and they then introduced a series of experiments to test the value of the new agent. On the 27th day of October, 1846, they jointly applied for a patent for the discovery of the anæsthetic effects of ether, which was called, in this connection, "Letheon." Dr. Jackson wrote a letter to the Academy of Science in Paris, claiming that *he* had discovered the anæsthetic powers of ether, but his letter was sealed and inclosed in another, with the request that the inner letter should not be opened till further instructions. He seems to have been in some doubt as to the value of the discovery. At a later period, the date of which we cannot give, Dr. Jackson pressed his claims before the Academy, and he was recognized as the discoverer of anæsthesia! And that record stands in the Academy to this day.

It should be here stated, in justice to Dr. Jackson, that having made several experiments with the nitrous oxide gas recommended by Dr. Wells, and having failed therein to produce anæsthesia therewith, he had become strongly confirmed in the belief that the gas had no anæsthetic property, and consequently felt justified in claiming his use of ether as the first use of an anæsthetic to prevent sensibility to pain.

While the application for the patent was pending in the Patent Office, Dr. Jackson, entertaining doubts of its value, assigned all his interest in it to Morton, taking an agreement from Morton that he should pay him (Jackson) ten per cent. of all he made out of it. Dr. Jackson then wrote to the Commissioner, stating the fact of the assignment, and requesting that the patent should be issued to Morton, which was done.

When Wells returned to the United States he was astounded to learn that Morton had obtained a patent for the discovery of the anæsthetic effects of ether, and claimed the honor of *the discovery of anæsthesia!* An excited discussion in the Boston *Medical Journal* followed between Dr. Wells and Dr. Morton on the subject. This discussion so worked on the sensitive nature of Wells that he became deranged, and committed suicide in the city of New York on the 24th of January, 1848.

Up to this period no one had used the nitrous oxide gas as an anæsthetic save Wells and even he with indifferent success. After the death of Wells, Drs. Morton and Jackson claimed that nitrous oxide was *not* an anæsthetic, and that insensibility to pain could not be produced by it. In one of Dr. Jackson's medical books he says: "By oft-repeated experiments, inhaling protoxide of nitrogen (nitrous oxide) myself, and by administering it to others, in every possible way, by large and small orifices, I soon became fully satisfied that *it possessed no æsthetic properties.*" This opinion was promulgated, and prevailed throughout the country from the time of the death of Wells, in 1848, till 1863, when Dr. Colton revived the use of the gas, and demonstrated not only that it *was* an anæsthetic, but altogether the best anæsthetic for brief operations. This fact also accounts for much of the misunderstandings which arose as to the true discoverer of anæsthesia.

During this interval of fifteen years, the gas passed out of the public mind as an anæsthetic, and the honor of the discovery of anæsthesia was generally accorded to Morton. Morton admitted the priority of Wells's experiments, but said that "as nitrous oxide is *not* an anæsthetic, Wells discovered nothing—I am the discoverer of anæsthesia." Virtually admitting that if nitrous oxide *was* an anæsthetic, Wells was the discoverer.

During this interval of fifteen years Dr. Colton was lecturing and giving amusing exhibitions through the country of the curious effects of the gas, but not being either a dentist or a surgeon, he had no occasion to use it as an anæsthetic, although he often spoke of it as such.

In the month of June, 1863, Dr. Colton, in the course of a lecture given in New Haven, Conn., detailed his experience with Wells, stating that since the death of Wells he had never been able to induce a dentist to try the gas as an anæsthetic. Dr. J. H. Smith, who was present, declared that he would try it, provided Dr. Colton would administer it. The result was a triumphant success. Dr. Colton then determined to come to New York and establish an Institution for the extraction of teeth with the gas; and as his name had been so long identified with "laughing gas," he called the institution the "Colton Dental Association," with rooms in the Cooper Union. This association have, during the past seventeen years, given the gas to over 121,000 patients without a fatal result.

It is due to Dr. Colton to state that this revival and demonstration of the value of the gas is attributable chiefly to his exertions, and that it led the medical and surgical journals throughout the country and in Europe to review the whole subject of anæsthesia, the result being that, almost without an exception, they have awarded the honor of the discovery to Dr. Horace Wells.

