

## Carriage Building.

### DRAFTING.

#### PRACTICAL APPLICATION OF THE ART TO EVERY-DAY WORK.

It is hardly possible in a series of articles designed for general reading, in a paper like the *Blacksmith and Wheelwright*, to treat exhaustively of so comprehensive a subject as drafting. Our object in these articles as set forth at the beginning, has been to show the usefulness of drafting as applied to any and all of the mechanical trades. Accordingly, we have described tools and the means to be pursued for home practice, restricting ourselves to hints rather than attempting to convey specific instructions. If we have succeeded in interesting any of our readers in the subject sufficiently to induce them to commence its study in earnest, employing for the purpose some of the many carefully prepared text-books on drafting now to be bought, we shall have accomplished as much as was reasonable for us to expect. Before proceeding further, however, for there are many other points in drafting to which we may call attention with advantage to our readers, it is well for us to glance at some of the practical applications of drafting in every-day work; applications which may be made even though the student has but a limited knowledge of the art.

Constructing an article on paper, rather than in material is an advantage in many ways. In the first place, to make an accurate drawing of any article, however simple, necessitates a familiarity with all the parts and details of that article, and, therefore, any one who does make such a drawing, becomes thoroughly familiar with its construction and its requirements in all particulars. In the next place, constructing an article upon paper, by which, of course, we mean carefully preparing a scale drawing of it, is very much cheaper than constructing it in material. A person thoroughly familiar with drafting tools and with a draftsman's method, is able to construct on paper, so far as planning and proportioning parts are concerned, to almost as good a purpose as though he worked in the material of which it is built. Hence, all experimental work should be performed upon paper rather than in the wood or iron as the case may be.

"Cut and try" rules are but expedients and are resorted to only by men who know of no better plan. The art of drafting obviates the necessity of all such methods and contributes a degree of certainty to mechanical work obtainable by no other means. The mechanic, furnished with a careful drawing of any article he is required to make, has an intelligent guide before him by which he is able to manage his work in all its parts. By a drawing, again, a person is able to study the effect of shape and the beauty of design, and the expediency of certain features of construction. He is enabled to show the relative proportion of parts before completing any portions of them. However, the advantages of drafting are so thoroughly understood by intelligent mechanics, that arguments are hardly necessary. A glance at the method of working out a scale drawing will be of interest to our readers in this connection. We shall address ourselves to the young mechanics. Suppose, for example, in looking over the files of the *Blacksmith and Wheelwright*, you see a design of a buggy or of a waggon, or of some peculiarly designed vehicle of some other name, which you would like to reproduce in material; or suppose you have an order for some special shaped vehicle, the original of which has appeared in a catalogue or in some periodical. The first step that suggests itself is a working drawing. The original sketch of the article may be to some scale, but for your purpose you want a drawing to a larger scale. You may want a new drawing by reasons of variation in size. You consider all these points and decide what fraction of full size you will make it. You may conclude it is best to have it an inch to the foot, or perhaps three inches to the foot. Some parts of it may be full-sized, but the general view should be to scale. The manner of working and the principles involved are the same whether for scale-drawings or full size, so we will not attempt to particularize. There are two general views which you require in your scale-drawing—an elevation and a plan. We give an example of these two views in the accompanying illustrations.

Having decided to what fraction of full size you will work and using for the purpose a triangular scale of the kind shown by fig. 4 in the article published in the April number, which also described its use, your first step will be to construct the elevation. You may find it desirable to use a little different style of wheel, or a little different size of wheel from that indicated in the small drawing by which you are working. Draw the wheels as you

propose to use them. You may substitute a different shaped body because you are able to buy bodies ready made. In your scale draft, make the body of the kind you propose to employ. Show every part upon the drawing as you are able to construct it. Having the several portions placed side by side as they will appear in the finished work, you can judge of the effect to be produced, from the drawing almost as well as though the finished article were before you.

After having thus made the elevation, as shown in fig. 1, you next require the plan, as shown in fig. 2. This is made to the same scale as the elevation, and the several parts in the two drawings correspond, as may be seen by comparing the two engravings. Besides showing the axles at right angles to the body, it is desirable to show the position of the front axle as it will appear when turned. It is necessary for you to note just how these parts will appear in the different positions in which they may be placed after the article is completed. Show the axle when shipped, by dotted lines, or, what is just as good, by using a different colored pencil. By this means you locate the striking plates upon the side bars of the waggon, and all other parts whose position is determined by the working of the article.

It is unnecessary for us to go into further details. Our object is accomplished by references of the most general character. Nor need we say much as to the means of using the drawings after they are made, because such drawings in the hands of the intelligent mechanic suggest their own use. If the builder has himself worked out the drawings he will, perhaps, make less use of his lines than of the knowledge of requirements which has been communicated to his mind by making the drawing. If the drawing is made by some other one than the builder, then it becomes the guide to which he works. He will work to it as he would work to written instructions of any kind.

We are aware that in carriage and waggon making, save only in some of the largest and most completely equipped establishments in the country, the use of drawings is quite exceptional. There are very few who understand the art of making drawings, and almost as few who understand the use of drawings after they are prepared, but such a state of affairs is no argument and has no special bearing upon the question. The use of drawings is in carriage-making omitted, not because they are unnecessary, but because the state of the art is not sufficiently advanced.

We venture to say that there has been more attention paid to the draftsman's art in carriage building in the past few years than ever before, simply because the means and the knowledge have been brought into more easy reach. We further believe that the employment of this useful adjunct is on to increase rather than that it is going out of use.

In the boundaries of newspaper articles, as we have already said, it is impossible to give more than a general account of drafting in its application to any particular business. We have, therefore, purposely avoided technicalities, and have shaped our remarks with respect to the interests of the general reader, rather than in a way to give special information to the mechanic. Before closing, however, we will offer a suggestion to the student or young mechanic.

We have said that one of the advantages to be derived from making a scale drawing of any article is the thorough familiarity with all the parts of a machine acquired in the act of drawing it. Accordingly no better means for the beginner in any line of trade, for becoming familiar with things, can be suggested than making careful drawings of them. Let him construct and plan and design on paper in his leisure moments. He will then acquire a desirable proficiency in drafting which some time will stand him in good stead, and he will also acquire a thorough familiarity with the objects with which he is associated. The young blacksmith may know, in a certain sense, all about ironing a waggon, but take him away where he can see no waggons; put him in a shop with forge and tools and iron, and tell him to shape a set of irons for a waggon, and he will most likely be lost. The general shape of each individual piece will doubtless be in his mind, but it will be intangible, and unless he has had long practice it will be an impossibility for him to reproduce in the metal any of the parts with any considerable degree of accuracy. On the other hand, if that same apprentice had practiced at drawing, which is, as we have said, really constructing the article upon paper, he would have so impressed on his memory the shape of every iron going upon a waggon that it would be comparatively easy for him to reproduce the pieces, even though no model or suggestions were at hand. If the "Young Mechanic," therefore, will occupy his spare time with pencil and paper, and square and drawing board, in constructing buggies, carriages, waggons, or, what is better, individual parts of each of these articles; if he will familiarize himself with wheels and hubs.