THE IRON INDUSTRIES OF BIRMINGHAM, ALA.

In a recent issue we published an article on the Iron Industry of Birmingham, Ala., in which brief mention was made of the uses to which the products of the iron furnaces of that district were applied. In continuation of the subject, we note the advancement in manufactures made at that place in the last few years.

It is now about twenty years since the then little village of Birmingham became known as the possessor of great wealth in iron and coal. The mineral and metallic deposits were found to lie in such profusion within her district, and in such close proximity, that but little expense need be incurred in their transportation to the furnace for reduction.

At some remote period there was evidently an upheaval of the earth where now stands the city of Birmingham, with a fracturing of the various strata of the earth's crust. This upheaval and the subsequent deposit of soil formed the beautiful valley with the elevated ridges on either side running in a northeast and southwest direction. By this grand process of nature the formerly deeply buried strata of bituminous coal and red iron ore were rendered accessible. For years the ridge upon the south side of this valley has been known as "Red Mountain," without any thought of great value being attached to it. At the close of the war, in 1865, every gift of nature was examined and utilized, and enterprising men, seeing evidences of such wealth cropping out of the earth, took advantage of the opportunity, and, by experiments, ascertained the richness of the ore. Further development showed the mine to be practically inexhaustible, and accompanied with overlying beds of coal.

In our illustrations we show the works in which this ore is made into fine merchantable pig iron. The iron of the Birmingham district is unexcelled for the manufacture of puddled bar iron and for purposes where it is essential that its working qualities in the finished castings should be characterized by that peculiar softness in turning, boring, filing and drilling that is so pleasing to the artisan and satisfactory in the final product. The demands of those who work in iron are varied; that which is most satisfactory to certain manufacturers will not do for a different class. Soft iron is useful for many purposes, but there are many important and extensive fields in which the soft iron of the South has found no place; notably in the use of iron for the manufacture of Bessemer steel and malleable iron. Peculiar qualities are required in these two very important fields of iron consumption, and it has been questioned if the Birmingham iron could come into use for these purposes.

The only use of pig iron prior to the invention of Bessemer, aside from that of making castings, was for the manufacture of wrought iron, for which purpose the softer grades of pig iron were specially adapted, also for other purposes in which the presence of such disturbing elements as sulphur, silicon, and phosphorus did not prove injurious. The process discovered by Bessemer of converting pig iron directly into steel was found to depend for success upon the almost entire absence of these disturbing elements; the value of an iron, for the Bessemer process, is carefully determined by chemists. The presence of 0·1 per cent of phosphorus, or 2 per cent of silicon, unfits it for making Bessemer steel, although it would still be serviceable for puddling into wrought iron and converting into blistered steel.

Until recently the irons made from the red ores of Birmingham contained phosphorus and silicon in quantity sufficient to prevent their use in the Bessemer process, as analysis showed the presence of 0·8 per cent of phosphorus. The subject of elimination of phosphorus from iron had been the study of chemists until 1878, when it was found that phosphorus would unite with lime and float as a slag consisting of phosphate of lime. By virtue of this important discovery it has been possible to convert millions of tons of iron into steel, this being known as the "basic" process, a process in which the converter is lined with magnesite bricks, with quantities of free lime, oxygen being provided by the introduction of scrap iron or ground limonite (brown ore). This process is used in the "open hearth" system, perfected by Gilchrist and Thomas.

The Birmingham irons, however, were unfitted for this purpose, as the amount of phosphorus was so great as to necessitate such an amount of lime to take up the phosphorus as to be destructive to the acid lining of the converter, and the amount of silicon was too great to admit of treatment in either a basic Bessemer converter or an open hearth furnace.

It has, therefore, been found that the Southern irons produced in the old way were unfitted for Bessemer or open hearth processes.

What has proved a failure, however, with chemistry as the teacher has been learned—so we are credibly informed—by the union of chemistry with skillful and correct management of the heats and of the burdening of the ore over the coke.

