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## MORE LIGHT.

The duplex tendency of modern science, to multiply the number of observed phenomena and at the same time to simplify our interpretation of them by bringing, into consistent and comprehensible order, facts that have seemed to be capricious, irregular and isolated, is happily shown in the latest discoveries in regard to the nature of sun light.

Hitherto the sunbeam has been thought to have a threefold character. It illuminates, warms and induces chemical changes; hence the inference has been that it must be composed of three distinct sorts of rays, interwoven like the triple strands of a cord but disentangled when subjected to the refracting influence of a lens or a prism. The evidence for this view has been very convincing. That the maximum illuminating power of the solar beam lies in the yellow portion of the spectrum is patent to every observer. Sir William Herschel found, by careful thermometric study of the spectrum formed with a prism of glass, a very unequal distribution of heating rays: there are very few in the violet end, from which point they increase slowly through the blue, green and yellow, very rapidly in the red, and attain their maximum manifestation in the invisible portion of the spectrum below the red. Dr. Wollaston, experimenting with the sensitive salts of silver, developed a similar inequality in the distribution of the so-called chemical rays, their intensest influence appearing in the violet and ultra-violet portion of the spectrum. From these and a multitude of later observations, telling substantially the same story, the supposed threefold character of the solar emanations has come to be a generally accepted article of scientific belief. Now, however, it appears that, while the observations were correct, the inference drawn from them was a mistake. Nearly thirty years ago, Dr. Draper called attention to an inherent defect in the prismatic spectrum, a defect originating in the very cause which gives rise to the spectrum, namely, unequal refrangibility. The rays toward the violet end are much more widely separated than those of the red end, and consequently a smaller number fall upon any given surface—as for example the bulb of a thermometer—and produce proportionately a smaller thermic effect. The fact, therefore, that the temperature of the violet portion of the spectrum is lower than that of the red does not prove absolutely that a violet ray has a lower heating power than a red ray, though it would seem so at first sight; the observed inequality may, and as experiment shows, does, arise wholly from the nature of the prism.

By an elaborate series of experiments, Dr. Draper has just shown that, if the visible spectrum be divided into two equal portions and all the more refrangible rays be collected into one focal group, and all the less refrangible into another, the heat-producing powers of the two are practically equal, instead of being strikingly unequal as they would be if the current belief were correct. He chooses, as the optical center of the visible spectrum, the ray having a wave length of 5768—the mean between the wave lengths of the less and more refrangible ends—and proves the portions on either side to have heating powers "so nearly equal that we may impute the difference to errors of experimentation." This demolishes the opinion that there exists in the solar spectrum a heat spectrum covering the less refrangible regions. Does the belief in a chemical spectrum in the more refrangible regions also stand on untenable ground?

Dr. Draper promises to publish soon the result of his studies in regard to the actinic power of the sunbeam. From intimations already given, we may infer that he will demonstrate the chemical power of rays of every kind, whether of low or high refrangibility, and thus bring this property of the sunbeam, as he does its heating power, into perfect harmony with the modern doctrine of the conservation and transmutation of motion.

The same result, we may add, has been arrived at by the European observer, Professor Lommel, who remarks, in a recent paper, that the curve of so-called chemical intensity only indicates the relation of the sun rays to certain reagents. Different substances absorb different rays, and chemical action, like light and heat, arises solely from such absorption. The fact that the violet and ultra-violet rays act with special force on the salts of silver is no reason for distinguishing them as *the* chemical rays. Other substances are chemically affected by entirely different rays, as for instance the coloring matter of plant leaves, chlorophyll, which is acted on chiefly by red light.

It is worthy of notice that, while these important discoveries materially modify scientific opinion, the change is—like all scientific progress—toward a simpler expression of knowledge; the supposed existence of various principles in the solar emanation disappears to give place to a view in harmony with the widest generalization yet made by man, namely, that there is neither heat, light, nor chemical action in the sun ray, but simply motion, which develops any or all of these manifestations according to the nature of the absorbing substance.

