"4th. Finally, by means of this method, it is possible to obtain pieces of large dimensions of Bessemer steel made with tungsten."

An Interesting Mineral Specimen. — There was presented lately to the collection of the Franklin Institute a specimen of great interest, not only in itself, but also in its relations with the history of mineralogical chemistry. This is a portion of the first cake of metallic copper produced at Riechelsdorf (1845) from the working of the copper slates (Peruvian formation), containing great numbers of minute black crystals, which were proved to be alotropic modifications of oxide of nickel by Dr. Genth (who was then completing his studies in the laboratory of Bunsen), whose name and determinations in connection with subjects of chemical analysis are so widely known, not only in this country, but also in Europe. Berzelius, to whom like specimens were shown after their discovery by Dr. Genth, was so much surprised by the character and location of the body, that it was only by tests, applied with his own hands, that he could convince himself of the fact.

The new substance for anæsthesia.—The new agent for anæsthesia, of which we have already spoken, in the *Cosmos*, some time since, and which is known as the quadrichloride of carbon, CCl^4, has recently been the subject of Dr. P. Smith's investigations. It appears that this composition has the agreeable odor of quinces is capable of producing anæsthesia in a very short time, often in half a minute, and that insensibility can be sustained, with or without loss of consciousness, that these effects are easily checked, that anesthesia is produced without excitement, and is not followed by nausea. It is employed for headaches, which it cures instantly, and for other pains. The editor of the *Lancet* states that this agent is preferable to chloroform in many cases.—*Cosmos*, p. 633.

Editorial Correspondence.

THE BESSEMER STEEL WORKS AT TROY.

A FEW weeks since, I visited the Bessemer Steel Works, at Troy. When all the machinery which they now have under way is in full operation, they will be able to turn out fifty tons of steel a day. Most of the steel is cast in ingots of several hundred pounds each, but they can make small castings with it. I was pleased to learn that they could make castings moulded in sand, but in all cases they

are very full of blow-holes. They however assert that, notwithstanding the blow-holes, the castings are twice as strong as similar ones made of cast iron. There is considerable waste in making small castings of this steel, and they are therefore obliged to charge heavily for those made, but, as a general thing, they decline to make very small ones at any price. The castings should, if possible, be worked under a hammer. Castings of ordinary cast steel can be secured at Pittsburg and Jersey City. The Bessemer steel is not intended to take the place of, or compete with, ordinary cast steel, the properties of the two being quite different in several respects. At Troy they are preparing to make steel rails for railroads, and in Vermont a company is establishing works to manufacture steel locomotive tires.—D. V. W.

University of Michigan.

DRILLING MACHINES AT THE HOOSAC TUNNEL.

ANN ARBOR, MICHIGAN.

EARLY in June last, I visited Hoosac Tunnel to witness the operation of the power-drills. Machines have been introduced at the east heading only, where they work eight at a time. These are driven by compressed air, at a pressure of thirty pounds per square inch. The air is compressed by water-power, supplied by the Deerfield river. In the tunnel are two heavy frames or carriages, to each of which are mounted four machines. When I observed them, they made about 180 strokes per minute, and drilled an inch and a half hole about three-fourths of an inch per minute. They may be worked more rapidly at a higher pressure of the motor. All the movements of this machine are automatic, except the advance feed. It appeared to require the constant attendance of a man to see that it did not feed too fast. It seems that this part of the problem has troubled most inventors of drilling machines. They have either failed to make them automatic and self-adjusting, or else the devices have been so costly and delicate, that they were of little practical value. But Professor Robinson (my assistant in the University) and myself have invented a method which, we think, entirely overcomes the difficulty. It is cheap, strong, simple in its structure, and *perfectly automatic and self-adjusting*. It will feed four or five inches at a stroke, if necessary; but, if the cutting does not advance, it will not feed any. If the other parts of a drilling machine can be made as strong and simple as this, no further difficulty will be experienced with them.