

On Heat and Electric Light.

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Heat is not a simple emanation of matter, nor an undulation in any ethereal medium pervading matter, but a force producing motion in matter itself, or in what we may term ordinary matter—a motion which, subdivided into minute vibrations, becomes heat. Yet, it is true, that the opinions of men regarding what "heat is," are very various. We shall now consider it as a product of voltaic ignition. We are familiar with many sources of heat the chief proximate cause of which is the solar influence, but there are others of a chemical, or mechanical character also. Among these are friction, and vital action, but the one with which we are most familiar—the one that is known in cooking our victuals and heating our houses is furnished by chemical action, in the form of combustion, chemical is far more powerful than mechanical action. The action of the steam engine is powerful, but the cause of that action is a chemical one, viz., the expansion of water into steam by heat. The effect of a ball projected from a gun is mechanical action, but the cause of the ball's action is a chemical one viz. the expansion of the gun-powder by ignition. By the voltaic battery we have a means of transferring both chemical and mechanical forces. The one to decompose the other to give mechanical motion, and consequently in both cases, the means of transferring heat.

If we take a slip of platina foil, furnished with a conducting wire immersed in a cylinder of porous earthenware filled with concentrated nitric acid, and surround the porous earthenware vessel by a roll of amalgamated zinc having a conducting wire soldered to it, and placed in an earthen jar containing weak sulphuric acid, we find on making contact and completing the circuit, that we have a source of heat by which platinum wire may be set on fire. But in the body to be heated, we find that certain electrical conditions are necessary; we find that a chain constructed of alternate links of platinum and silver (the latter a better conductor of electricity than the former,) made to form part of a galvanic circuit, will be unequally heated. The platinum links present a luminous appearance, while those of silver look like black bands beside the brilliant light of their companions. The better conductor allows the heat to run off, while the worse conductor affords resistance to the electricity passing through it. But there are also circumstances of an external nature equally important to the production of heat and luminosity by the voltaic battery. Did we live in an atmosphere of hydrogen, the same amount of voltaic force would not give us any ignition of the platinum, and a person experimenting under such an atmosphere, would have to employ a greater power to discover this voltaic force at all. If two platinum wires be arranged so as to ignite in the atmosphere, as stated in the foregoing experiment, and a jar be placed over each, the one jar containing hydrogen, and the other merely containing the surrounding air. On connecting the wires, the one under the jar with air, will become ignited, displaying both the phenomenon of light and heat, while the wire under the hydrogen jar will neither be hot nor luminous, and if the jar be reversed, the former bright wire will become cold and dark and the former dark wire hot and luminous. This fact shows that we are too apt to regard phenomena in a merely abstract light, instead of taking into account all the circumstances by which we are surrounded. This incapacity of platinum of becoming luminous in a hydrogenated atmosphere is very important knowledge in respect to propositions that have been made to illumine mines. The light which the voltaic battery produces is the most intense of any that we know of. In reference to the Electric Light lately produced, there is nothing new but in the mechanical arrangement. The powers of voltaism for lighting, were fully investigated in Davy's time, although the battery was not so constant then as it is now. By using nitric acid, which is the best for lighting, it costs for a battery of 30 cells (by the expenditure of metals and acids) about 48 cents per hour, and there are other expences connected with it, which will make

the cost about 75 cents per hour. This expense however produces a light equal to 1444 wax candles, a wonderful result—no doubt.—In the present state of its application for general illumination there are many difficulties which present themselves, but for producing intense light upon a given spot, there is certainly no objection to its immediate employment. In lighthouses it could be well and easily applied, and there are strong grounds for hope that our ordinary agents of light and heat, will yet be supplied by voltaic action.

Statics.

This is a branch of mechanics which but few practical men study, care any thing about, or know any thing about. This is not right as the study of it fits the mind to reason upon the minutia of the science of mechanics and therefore it should claim the attention of every mechanic.

Statics is that branch of mechanics, which treats of the relations that must subsist between the magnitudes, and circumstances of action, of forces, that they may be in equilibrium, and consequently, allow the bodies upon which they are impressed, when at rest, to remain at rest.

Bodies of known magnitude, are considered as composed of an indefinitely large number of small portions of matter, called material particles; so small, that the length of every line comprised within the limits of any one of them, is less than any length that we can assign.

