MISCELLANEOUS.

[Reported expressly for the Scientific American.]

Lectures on Chemistry.---No. 3.

[An abstract of a Lecture on the Atmosphere, delivered before the Mechanics' Institute, at Cincinnati, Ohio, by Prof. Chas. W. Wright.]

The following diagram may be taken by representing the average composition of the air:

	By volume.	By weight.
Oxygen,	20·55	22·76
Nitrogen,	78·16	76·15
Vapor of Water,	1·25	1·03
Carbonic Acid,	0·04	0 06
	100 00	100 00

Besides the above-mentioned constant ingredients, the general atmosphere is probably never free from the presence of minute amounts of ammonia, probably the carbonate, iodine, and ozone.

The proportions of oxygen and nitrogen, are generally the same from whatever locality the air is taken for analysis, but from some recent researches on the composition of the atmosphere, instituted by Dewey, it appears that the proportion of oxygen is greater in air taken from the surface ot the sea than it is over the land. The difference, however, is very slight.

The quantity of the vapor of water in the atmosphere varies with the temperature, being greater in summer than in winter. In summer the absolute amount of water in the air may be very great, and yet the atmosphere will appear dry, from its capacity for moisture, being increased by the elevated temperature; and in winter the air may appear moist from its capacity for the vapor of water being diminished by the low temperature; the relative amount of moisture in the last case being great, but the absolute quantity much less than when the temperature is higher. The moisture ot the atmosphere sometimes exists in the form of vesicles, and when at great heights constitutes clouds; when near the surface of the earth it is called fog. The only difference, then, between a cloud and a fog, is, that the latter is in contact with the surface ot the earth, and the former is high up in the atmosphere. These vesicles are formed whenever the air is highly charged with moisture, and has its temperature suddenly reduced. This is seen when the warm moist air of the Gulf Stream is cooled off the Banks of Newfoundland, where probably the fog is more dense than in any other place in the known world. In the fall and spring navigation of our western rivers is frequently interrupted by dense fogs. In the fall the land becomes cold by radiation sooner than the water in the river, and the capacity of the air over it, for moisture, diminishes, consequently it condenses the moisture, which is held in transparent solution over the water, producing a fog. In the spring, on the contrary, the land becomes heated sooner than the water, and heats the air in contact with it, increasing the amount of moisture in it, which, as it comes in contact with the cold water, is condensed as vesicles of fog. Thus we see that the fogs of spring and fall are not produced in the same mannner.

The amount of carbonic acid in the atmosphere varies; thus, it is greater in winter than in summer, it increases in dry weather, and is greater during the night than during the day. On high mountains and elevated situations, it is in greater abundance than in valleys and on plains. After a shower of rain it is less in quantity, being dissolved and carried to the earth. In the summer, when the sun is above the horizon, it is abstracted from the atmosphere by the green matter of the leaves of plants, and an equal volume of oxygen returned to the air in its stead, and hence its diminution at that season of the year. The carbonic acid is a no less important constituent of the atmosphere than oxygen, for without it plants cannot grow, it being the food of that class of organized beings.

It becomes a question, as the above-mentioned substances are of different weights or specific gravities, why they do not separate from one another in the order of their densities, forming regular strata—the lighter gas resting upon the heavier? The reason why it does not occur is, because all gases, so to speak, are soluble in one another; in the same manner as alcohol and water, which, when mixed, have no disposition to separate, although water is much the heavier body. This mingling of the gaseous elements, in the atmosphere is called diffusion, and if it were not for this very important law of the gases, a city like that of Cincinnati would, in the course of a few hours, in the winter time, be entirely submerged in an atmosphere of carbonic acid gas, or "choke-damp," or "the damps," as it is commonly called, which is the gas that suffocates persons descending into wells and coal pits.

The atmosphere possesses within itself the means of its own purification, and converts all decomposing organic matter into carbonic acid, water, ammonia, and nitric acid. Ozone is probably the principal agent which accomplishes these very important transformations, for it is the most powerful oxydizing agent in chemistry, attacking and destroying all organic matter. Thus, then, by the action of the green matter of the leaves of plants, the law of the diffusion of gases, and the oxydizing power of ozone, the atmosphere is kept in a state ot eternal identity of composition.

Hydraulic Rams.

