certainly not more strange than it did to engineers when men chipped and worked by hand what was now done by planing, riveting, or other machines. When they considered the great restrictions at present placed upon the use of gunpowder and other explosives in mines, and that every day the coal to be got lay at a greater depth, and the difficulties of getting increased more than *pro rata* with the depth, he thought there could be little doubt that in a few years the government would entirely prohibit the use of explosives in mines. He now proposed to compare the two systems of breaking down coal —by gunpowder and that by compressed air at 8,000 lb. pressure per square inch or upward. The undermining of the coal would in both cases be about the same, also the time taken to drill the hole, provided the machine drill was used. If the arrangement of the receiver as proposed in the foregoing remarks, with or without hydraulic pump, were carried out, then the time taken to fire the gunpowder or burst the cartridge by compressed air would be about the same. In stemming the hole there would be a gain in favor of gunpowder of about ten minutes, but at the same time it would be at greater risk. If instead of the portable receiver a machine had to compress the air to the required pressure, there would be a gain of about thirty minutes in favor of gunpowder; but, as they were aware, when a shot had been exploded by gunpowder the working place was filled with smoke for a quarter, half, and in some cases three quarters of an hour, so that the gain in time was more than counterbalanced.

Compressed air, however, possessed advantages ever gunpowder which could not be too highly estimated, above all as regarded safety. He thought there was no one connected with mining but would admit that the time had now arrived when some power ought to be found to supply the place of gunpowder when it was prohibited, to enable us to produce coal as economically then as now. Should gunpowder and other explosives be prohibited, what was the best means to supply their place? He thought for the reasons he had named in the foregoing paper that compressed air would stand foremost, especially for its safety. Although monetary considerations might, to a certain extent, weigh with people, no one could deny for a moment, after seeing the lavish expenditure made by colliery proprietors for the safety of their men, that safety was the main consideration with both mine owners and the managers.—*Colliery Guardian.*

THE NEW YORK ACADEMY OF SCIENCES.

A meeting of the New York Academy of Sciences was held Monday evening, May 12, Prof. Newberry in the chair.

COPPER AND SILVER IN MAINE.

At the request of the president, Dr. Hamlin, the author of a very interesting book on tourmalines, gave an account of the new mineralogical discoveries in Maine. Until very recently it was not known that either copper or silver existed in Maine. A copper belt, some two miles long and from 200 to 400 feet wide, has now been discovered about the middle of the southern part of Maine, directly on the coast; but it is impossible as yet to present any trustworthy information in regard to the richness of the deposit.

Some twenty miles to the northeast of this copper belt silver has been found in flakes, masses, and filaments, specimens of which have found their way to Boston for exhibition. A shaft has been sunk some hundred feet deep, and it is reported that the ore increases in richness with the depth.

GEOLOGICAL NOTES.

Dr. Newberry announced the receipt of a collection of fossils from Moosehead Lake, and also of one from Fort Bennet, Dakota, which latter appeared to the finders as of vegetable origin, resembling a species of nuts, but which on examination proved to consist of saurians' teeth, having some resemblance to the teeth of crocodiles, but not being as yet sufficiently investigated for identification.

Further geological investigation of the north shore of Long Island confirms the conclusion previously arrived at, that the micaceous sandstone found there in the glacial drift, and containing impressions of dicotyledonous leaves, belongs to the cretaceous period. Its source has not as yet been ascertained.

The paper of the evening was by Dr. Albert R. Leeds, of the Stevens Institute of Technology, on the presence of peroxide of hydrogen in the atmosphere.

PEROXIDE OF HYDROGEN IN THE ATMOSPHERE.

The existence of hydrogen peroxide in the atmosphere has been doubted by many investigators. The reason of this is to be found in the difficulty of ascertaining its presence, seeing that several other substances, such as ozone, nitrous acid, and nitric acid, give almost identical reactions. Numerous tests have been devised to distinguish these substances, but nearly all are liable to objections. A solution of iodide of potassium and starch is colored blue by ozone as well as by the peroxide. The addition of sulphate of iron, or of litmus, has been recommended, but the results have been questioned. Struve proposed a solution of oxide of lead in caustic potash, with the addition of a few drops of basic acetate of lead, in which the peroxide of hydrogen produces a precipitate of binoxide of lead. A freshly prepared solution of guaiacum that has not been exposed to the light, and to which a watery infusion of malt has been added, first turns pink and then blue by the action of the peroxide, and forms a test of such delicacy that one part in ten millions can easily be detected. Yet this test is also affected by ozone. The investigations in progress at the Institute seem to indicate, however, that ozone acts upon it much more slowly than peroxide of hydrogen does. The same remarks apply to the test of A. Levy, of Paris, who uses arsenious acid and arsenite of sodium, which are converted into arsenic acid and sodium arsenate by the action of ozone.