The circumstances of action, upon which together with their magnitudes, depend the effects produced by forces,—on which would be produced by them, if not held in equilibrium by other forces acting at the same time, upon the same body,—are the points of the body at which the forces are applied, and the directions in which they act; which last are the same as the directions of the motions, which they would cause if the several particles were perfectly free, and acted upon singly and successively, by each of the forces which are applied to it.

A line in the direction of any force, drawn through the point of application of that force, we shall call the line of direction of that force; and any line parallel to this will be called simply the direction of that force: thus any number of parallel forces may all be said to have the same directions, but not the same lines of direction.

When a single force is impressed upon a material particle, it tends to move it in the direction in which it acts; and this tendency can only be counteracted by an equal and opposite tendency, which, in the case of equilibrium, with no other exterior force acting upon the same particle, must be produced by the forces, which are called molecular, with which the several particles of a body strive to hold each other invariably in the same positions; or rather, with which they strive to replace each other in their original positions, when slightly disturbed from them by the mutual action of these molecular forces, is to transmit as it were, the action of the force impressed upon any one particle to the particles adjacent, and from these again to others beyond, in such wise that the same effect is produced at whatever point in the line of its direction any force is applied: thus two men pulling at the opposite ends of a rope, or pushing at the opposite ends of a rod, must pull or push with equal forces to produce equilibrium, other forces being supposed to act, whatever be the length of the rope or rod."

Sickly Plum Trees.

The Pennsylvania Cultivator says that salt freely applied to the surface of the ground around the tree, over an area as wide as the extent of branches—strong brine applied as a wash to the trunk and limbs, and pulverized salt introduced into the trunk of the tree by boring into its centre, and then plugging it up—all or either of them are said to be certain means of restoring plum trees that are in a sickly or enfeebled state—trees that are troubled with the curculio bug—or trees that have evidence of diseased sap, black warts—into a healthy and luxuriant condition. The plum is naturally a marine tree, and it is surprising how much salt it will assimilate and thrive upon. Try it.

Health of Children.

The following extract from Dwight's Father's Book will be found both instructive and pleasing, and endorsing in the fullest extent Lord Brougham's sentiments on "Early Habits."

Rising early is a habit of high importance to fix in children; and in forming it, there is far greater facility than in other cases. There is a natural propensity in children generally to early rising, which needs only to be gratified and encouraged. They usually retire to bed some hours before their parents, and at daylight, or at least sun-rise, are generally awake, and anxious to rise. Many of them are actually bred up with difficulty to the habit of taking morning naps, which, when once formed, generally prevail through life. Let his father deny himself so far as to retire early, and become an early riser also. His health, enjoyment and usefulness, he may depend upon it, will be perceptibly benefited. And this may be connected with another preventive of disease—active employment. The morning is the season for activity; the frame, invigorated by repose, is prepared for exertion, and motion gives pleasure. The pure atmosphere, so much sweeter and more exhilarating than the air of a confined chamber, has been prepared to be breathed; and, like all Nature's medicines, it is superior to any which science can produce. Early rising and early exercise might more properly be called food than medicine, as they are designed for daily use, and to protect us from disease rather than to remove it. Every thing, except mere sloth, invites us, to the most favourable season for exercising the frame, as well as for making useful impressions on the mind and heart, and whoever tries to conduct the education of his child independently of this practice, will lose some of the most favorable opportunities.

Sinfulness of Inoculation.

When in 1718 inoculation for Small-pox was adopted in this country, the greatest uproar was stirred up against it. Not only was the whole medical profession opposed to it, but further, as Moore tells us, in his amusing work on inoculation "some zealous churchmen, conceiving that it was repugnant to religion, thought it their duty to interfere. They wrote and preached that inoculation was a daring attempt to interrupt the eternal decree of Providence. Lord Wharnclyffe, in his life of Lady Wortly Montague, says "that the clergy descended from the pulpit on its impiety. A Mr. Massey preached in 1722, in St. Andrew's Church, Holborn, that all who infused the viriolous ferment were hellish sorcerers, and that inoculation was a diabolical invention of Satan." And one of the Rectors of Canterbury, the Rev. Theodore dela Eaye, perhaps exceeded this in a sermon preached in 1751, for he denounced with horror, inoculation as the offspring of atheism, and drew a touching parallel between the virtue of resignation to the divine will, and its practice.

