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Contents.

(Illustrated articles are marked with an asterisk.)

EXPLOSIONS DUE TO LOW WATER.

In our issue of March 8, we published an article in which we exhibited the fallacy of the popular ideas relating to the consequences of low water in steam boilers, and showed how collapse, even, might occur as a result of this condition. We related a case, as described by a correspondent, in which collapse actually took place. We explained the manner in which explosions might, under some circumstances occur, and, in conclusion, summed up our argument in the statement that overheated surfaces, where low water had occurred, might produce either explosion or collapse, or might cause no dangerous result, according to the peculiar circumstances of the individual case. The question of a correspondent leads us to take up the special case of explosions caused by the increase of pressure which may be produced, in some cases, by the injection of feed water upon overheated surfaces.

In the article above referred to, we showed the possibility of cold feed water, entering a boiler filled with steam, producing the condensation of that steam and the consequent collapse of the boiler. Should, in any case, the feed water be too warm to produce instantaneous condensation, or should it be evaporated so rapidly as to supply fresh steam faster than condensation could take place, an increase of pressure would occur which might produce, and probably in many cases has produced, the explosion of the boiler.

Let us suppose, as an extreme case, a plain cylindrical boiler, of 42 inches diameter and 30 feet length, to have become completely emptied, by some accident, and then to have a supply of water forced in under the conditions last described. We may easily calculate what pressure of steam will be produced, if the feed water were boiling and the plates red hot,—conditions most favorable to increase of pressure. Such a boiler, if of quarter inch plate, would weigh not far from one and a half gross tuns. If the fire line were at the middle line of the boiler, about 1,800 pounds of iron might become red hot, were the boiler to become empty. Nine pounds of red hot iron were proved, by Professor Johnson and the Committee of the Franklin Institute in investigation of this subject, to contain heat enough to be just capable of evaporating one pound of water. Seventeen hundred pounds of iron might therefore evaporate $\frac{1800}{9} = 200$ pounds of water, under most favorable circumstances. This weight of water, occupying the full capacity of the boiler, 290 cubic feet, would produce a pressure of about 300 pounds per square inch. In one actual experiment by the Committee of the Franklin Institute, the pressure rose above 200 pounds per square inch, when it overcame the resisting power of a portion of the boiler, and they were unable to determine the maximum limit.

The case which we have supposed would, evidently, be likely to produce explosion, were the pressure not relieved by the safety valve; but it must be remembered that this is the extreme case, and one likely to be seldom met with. It will rarely happen that one half a boiler will be thus heated to a red heat, and that it will yield its surplus heat to heated and rapidly injected feed water; and even then it is only when the safety valve is inoperative that the pressure can reach the indicated figure. Suppose a boiler of the locomotive type to have its crown sheet similarly overheated, while a heavy pressure still exists within it, say 120 pounds. By similar calculation we can readily determine the increase of pressure. The crown sheet being, say 1 feet square and $\frac{3}{8}$ inch thick, and the boiler containing 100 cubic feet of capacity above the then existing water line, the pressure, if unrelieved by the safety valve, would, in this example, rise to nearly 800 pounds per square inch, except for one very important circumstance: that is, that saturated steam already existing would, as shown by experiment, be condensed by the slightest increase of pressure and, thus yielding before the newly developed vapor, the result would be that the pressure would really be but very slightly increased. It is far more likely that, in this case, the overheated crown sheet would yield from simple weakness, and that an explosion would result in tha manner, as has actually occurred under our own observation.

Our readers will be very likely to agree with us, we think, when we draw the conclusion that the statement that "water coming in contact with red hot iron creates a gas ten times as explosive as the best gunpowder" requires some modification. Learning more precisely in what manner deficiency of water produces danger, those among them who have steam boilers under their charge will be able to act more intelligently in avoiding such risk.

INJUSTICE TO WORKMEN.