## THE FRENCH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The well filled pages of the French scientific journals indicate that the many industries of France are rapidly recovering from the disastrous effects of the late war. Not only is this apparent, but the popular belief is becoming strengthened: that, by the advancement and diffusion of scientific knowledge, by the cultivation of a scientific mode of thought and study, and by the union of those learned in theory with others equally skilled in practice, the regeneration of the country may be greatly promoted.

A body has lately been organized on the above principles, termed the "French Association for the Advancement of Science," the first meeting of which has recently been held in Bordeaux. The *séance* was in every way successful, not only numbering among those attendant the names of many distinguished Frenchmen, but also those of Messrs. Gladstone of England, Respighi of Italy, Soret of Switzerland, and others whose celebrity is world-wide. At its commencement, the society has 800 members, a capital of 150 000 francs and a revenue of 16,000 francs per annum. M Quatrefages was elected President, and M. Wurtz, Vice-President, for the ensuing meeting to be held at Lyons in 1873.

## A NOVEL NEWS BULLETIN.

Madison Square in this city, at the intersection of Broadway, Fifth Avenue and Twenty-third Street, is one of our most central and notable places. Vehicles and pedestrians converge here from various directions, the square is splendidly illuminated by the new oxygen lights at night, and the locality presents at all times a scene of activity and life. The streets here form a narrow triangle, the sharp apex whereof, covered with a group of small buildings, points directly into the open square. Upon the extreme point of the angle, a diminutive hood or lighthouse has been placed, within which an oxyhydrogen or calcium light and a magic lantern are used to throw pictures, at night, upon a canvas screen, perhaps twenty-five feet high, which is hung from a frame arranged on the roof of the adjoining buildings. The canvas stands in full view from all parts of the neighboring square, and the apparatus is employed in the evening for the exhibition of illuminated advertisements of all sorts. The advertisements are photographed upon glass, and, on being introduced within the lantern, are brought out upon the screen in large characters and beautiful colors. Well executed photographic pictures are also thrown up by way of variety, and the exhibition attracts crowds of people.

On the evening of the recent elections, this magic lantern apparatus and screen was put to use as a news bulletin for the New York *Times* newspaper. As fast as the telegrams of the election returns were received at the telegraph office, which is just across the street, they were written off with India ink on transparent pieces of gelatin, placed in the lantern, and instantly shown upon the screen in huge characters, to the delight of the waiting multitude below. The whole square was thronged with people, who made the welkin ring with their shouts whenever the telegrams particularly pleased them. The lighthouse man would then introduce the figure of a huge negro, in scarlet coat, sitting on a stump and laughing as if his sides would split, or some other amusing thing, the appearance of which on the canvas would be greeted with roars of laughter. It is probable that ten or twenty thousand persons were present, all of whom enjoyed a fair view and easy reading of this truly novel, conspicuous, and admirable news bulletin.

## PROFESSOR JOHN TYNDALL.

It is with especial pleasure that we announce the arrival in New York of this distinguished scientist, who visits our shores for lecturing purposes, observation, and recreation. His lectures will illustrate the latest researches upon Light, and will command marked attention. He is one of the most clear and interesting speakers, and possesses the happy faculty of making every part of the science which he takes in hand thoroughly understood by his hearers. It is stated that he will commence his series of lectures in Boston, returning to New York some time in December. He has been invited to meet the members of the Lyceum of Natural History, in this city, and other societies, before going to Massachusetts. On his arrival here he was welcomed at the wharf by Mr. Hector Tyndall, of Philadelphia, a near relative. In his personal appearance, according to the daily papers, Professor Tyndall is small in stature, of spare face, has bright gray eyes, and a short iron gray beard, wears spectacles, and dresses in black.

## AMERICAN STERLING---A NEW AND REMARKABLE ALLOY.

A company has been recently formed here for the introduction of a new alloy, termed "American sterling." The composition is as yet unpatented and its proportions are consequently secret, but results, drawn from a series of careful tests and experiments, point plainly to the fact that the new metal is not only a discovery of great importance, but to all appearances calculated to revolutionize a large and flourishing branch of industry.

