MISCELLANEOUS.

[Reported expressly for the Scientific American]

Lectures on Chemistry.---No. 2.

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

Water is composed of oxygen and hydrogen combined, in the proportions of eight parts of the former to one of the latter, by weight, and by volume, of two of hydrogen and one of oxygen, or in 100 parts of water there are 11·1 of hydrogen united to 88·9 of oxygen.

Water plays the part of a base towards acids, and of an acid towards bases: thus, when it combines with sulphuric acid it is termed the sulphate of water, and when it unites with lime the compound takes the name of the hydrate of lime. By most chemists, water is looked upon as a metallic oxide or rust, hydrogen being considered a metal; and Dr. Kane has shown that there is the closest similarity between the oxydes of zinc and copper, and water, which is the oxyde of the metal hydrogen.

In some quantities, water is transparent and colorless, but in large volumes it is blue by reflected, and green by transmitted light. The solvent powers of water exceed that of any other liquid. As a general thing, this solvent power is increased by heat, as regards solids, but the reverse is the case as regards gases. Under great pressure, water will dissolve bodies, as glass, which are insoluble in it at a moderate heat and pressure. Water, like most other bodies, contracts on the abstraction of heat; but when its temperature is reduced to 39°, the loss of heat, instead of causing contraction, increases its volume, and hence, at 39°, water is at its point of maximum density, and the addition or abstraction of heat will augment its volume. From 39° to many degrees below the freezing point of water, it expands, and hence ice is of less specific gravity than water, and floats upon it. The importance of this, in preventing the consolidation of large bodies of water, is evident. At 32°, if water be agitated, it freezes, but if it be under great pressure, which resists its expansion, it will not consolidate at that degree of temperature, and the same is true in regard to other substances that expand in congealing. Water, in the act of freezing, parts with all matter which it holds in solution and suspension, and hence the water of the ocean is rendered sweet and drinkable by being frozen. On the same principle, ice, which is cut from pools that are stagnant in summer, is fit for domestic use. Ice which contains air and other impurities, mechanically suspended in it, thaws much sooner than that which is free from such contamination. In passing into the condition of water, ice conceals, or renders latent, 140° of heat, and water, in the act of freezing, imparts the same quantity of heat to surrounding bodies. Hence, freezing is a heating process, and thawing a cooling one; for the same reason large masses of snow and ice are never melted suddenly, and inundations are less frequent than they otherwise would be.

When the mercury in the barometer stands at 30 inches, water boils at 212° in a metallic vessel, but in a smooth glass vessel it requires 214° to make water boil. Water, free from air and other impurities, does not boil at 212°, but when it reaches a temperature of 270° it explodes violently. This can best be shown by melting ice under the surface of oil, which prevents the absorption of air, when at 270° it explodes. A diminution of atmospheric pressure reduces the boiling point, and if it be increased the reverse is the case. Water evaporates at all temperatures, even in the condition of ice it assumes the gaseous form, without passing into the intermediate condition of a liquid. This is seen when articles of clothing are hung out to dry in winter, when they freeze and dry without thawing, and the same thing is seen when the mud in the streets freezes and dries, although the temperature may remain below 32°. In boiling and passing into the condition of steam, water takes up and conceals 1000° of heat; and when this fluid is boiled violently, it is no hotter than when it boils slowly, from the fact of the additional heat being carried off by the steam, and the temperature of the water, under ordinary atmospheric pressure never rises higher than 212°. The knowledge of this fact is of great importance in domestic economy; for water, boiling gently, will accomplish as much in culinary operations as when the ebullition is violent. The latent heat carried off by steam has much to do with regulating the temperature of the earth, and also that of the bodies of animals, for the same law holds at low as well as at high temperatures. At 212° the elastic force of steam is equal to a pressure of one atmosphere; at 250° the pressure is doubled; and at a temperature of 500° we have a pressure equal to 50 atmospheres. Thus we see, contrary to the common impression, it does not require twice the amount of heat to double the pressure. The action of water on metallic vessels is not a little singular: thus, if the water be pure, its action is more corrosive to lead and zinc than if it have mineral matter in solution. The water of the ocean, at great depths, has a different action upon metals from what it has at the surface. At the surface, according to the experiments of Dr. A. A. Hayes, metals are converted into oxydes and chlorides, but at great depths the same metals are converted into the sulphurets.

The Poetry of Mechanism.

