous mass than it looks to be, and the manufacturer is much better prepared to do this properly then the painter is. It is true that some are careless in this regard too, but they have a reputation made or lost among carriage painters and manufacturers, who have worked up a good trade in this branch of their business are not very likely to lose it by imperfectly combined mixtures.

102. Beautiful effects in glazing with ultramarine blue result from glazing over a coat of very deep green. The results of such a combination are always pleas-

ing. The glaze colors should be mixed with elastic rubbing varnish, and put on flowing. Of course ultramarine can be procured, that is sufficiently opaque to cover solidly in one coat, but no such delicate and rich, aristocratic tones can be obtained from it, as by preparing grounds first and glazing over them afterwards.

QUESTIONS ON LESSON XV.

96. What is said about the application of the color coats for the several groups?

97. How should Van Dyke brown and other semi-transparent browns be used?

98. How should the grounds be prepared for Vienna browns?

99. What use is London smoke made of in carriage painting?

100. What is said of the blue group in a general way?

101. How are grounds for ultramarine prepared and painted over?

102. What effects are produced from glazing ultramarine over green grounds?

LESSON XVI.

THE GREEN GROUP.

103. The greens which are mostly used in carriage and wagon painting, either for solid painting, or as grounds for other green used over them as a glazing color are *Chrome greens* and these are compounded of Prussian Blue and Chrome Yellow. It is a very hard matter to keep them intimately mixed, and in spite of all that can be done, *they do* separate with the consequent results that they give either a cloudy or a streaky finish, unless great care is exercised during their application.

104. There is no way known, which will prevent this separation except constant stirring, and this is the only remedy. Be at it every time you use a brushful of the mixture. If this is properly attended to,

there will be little trouble; if not, the trouble is sure to come. This applies not only to the greens that may be compounded in the shop from chrome yellow and Prussian blue, but fully as much to those already prepared by the manufacturers, as these two colors composing it are compounded, but do not unite together. The blue being much lighter in weight than the yellow, it will usually separate and rise to the top.

105. All the other compounded colors from greens, such as the Merrimac, Quaker, Brewster, Bottle and especially the Olives, require great care in their handling and manipulation, not only as regards their settlings, but also in their application. They should never be cross-brushed, as it will surely bring out differences of color and streaks. It is much safer to use the greens as flat colors. They cover well and two coats will always cover solidly.

106. Green ultramarine, Paris green

and Verdigris, are all transparent greens, which are very useful in glazing. Many proprietary green carriage colors of coal tar extraction, both opaque and transparent, are being introduced from time to time. It is hoped that a perfect substitute for Paris green which may be non-poisonous may be found.

THE REDS.

107. The reds are widely used by the carriage painter for a multitude of widely different work, according to the shades of it, which vary from the glaring scarlet to the subdued magentas and warm shades of red browns. The reds are derived from widely different sources, and what might be said of one, and of the proper way of treatment for it, might be altogether misleading when applied to another and so on. So nearly every red will need to be treated according to their individual requirements.

108. The vermilions have a wide range from light scarlet to magenta, and according as the genuine English, so called, or the numerous imitations of it under hundreds of proprietary names are used, the work will need to be done differently. The imitation vermilions usually cover very well, and need no special ground, although some are the better for a pink ground, made of Venetian red and lead, and applied as a color ground for them. In fact no error can be made in using it as such for all imitation reds.

109. English vermilion requires such a ground always—the peach blossom pink is the best and it should dry with an egg-shell gloss, as it will prevent any sinking in of the vermilion. The first coat of vermilion should have considerable gloss too, and the last should be color and varnish, carrying a decided gloss. Japan should never be used in connection with quicksilver vermilion and it is needless to say,

that linseed oil never should, as it will darken it and destroy its brilliancy of tone.

QUESTIONS ON LESSON XVI.

103. What is said of the green group of color in general?

104. How are green colors to be kept from separating?

105. How should green colors be applied?

106. What green colors are mainly used for glazing?

107. What is said of the red pigments in a general way?

108. What is said about the application of the imitation vermilions?

109. How should English Vermilion be applied?

LESSON XVII.

RED GROUP CONTINUED.

110. Some beautiful effects are produced by glazing English Vermilions with

carmine. It is a job that but few who know how can tackle, without fear and trembling. In order to give the student the best there is in the way of a description as to how it should be done, the following which is extracted from Hillick's book will be found as good, and more easily understood than any that could be desired.

111. "For warmth and brilliancy of color effects, carmine among a long list of gorgeous reds is without a rival. Carmine is a glaze color exclusively, and the splendor of its radiance is governed exclusively by the ground color. Carmine, along with its near relatives of the red order, has a decided tendency to face, flake and chip off. The ground color, therefore, must in addition to being faultless in color, density and surface features, be possessed of great enduring qualities. It must be accepted as a rule worthy of practice, that the ground colors for the general order of reds, should be mixed with a binder of

varnish sufficiently strong to impart to them when dry, at least a faint gloss—an eggshell gloss. A ground so prepared is fortified to counteract the fading and flaking properties of such of the red,s as are used as glaze colors."