It is always the case among antagonistic parties that there are a few on either side who rush to extremes and, by their precipitate and ill advised measures, neutralize such satisfactory adjustment of the question in dispute as might be effected through the efforts of the more cautious and conservative majority. We have given a multiplicity of instances of the imprudent proceedings of trade associations, and have repeatedly condemned the coercive system which these societies have seen fit to adopt in order to compel the support of disaffected working men. From the following document, however, which we have recently received from a correspondent, it appears that the extremists are not all arrayed on the side of the unions. The Joliet Iron and Steel Company is one of the largest establishments of its class in Illinois, as will be seen from the description printed in another column.

RECEIPT AND CONTRACT.

JOLIET, ILL., February ——, 1873.

Received of Joliet Iron and Steel Company, the full amount due me as per pay roll for services rendered said company during the month of January, 1873.

And for the consideration of the above mentioned, I do hereby agree that said company shall not be liable to me (nor my heirs, executors, administrators, or other persons who may be dependent upon me for support in case of my death) for any damage or accident resulting or occurring to me while in its employ, whether caused by the negligence or carelessness of any of the officers or employees of said company, or from any other cause whatsoever. And that said company shall have the right, at any time, to discharge me from its employ without notice.

Further, that I will continue in the employ of said company from month to month at the current rate paid by said company for the class or kind of work done by me, and not leave the employ of said company or refuse to perform my daily duties without fourteen (14) days notice in writing of such intention to the superintendent, foreman, or the person under whose orders I am employed, previous to the time of leaving or failing to perform my daily duties.

And in consideration as aforesaid, I do further agree that in case I fail to comply with the conditions last aforesaid, that I will forfeit all moneys earned by me and remaining unpaid at the time of such failure on my part to comply with the terms of this contract.

Signed, ——————————

Witness. ——————————

Although it is possible that this contract may be legally valid under the statutes of Illinois, we doubt whether its terms would receive a rigid interpretation from any court or be enforced through any jury. It is plainly inequitable, inasmuch as it gives to the employer rights which it denies to the employee, and places the latter in a position in which his means of support may be at any moment taken from him without warning, and without leaving him any mode of redress. That this power may be so used as to cause great hardship is clearly obvious, while the system of requiring men not only to give their time and labor, but to bind themselves by such oppressive obligations, for the simple and single consideration of their already faithfully earned wages, seems to us wrongful and highly unjust. "The laborer is worthy of his hire," and although employers have a perfect right to regulate the quantity, quality, and manner of performing his work, they should not take advantage of the necessity which impels a man to toil for the existence of himself and his family, to impose upon him extreme conditions which, were he less dependent, he would unhesitatingly refuse.

We cannot too strongly protest against the adoption of such a method of governing workmen as the above would signify, and we would earnestly advise its discontinuance. It is on such proceedings as this that the harangues of the leaders of strikes and labor uprisings find a substantial basis, which lends to their arguments a weight with men who otherwise would fail to be moved by them. The doubtful benefit, which perhaps may accrue to a single establishment is a hundredfold outbalanced by the obstacles thus thrown in the way of those who are striving to reach a fair and equitable adjustment of the question of labor reform.

It seems to us that the coercion in this case is as evident and in every respect as much to be condemned as that exercised in the contrary direction by the unions. Indeed, if employers adopt this course, with their restrictions on one hand and those of his society on the other, the future of the working man is at best sadly unpromising.

PROPOSED NEW PATENT LAW IN ENGLAND.

A committee of London patent agents has prepared a bill for a new patent law, the passage of which through Parliament is proposed. It is a sort of a patent hash, having been made up, apparently, by means of scissors and paste, its components being derived, in small items, from the patent laws of various countries. It provides that the present set of supernumerary officials, the "Lords and Commissioners," shall still remain in office, to draw their salaries, for that is all they have done or are expected to do. To this gallant body, a corps of six new members are to be added, with salaries varying from $7,500 to $10,000 each.