On the Evening of the 14th inst. the Rev. S. Osgood delivered a most interesting lecture before the Mechanic's Society, the subject of which was. "The Poetry of Mechanism, or the Future of Useful arts:—"

When Franklin, said the lecturer, upon seeing some flies restored to life that had for some months been immersed in wine declared that he would gladly be drowned in the same manner, if after the lapse of a hundred years he could be resuscitated, and be allowed to see the state of things in this country at that time, he little thought how far the reality would surpass his most sanguine expectations. So varied and startling have been the events of the last century, that its sober history, if stated befoehand, as prophecy, would have been deemed about as probable as some Oriental legend or narcotic dream. Before the gateway of that palace of historical wonders into which Christendom for three centuries has been passing, and where as we press on, each year is adding some new marvel, and prompting the question, "What next? what next?"— as the veil before an unexplored recess is beginning to quiver, before that gateway stand three forms who have given the chief impulses to all modern history. Central stands a stout figure that cannot easily be mistaken; in his hands he holds an open Bible, and at his feet, among a pile of controversial folios, may be seen a scroll bearing the title, "Address to the Magistrates of Germany in behalf of Public Schools." On one side of him stands a manly form, with a face blending the refinement of the gentleman with the daring of the sailor, and you hardly need to look upon the compass and the helm before him to connect him with the sea. On the other side stands one with far less imposing air, yet with the inbred dignity ever characteristic of earnest intelligent industry, he leans upon a rude printing press, as seeking rest after anxious thought and severe toil.—These are the three, you know them at once, Luther, Colombus, Guttenberg; three heroes, arbiters of modern history. The open Bible, the New World, the printing press; with these powers what vast revolutions associate themselves.

Let us select any master piece of mechanism, and consider, not merely the beauty of its workmanship, but the exquisite adjustment of its various parts and movements. Let it be a printing press or a spinning frame, a power loom or a steam engine, an organ or a telescope. Consider the number of materials and forces harmoniously combined—recall the history of each material and the origin of each force, and straightway every law of nature, faculty of man, gift of Providence, associated itself in some way with the construction. Nay, every piece of wrought iron was, to a thoughtful mind, a heroic poem, for it told the story of an art identical with the progress of civilization. The telescope! what power of mind, what skill of the hand, what use of life, what attribute of God, was not illustrated by its structure and application? The most common mechanism, would tell, if we listened, a chapter of romance. Enter the realm of the beautiful arts, and did we not see the mechanic as virtually translating its master pieces into general language, and by correct copies bringing the most beautiful forms of art within the means of many. In music, when hearing the compositions of Thalberg, or an oratorio of Haydn, we should not forget that Shoedek invented the piano, and Forner gave the organ its compass and swell. Our enjoyments of scenery, too, were in a great part owing to the iron-horse and iron-oarsman. The beauty of mechanical art interpreted the beauty of natural mechanism, and here a realm opened into which we could not even glance.

When we look back to the invention of printing by Guttenberg, and see what has been accomplished since; "what are the next four centuries to do?" The facts of history gave romance to the pages opening in the future. The common-places of our day would have startled our Puritan fathers. Old Merlin would be found a tame plodder, when compared with the philosophic Morse. Mysteries opened all around, in iron, air, water, fire.—The modern Aladdin had rubbed the magical ring, and a Titan power knelt at his feet and waited his word; he had lighted his wonderful lamp, and lo! from its flame a power arose that reared palaces, cast mountains into the sea, and mocked at winds and waves. Who would dare to predict the future—to speak what things should be done in the air, or on sea or land, or under the earth—to conjecture how far mechanism would borrow mind from man. The future of mechanism was intimately connected with the physical, mental, and moral destiny of man. All history showed that man had progress in proportion to the power of the implements within his reach. That a great work was to be done for the welfare of man, was evident from what had been done. The wealth of England came from her manufactures, and Watt and Arkwright, more than Wellington and Blucher, gave her the palm in the strife with the enemy. Our Fulton gave this nation a greater source of wealth than all the mines of California. The lecturer proceeded to show that the mind of man would share in the power destined to mechanic art. That it would ameliorate his condition—our men would toil and feel no pain. Politicians were in the habit of speaking a great deal about maintaining the Union; but he would say a word for the mechanic. He believed the mechanic had so wired and clamped it together, that politicians would find hard to dissever it. In conclusion, Mr. Osgood said that the different lines of discoveries and inventions had been converging towards a common centre. In a thousand ways, the movements started by Luther, Columbus, and Guttenberg combined in new adaptations. Arkwright, Watt, and Fulton, met and combined as they never dreamt of; Franklin and Galileo united their discoveries in the telegraph years after their decease. When the arts and sciences, with their strong arms and sage heads, met in a true order, central among the vast hosts would stand the symbols of religion—chief among the waving pennons should float the spotless banner of Him who was the power of peace and king of men. The invention of Watt, the analyses of Davy, the constructive genius of Angelo, all should be represented in concert with the faith of Luther and the humanity of Penn. Thus guided, mechanism would follow a Divine mandate; it would build the walls that are salvation, and the gates that are praise. The strong hand outstretched in power should be uplifted in devotion and opened in charity. The speaker sat down amid loud applause, and well he deserved it. He takes true and noble views of the benefits conferred upon man by inventors and discoverers.