112. "To secure a first class job of light carmine, bring the surface level and smooth, and then apply a coat of peach blow color, made of white and some of the ordinary reds. Over this apply a coat of deep English Vermilion, using the Vermilion stoutly, charged with rubbing varnish. Polish this coat when dry with curled hair, and apply a second coat of the Vermilion, adding a sufficiency of varnish to convert the mixture to the color and varnish class. At the proper time this coat should preferably be rubbed lightly with pumice stone and water. Next apply a coat of clear rubbing varnish, which in in due time also demands rubbing with pumice stone and water. Then to rubbing

varnish, elastic or quick, hard drying, as the size of the surface may dictate, add enough No. 40 carmine to fully stain the liquid, say ¾ of an ounce to one full pint of varnish (many first class painters use ½ an ounce of carmine to one pint of varnish), and apply to the surface, be it body or gear with a soft badger or bristle brush, For a less expensive job omit the coat of clear rubbing varnish and apply the carmine directly to the vermilion."

113. "A method easier to carry into execution in painting a carmine job, consists in adding a little carmine to the last coat of vermilion color and varnish. This coat is rubbed with curled hair, then carmine is added to varnish, as in the first method, after which a *small* quantity of vermilion is put in to give the mixture opacity or covering power. Clouding and such other incidental imperfections to be considered in connection with the work of one not really an expert in the manipula-

tion of glaze colors is thereby avoided. For a darker carmine use a ground of flamingo red, carmine red (a solid color), road cart red, kalliston red, or permanent scarlet dark shade, the latter requiring a light vermilion ground.

114. "In applying carmine to wheels it is advisable to flow the whole wheel at once instead of doing them in sections, as by this practice, a cleaner, clearer and more satisfactory job is secured. For the gear do the whole of one end of it, before wiping up, and then the final end, finishing with the reach and sidebars. To obtain the real purple and fine linen of carmine effects, the color and varnish requires to be flowed on freely and quickly, and promptly slicked up. Pottering and sectional patching up invite inferior results."

The above gives in a nutshell what is considered the most difficult of all color laying by the carriage trade. It gives the best way and also the next best to it, which

is very good, but cannot turn out such work as only the first will.

QUESTIONS ON LESSON XVII.

110. What is said of Carmine glaze over English Vermilion?

111. How should the grounds be prepared for Carmine glaze?

112. Give further descriptions of it?

113. Is there not an easier method of doing Carmine glaze?

114. Which is the best method of applying Carmine glaze to wheels and running gears?

LESSON XVIII.

REDS CONTINUED AND YELLOWS.

115. There are a number of various reds mostly of coal tar origin, some of which made from paralin and madder lake are nearly permanent; others again made from cheaper aniline colors are more or

less fugitive. As all are improved in tone by the use of ground colors, and as the manufacturers usually prepare the ground color to go with their highly seasoned named goods such as Oriental red, Ottoman, Flamingo, etc., etc.; each manufacturer with a long list of proprietary names; it will be well to use such grounds according to directions, and it will be found that nearly the whole list will require over the proper ground, a color coat plus a color and varnish coat over it; in no case should the finishing coat be a dead one.

116. The dark solid iron reds such as Indian, Tuscan, etc., come usually in two shades, pale and dark. They are seldom used by themselves but usually as grounds for some of the lakes, or as grounds for the so-called wine colors. The manufacturers also furnish the ground colors ready prepared to suit the shades of wine colors they send out, better results will be obtained in the long run by using

the grounds which are especially prepared for them. They should be finished up in color and varnish as related in the preceeding paragraph.

117. The Red and Red Brown Lakes form an important item of the carriage painter's stock of red pigments. All colors designated as *Lakes* are used only as glazing colors to enrich the ground or solid colors over which they are placed. Many of them that were considered indispensable a generation ago and which are yet used to some extent are anything but permanent, and why they are used at all is a mystery. There are so many of the lakes now to be had that are, or may be designated as permanent, being made from alizarin from which is derived madder lake that there is no excuse for using the undependable sorts. All should be used with considerable varnish as noted in paragraph 115. Under the "Pure Food" law if they are made from Alizarin, or contain

the equivalent of madder lake that they should, the label will tell of it and no one need err in buying them blindly. Most of them carry some proprietary name, many going under different names that are identical, when made by different firms. The mostly used ones are Munich lake, maroon lake, carmine lake, carriage part lake, Chatenne or Cramoisi lake, etc.; the list might be indefinitely enlarged without adding much to it but names however.

THE YELLOWS.

118. Are much employed in the painting of running gears of vehicles, and in automobile and wagon painting are used for bodies as well. They are pleasing as well as showy, if well balanced up with some complementary and harmonious colors. They require a somewhat different handling all the way through the job in order to obtain the best results from them.