Dr. Morton deserves great credit for the persistence with which he pushed the use of ether in the Massachusetts General Hospital, amid great difficulties and discouragements, till it was recognized and adopted by the profession. Dr. Jackson deserves credit for suggesting the use of ether in place of nitrous oxide, and for his part in the first experiments made with it. But the substitution of ether for the gas does not constitute a new discovery. Dr. Willard Parker of this city, in a letter written on the subject says: "I further say, it being known that nitrous oxide would produce anæsthesia in surgical operations, it would suggest to any one having any knowledge of the two substances that sulphuric ether would produce the same effect, and the substitution of ether for gas does not merit the name of discovery."

PREVENTION OF EXPLOSIONS IN COAL-MINES.

In the midst of the present depressed state of the coal-trade, the question of the safety of mines (especially with regard to those terrible explosions) is rightly receiving the serious consideration of the mining profession. Various schemes have been devised and planned; but either from their being not practicable or too costly, they have not been adopted. The method, however, which I am about to describe has neither of these objections: it is quite practicable, and does not involve much cost. It is well known that in those coal seams, and adjacent beds of black shale, which give off explosive gas, the goaves become filled with it—at once a magazine of gas, and it is to these goaves which can be traced, directly or indirectly to nearly all the large explosions, so that it is the clearing of these goaves to which we must direct our attention in order to lessen the number of explosions. My plan consists of putting down bore-holes out of the return air-courses in the highest seam through the goaves and unworked coal of the lower seams, so that explosive gas, which is specifically lighter than air, will rise up the bore-holes into the return air-courses of the top seam, and thence be carried away by the return air-current to the upcast shaft. In the accompanying sketch, B represents boreholes, U the upcast shaft; the arrows indicate the direction of air and gas currents. The bore-holes will have to be surmounted by a bent tube, one end inserted in the bore-hole, and the other standing out in the direction of the air current, so as to protect the hole from the air current and loose materials. It will be observed that a bore-hole is kept immediately back from the face of the coal. This is a precaution necessary when beginning to work the long-wall, for after a portion of the coal has been taken out, the roof settles down upon the pack walls and timber employed to keep the roads open; this settling down extends upwards to where the strata is more firm; the result of this is that a horizontal fissure is formed between the solid rock and that which has settled down, in which a large quantity of gas may be accumulated. After a while, when more coal has been taken out, the rock breaks away from a higher level, and over a more extensive area, and owing to its great weight, it suddenly crushes the broken mass lying below it, and displaces with great violence the accumulation of gas contained therein, which is forced into the working places among the workmen and their lights, thus fouling the air-current, so that by having a bore-hole put down, as the gas accumulated, it would make up the bore-hole before the second crush took place. The same thing would take place in starting to work the broken under any system. It will be observed that bore-holes are put down into the goaves that have been formed any length of time. It has been stated before that these goaves form natural gasometers, being above the level of the workings of the mine, the gas in them being elastic and less in volume, and occupies less space when the density of the air is greatest, and with a diminution of atmospheric pressure, as when the barometer falls, the volume of the gas increases and issues out into the workings; this, however, may be avoided by using the bore-holes, as the gas would then rise up the bore holes and be discharged into the return air-current. The utility of the bore-hole put down through the fault will be obvious when it is remembered that instances of faults giving off inflammable gas are very frequent. It sometimes happens that there are spaces of a few feet area in the leaders of these faults, in which are stored up, at immense pressures, large quantities of explosive gas ready to appear as blowers as soon as tapped. The same thing exists in unworked coal: fissures sometimes pierce the strata, and are filled with explosive gas. In collieries using the return air furnace, care must be taken not to allow those return air-currents into which the bore-holes discharge to go over the furnace, but they must be conveyed by a separate drift into the upcast shaft. With the present boring facilities, holes can be put down with very little cost, and when the circumstances of the upper seam admit, would amply repay the trouble and cost.

T. L. E.