which writing has been traced with a glass rod, the tip of which is perfectly round and smooth, is exposed to iodine vapor, the characters appear brown on yellow ground, which wetting turns to blue. This change also occurs when the paper written upon has been run through a supercalender. If the paper is not wet, these characters can be made to appear or be blotted out by the successive action of sulphurous acid and iodine vapor.

Writing done by means of glass tips will show very little, especially when traced between the lines written in ink. The reaction, however, is of such sensitiveness that where characters have been traced on a piece of paper under others they appear very plainly, although physical examination would fail to reveal their existence, but a somewhat lengthy exposure to iodine vapors will suffice to show them.

If the wrong side of the paper is exposed to the iodine vapor, the characters are visible, but of course in their inverted position.

If the erasure has been so great as to take off a part of the substance of the paper, the reconstruction of the writing, so as to make it legible, may be regarded as impossible; but even in this case subjecting the reverse side of the paper to the influence of the iodine will bring out the reverse outlines of the blotted-out characters so plainly that they can be read, especially if the paper is placed before a mirror. In some instances, when pencil writing has been strong enough, its traces can be reproduced in a letter press by wetting a sheet of sized and calendered paper in the usual way that press copies are taken, placing it on paper saturated with iodine to be reproduced, and putting the two sheets in a letter book under the press, copies being run off as usual in copying letters. The operation, however, must be very rapidly carried out to be successful. As a matter of fact, the certainty of these reactions depends entirely upon the class of paper used. Paper lightly sized or poorly calendered will not show them, while manipulations of which I think description would be rather superfluous here can interfere very materially with the results mentioned above.

Another point consists in knowing how long paper will retain these reactive properties. In my own experiments the fact has been demonstrated that irregular wetting and rubbing three months old can be plainly shown, as after this lapse of time characters traced with glass rod tips could be made conspicuous. I have noticed that immersing the written paper in a water bath for three to six hours will secure better reactions, but although these reactions are very characteristic, they are considerably weaker.—Scientific American.

ZINC PROCESSES.

Three different processes, each believed to possess its peculiar advantages, are in vogue among the manufacturers of zinc in Europe. In Belgium, to get pure zinc from the oxide, the latter is mixed with coal and heated in a retort, the zinc volatilizing and coming out of the mouth of the retort as vapor; cadmium is always with the zinc, and cadmium vapor comes out first, and, when lighted, burns with a brown flame, the latter changing to green as soon as

the zinc vapor begins to come off; an iron cap is then placed over the mouth of the retort, through which the vapor passes and is condensed into a fine dust, and gradually the cap becomes hot and melts the dust into liquid zinc, which runs into moulds and is cast into blocks. The Silesian process differs from the foregoing only in the retort; the mixture of ore and coal being put in and heated, and the vapor passing out through a tube bent at right angles to the retort; the tube is kept cool, but not cool enough to condense the vapor into solid zinc, as, if this should happen, the pipe would become clogged and the retort would burst. In the English process the retort consists of a tightly covered crucible, through the bottom of which passes a pipe; the pipe is stopped with a wooden plug, and the mixture of ore and coal is put into the crucible and heated, and as the mixture grows hotter, the plug is converted into charcoal, allowing only the zinc vapor to pass through it.--Exchange.

AN ENGINEER TAUGHT BY AN INSECT.

It has been said that the operations of the spider suggested the art of spinning and weaving to man. That may be doubtful, but it is quite certain that to a hint from an insect was due the invention of a machine instrumental in accomplishing one of the most stupendous works of modern times-the excavation of the Thames tunnel. Mark Isambard Brunel, the great engineer, was standing one day, about three quarters of a century ago, in a shipyard, watching the movements of an animal known as the Toredo Navales-in English, the naval wood worm-when a brilliant thought suddenly occurred to him. He saw that the creature bored its way into the piece of wood upon which it was operating, by means of a very extraordinary mechanical apparatus. Looking at the animal attentively through a microscope, he found that it was covered in front with a pair of valvular shelves; that with its foot as a purchase, it communicated a rotary motion and a forward impulse to the valve which, acting upon the wood like a gimlet, penetrated its substance; and that as the particles of wood were loosened, they passed through a fissure in the foot and thence through the body of the borer to its mouth, where they were expelled. "Here," said Brunel to himself, "is the sort of thing I want. Can I reproduce it in an artificial form?" He forthwith set to work, and the final result of his labors, after many failures, was the famous boring shield, with which the Thames tunnel was excavated. This story was told by Brunel himself, and there is no reason to doubt its truth. The keen observer can draw useful lessons from the humblest of the works of God .--New York Ledger.

THE TRAIN STAFF BLOCK SYSTEM.

Although single track railways are rapidly becoming a thing of the past, there are still many such roads in the country, some of which will be changed to double or quadruple track roads in obedience to the exigencies of traffic, while others will forever remain in their present condition. Some roads are furnished with a double track throughout, with the