The "Alice" furnace of the Tennessee Coal and Iron Company, in Birmingham, an interior view of which we show on our front page, has, by careful management, been successful in producing pig iron from the ores of the Birmingham district, showing a percentage of considerably less than 0·1 per cent of phosphorus and 0·5 per cent of silicon. Tests of the iron have so far satisfied the chemists of such well-known steel producers as the Carnegies, Jones & Laughlin, Park Brothers, and others that already—as we are informed—thousands of tons of this pig iron have been ordered by them from Birmingham furnaces The importance of these results will be appreciated when the cheapness with which Southern iron can be produced is considered.

Our illustrations show the casting flow of the "Alice" furnace, and a perspective and sectional view of one of the moulds. It will be seen that the pigs are cast in iron moulds instead of sand moulds as usual. One of the main objects in this method is to prevent the crusting of the exterior surface of the pig with extra silica, which would deteriorate the iron in subsequent melting.

A Submerged Forest.

Many years ago, even so far back that the traditions of the oldest Siwash extend not thereto, there was some vast upheaval of Mother Earth on the shores of Lake Samamish that sent a portion of the Newcastle hills sliding down into the lake, with its tall evergreen forest intact, and there it is to this day. About this time of the year the waters of the lake are at their lowest, and then the tops of the tallest of these big submerged trees are out of the water, but never more than ten or twelve inches.

Unfortunately for the curiosity seeker and traveling public generally the submerged forest is on the opposite side of the lake from the railroad and the station of Monohon, and very few people ever see the phenomenon unless they take the time and pains necessary to reach it.

Sam Coombs, the pioneer, is very enthusiastic concerning its beauties and mystery. He talks Chinook fluently, but with all his quizzing of the red-skinned inhabitants he has never learned anything that will throw any light on the history of the forest under water. The waters of the lake are very deep, and the bluffs back of the beach very precipitous, so that the only explanation of the freak is that either by an earthquake or some other means a great slide has been started in early times, and it went down as a mass until it found lodgment at the bottom of the lake. At this time one can see down into the glassy, mirror-like depths of the lake for thirty feet or more. Near the banks the forest trees are interlaced at various angles and in confusion, but further out in the deep water they stand straight, erect, and limbless and barkless, 100 feet tall. They are not petrified in the sense of being turned to stone, but they are preserved and appear to have stood there for ages. They are three feet through, some of them, and so firm in texture as to be scarcely affected by a knife bla e. The great slide extended for some distance, and it would now be a dangerous piece of work for a steamer to attempt passage over the tops of those tall trees. Even now the water along shore is very deep, and a ten foot pole would sink perpendicularly out of sight ten feet from the shore line.

All over this country are found strata of blue clay, which in the winter season are very treacherous, and given the least bit of opportunity will slide away, carrying everything above with them. This is the theory of the submerged forest of Lake Samamish. It probably was growing above one of these blue earth strata, and heavy rains, or probably an earthquake, set it moving. The quantity of earth carried down was so great that the positions of the trees on the portion carried away were little affected. It is hardly to be believed that the earth suddenly sank down at this point and became a portion of the beautiful lake.

Few such places exist. There is a place in the famous Tumwater Canon, near Leavenworth, which is in some respects similar. At some early time a portion of the great mountain side came rushing down and buried itself at the bottom of the canon. Now there is a considerable lake, and in the center stand tall, limbless trees, different in species from those growing along the canon.

At Green Lake, near Georgetown, Col.—a lake which is 10,000 feet above sea level—is a submerged forest of pine trees, some hundred feet tall, but not so numerous as in Lake Samamish. This same theory explains their presence as given above.—Seattle Times.

The Discovery of Argon.

Lord Rayleigh and Prof. Wm. Ramsay called at the United States Embassy, in London, recently, when Mr. James R. Roosevelt, first secretary, handed to them a check for $10,000, which had been granted by the Smithsonian Institution, at Washington, as the first Hodgkins prize, for their memorandum on "Argon, a new constituency of the atmosphere," embodying a most important discovery in connection with atmospheric air.

