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Heat and Cold Phenomena.—The Cause.

We have heard and read much about heat and cold, and we are quite sensitive in our feelings on the subject. But what is heat, and what is cold? Many theories have been advanced respecting heat, all the authors of which seem to have committed the blunder of supposing they had demonstrated what heat is, by merely describing its effects. We have never heard of an attempt being made to explain what cold is, beyond that lucid one, "it is the absence of heat," and which is just as applicable to heat,—"it is the absence of cold." Both heat and cold produce peculiar effects.

By heat, substances are made to expand, metals to assume the form of gas, and the flinty rock to run like water. Cold, on the other hand, reduces fluids to solids, but like heat it also expands substances. Strong cannon have been burst to pieces, as with gunpowder, by filling them with water and submitting them to severe cold. Rocks are split asunder, and limbs of trees are burst from their trunks during intense cold. If heat is a substance, as is asserted by some, why may not cold be a substance also? The fact is that heat and cold are just terms in general use for describing certain effects arising from a cause, or from causes not yet distinctly known. We know something respecting the operations of gravity, but no person can tell what gravity is; and it is the same with heat and cold. Faraday has come to the conclusion that all the forces of nature may be traced to electricity in different conditions; and heat and cold being forces of nature would come under his classification as electrical phenomena. The recent "cold term" or cycle, experienced through such an extent of our continent seems to favor his hypothesis, at least so we would conclude from the information published on the subject by E. Merriam, the well-known meteorologist. He states that this cold term lasted thirty days, and that very intense cold was experienced in many places which heretofore always enjoyed mild winters. At Waverly, Mo., on the Missouri river, the temperature on the 25th of December was 24 deg. below zero; and on the 9th of this month it fell again to the same point; and had there been a wind prevailing at the time, it is believed that all the live stock in that part of the country would have perished, as the temperature was more like that of the Arctic regions than that of the mild southwest of the United States. Mr. Merriam says, in relation to the severe cold, "it must come down from the high mountains and from the great ethereal where the cold holds perpetual dominion. He also alludes to the recent eruption of the great volcano in the Sandwich Islands as having something to do with it, and says: "from the gigantic crater, nine miles in circumference, such a volume of electricity is discharged into the ethereal that human estimate cannot count it up." These remarks favor the views of Faraday respecting electricity being the cause of natural forces.

On the 12th and 13th ult. myriads of live black bugs fell on the snow at Fairfax, Va., and covered it as with a mantle of velvet; and many other strange things have also taken place during this cold term, such as the shock of an earthquake felt at Ogdensburgh, N. Y., on the 6th ult., several shocks in Virginia on the 9th, and an electric cloud, which sent forth a current of great length, on the 19th. As earthquakes have heretofore been attributed to electricity, the shocks mentioned in connection with the recent cold term, furnish further proof in favor of Faraday's theory; so that it may be positively true, that the same cause which plates a tea-spoon and dispatches a telegraph message, also sends us our cold and hot terms.

By recent accounts from Europe we learn that the cold has been as intense there as it has been here. At Odessa, on the Black Sea, the thermometer stood for several days at 27° below zero, and many persons had been frozen to death in their beds. It had also been very cold in England. We have often heard it asserted that when we had a cold winter in

America, mild weather used to prevail in Europe, and vice versa; but the past and present winters have been equally severe on both continents. We wonder if philosophers have observed any peculiarity in the dip of the magnetic needle during such severely cold seasons?

The Woodworth Patent Extension.—Appeal to Governors and State Legislatures.

During the progress of the memorable efforts made in 1852 to foist the Woodworth extension bill upon Congress, the attention of many of the State Legislatures became turned to the subject and some of them passed resolutions instructing their Senators and Representatives at Washington to use their influence and their votes against the passage of the act. These resolutions had a powerful effect, and contributed, perhaps as much as any one cause, at that time, to the signal defeat of the scheme. In less than one year from to-day this venerable monstrosity, if ignored by the present Congress, will die a natural death. Its lease of life expires, by law, in December, 1856, and after that time, unless the patent is now renewed, it will trouble no one. It is fully sensible of this fact, to speak figuratively. It knows that its dying hour approaches, and it is mustering all its forces with a view to avert the catastrophe; it is about to make a grand final struggle. Its most powerful agent is money. Richer than Cræsus, it is lavish in its expenditures and profuse in its promises. To obtain influence or put down opposition, it freely pays gold. Its great hope is, directly or indirectly, to subsidize Congress; to effect this purpose, secret agents are busily at work, in many directions, concentrating every possible influence that will aid in carrying out the end. If the votes of less than half the members can, in any manner, be secured, the victory will be won, and the whole country will once more be laid under disgraceful tribute to its avarice. For years the patent has brought in an annual revenue of over three millions of dollars. Vast sums can be afforded to be spent to secure its continuance; but, if successful, the re-payment of these amounts, ten thousand times over, will be required, and the money must come from the earnings of hard-working, industrious people.