In its crude state, this new alloy resembles nickel; but after being worked up, it is almost undistinguishable from silver. Unlike the latter metal, it does not tarnish and is unaffected by sulphurous vapors, so that it is eminently adapted to replace silver, Britannia or the ordinary alloys in the manufacture of table ware. Articles of food have no action upon it; alkalies produce a temporary tarnishing which may be immediately removed by a slight rubbing with the hand. Made in the form of cutlery, the alloy possesses none of the disadvantages of steel or plate; it takes a keen cutting edge, requires little or no cleaning, and is unaffected by ordinary organic acids. Knives made from it show no black edges after short usage as is the case with plate, while they can be ground or sharpened whenever necessary. The metal is unusually flexible and tenacious; a table fork made from it was, in our presence, twisted into a perfect knot, without showing the least flaw or intimation of breakage.

In the manufacture of hollow ware, there is little doubt but that, when this composition becomes widely known, it will prove a formidable rival to, if it does not entirely supplant, German silver and its kindred alloys. It is not only harder but one third lighter than Britannia metal, while its cost is about one half that of plated ware. Although the articles made from the solid sterling present an appearance equal to fine silver, the alloy may, when required, be used as a basis for electro-plating, the smoothness and evenness of its surface rendering it possible to give the deposited silver a much higher finish than can be imparted to ordinary plate. As the silver wears away in course of time, the sterling, being of the same color, gives no evidence of the fact, so that the unsightly brassy edges and backs common to long used plated table ware are entirely obviated.

The effect of hammering or compression on this composition is to give it an increased elasticity. Its strength is so great that it can be, and has been, substituted for steel in the manufacture of pistol barrels, while repeated tests, made at the Colt Armory, at Hartford, Conn., show that it has three times the tenacity of the latter metal. At an experimental trial, a spring of steel wire parted at 3,000 pulls; 82,000 pulls were necessary to break a precisely similar wire of sterling.

The American Sterling Company, Leavitt Hunt, Esq., President, by whom this metal is manufactured, has its offices at Nos. 1 and 3 Dey street, in this city. Among its directors are many gentlemen well known as of long experience in the silverware trade. The works are located at Naubuc, near Hartford, Conn., and consist of substantially built brick buildings, 500 feet long and 50 feet wide. About 120 hands are employed, and some $100,000 worth of tools of every description are in use. A late visit to this interesting factory enabled us to witness the manufacture of the composition and its subsequent transmutation into finished table ware. Five melting furnaces are used, and about 2,000 pounds of alloy are daily finished. The crucibles used contain 150 pounds each of the metal, which, after melting, is run into ingots about two feet and a half in length. In this condition it is largely sold to spoon and fork manufacturers, throughout the country, at the price of one dollar per pound. The annealing of the ingots is accomplished in a furnace of novel pattern. The bars are placed on a low, wide chamber, below which is a large wood fire. The grate is surmounted by a fire brick arch. The upper chamber has a flat floor, and is also arched above. The heat passes through openings at the side of the fire space, up outside of the same, and then enters the annealing chamber through apertures in its side. In this furnace, which is some twelve feet in length, an entire days' melting can be annealed in two hours.

The rolling mills and subsequent processes for reducing the metal to the requisite degree of tenuity are of the ordinary well known descriptions. At the time of our visit, the factory was engaged upon the manufacture of spoons and forks exclusively, although abundant machinery was at hand for the manufacture of the most elaborate table services. Several specimens of the latter, experimental pieces in the shape of elegantly made and designed ice pitchers, salvers, etc., were shown to us, from which we were able to obtain an excellent idea of the perfect adaptability of the material to the purpose.

With the process of manufacturing spoons and forks by means of suitable dies in drop presses, our readers are doubtless familiar. We have therefore only to add that the alloy is worked by this means as readily as pure silver, and much more easily than the ordinary German or nickel silver. But here an important advantage must be noted. In using the last mentioned material, at least three gross, out of every ten, of forks or spoons are spoiled—that is, owing to the brittleness of the metal, they become cracked under the powerful