Messrs. Editors—In No. 7, page 53, of the Scientific American, you appeal to your Pennsylvania friends, by whom you doubtless mean Mr. Birkinbine and myself, to answer a communication you received from J. D. Rice, of Philadelphia; I have waited until this time to see what reply Mr. Birkinbine would make to this appeal, but as he has made none, I feel compelled, in self-defence to state how far this commnnication has any reference to me. As to the ram at Naples, N. Y., I never had any thing to do with it, and the first intimation I ever had of its not succeeding, was through the communication of Mr. Rice. All that I had to do with the ram at Girard College, was to calculate and make a draught of the curve of quickest descent for the driving pipe; this I did at the request of Mr. Henry Tatham, who took a deep interest in the concern, and recommended the works to be erected, and through whom I sent the calculations and draught to Mr. Birkinbine, who, I infer from letters I received from him afterwards, laid it out accordingly. I understand, by those who ought to know, that this ram was discontinued only on account of the feed-water becoming too small for the increased demand, and not to anything depending on either Mr. Birkinbine or myself. If I have stated, above, anything incorrect, Mr. Birkinbine can correct me. Joseph C. Strode.

Remarkable Escape.

The Reading (Pa.) Journal states that a young man of that borough, a printer, while paying a visit to certain iron ore mines in that vicinity, undertook to descend a perpendicular shaft, some eighty-five feet to the first landing, by means of a bucket and windlass. When let down, however, about ten feet, the bucket struck an obstruction, and was suddenly overturned, throwing the young man out, but fortunately feet foremost, which position he kept the whole seventy-five feet to the bottom, striking upon some boards covering a deep pit of water, which broke his fall and saved his life. He was slightly scratched and bruised by striking the sides of the shaft, but was otherwise unhurt.

Steam Fire Engine.

The municipal corporation of Cincinnati have just had constructed for use in extinguishing fires, a steam fire-engine; and at a public trial of it it has proved entirely successful. It throws six streams of water by steam power, works constantly, and steam can be generated in five minutes, and kept up without difficulty for any length of time. It is drawn by horses, assisted by the power of the machinery.—[Exchange.

[Mr. Ericsson constructed such an engine for this city years ago: it is illustrated in Ewbank's Hydraulics, and there was one illustrated in our last volume.

The Fire Telegraph of Boston.

The new Fire Alarm System in Boston does not work well at all. The Secretary of the Board of Engineers sent a communication to the Common Council that it is an entire failure, or "a miserable failure," as one of the members termed it. The communication was referred to the Committee on the Fire Department. The system will no doubt be abandoned at once.—[Lowell Courier.

[This is bad news; we are not prepared to say a word in comment, as it is a question of fact. A Police Telegraph—a visual one—is soon to be erected in New York, by Robertson & Miller, upon the principle, we believe, of Bain's Railroad Telegraph.

Manufacture of Iron--- New Process for Making Wrought-Iron Direct from the Ore.

In the process of extracting iron from the ore, although an object of the utmost consequence, the aid of science has never been employed to the high degree that its manufacture would appear to require:—such as it was in the days of our fathers, such it is now, few or no material changes having been made in the mode of making iron from the earliest periods of the art. Considering the vast increase in our knowledge of chemistry during the last half century, it is a great reproach to the iron masters of America and England, that while all other classes have made such rapid strides in the onward progress of improvement they alone have remained quiescent, content to go on in the same hum-drum manner from one generation to another. This apathy, we are glad to find, has been at last broken into, and a new era of iron-making is about to be inaugurated, in which, we are proud to say, our country will take the lead. A new process for making wrought-iron direct from the ore, independently of the usual introductory melting into pigs, has been discovered by Mr. Jas. Renton, of Newark, N. J., who has taken measures to secure a patent for the same. A company, with a capital of $100,000, have been formed for the purpose of carrying on the manufacture, and buildings have been in part erected on the Passaic River, at the foot of Parker street, Newark, where the process has been now in successful operation for several weeks. The results of these experiments have been such as are fully conclusive ot the advantages offered by this new method: a good quality of wrought-iron can be made direct from the ore, by which an immense saving in the ordinary manner of using pig-iron is effected.