Correspondence.

Sylvanus Sawyer.

To the Editor of the SCIENTIFIC AMERICAN:

My attention has been called to an article in a recent number of the SCIENTIFIC AMERICAN concerning the late Sylvanus Sawyer.

No mention is made of his connection with his brothers Joseph and Addison.

While I would not detract from his prominence as an inventor, no account can properly be given of him that does not include them, one or both of whom were always associated with him in business in the old "gun" days, and were also inventors in those lines. Addison invented a combination shell used in the late war, a combination fuse, and other ordnance articles, upon which he obtained patents.

He also invented the "Sawyer canister," which was adopted by the government, and for which he was awarded $25,000.

Concerning the rattan business, Addison's invention, the "tubular spurred cutter" for utilizing rattan pith, patented by him in 1854, revolutionized the rattan industry of the world.

They were three remarkable men, sprung from a race of ingenious mechanics.

Granting the honor due his brothers will not lower the rank of Sylvanus Sawyer among the inventors of his time.

Allow me to make a correction. Sylvanus Sawyer died at his home in Fitchburg, Mass., not "Templeton," where he had long been identified; also that he was the son of John and Lucy (Balcom) Sawyer, instead of "Malcom J." MARY E. SAWYER.

Boston, Mass., November 25, 1895.

Electric Power in New York City.

The Electrical Engineer says that on January 1, 1895, the Edison Electric Illuminating Company had connected 7,615 horse power of electric motors, but at the end of October it had no less than 11,263 horse power, an increase of 3,648 horse power in the short period of ten months. The horse power capacity thus connected includes, it would seem, a great many of the fan motors, but not all, as it is becoming a common practice for people to plug the small motors into lamp sockets without fuss or notice, and, of course, these do not appear on the returns.

The company has 251,487 incandescent lamps connected and 3,280 arcs. This would figure out in the neighborhood of 25,000 horse power, so that one-third of the company's total connected capacity is now represented by motors. This is a notable showing for power uses of current. We estimated that whereas in the census year, 1890, the motors averaged about 1 horse power each, they might now reach 5 horse power. Mr. Lieb informs us that the motors average between 5 and 10 horse power, and that one of the motors in regular service on the mains has a rated capacity of 40 horse power. It is evident that the stationary motor industry must be increasing at a rapid rate, for these figures, large as they are, take no account of other stations than the Edison, and do not include isolated plants, many of which are heavily loaded with motor duty in running pumps, elevators, ventilators, etc.

The Preparation of Wool for Underclothing.

The method of preparation consists in soaking the pure, unsulphured, undyed wool in the extract described below.

Bark, taken from the stem and roots of the Daphne mezereum, a tree growing in the northern regions of Europe, after being dried in the air for rather less than a year, is cut up finely and placed in 40 per cent of spirits of wine and 60 per cent of water, for six days, in the proportion of one part of bark to four parts of the mixture. In this time, the spirits of wine draws out of the bark resin, oil, daphnine, wax, etc., and a brownish mass results. After straining it off from the macerated bark, the extract is put into a copper vessel of such a shape and size as is suitable and convenient, then heated to 35° Reaumur, and the wool in a completely loose condition, so that the extract may reach and act on all the fibers, is placed therein, and kept for three hours at this temperature, whereby it is impregnated with the alcoholized extract. After this time, the wool is taken out of the vessel and dried on wide meshed hurdles; it can then be spun and woven.

The patentee claims that, during wear, the wool prepared by this method remains generally odorless and possesses an unsurpassable suppleness and softness, as well as a peculiar absorptive activity on the humors and perspiration of the body, which are therefore drawn to the outside of the texture, causing the body to keep dry; that the wool loses its natural harshness and the prepared material does not irritate the body, and that the single fibers become exceedingly elastic, porous, more capable of absorption and shrink no more, so that the properties beneficial to the human body are never lost, even by washing, clean ing and thorough airing of the stuff.