Under these circumstances we appeal to the Governors and Legislatures of our States to lend their assistance, for the last time, towards the suppression of this gigantic wrong. We ask them to draw up messages, to pass resolutions, to direct Congressional Representatives, and to exercise every other power within their control to prevent its consummation.

We call upon good men, everywhere, for aid. Citizens of all classes can greatly assist in this matter, if they are so disposed; we hope they will, for once, do their whole duty. Let them write letters to friendly Members of Legislatures requesting attention to the subject, and explaining its necessities. Let them keep petitions in constant circulation, and send them, as often as possible, to Washington. Let them be up and doing, for there is danger in delay. Whatever is to be done should be done quickly.

Remonstrances to the Woodworth Patent Extension.

We would again remind our readers that printed petitions of remonstrance against this outrageous scheme can be had gratis, on application at the SCIENTIFIC AMERICAN office. Enclose a stamp for postage.

One more vigorous effort made and the monster receives his death-blow. The parties interested are earnestly seeking, to obtain the extension. On no principle of right or justice can they succeed. Come forward, one and all, and help to put the millstone round their necks.

Life Benevolent Association.

There is an Association composed of the most respectable merchants in this city, the object of which is to procure life boats and station houses, with apparatus and means of saving life in cases of shipwreck on our coast, and also to encourage meritorious conduct in persons for saving life, by granting medals and pecuniary rewards. Congress has provided many life-boat stations on the New Jersey and Long Island coast, and these have been the means of saving 1700 persons from death; but owing to the increase of commerce in New York, the present means for saving life in ship-

wreck are not adequate, hence the formation of this Association. It appeals to the public for support. Robert C. Goodhue, Esq., No. 64 South street, is treasurer.

History of Gas Lighting.—Who was its Inventor.

We have lately noticed a paragraph in a number of our exchanges, attributing the invention of gas lighting to Phillip Le Bon, an engineer of roads and bridges in France, in 1785. The following is an extract from the paragraph referred to:—

"Le Bon commenced by distilling wood, in order to obtain from it gas, oil, pitch, and pyroligneous acid, but his work indicated the possibility of obtaining gas by distillation from fatty or oily substances. He eventually died, ruined by his experiments. The English soon put in practice the crude ideas of Le Bon. In 1804, Windsor patented and claimed the credit of inventing the process of lighting by gas; in 1805 several shops in Birmingham were illuminated by gas manufactured by the process of Windsor and Murdoch; among those who used this new light was Watt, the inventor of the steam engine. In 1816 the first use was made of gas in London, and it was not until 1818 that this invention, really of French origin, was applied in France."

So far from the foregoing being correct, gas was made from coal in England in 1688. The Rev. Mr. Clayton, of Crofton, Yorkshire, who had visited Virginia, in giving an account of his observations in that colony to the Royal Society, compared the nature of the violent thunder of Virginia to the spirits which he had drawn from coals, and exploded, and which he had caught in bladders, and burned until it was consumed, which was nothing less than coal gas. Dr. Watson, in his Chemical Essays, in 1773, describes the process of distilling Newcastle coal in a retort, and obtaining inflammable gas therefrom. The discovery of making gas from coal was therefore made long before Le Bon's day; yet there can be no doubt but this French engineer made illuminating gas from wood, without any knowledge of what the English chemists had done before. W. Murdoch, spoken of in the above extract, illuminated his own house and his office with gas, in Redruth, Wales, in 1792, and was the first person who introduced it into public use. He did for gas illumination what Fulton did for steam navigation—he brought it into successful public use.

We have seen a statement in one of our contemporaries to the effect, that no method yet employed to purify coal gas, has been effectual in separating the sulphuretted hydrogen from it. It is indeed true that there are some iron pyrites in all coals used for making gas, and both ammonia and sulphurous gas are produced from coals with the carburetted hydrogen gas. But then the process of separating these impure gases perfectly, is well known. If the gas is first passed through a solution of the sulphate of iron, and then through the common lime purifier, and then washed in water, every trace of sulphurous acid and ammonia will be removed from it.

Water Wheel Railroad.

