minute and the result will be the discharge in cubic feet per minute. The velocity of the stream can be found by laying off one hundred feet of the bank and throwing a float into the middle, noting the time taken in passing the hundred feet. Do this a number of times and take the average; then dividing this distance by the time gives the velocity at the surface. As the top of the stream flows faster than the bottom and sides, the average velocity being about eighty-three per cent of the surface velocity at the middle, it is convenient to measure a distance of one hundred and twenty feet for the float and reckon it as one hundred feet."

The above method is exceedingly crude but is the simplest and is satisfactory where you do not care for an exact measurement.

An indicator consists of a small cylinder with the piston rod attached to a lever which carries a pencil. The cylinder of the indicator is attached to the cylinder of the engine by means of a pipe and valves in such a manner that the pressure which moves the piston of the engine will also be exerted upon the piston of the indicator. This causes the latter to move up or down in its cylinder in accordance with the steam pressure in the cylinder of the engine. The pencil arm which the indicator piston actuates is placed against a drum which carries a piece of paper. This drum rotates exactly in synchronism with the motion of the piston of the engine. The pencil traces a figure on the paper which is called the indicator card. The indicator piston works against a spring which is carefully calibrated so that an inch of movement of the pencil arm will represent a known definite pressure. The vertical heights of the card represent pressure in the cylinder at various points of the stroke while the length of the card represents the stroke of the engine piston. The figure, therefore, must be measured by two scales, one which is the scale of the spring, the other of the stroke. The indicator card reveals the pressure in the cylinder and the total work done. To the experienced eye it shows many other things, such as the setting of the valves and the general condition of the engine. An indicator can be used upon either steam or gas engine. When used on a steam engine the piping is arranged so that by the opening of one valve and the closing of another the pressure from either end of the cylinder can be recorded by the indicator.

Q. T.H.C. Please tell me at which speed you would get the most power out of a steam engine, at 400 revolutions per minute, or 225 with steam tractor the same in both cases.

A. The power of a steam engine is directly proportional to its speed. All other things being equal, doubling the speed will double the horse power.

Q. F.A.R. It is very difficult to hold steam with any boiler here on account of bad straw. Do you think it advisable to run the water pipe from the injector or pump through the smoke box, making several turns and then lead it out to the boiler?

A. Your plan of using a coil in the smoke box through which to circulate the feed water would work successfully if you could arrange for a constant circulation of water, but without a constant circulation the water would become very hot and turn into steam at high pressure. Of course, it would escape through the outlet into the boiler, but pockets would form in the coils in which there would be no water If any of the coils became dry they would burn out in a short time and anyone near the front or back of the machine at such a time might be dangerously scalded. You might be able to put in a coil, with connections at both top and bottom to the boiler if care were taken that each length of pipe pitched upward at about the same angle. You could then arrange a tee in the lower section of pipe through which the water could be pumped, but even if this were done there is no assurance that the water would not flow into the boiler instead of being forced through the coil. There is another thing also to consider and that is the obstruction of the draft in the smoke box by a coil of pipe. Economizers are used in connection with sanitary steam plants built along the lines you suggest which have improved the economy of such plants anywhere from 10 per cent to 15 per cent. It is comparatively easy in a large installation to arrange a set of pipes and also arrange to keep them cleaned, which, by the way, is very essential to their perfect operation.

In a small installation like a traction engine boiler, we believe the idea would be pretty difficult to work out satisfactorily.

ERROR.

In the advertisement of the J. I. Case Threshing Machine Co. in our issue of July, the statement was made that ninety per cent of the grain is "Threshed" at the cylinder.

This typographical error will be obvious at once to our readers who will no doubt themselves have corrected it to read "SEPARATED" at the cylinder. We regret the error which is solely due to carelessness in proof-reading.