The process is founded upon truly scientific principles, and supersedes the necessity of previously melting into pig-iron, as the ore can be made immediately into blooms, an advantage which will be immediately appreciated by all interested in the manufacture of iron. We have personally visited the place and can, therefore, speak more confidently on the subject; during our stay we saw the operation carried on, and marked the time required for making the iron, which was at the rate of a ton per day, of twelve hours,—3 blooms of over 70 lbs. each, having been made in about an hour. An improvement like this, on the old-fashioned slow and expensive process, by which the ore or metal has to undergo two successive exposures in the furnace before it can be made into wrought-iron is a great triumph of American skill, we hasten, therefore, to record the event, and doubt not that other countries, as well as our own, will vie with each other in laying hold of the benefit conferred upon our times by the consequent economy that is now presented to their notice. Any description of fuel—wood or coal, both anthracite and bituminous, can be indifferently employed for heating the furnace, and with nearly equal advantage. Further particulars may be known by letter or otherwise, addressed to the above-named gentleman.

Letter from China.

Canton, China, Aug. 7, 1852.

Messrs. Editors:—I have seen it stated that daguerreotypes have been taken on glass plates, and wish to ascertain whether the coating renders them opaque, so that they would not answer to be used in the place of paintings in a magic lantern. If they could be so used it would increase the facilities for communicating truth and science to this people, especially in physiology and natural history. I wish, also, to learn the most approved and least expensive method of cleaning rice in the United States; the method here is quite primitive, and leaves the process half completed. Has india rubber ever been tried as a covering for the inking rollers of the printing press, in place of composition? Will it answer?

By answering these queries in your columns you will much oblige one pledged to benefit mankind to the extent of his ability.

Yours, &c. D. Vrooman.

[The daguerreotypes on glass which we have seen, would not answer for the magic lantern.

The Rice Hulling Mills, employed in South Carolina—an improved one being patented by P. McKinlay, of Charleston, last year—are simply beetles working in a close chamber, and made to pound the rice.

India rubber has been tried for printers' rollers, but it does not answer the purpose like the kind made out of molasses and glue.

It is our opinion that the Scientific American finds its way into more families than any other paper (except it may be some religious ones) in the world. We have a subscriber in the capital of Siam—and here is one in Canton; and in many curious nooks and corners of the world, the contents of our columns are discussed weekly by men—the intelligent few—scattered among the people of different nations, kindred and tongues.

Heating Water for Steam Engines.

Two gentlemen in France have patented an apparatus that promises to be of much use in economizing the fuel for high pressure engines. The plan consists in conducting the steam, after its action on the piston, into a close vessel, which likewise holds the cold water intended for the boiler: this latter rapidly acquires, by the condensation, a temperature of 98° or 100° centigrade. The water is then conducted into another vessel, in which it deposits the earthy particles and other extraneous substances, that it may contain before entering the boiler.—This arrangement presents the advantage of forming much less calcareous deposit, and of not obliging the boilers to be so often cleaned

Fire Damp Explosions.

An explosion of fire damp took place last week in Mr. P. Fogarty's colliery, at West Wood, Pa., burning eight persons, several only slightly but three badly, one of them has since died. The explosion, according to the "Pottsville Miners' Journal," was caused by sheer carlessness—the colliery had not been worked for several days, and while in the act of cleansing the breast of the foul air that had been collected, a common lamp was taken directly into the current of foul air which caused the explosion.

The Iron Trade Flourishing.

The Montour Rolling Mill, in Pennsylvania, is now running up to her utmost capacity, on heavy rails. The Rough and Ready Rolling Mill is running on small rails and merchant iron. Three anthracite furnaces are in blast in this region, and two more, lately repaired and enlarged, will be blown in next week. Two others are to be enlarged and repaired, as soon as may be, and put in blast. This will make seven anthracite furnaces in this vicinity, and the hot blast fixtures, lately arranged and to be arranged, are put up with a view to the building of two more furnaces. "When these improvements are completed," says the Danville Intelligencer, "we will have nine anthracite furnaces in this vicinity supposed to be the best location for making iron in the world. The Montour Company are now laying the foundation for another rolling mill, 200 feet long, with a view to doubling their capacity to make railroad iron. These, and other improvements going on here, once completed, it will be idle for any other iron region in the United States to show facilities for the manufacture ot iron equal to those of Danville."

Salt of Gold.

A double salt of hyposulphite of gold and of soda, known by French daguerreotypists as the "salt of gold," has been lately obtained, says the "Lumiere," by a French chemist, M. Engler, of the greatest purity and perfectly white.

The total loss of property by fires in California during the past three years, is estimated at sixty-six millions of dollars—more than has been destroyed by fire in all the rest of the United States during the last ten years.