[There are men who are not preachers in the pulpit, but out of it, who at the present day are characterized not by religious hostility to this and that discovery, but a more base motive, viz. selfishness.

Effect of Trifles.

Mohammed, when pursued by his enemies, ere his religion had gained a footing in the world, took refuge in a certain cave. To the mouth of this retreat his pursuers traced him; but when they were on the very point of entering, their attention was arrested by a little bird darting from an adjoining thicket. Had it not been for this circumstance, the most trivial that can well be conceived, which convinced them that here the fugitive could not be concealed, Mohammed would have been discovered, and he and his imposture would have perished together. As it was, he effected his escape, gained the protection of his friends, and by a most artful course of conduct, succeeded in laying the foundation of a religion which now prevails over a large portion of the world.

The life of David, is stated by tradition, to have been preserved from Saul, by nearly the same means—a spider weaving her web across the mouth of the cave. How careful all should be in explaining the doings of Providence. We often are presumptuous for what we think right.

Chinese Hemp.

French agriculture has recently been enriched by a very important new production.—This precious article is the Chinese hemp, the seeds of which were imported into France by M. Stier, a member of the French embassy in China and has been cultivated and naturalized at Marseilles by M. Garnier Savatier. This hemp, the reproduction of which is now secured by the seeds which have ripened in the best possible manner, grows to a height of twenty-four or twenty-five feet, the stalk is from 5 to 6 inches in circumference, each plant produces from two to three kilograms of seed, and furnishes thread enough to make a yard of superb lawn, superior in beauty and quality to any obtained from French materials. The cultivation of the plant in the south of France will be the more precious to the country as a climate of the temperature of that region is necessary for its fructification, and its seeds will find a ready sale in other countries where the seeds will not ripen, but where the filaments may be produced. The South will thus have a double advantage.—Some specimens of this plant were exhibited at the Agricultural Show at Montpellier. The height of it was from twenty to twenty-two feet.

Ornaments in Brass.

Thin ornaments in relief are first modelled in relief in clay or wax, upon a flat surface. A sand flask is then placed upon the board, over the model, and well rammed with sand, which thus takes the impress of the model on its lower surface. A second flask is now laid on the sunken impression also filled with sand, to take the relief impression from it; this is generally termed the black mould. The thickness of the intended cast is then determined by placing an edging of clay round the lower flask, upon which edging the upper one rests, thus keeping the two surfaces at the precise distance from each other, that it is intended the thickness of the casting shall be. In this process, the metal is economised to the greatest possible extent, as the interior surface or back of the casting, is an exact representation of the relief of the subject, and the whole is thus made as thin in every part as the strength of the metal permits.

Friction Matches.

Letters from St. Petersburg state that in the thirteen northern provinces of Russia and Europe more than 32,000 houses have been destroyed by fire during the past year, while ordinarily in these provinces not more than about two thousand, or two thousand five hundred a year are burned.

The government has ascertained that, for the most part, these fires, which have caused a loss of twelve millions of rubles, are the result of crimes, and that they were lighted by friction matches. In consequence of this, the Minister of Police has made a decree that henceforth no factory of these matches be established within cities, and nowhere else without special license from the higher authorities.

Cowper's Home.

Cowper's house at Olney, is still standing in the same ruinous state so humorously described by the poet; his parlor is occupied as a girls' school. The summer-house in the garden, where he used to sit conning his verses, also remains, its walls covered with visitors' names. His residence in the neighboring village of Weston has been much altered, but it is still beautiful with a profusion of roses in front.

A Curious Case.

A gentleman experimenting near Waltham, England, on the new electric light, happened to touch the conductor with a part of his hand where there was a slight flesh wound or scratch. The arm swelled, tumors broke out all over his body and limbs and in spite of every effort to save him, he died.

Precise Enough.

In a recent case tried in Cincinnati to establish the precise time of the death of a man who with his wife, were blown up by a steam-boat explosion, an Irishman was put on the stand who was also blown up, but escaped.—Said the attorney to him, "When did you last see the gentleman alive?" "Sure, your honor, as me and the stovepipe were going up, we met him coming down."