119. The yellow pigments no matter of

what tone they may be should be placed over a white lead base, and the running gear should be painted with keg lead thinned half linseed oil, half turpentine and with a tablespoonful of good drying japan to the pint of color mixture. The first coat of it over priming should be sandpapered with No. 1 paper, puttied over with white putty. The putty should be so carefully well done as to need no sandpapering. A second coat of the same lead, but carrying a trifle more linseed oil should be given but applied with a camel's hair brush, so as to lay the color smooth enough to not need sanding. Over this finish up with a color coat of the yellow, and another of color and varnish.

120. For wagons usually the same treatment is to follow for bodies, but if a fine job is wanted and these were rough stuffed then wash off the oil from keg lead with turpentine or benzine, and bind the lead in rubbing varnish and apply two coats of

the white with a camel's hair brush. Polish after each coat with clean curled hair. Then put on two coats of the yellow color, the last being color and varnish. Arlot the Parisian author and a recognized authority in coach painting, says that this underpinning with white prevents the fading of the yellows from showing, and Hillick endorses it for doing the same thing here, and hundreds of others not so well known but who are entitled to consideration do the same, so it must be O. K.

QUESTIONS ON LESSON XVIII.

115. What is said about the use of the proprietary reds in carriage painting?

116. What is said about the use of the dark reds, Indian, Tuscan and wine colors?

117. What are the various red and brown lakes and how should they be treated?

118. What is said of the yellow group of pigments in a general way?

119. How should the yellow pigments be applied to the running gears?

120. How should they be applied to the bodies of carriages and wagons?

LESSON XIX.

THE WHITES.

121. This will end up the color coats on the list, and while it comes last is by no means the least important. It is used in the painting of all kinds of business wagons, and for all kinds of uses including milk wagons which are usually painted white. Busses, hearses for children, all must be painted white, and white will be the foundation upon which some very showy business wagon ornamentation and lettering will be done.

122. This lesson is entitled the whites, a plural designation which may be misleading, as some may suppose that any and all whites may, or can be used in carriage

painting. The plural in this case must apply to white lead or to the many makes of it including the flake, whites, kremitz and Florence white, all of them white lead pure and simple. Zinc white however useful it may be in other lines of painting should never be used in carriage work. As adjuncts in preparing some special mixtures a little whiting or carbonate of lime is made use of—but not as a coloring agent—on the contrary. Its use is simply a mechanical one.

123. The process of progression of the painting of a white job is somewhat similar to that described in the previous lesson for yellow—only more so. The job should be more thoroughly well cleaned of all spots and stains before the priming begins, than for the other colors. When it has been properly cleaned, proceed to give it a coat of raw linseed oil, well and uniformly brushed in. When dry sandpaper it also uniformly alike. Then pro-

ceed to put on a coat of what may be termed second priming of keg lead thinned with 3/8 linseed oil to 5/8 turpentine with a teaspoonful of light japan to a quart of the primer.

124. The puttying should be put on over this first coat of white. The putty should be made from white lead, dry and pale rubbing varnish 1 part and gold size japan 2 parts. This putty for stopping holes may be used considerably stiffer than for general puttying. For glazing it must be reduced to the proper consistency of thinness with turpentine.

125. A second coat of what may be called the priming white coat very similar to the first and thinned with $\frac{3}{16}$ of raw linseed oil to $\frac{13}{16}$ of turpentine should now be given the job, after the putty has been properly sandpapered and dusted.

126. For most purposes the job can be surfaced, and the coloring carried along without the special rough stuffing de-

scribed heretofore, although on the very best work it is still followed, but the following system will give nearly as good results: mix flake white or any other special white lead of great body and good color, bind it with hard drying finishing varnish, thinning it with turpentine to reduce it to a good brushing consistency, applying two coats of it with care in order to have no brush marks showing. After this give a coat of hard drying finishing varnish to which has been added sufficient white lead to kill the yellow of the varnish. This coat should be flowed on full. When dry it should be rubbed with pumice stone and water, and after cleaning give another coat of color and varnish which should also be rubbed and cleaned as the other, and another coat of color and varnish applied. This is usually enough to produce a smooth, solid, clean surface of good lustre. If it is desired to stripe, letter or ornament

over this it can be done, and pencil varnished over such.

127. Where gold or any other leaf gilding is to be done, the finishing coat should be flat or very nearly so, as otherwise it will be next to impossible to prevent the leaf adhering to the varnished surface. It will be better to let the gloss coat remain until it has had time to dry hard, not less than a week to 10 days, then rub with pumice and water, then ornament over that and polish when dry with rotten stone and sweet oil. For cleaning up the oil, dust some wheat flour over it and clean up with a soft duster, wiping off with silk cloth.

QUESTIONS ON LESSON XIX.

121. What is said of the whites in general?

122. What are the white pigments useful in carriage painting?

123. How should the priming be done on a white job?

124. How is the putty made and applied?

125. What is said of second coat lead priming?

126. How is a white job colored and finished without rough stuff?

127. How is the ornamenting done on a white job?

LESSON XX.