Some items are then taken from the American law. Examiners are to be appointed, all cases are to be examined as to novelty, and rejections made when the examiner thinks proper. This officer may summon the applicant and compel him to make such amendments as he may require. The present burdensome patent fees are to be retained, while another section provides that the patentee shall be compelled to grant licenses for the use of his invention, on such terms as the examining committee may think proper; and they may also vary or cancel licenses. Issues of infringements are to be determined by a judge, without a jury, who may call in examiners, if he desires, to assist him. Items from the Austrian and continental systems are introduced, requiring that the invention shall be worked within a specific time or the patent rendered invalid.

The grant of patents to the first applicant, whether inventor or introducer, as at present provided, is prohibited, and patents are only to be granted to the inventor or his authorized agent.

The last mentioned clause is the only really sensible improvement that the bill contains. The effect of the other provisions will be to place difficulties and troubles in the way of inventors, without conferring benefit on anybody. We are surprised at the stupidity which this proposed bill exhibits.

What is needed for the encouragement of the useful arts in England, and in every other country, is:

First, the publication in cheap and popular form of the drawings and specifications of all patented inventions, so that the people may become fully informed as to what is doing or has been done in the arts.

Second, the reduction of the fees and the forms for obtaining patents, so that the masses of the people, who are poor, but among whom the real thinkers and inventors are to be found, may readily secure patents for their new ideas.

Third, the placing of the entire control of the patent, from the day of its issue to the close of its term, in the hands of the inventor, to be his property, to be used as he thinks proper, subject to no compulsion or other official interference.

Nearly all of the changes proposed in this bill are steps in a backward direction, not an advance in keeping with the spirit of the age. The present British law is immeasurably superior to this one now proposed. Indeed the existing law is admirable in nearly every respect and works admirably. Almost the only change it needs is a reduction of the enormous patent fees it now requires, and the limitation of the issue of patents to inventors only.

PSEUDO SCIENCE.

We have before referred to the fact that mere reasoning, not based on sufficient observation of Nature, almost always leads to false conclusions and baseless theories, that this was the main fault of the ancient philosophers, and is still the fault of that class of moderns who labor under the serious disadvantage of deficient mental training; we have also asserted that docility to Nature's teachings and a liberal amount of resignation of our own speculative faculties are the real means to come to the knowledge of the truth. Even some of the most eminent men have erred in this way, and are lasting monuments of warning against mere speculation; one such is no less a personage than the famous German philosopher Emanuel Kant, who risked himself on the field of mechanics so far as to write a volume on dynamics, or, rather, on a false imaginary theory of motion, which he calls dynamics. We will only point out a few of his errors:

Kant had evidently never been instructed in regard to the resistance of motion by friction, and he was ignorant of the fact that all motion, once imparted, would continue in the same direction as long as it was not prevented by other causes, of which friction is the most common and, on the surface of our earth, the permanent cause which finally arrests all motion. Having no conception of this, but imagining that force must be a metaphysical immaterial thing which can be communicated to matter, he distinguishes two kinds of force, living force (*vis viva*) and dead force (*vis mortis*), and he illustrates these two forces by the following experiment: "When a book lays on the table," he says, "and I push it forward with my hand so slowly that it stops moving as soon as the contact of my hand ceases, I give it only a dead force; but when moving it with such violence that it continues its motion after the contact of the force-giving hand has ceased, I give it a living force. So a heavy box or trunk, dragged over the floor, is moved by a dead force, but a stone thrown by hand is moved by a living force." He considers that a body, when moving it without contact of a moving force, possesses the force *viva*, the living force; and the conclusions he further arrives at, being based on such false premises, are, of course, totally at fault and contrary to experience and even, we dare say, to common sense.

