

someone else is using. After an hour or two waiting he gets the rod, and then he has to begin to puzzle out what the stuff he has is intended for, as probably it is neither marked nor cut to size. Then, just as he is beginning to see his way a little, a setter-out will take away the rod to set out a part of the work in the mill. The joiner sees no more of rod or materials for a day or two, but has to commence two or three more jobs in the same manner. In the mean time, the stuff is being dogged about in the mill, worked a bit at a time, and when it eventually reaches the joiner again it is knocked about and bruised; some grooved, rebated, or moulded to one setting, some to another, and he has to ease and fit and waste time to make the work fit together. And yet, forsooth, all this muddle under what is called a good sharp foreman, who considers he has a perfect system, and who fully satisfies his employer. I could give many similar instances—in fact, I know of few shops where a saving of 15 to 20 per cent could not easily be saved. If a foreman has more than thirty men he should have a working assistant, and he requires an additional one to every twenty or twenty-five men beyond that number. The principal foreman should have specification drawings and full particulars, give particulars and drawings to his assistants, set out all the most particular work, superintend shop, mill, and yard generally, always knowing what materials are in stock, etc. If he does all this practically he has enough to do, and should be well paid for it. Each assistant should set out for his own men one job only on each rod, then take off his materials. I will here give the system I have found to answer well. Get material books, ruled as follows, or sheets will do, but I find books best:—

ORDER NO. 20.—NAME OF JOB.—DATE.

Number.	Description.	Material.	Length.	Wide.	Thick.	Finished width.	Do. thickness.	Remarks.
12	Styles	Oak..	ft. in. 6 9	in. 5½	in. 2½	in. 5½	in. 2½	All good stuff polished.
12	Rails	"	3 0	5½	"	10½	"	
6	Muntins..	"	1 6	5½	"	5½	"	
6	"	"	1 4	"	"	"	"	
6	"	"	2 6	"	"	"	"	

And so on the whole of the materials required. After the list is written out, it should be pasted on a board, together with a time-sheet, as example below:—

TIME-SHEET.—ORDER NO. 20.—NAME OF JOB.—DATE.—

Number or Name.	Time first week.	Second week.	Third week.
20	10	—	—
15	30	—	—
21	9	—	—
40	20	52½	40

A paper is then given to cutter-out, as follows:—

ORDER NO. 20.—MATERIALS.—NAME OF JOB.—

Feet run.	Material.	Width.	Thickness.	Quality.
150 36	Riga oak.	5½ in. 11 in.	2½ in. 2½ in.	Brand. "

After booking his material, which must include waste, this list is sent to stores, and other materials added, such as glue,

screws, nails, etc., and when job is completed, list and time-sheet are at once sent in, and exact prime cost can be obtained at once. It can be seen, by comparing list on board and materials list, what stuff has been wasted, thus having an effectual check on cutter-out, and, at the same time, it is an easy method of keeping stock of all materials. It is necessary to give finished sizes of panels, etc., to be jointed up, and also of stair-treads and risers, sash-frame casings and pulley stiles, etc., so that the stuff may be planed up in long lengths and cross-cut to exact length, to save a lot of squaring and cutting off afterwards, as well as being quicker for setting out. The rule—one job at a time—should be strictly adhered to. The materials, after cutting-out, are sent to the planing machine, together with list and time-sheet. The list explains finished sizes and number of pieces, and the whole of the stuff is kept together, as each man can see whether he has the lot or not. The joiner, who is to do the work should set it out, what is necessary; but with good machinery and good machinists it is not necessary to set out the whole. It is much better to give a rod or odd strip, the length from shoulder to shoulder, for work for tenoning machine, with number to each length written on rod, and an odd piece of stuff to set to should be included in list, especially when rails, etc., are scribed. All rails should be tenoned before setting-out for mortising, as it insures greater accuracy. It is only necessary to gauge one mortise for a good machine, and on no account should a job be done at two or three sittings. If this system is carried out all through, the stuff is kept together, the tenoning, grooving, moulding, etc., are all the same throughout, and the work is bound to come together accurately, and should require no fitting. If the work is sashes, with a lot of bars to scribe, it is best to get sufficient stuff in 9 in. or 11 in. widths, tenoned and scribed to length, then cut down to thickness of bars and moulded, as the lengths are more accurate and the scribings cleaner. If machinery is used to best advantage, and the foreman works to this system, and keeps rods and plane material well forward, there is no need for waste, either in time or material; the mill and shop are kept in order, so they may be swept out daily as every shop should be. To employ machinists, at times it is good policy when they are not pushed to get a good stock of wedges to each size chisel, also glue-blocks, buttons, cross-tongues, etc., also beads and mouldings in general use, the cost of which should be kept for charging to the various jobs. This saves running about and waiting, as joiners very often have to wait for a few wedges and glue-blocks while they might use them. By this system of keeping time the time is accurately kept, as each man has to book his time as soon as he has finished his part and pass on the sheet to next man, so there is no chance to cook the time, as is often the case. Let each joiner set out his own work—it is cheaper than having setters-out (unless the work can be turned out of the mill so as to only require wedging-up and cleaning-off), as it often takes as long for a man to look over and sort out his stuff and examine the setting-out as it would take to set it out, besides which a man can always do more work from his own lines than from those of another. Of course, everything depends upon what the foreman is. In the first place, he should be a first-class joiner, able to hold his own as a workman with any man he has under his control. In the second place, he should be a first-class draughtsman, and able to set-out any difficult work in such a manner as to be beyond the criticism of any of his men. (I can safely say that 40 per cent of the many foremen I have met, and had dealings with, cannot lay claim to either of these qualifications). In addition, he should have an even