THE ORNAMENTING.

128. Many vehicles are finished plain without any kind of ornaments, but many again are striped and otherwise ornamented and business wagons sometimes very highly so and are lettered, also serving as an ambulant advertisement to the firm in whose service they are employed and no doubt many times paying for them selves in effective and far reaching adver-

tising. There is no doubt now in the mind of advertisers that money expended on good wagon advertising pays better than in any other advertising agency, as it forces itself upon all classes of people if it has been well done and frequently upon many who would never look at newspaper advertising.

129. It is usual to go ahead and varnish and finish a job with varnish before the ornamentation takes place, and it may seem strange that the details are here given ahead of time as it were before the finishing process has taken place. It really matters little about that when it is understood before hand. The reason why it is here given is that it is frequently the case that when jobs that are simply ornamented with striping which are not seriously dulled by the varnishing may be striped and ornamented at this stage of the finish, and the final coat of varnish given over it. It matters but little really

as to when the details are given and the operation can be delayed until after the final varnishing has been given.

STRIPING.

130. The striping is the main ornamentation given all vehicles that are ornamented at all and frequently consists exclusively of that. It is really the most difficult of all the rest, for if it is not well done it will show at a glance by the unevenness of its lines, while mere ornaments may look fairly well even when the lines are not all perfectly true. It is therefore of the greatest importance that the operator should have had some practice in order that he may have enough confidence to enable him to produce perfect lines. This confidence can only be acquired by practice, and while not very difficult, no one ever drops into it without practice, and some require lots of it before they can trust themselves to do it right. To the experienced

it is as easy as falling off a log, as the saying is, and some of these frequently do excellent work when they could hardly walk straight from intoxication, but then they are *experienced,* and it has become second nature to them to make perfect straight lines of any widths.

131. Fig. No. 9 gives the usual shape of striping brushes. For the lighter weight colors camel's hair will be found the best for use, and for the heavy colors such as flake white and English vermilion the sable and ox hair stripers of the same shape will be found better as they will not sag under the weight as readily as the others. Fig. No. 12 gives the shape of the so called sword or dagger striper for making fine lines with. Many prefer to make them themselves from the larger sized striping brushes which they break open and graduate to suit themselves, placing the hair into a red cedar stick which is split in the center and which when properly filled is tied

around above the split, and a handle is whittled from above the tie.

132. The material used for striping may cover the whole field of color, but in actual practice the colors are not numerous for the reason that but few are sufficiently opaque as to make it possible to make a good stripe with one coat. White lead or rather flake white on extra good bodied white lead and the chrome yellows, are excellent bodied colors and also pale English vermilion. The above colors for striping over black will cover in one coat. For striping over lighter colors however a much larger number of fairly well bodied pigments can be used which would be unavailable over a very dark ground.

133. The thinners have a great deal to do as to the proper working of the colors in striping. Each color really requires a somewhat different manner of thining. Linseed oil is not the best medium to thin striping colors with as the flow will be

rather uneven and while it will not be possible to present an absolutely perfect remedy a mixture of varnish, japan and turpentine in various proportions to suit the colors being used will in a great degree help out. When oil has to be used with some colors always mix it with quick rubbing varnish.

QUESTIONS ON LESSON XX.

128. What is said concerning the ornamentation of vehicles?

129. What reason is given for presenting the subject of ornamentation before the final varnishing.

130. What is said of striping in a general way?

131. What tools are required for striping?

132. What material is used and how should it be mixed?

133. How should the colors be mixed for striping?

LESSON XXI.

ORNAMENTING CONTINUED.

134. The striper is now ready with pencil, material and with a few previous trials it is hoped with sufficient experience to go ahead and try his luck. He will be called upon to make the following named stripes:

1. Hair line—the finest made.
2. Fine line—the next finest.
3. Stout line—a medium fine line.
4. Round line—nearly double the size of 3.
5. Narrow stripe—nearly double the size of 4.
6. Heavy stripe—nearly double the size of 5.

After that the striping may be called by the actual width it occupies in ½, ⅝, ¾ or 1 inch as the case may be. The extra wide stripes cannot usually be made at one stroke, so that the two outer edges are made, and the center may take care of it-

self and if need be can be filled up afterward solidly.

135. In the larger wagons many fanciful lines are made—some consisting of double lines of equal widths, others again of a heavy center stripe bordered with two fine lines or that order reversed, a fine line in the center with a flanking of two heavy lines and any number of other combinations.

136. Wagons are usually ornamented with fine lines of striping made up into all sorts of fanciful designs with here and there an addition of free-hand lines interspaced with said short stripe work. This is much used on springs and corners of small panels, etc.

137. Scrolls are also largely used in large wagons and omnibus work. The space that this manual can devote to the subject of ornamentation will hardly suffice to much more than mention it. The reader and student must take up some

good book on decoration and on scrolling, and must expect to devote considerable time to study and practice before he can expect to become good or even passable at this work. Many very good carriage painters never attain to any great degree of skill in ornamenting outside of being able to do some good striping, and it is not given to every one to become such—but it is anything but impossible to the one who will try, and is willing to give the proper time to the study.