Reasoning from the analogy of the recomposition of nitrate of ammonia from nitrous oxide and water, our distinguished chemist, Sterry Hunt, threw out the ingenious suggestion that the nitrates in the atmosphere might be due to the combination of atmospheric nitrogen with evaporating water. Later, Schönbein, the discoverer of ozone, came to the same conclusion from different premises, and actually found nitrites in the air wherever water was evaporated. Bohlig, however, demonstrated that in these experiments the proper precautions had been neglected, and that the nitrites found pre-existed in every case in the atmosphere. When the air was previously purified from every trace of nitrites none could be detected in the results of the experiments. This was a fortunate fact, for if nitrites were formed by mere evaporation of water in the air, atmospheric tests would be of no value, as we could never determine to what agency our reactions were due. In another sense, however, it was unfortunate, as it deprived us of a very plausible explanation of nitrifaction in the atmosphere, on which plant life is in a great measure dependent.

The most extensive investigations of the presence of hydrogen peroxide are those of Schoene, of Moscow, who examined all the snow, hail, rain, and sleet that fell in Moscow for one year, beginning July 1, 1874, and ending June 30, 1875. He found peroxide present in 208 out of 215 specimens of hail and rain, and in 86 out of 172 specimens of snow and sleet. The average amount was 0·17 c.c. in 1,000 cubic meters of air. His method was to add his sample to a weak solution of iodide of potassium and starch, and to compare the color ation with that produced by standard peroxide solutions of different strength. He found among other interesting results that the equatorial winds were much richer in peroxide of hydrogen than the polar winds. Houzeau, of Paris, was unable to find any peroxide in the atmosphere of that city, and it is suggested that it may be absent in some localities. Prof. Leeds found none in Hoboken, although his processes are so delicate as to enable him to detect minute quantities like the following: 100,000,000 parts of air were found in one analysis to contain 16 parts of ammonia, 10 parts of nitrous acid, and 17 parts of nitric acid, equivalent to 15 parts of nitrite and 20 of nitrate of ammonia.

The influence of these substances may be of the utmost importance in relation to health and disease, as well as to vegetable life and growth. But the investigations made in reference to their determination, both qualitative and quantitative, will be of limited utility so long as any doubt is possible as to the reliability of the tests employed. When the New Jersey Board of Health desired Dr. Leeds to furnish them with trustworthy ozonometers to be used in systematic observations throughout the State, he was obliged to reply that there were none he could recommend.

INDUCED MAGNETISM.

Mr. Wolcott then exhibited an experiment to show that a wire, magnetized at its middle point by contact with the pole of a magnet, had the same polarity at both ends. Prof. Seeley then made some remarks on induced magnetism, which were discussed by Mr. Warner, and the Academy adjourned.

C. F. K.

Hyposulphite as a Therapeutic Agent.

Anthony's Bulletin contains a communication from a correspondent proclaiming the rare virtues of hyposulphite of soda as cure for erysipelas. Medical men are familiar with the use of hyposulphite as a somewhat active aperient, and it is regarded by some as very valuable in removing impurities of the blood; but it has not come much into use in medicine. We place the new claim for it on record, but would caution our readers against experimenting with disease. Erysipelas is too dangerous a malady to be tampered with, and should be placed under the treatment of a competent medical man. We subjoin the communication in question:

"I take pleasure in communicating the needed information concerning the virtues of hyposulphite of soda in erysipelas. Of course, when erysipelas proceeds from a wound, it is more delicate to manage, and requires the best surgical skill; but when it is of the milder form, on the outside skin in the face or any other part of the body, proceed as follows: Take of hyposulphite of soda any quantity, and make a saturated solution in a bottle of any convenient size—six, eight, or ten ounces. If the individual is a strong, hearty man, and the disease has a good start, give your patient one tablespoonful every hour for twelve hours; then decrease the dose, as the benefits become manifest, say once in three hours. It may cause diarrhea; but never mind, it will destroy any febrile symptoms. Twenty-four hours is generally sufficient to produce a decided change for the better, unless it has six or seven days' start, in which case it will take longer. The results are generally so wonderful that I have never known the remedy to fail. With an old person you may substitute a teaspoonful for tablespoonful, and once every two hours. You may put this down: that the sooner you can get a good quality of the soda solution into the body, the sooner the trouble will be over. Now, for an outward application: use equal parts of the soda solution and glycerine; saturate cotton flannel with the above, and lay on the part affected. Eat simple food—avoid all exciting food and drink; farinaceous diet is absolutely necessary. If you can bathe the part affected with the above solution, do so; then lay on the saturated cotton.