On page 137, we copied a short article from the London *Athenæum* describing a new method of drawing up railroad cars on a steep incline on the Mt. Ceniz Railroad, Piedmont.—The plan was described to consist of a water wheel operated by the power of a descending current, and made to ascend the incline, by having its shaft bearing on side rails, and its buckets in the water, and thus to draw the train of cars after it. We stated that the plan in all likelihood was not correctly described by the *Athenæum*, and that it probably consisted of a more reasonable method, viz.:—that of a fixed water wheel at the foot of the incline, for drawing up the train by an endless rope; and this plan we stated was not new.

A correspondent in St. Louis sends us such information as proves conclusively that even the plan of the water wheel carriage ascending an incline against the motion of the current which drives it, is not new.

On August 29th, 1825, such a plan exactly, for transporting carriages with goods up an incline on a railway, was described in one of the Philadelphia papers, and the invention of it was attributed to George Reeve, of Orange Co., N. Y.; it was called the "Ascending and

Descending Hydrostatic Carriage." When the article describing it was published, Silas Dinsmore, of Mobile, Ala., answered it, stating that Archibald Smoot, of that city, had shown a miniature water wheel carriage of the same kind in 1822; explained its use, and operated it publicly before a large crowd of citizens.

We would really like to see such a wheel in operation on an incline of about 60 feet to the mile. At present we cannot see how it would ascend it, and therefore we do not believe it could. If it will work, a paddle-wheel boat may yet be made to climb up Niagara Falls. The covetousness of no man should be excited respecting the authorship of this railroad water wheel.

Important to Inventors and Model Makers.

Too many applicants for patents, disregard the rules of the Patent Office in preparing their models, and thereby cause themselves unnecessary trouble and expense. Numbers of models are constantly refused by the Department on account of their being too large, too imperfectly constructed, or not properly painted or polished, to meet the official requirements. Before us lies a letter from the Commissioner, which we will publish, giving the names of the interested parties, in initial, as a warning to others who may happen to be engaged in the construction of models for applications for patents, or soon intend to do so:

"U. S. PATENT OFFICE, Jan. 22, 1856.

GENTLEMEN—The models in the following late applications can be repaired by the Office for the prices annexed:

1. D. C. T.—Water Wheels,—broken; charge for repairs, \$1.50.
2. A. & T. S. S.—Gang Plow,—broken; charge for repairs, \$2.
3. A. A.—Screw Propeller,—too large; charge for reducing, \$1.
4. W. H. B.—Spike Machine,—charge for painting, \$1.
5. J. S. G.—Converting a Reciprocating into a Rotary Motion, &c.—requires painting; charge, \$1.

Very respectfully,
C. MASON, Com.

Messrs. Munn & Co., New York."

For the further information of all our readers, we subjoin the official rules in respect to models. If properly observed by model makers, the troubles we have named will be avoided. Annexed are the rules:—

"The model must be neatly and substantially made of durable material, and not more than one foot in length or height, except when a larger model is permitted by the Office for special reasons, to be shown by the applicant. Models filed as exhibits, in interference and other cases, should also, as far as practicable conform to this rule as to size. Should they exceed this limit, they will not be preserved in the Office after the termination of the case to which they belong. If made of pine or other soft wood, they should be painted, stained, or varnished.

A working model is always desirable, in order to enable the Office fully and readily to understand the precise operation of the machine. The name of the inventor, and also of the assignee (if assigned,) must be fixed upon it in a permanent manner.

When the invention is of a composition of matter, a specimen of the ingredients and of the composition, which the law requires, must accompany the application, (see act of 1836, section 6,) and the name of the inventor and assignee (if there be one) must be permanently affixed thereto."

Many of the models received at this office, and also at the U. S. Patent Office, come packed in cotton. If oil paint or a slowly drying varnish has been used, the model, by the time it reaches its destination, is thoroughly deprived of its beauty by the firm adherence of the cotton to its parts. If cotton is not used dust generally takes its place, and becomes cemented to the model. For the prevention of this vexation we herewith present an excellent recipe:

TO COLOR OR PAINT MODELS—Dissolve gum shellac in alcohol and add a small quantity of coloring matter; any color that is ground in water will answer. Models constructed of hard fancy woods, such as maple, beach, walnut, mahogany, etc., require the shellac only, no coloring water being requisite, as the shellac will bring out the natural grain of the wood. Avoid copal, and all oil and turpentine varnishes, and also oil paints, as they require considerable time to dry, and generally cause the working parts of models to adhere, and so stick together so as to render them inoperative.