138. For this reason and also because it is possible to do ornamenting much quicker by the use of what is known as "Transfer paper" a great deal of this work is seldom done by hand at the present time, as it can be bought ready made much better than the average workman can do it, at much less figures—and any one can put them on. They come in gold and color and in an endless variety of subjects, including some of the largest sized

gold shaded scrolls, down to the finest of heraldic ornaments, gold corners, breaks and even lines and lettering. These ornaments are printed upon a paper which has been sized with a preparation that swells and slips off when it has been wetted on the back. The places on the job which they are to occupy must be carefully marked out, and the transfer which has been traced over with varnish should be applied and held tightly against it and well smoothed out, then dampened on the back with clean water and a sponge, when in a few minutes the paper will slip out and leave the printed design upon the vehicle. It will remind the average workman of his boyhood days when he used to dally with decalcomanie designs as they were then called.

By the help of these transfers the average workmen, especially those working in country repair shops need not be afraid to tackle any kind of ornamental work, and by aid of catalogues of firms handling

carriage-transfers he will be able to tell in a few minutes just exactly how much the ornamentation will cost—which would hardly be possible except in shops where the original building of such vehicles is made a specialty of.

QUESTIONS ON LESSON XXI.

134. What are the various stripes named?

135. What is said about the combination of stripes?

136. Where are the combinations of stripes and free hand ornaments principally used?

137. What is said of scrolls and other ornaments?

138. What use is made of transfer ornaments on carriage and wagon work?

LESSON XXII.

LETTERING ON WAGONS.

139. Lettering may well be reckoned as a part of the embellishment or ornamentation of a vehicle. Either in plain colors surrounded by a becoming color setting, or done in colors plain or shaded there is much room for artistic display, not only in the execution of the lettering itself but in the proper selections of the colors used in doing the work.

140. All that has been said as to colors and the mixing of them is applicable to "lettering" as well as to striping and other ornamentation with the exception that the brushes of course will be lettering brushes of the kind and shape suitable for the same kind of work anywhere else, as there is no difference in the execution of the same—only that a little more pains must be exercised in order that it may be done with absolute cleanness.

141. Some styles of lettering look good on wagon painting, others again do not. It is possible to use styles of lettering upon a sign which is stationary, that can be read readily by a person who is walking towards it, or past it, which if placed upon a wagon passing him on the run perhaps would appear illegible to him. Therefore many of the ornamental alphabets which are crowded into the inside of the various books on lettering are totally unsuited for wagon lettering. Plain block, either capitals, or lower case or the same shaded, look best. Even the Romans which are so elegant in form do not do well unless given a much heavier thin stem than usual.

142. Gold work is always in good taste and looks well with any of the dark colors, and even with whites and other light tints when edged up with some darker color to enhance the contrast between them and the ground color. It will be unnecessary to go into details as to how to gild properly,

as there is not enough space to do so, neither to give an extended lesson as to how to do the lettering. Excellent books upon the subject are being published and one of them "Atkinson's" with "questions" which makes it a valuable aid to students, or for use as a book of reference, and the student who desires to learn this branch of trade and which really is a separate one from carriage painting proper—can do no better than to procure a copy of it.

143. Monograms are frequently painted in colors and gold on panels of coaches and vehicles, and in large and fancy colored schemes on business wagons. This requires considerable skill in order to properly balance the various letters. The rule is that the family name letter shall always be the most prominent, then the first surname and the others if any, to follow in importance—the above of course applies to a one name monogram. In business

monograms the letters of two or three partners should be very nearly of equal prominence, and the *Co.* across or entwined between. It of course depends somewhat upon the prominence of the partners, and a junior with little capital in the business is not entitled to the same prominence as the senior who may own nearly all the business.

QUESTIONS ON LESSON XXII.

139. What is said of lettering on wagons in general?

140. What tools and material are used in lettering?

141. What are the best letters to use on wagon lettering?

142. What is said about gold work on vehicles?

143. How should monograms be gotten up?

LESSON XXIII.

VARNISHES AND VARNISHING.

144. The varnishes used in carriage painting of whatever sort can be placed in two classes—hard drying and elastic. The first or hard drying class could also be designated as quick drying—for the two usually go together although not always so but as a rule the elastic sorts are slower in drying than the hard drying sorts. Besides the above divisions varnishes may be divided into color mixing varnishes, rubbing varnishes, gear varnishes and finishing, each of which being graded as hard or elastic and also of many qualities as to the composition and value of the gums entering it.

145. Varnishes are never prepared by the carriage painter as in the old times, the processes being too intricate and the technical knowledge required to make them too deep for the average workman. There-

fore he now depends upon the varnish manufacturer for all the goods in that line that he needs. The manufacturers have kept in close touch with him and as fast as a new need has developed for a special varnish to fit it—such have been evolved by him after proper experimenting. Every manufacturer tries to cover the field of carriage painters' requirements fully and there are few such who make any attempt at catering to that branch of the varnish trade who do not list at least a dozen or two of separate carriage varnishes from quick rubbing to wearing body.