If Kant had discussed this matter with a good physicist of his time, and obtained some information on the subject of friction, and absorbed this information, in place of exclusively indulging in his own fanciful and groundless speculation, he would never have published his volume on dynamics, which must injure him in the eyes of all impartial investigators. It shows how superficial a thinker Kant was after all; it raises the suspicion that if he was not more correct in his metaphysical reasonings than in his plain physics, he does not deserve the confidence of his readers, and his conclusions may go for naught.

Another illustration of a similar nature is Goethe, who in the latter years of his life had a notion to study optics, and wrote a volume on light and colors, in which he proves that he had not the least capability of making experiments, and was still more deficient in his powers of observation. His conclusions are almost all false; he is perhaps worse than

Kant, and his book is nothing but a confession of deficient judgment in regard to experiments and defective training, his education being, as is well known, exclusively literary.

As there is no more useful labor than opening the eyes of people to the truth and rooting out their prejudices, we consider it a necessary and progressive step to tear away a portion of the halo which surrounds certain names, and which has almost become to mankind sacred, owing to the habit men have of regarding their heroes as superior in all respects to the ordinary run of humanity.

LENS FIRES.

Dr. H. C. Bolton, of Columbia College, New York city, states that on a recent occasion, at 9 A. M., on entering his laboratory he found a wooden table on fire, ignition having been occasioned by the rays of the morning sun, which fell upon a glass spherical flask containing water. The flask served as a lens which concentrated the rays and set fire to the wood. The author also alludes to the statement of Lactantius (A. D. 300) who mentions the use of glass globes, filled with water, to be used in kindling fires; while Pliny recommends the use of lenses for the purpose of cauterizing the flesh of sick persons. As to the latter, one Mr. Barnes, of Connecticut, took a patent in this country some five years ago for the use of lenses for the purpose suggested by Pliny.

In respect to fires occasioned by lenses, doubtless there are many examples. It is well known that vessels at sea have been set on fire by the bullseye glasses used to admit light to between decks. These glasses were formerly made convex on one side, thus forming powerful lenses. In consequence of the loss of property and danger their use has been discontinued, and thick plates of glass, flat on both sides, have been generally substituted.

Captain Scoresby and Dr. Kane used to astonish the natives of the polar regions by taking blocks of clear ice and cutting them into the form of lenses, with which they instantly kindled fires.

CURIOUS EFFECT OF LIGHT ON SELENIUM.

Selenium is a substance that resembles and is allied to sulphur. It is found in connection with some natural deposits of sulphur, but it more commonly occurs in combination with metals, forming selenides. Selenium is less combustible than sulphur, burns with a blue flame, and emits a putrid horse-radish odor.

Mr. Willoughby Smith has been making a series of electrical experiments with selenium, and, at a recent meeting of the Society of Telegraph Engineers, London, he made known the following remarkable results:

The sticks of selenium were connected with platinum wire and hermetically sealed in glass tubes. The electrical resistance of some of the sticks was very great, others much less, and he was at a loss to account for this lack of constancy, until, after various trials, he found that it was due to the action of light. When the sticks of selenium were shut up in a box so as to exclude light, the electrical resistance was highest and remained constant; but when the cover was withdrawn and light was allowed to fall on the sticks, the electrical resistance diminished 15 to 100 per cent, according to the intensity of the light. The shading of the selenium by means of glass plates of different colors showed that the conductivity was altered in proportion to the interception of the light. These are very singular observations, and may lead to new and useful discoveries concerning the qualities of other substances, and the manner in which light and electricity affect them.

THE SIPHON RECORDING TELEGRAPH INSTRUMENT.