First Locomotive West of the Mississippi.

On the 2nd inst., the first scream of the iron horse was heard on the west of the Mississippi in St. Louis.

The Pacific Railroad has been commenced, and has so far progressed that the locomotive, with burden and freight trains, is running upon it. True, only a few miles are yet in use, but who can predict how long or short the period when the locomotive will start from the Mississippi and terminate its flight on the shores of the Pacific.

The New Crystal Palace.

Our friends the Directors of the New York Crystal Palace, who have so ostentatiously put themselves forward as the sole Representatives of American Industry, appear to have but little suitable notions of their heavy responsibility. We have made a visit to Reservoir Square, and were disappointed at beholding the building in so backward a state, nor does there seem to be much inclination to carry it on with a proper vigor. Only a few columns have been reared, and there are both a numerical deficiency of workmen and very little material on the ground. We would advise Mr. Sedgwick and his coadjutors to evince more energy, or else we are confident the Crystal Palace will never be completed at the specified time. The frost has already set in and from now until the following spring not much can be done. How long, we would ask Mr. Sedgwick, will there then be to erect the building? Not two months, and not only to erect it, but to have every thing prepared and arranged for exhibition. According to their present manner of working, they will require at least twelve months instead of until May, to get it complete. Upon the whole we are fearful that the affair will turn out a failure; nothing has been done on a scale commensurate with the proposed objects—The building, with regard to size, will evidently be ridiculously small, and if only one half of the quantity of articles are sent that have been expected, there will not be room for them. A similar petty spirit appears to guide the Directors in other matters, and already it has set itself up antagonistic to the interests of private individuals in the city. Instead of being what it was proposed to be—an Industrial Exhibition similar to that in London, for the encouragement of manufactures and trade, it is diminishing already into a mercenary speculation, and the objects lost in gratifying the whims and pandering to the views of an interested clique. Unless some change is made, we doubt much whether it will not turn out a failure, for at present there is not that public spirit exhibited by the Directors which we had hoped to have seen evinced. Our character as a nation depends upon their management of the concern.

The First Prize.

We have received the following letter from the party who gained the first prize for the largest list of subscribers, and are rejoiced to find that a hard-working mechanic has been the lucky man. It will be seen from his letter that he has not lost any time while canvassing for us; and we will undertake to say the time he has spent in reading the Scientific American has not been lost either. If our subscribers would only exert themselves a little in diffusing a knowledge of our paper among their acquaintance, we have no doubt that the circulation would be immensely increased. It is evident from what our correspondent says, that its advantages are immediately felt and perceived by those to whom it is made known:—

"Messrs. Munn & Co.—Your favor of the 13th inst. was gratefully received, containing the announcement that the first prize for the largest list of subscribers was awarded to me; it was somewhat unexpected, though I fondly hoped to be the lucky man. The Scientific American is truly a valuable source of knowledge—the reading of which commends it to every intelligent man, and I found that it required no extraordinary gift of gab to convince those who would give it their attention. I shall endeavor, wherever I may be located, to introduce it among my acquaintance, and to extend its patronage. As you wish me to indicate my preference either for the Pitcher or the money, I would state that I am a mechanic, dependent upon my daily toil for a livelihood—and you are aware that mechanics' means, at best, are small—and therefore choose the money. I may as well add that I obtained my subscribers without losing any time from my business. Permit me to thank you for your promptness and gentlemanly attention to myself although to you a stranger.

John Marston.

Saratoga Springs, N. Y., Dec. 16, 1852.