146. The rubbing varnishes as the name indicates are intermediate in their use in carriage work. They are used exclusively in surfacing up the colored job and preparing it for the application of the finishing coat. Its application requires skill and a good knowledge of how to judge of the surface. The rubbing coats should never be skimpted on nor skinned, for as sure as

it is not given full the dust pits will surely show while if properly put on these will be absorbed and will not show.

147. It is usual to give the job two coats of rubbing varnish and a third one called the finishing rubbing coat, but from the first to the last as great care must be exercised in their application as possible. Let them be full to the limit as only full coats will give that proper rounding out which is brought out to full perfection by the flowing finishing coat. It is the only way to apply varnish which will prevent the showing of brush marks.

148. The best devices upon which to do body varnishing is upon stands which can be titled to any angle desired. Of course all the large shops are equipped with a variety of tilting stands to suit their special requirements. Any handy mechanic can readily make them.

SURFACING THE RUBBING VARNISH COATS.

149. The job it is supposed has been given the full length of time required for the proper drying of the coats according to the manufacturer's directions which are usually placed upon the cans containing the rubbing varnish; then it is ready for the surfacing. In order to do this work advantageously and with the least waste of time and labor, everything required for its performance should be placed so it can readily be reached. Galvanized iron pails to hold the water, some good sheep's wool sponges and chamois skins. Felt rubbing pads and a box containing 0 or 00 pulverized pumice stone. The water used should be cistern water and soft. If at all hard, some washing soda, or carbonate of soda should be put into it in order to break its hardness. One teaspoonful will be enough for the purpose to the pailful of water.

QUESTIONS ON LESSON XXIII.

144. What is said of varnishes in a general way?

145. What various grades of varnishes are used in carriage painting?

146. How should the rubbing varnish coats be put on?

147. How many coats of rubbing varnish are usually required?

148. What is said of the tilting stands?

149. What tools are required for surfacing rubbing varnish?

LESSON XXIV.

VARNISHING CONTINUED.

150. The surface of the job to be rubbed should be first washed with clean water. Then take up the rubbing pad and dip it lightly in clear water then afterward into the powdered pumice stone then over to the surface to be rubbed. The rubbing should be done lightly at first and the pres-

sure gradually increased until the full force allowable is applied. The mouldings and outer edges should be rubbed first and the work proceed on toward the center, where it is finished. It is a hard matter to state exactly "how to rub" just right, nothing but experience can teach that. A good rule is to rub lightly over the first coat of rubbing varnsh, increasing the pressure on the second and so on to the third or fourth or as many coats as are given sometimes. Too much pumice stone or too much water should be avoided as much as possible nor should the pumice stone be allowed to dry upon the surface.

151. The rubbed surface should be washed with clean water and a sponge as soon as the rubbing is done in that part and a change is made to rub another portion; in that way there will be no chance of the pumice drying on the job. Bear in mind to do the work evenly and uniformly all over alike including the corners, etc.

When one is able to do that he is then fully entitled to the distinction of being called a *good rubber* which by the way is a title which does not fit the green one as a rule, for the good rubber usually is made but not created, nor does he drop into it as a drop of rain to the earth.

152. After the job has been rubbed all over, a general cleaning up should take place. To do this properly, every chamois skin and sponge as well as the water must be absolutely clean, and used for that purpose only, and as soon as the washing and cleaning has been done, they should be rinsed beyond a doubt as to their cleanness and stored away in a dust-proof closet. This cleaning must be done first on the inside of the job and every part of it must be washed free of grit, or the finishing flowing coat will not be as good as it should, therefore there cannot be too much said in recommending absolute thoroughness in its performance. The flowing varnish is

pretty sure to find every speck of grit and to bring the same in full sight or to roll it around and scratch.

153. The flowing coat of finishing varnish should always be given a job as soon as it is dry from the final washing and cleaning up after the rubbing. If for any reason it should have to be left overnight before the varnishing takes place it should receive a light rubbing the next day before it is applied. The reason for this is that the surface will be scummed over with a light coat of something caused by oxidation, and which will greatly hinder the good work intended by giving the job its final coating.

154. To resume into a few rules the pith of good rubbing as they have been given by Hillick they are given below:

No. 1. Use roll or blocked broadcloth or felt rubbing pads.

No. 2. Direct the rubbing strokes all in one direction and lengthwise of the panels.

No. 3. Avoid the excessive use of pumice stone or water and indulge in not too heavily applied pressure of the rubbing cloth. Moderate pressure uniformly sustained, is the correct practice.

No. 4. Maintain constantly and at all times, a conspicuously clean washing up kit; and in washing the surface do not stop short of having it unmistakably and shiningly clean.

QUESTIONS ON LESSON XXIV.