"Hypo is equally as efficacious in any poisons from insects or vegetables; old wounds in sores are soon healed by washing the parts in a solution of soda. It is also good in typhoid fever, carefully administered.

"Now, if a person has a form of erysipelas that is not so decided, but (say) chronic, let him take a teaspoonful every night of the solution, and the disease will be entirely removed, if kept up for a month. The disease seldom or never attacks a person the second time when eradicated by the soda treatment.

"If any other information is needed, I shall be very much pleased to communicate, for I consider the foregoing has saved my life, and it has cured fifty persons in succession without fail right under my own supervision."

RECENT MECHANICAL INVENTIONS.

An improved apparatus for automatically measuring and discharging grain has been patented by Mr. Robert H. Edmiston, of Loveland, Col. It is particularly intended for use in connection with thrashing machines to measure the grain as it is delivered from the thrasher.

Mr. Daniel D. McIntyre, of Sterling, Neb., has invented an improved washing machine, consisting of a semi-cylindrical suds box, having a slotted bottom, and having a pump barrel for creating a circulation of the suds, as the semi-cylindrical rubber is operated by means of a hand lever.

An improved press for compressing cotton and other similar materials has been patented by Mr. W. J. Butts, of Willow Green, N. C. It consists in a horizontal box mounted on wheels, and drawn forward by a screw, the ribbed bed at the end of the box being drawn forward by a screw toward a fixed ribbed platen, so as to compress cotton contained in the box.

Messrs. F. E. Cross and R. G. Speirs, of Waterbury, Conn., have patented an improved machine for straightening and cutting wire. It is arranged to work automatically, and it consists in an arrangement of clamps and a stopping device in connection with cutting mechanism, which cannot be described without an engraving.

An improved grain toller has been patented by Mr. David Waugh, of Willsburg, W. Va. It consists in a notched rotating disk arranged in the grain tube. It is contrived so that the grain that passes through the notch as the disk revolves is counted as toll.

An improvement in machines for dressing millstones has been patented by Mr. David L. Ellis, of Homer City, Pa. It consists in the combination of an adjustable slide provided with a rubber block or strip and set screw, and a peculiar arrangement of frame and feed screw.

Messrs. S. S. Black, of Fredericton, N. B., and Charles A. Black, of Chicago, Ill., have invented an improved machine for trimming the sole edges of boots and shoes. It consists in a combination of ingenious devices, whereby the sole is quickly and neatly trimmed.

Large Farming a Precarious Business.

The following figures are given by a San Francisco correspondent of a Philadelphia paper, as evidence that farming on a gigantic scale is profitable neither to the country nor to the farmer. He says: "The largest wheat producer in California, or in the world, is Dr. H. J. Glenn. He was formerly from Monroe County, Missouri. He is a man of great enterprise and energy. His ranche lies in Colusa county, and comprises 60,000 acres, nearly all arable land. He has this year 45,000 acres in wheat, which, at a low calculation, will produce 900,000 bushels. His wheat will sell for 85 cents per bushel, or $765,000. Dr. Glenn has been farming ten years, and one would suppose he ought to have a handsome sum to his credit in bank; but what with a failure of crops—which occurs two years in every five—and the enormous interest he pays on his loans, he is said to owe a round million of dollars. Last year his credit was bad, as he had no crop. Now, with his splendid crop in prospect he will probably get out. The Dalrimples of St. Paul, who, ten years ago, were the largest farmers of wheat in Minnesota, raising as much as 40,000 bushels in a single year, went to the wall. Another large wheat raiser is D. M. Reavis, whose land lies on the borders of Colusa and Butte counties. He is also from Monroe county, Missouri, and has an unpretending little estate of 15,000 acres, 13,000 of which are in wheat, which he thinks will average this year 30 bushels, or 390,000 bushels. He also is hard pressed, and I am told is paying 9 per cent on a couple of hundred thousand dollars of borrowed money. If farmers raising half a million to a million bushels of wheat cannot get out of debt, it might be well to inquire what is the use of having so much land? The truth is that from the frequent failure of crops in California and the waste that attends on large operations of that kind, farming on a gigantic scale in this portion of the Pacific coast must be considered a failure. North of this, in Oregon and Washington Territories, there is no failure of the harvest; farming operations are carried on on a smaller scale, and consequently the farmers, while not rolling in wealth, are all well to do."

Rapid Communication.

A merchant, sitting in his office in South St., New York, recently received an answer to his dispatch sent to Shanghai, six hours previously. Thirty thousand miles in six hours is good time, even for the telegraph. The charge to Shanghai is $2.80 per word; to Yokohama, $3.05; but the code, or cipher, is so well systematized by certain mercantile houses, that a single word serves for a dozen when transcribed.