150. How should the rubbing be done?

151. How should the powdered pumice stone be cleaned up?

152. What is said of the final cleaning up?

153. Should a job be cleaned up very long before the flowing finishing coat is given?

154. Repeat the four rules given for doing good rubbing.

LESSON XXV.

VARNISHING CONTINUED.

155. The proper location of a varnish room for finishing coat and indeed for all coats, is an all important item for it is next to impossible to do a good job of varnishes if the proper conditions for doing good varnishing are not maintained. The requisites for a good varnish room are many. The most important one perhaps is the possibility of perfect cleanliness, and consequent freedom of dust and dirt. Then of nearly of as much importance a room where the proper amount of temperature and ventilation can be kept up at will. It has already been noticed that shops which can be steam heated are better than those heated by hot air or stoves.

156. The floor of the varnish room should be tight, and then it can be swept up clean and given a coat of the patent oily coarse sweeping mixture which at-

tract every particle of dust into itself instead of scatterng it into the atmosphere of the room to be later on deposited upon the varnished job. The next best thing is to take dampened sawdust, scatter it over the floor and carefully sweep it all up afterwards. Never flood a floor but moisten it only.

157. Every varnish room should have a thermometer to register the heat which should be looked after if it drops below 70° Fah. for varnish must not chill. A hygrometer should also be in the room so that the amount of humidity can be ascertained. There should be a closet in the room in order to hold the varnishes to be used. These should have been maintained at the temperature at which they are to be used, 70° upward. Have some good strainer in the closet in order that the varnish may be strained before applying it. This may seem superfluous but it is the practice followed by most carriage varnishers—who

just will not take any chances and for good cause too. The trouble is a very slight one, and it insures against mishap.

158. Before applying the varnish, the surface of the job should be carefully dusted over with a soft silk cloth. Next moss off the inside of the body and varnish it, then proceed to varnish the outer part of the job. It is best to use a one inch flowing brush and run along the base of the panel and sides to do the rise of the seat as one proceeds to do the upper edge of the panel or box. Then take a 2 or 2½ inch flowing brush and *flow* on the varnish over the main surface. The brush should be held rather flat, and *always* pretty well filled with varnish. This will greatly help the equable distribution of the varnish over the whole surface. Every precaution and advantage must be taken advantage of in order not to have to touch the varnish any more than can be helped in order to have it free of brush marks and

if it is fully and properly flowed on it will need but little cross brushing to bring it to a perfect level. It is an axiom well known of every carriage varnisher that the least brushing of varnish will produce the maximum of lustre and mirror-like finish.

159. In finishing the running gears there will not be nearly so much trouble as over the finishing of the bodies, as they are more or less rounded and angular, and they take on a fine lustre but it requires skill nevertheless. The greatest care must be exercised in washing and cleaning up, as bolts and nuts and closely angled irons make it difficult to get at the parts. After the rubbing, a small syringe can be utilized to good advantage in squirting out the pumince stone from its hiding places and it will give the proper force to hoist and wash them away, after drying and careful dusting. Below Hillick's way of putting on the finishing coat on gears and

wheels is given in his own words: "In finishing the gear begin at the front axle and proceed to flow the whole front end before wiping up. This gives the varnish a chance to take its position on the surface, and the wiping up serves to level out the inequalities and remove the surplus. After the front, the rear, then the reach and last the side bars if any. A brush should be kept solely for wiping up the underside of axles, head blocks, spring bars, side bars, etc. In many factory shops the finishers wipe such parts with the palm of their hands. The varnish stripings are thus caught by the hand and distributed in the form of a glaze to the parts in question."

160. "In varnishing wheels, which are always included in the term running gears, slip the wheel upon the revolving jack, and standing with the left side nearest the wheel and partly facing it, begin by flowing the sides and face of the spokes, reach-

ing the brush well over to the back surface of the spokes. Then flow front of hub. Next the inside and face of the felloe. Now whirl the wheel so that its rear surface takes the place of the front. Catch up and close in with varnish all strips on the rear surface of spokes not flowed when the sides were done. Then flow rear of hub and lastly the back surface of the felloe. Reverse the position of wheel and slick up all places needing it and set away on a second wheel jack, giving the wheel a sharp spin necessary to flow the wheel properly. Four wheel jacks are necessary. . . . When applying rubbing varnish it is advisable to flow not more than six or eight spokes before wiping up.''

QUESTIONS ON LESSON XXV.

155. What is said about the proper requisites which should be in the finishing varnish room?

156. What is said concerning the treatment of the floor of the varnish room?

157. What tools and appliances are necessary for best work in applying finishing varnish?

158. How should the flowing finishing coat be applied to bodies?

159. How should the running gear be finished?

160. What is the best manner of finishing the wheels?

LESSON XXVI.

REPAINTING OLD JOBS.

161. The country shop has really more repainting of vehicles to do than the actual painting of new vehicles. It is not to be supposed that very much of this repainting is actually done from the ground up as described in the previous lessons. Indeed, there is but little of that done, and when it is it no wise would differ much from the description given except that

there is the burning off and cleaning up of the old paint to be attended to extra. There are several cheap and hurry ways of doing this "Crushing up" of vehicles in order to restore them to a presentable condition and gave them back a portion of the old lustre.

161. Much of the repair work done in country shops is really only "touch up and varnish." This of course will only apply to vehicles which are not in very bad shape. Where there is much room so that the jobs can be done "as they are" without the having to take them to pieces and a sufficient number of them can be done at the same time, this sort of work will pay very well, as the cleaning up will usually take up as much time as all the rest of the work, and some cheap man or cub can be used to good advantage at that. Of course the shafts, wheels and sometimes the tops will have to be removed for easier cleaning and ease of getting at the

jobs, but that does not take long in either the taking off or putting back on.

162. Benzine is the best dissolvent of the grease and dirt that accumulates about wheel and axles and the smivings found elsewhere are usually of the same category having been carried there in some way. The loose inside traps, as carpets, seat cushings, etc., should be removed and placed where they will be easily found and the whole carefully dusted off and cleaned up. Then give the bodies a slight rubbing with pumice stone and water which must be well rinsed off and the running gears must also be well washed and dried with chamois skin.

163. One of the greatest troubles usually encountered is in matching up colors for a touch up job. This will exercise the ingenuity of the average painter. He will gain some experience in this line with time but he is likely to make some mistakes at first for it is not only match-

ing the original colors which were put on the job when new which he has to cater to, but he must make an allowance for fading which in some of the reds and yellows may amount to a good deal. Then again the fading is not universally alike owing to some part of the job being better protected from sunlight than others, so that there is a Joseph's coat sort of uniformity to cover up. There is one rule in matching that will help one to some extent in his dilemma: A color mixed to dry with a good gloss will reflect more light than it absorbs, and a flat will absorb more than it gives out, so that the colors should be tested upon some part of the job in order to ascertain its nearness to the original *as it is then.* Even with a full quota of varnish most colors are likely to dry out lighter than they look when first put on.

164. When the color is satisfactory in tone, proceed to touch up the felloes and

all other places on the job from which the color has been worn away to the bare wood, with lead paint thinned with linseed oil to which has been added a little japan. This touching up of the bare places should have been attended to as soon as cleaned in order that it may be nearly dry by the time the colors are prepared for use in the touch up. As soon as set proceed to go over them with the color, and varnish touch up. Then go over the dressing of the top curtains and dash boards. Then finish by varnishing the inside, and by a good flowing coat on body and gears.

165. Many jobs however require to be painted all over with one coat of color and varnish and afterwards to be flowed varnished. If there is any striping this will of course have to be done over if required, otherwise it will take but little more time to go over the job than to match up a touch up of color varnish. The operator must be very careful not to cut in too deep in

the rubbing with pumice stone and water, as otherwise a lot of fine cracks will be likely to show up, so he must only give a very light rubbing.

166. But many old jobs are brought to the shop to be repainted which are in very bad shape and which really should be burned off, and receive a complete renewal of the painting.

But the owners will not stand for the cost and will ask the painter to do the best he can—but cut expense out of it. There is no good way to do this and at best the whole method given is but a makeshift. If the job is badly cracked and fissured, the best thing short of burning it off is to scrape it off with a two inch scraper down to the undercoats, then coat this over with rubbing varnish, rub it with pumice and water, or brick and water avoiding a close touch to the wood. Next proceed to give the job a coat or two of lead color, and varnish. But there is nothing after all

that will take the place of burning off all the old paint and varnish, and rebuilding all the paint structure from the ground up. It will cost a few dollars more it is true, and if the rig is in fair condition it will be better, much better in the end, and really the more economical, for the makeshift will be as bad as ever after a year or so.

167. Taking care of "tops and dashboards" while not particularly a painter's job, in the carriage factory, really becomes a part of it in repair shops. The carriage trimmer may have to make some repairs in the way of replacing worn out parts, but after that, he turns it over to the painter, who must see to it that it is made to look as good as new, (if he can). Leather tops really require little more to keep them in good condition that being washed with castile soap and soft water. There are numerous carriage dressings upon the market which preserve the enamel of the leather and rubber cloth

used on carriage tops, and each giving full direction as to their application. All contain or should contain neatsfoot oil and tallow in their composition, in order to soften the leather and to prevent its cracking, but of course they do not carry an enamel with them. The addition of a little beeswax adds some lustre, but not as much as the average man likes to see.

QUESTIONS ON LESSON XXVI.

161. What is said in a general way about the painting of carriages?

162. Which is the best way to clean up an old job for color and varnish?

163. How are colors for touch up work to be matched?

164. How is the touching up done?

165. How is one coat of color and varnish, and one coat of varnish done?

166. What is said about old jobs that are badly cracked?

167. How should carriage tops and dashes be taken care of?

INDEX

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

R

S

T

U

V

W

Y

Z