Perhaps the most valuable inventions in connection with submarine telegraphy have been made by Professor William Thomson. During the laying of the Atlantic cable, the services of Thomson's reflecting galvanometer were most valuable, but lately he has succeeded in perfecting a recording instrument which is worthy of description. The instrument in question is in use at Duxbury, operating through the French Atlantic cable. It is available for recording a positive and a negative current upon a strip of paper in the long and short signals of which the Morse alphabet is composed. The difficulty of producing such a recorder as this has been due to the difficulty of obtaining marks from a very light body in rapid motion without impeding that motion. To effect this, the inventor connects (either by direct attachment or by stretched thread or fiber), to the body moved by the received current, a light marking needle or tube, from the end of which ink or other fluid is spirted upon paper. The signals which are to be recorded give rise to motions of the marking end which are parallel to the plane of the paper, while the paper is drawn along its own plane and in a direct perpendicular to the line of the motions caused by signals. Sir William Thomson employs for the marking needle, by preference, a capillary tube, or a bristle dipping at one end into a stationary reservoir of ink or other fluid; and he causes such fluid to be spirted or drawn from the opposite end of the tube by means of an electric force, or by means of rapid vibrations maintained in the needle or in the paper, in a direct perpendicular to the plane of the paper. These vibrations may be maintained mechanically or pneumatically as by the agency of sound, so that the paper receives ink by a succession of fine contacts, between each of which the tube or bristle is quite free to move. When the electric method is used, the paper is drawn over a metal plate electrified, say, positively, the capillary tube being electrified negatively; and a powerful difference (potential) is maintained between the tube and the metal plate, such as would tend to cause a succession of sparks to pass between them and which, under the circumstances, produce a fine stream of ink, or a succession of fine dots, spirted from the tube on to the paper, leaving a record of the position of the tube at each instant and drawing a continuous line on the paper, without impeding by friction the motion of the tube as directed by the receiving instrument. It has been found most convenient to allow the paper to move in a vertical plane, and to use a small glass siphon with its short leg dipping in the ink and its long leg pointing obliquely downward at the paper and close to it. The receiving instrument used in connection with this marking apparatus is a peculiar arrangement in which the received current passes through a very light coil of a small number of fine wires. Part of this coil is placed in a powerful magnetic field produced by permanent magnets or by electo-magnets, which set with great force upon the coil when the current passes through it. The coil is kept stiff without any complete framework or bobbin, by the use of stiff pieces or booms, drawn asunder by threads or strong fibers stretched to fixed points and serving to support the coil while giving it the requisite freedom to move and the needful stability. The message recorded by the ingenious apparatus appears like a continuous line; but when examined closely, it is found to be made up of a series of ink dots. The line made in a longitudinal direction corresponds to spaces in the Morse alphabet made by heading the current; and the to and fro transverse lines, which may be long or short as the cable current varies in strength, accomplish the same purpose as the dot lines made by the Morse pen. Thus the swinging motion of a delicate coil is perfectly recorded with minimum expenditure of force. Sir William Thomson has accomplished what has been hitherto deemed an impossibility.

THE VIENNA EXHIBITION.

On Saturday, March 15, General Van Buren, with his family, left for Vienna to take charge of the United States Department of the great exhibition. The appropriation by Congress of $200,000 and two vessels for the free transportation of merchandise has enabled the Commissioner to collect a large number of articles for the great show, notwithstanding the unprotective nature of the Austrian patent laws. Most of the exhibitors are manufacturers whose wares are well known here, and whose inventions have been so long in public use that the patent laws of no foreign country would probably afford them protection.

Had the Austrian Government amended their patent laws so as to afford the protection that the word "patent" implies, a larger number of our more recent and important inventions would have found place in the American department. If our part of the show does not compare favorably with other nations, it should be ascribed to the unwillingness of American inventors to trust their novelties to Austria's tender mercies.

The ship Supply completed her cargo and sailed for Trieste a fortnight ago, and the ship Guard will sail, with the last of the goods for the exhibition, on March 20. Both are sailing vessels, and it is therefore uncertain when they will reach their destination: in season, however, it is hoped, to permit their freight to reach Vienna before the opening of the exhibition May 1st. About the same class of articles will be found in the American wing of the Austrian show as is seen year after year at the Fair of the American Institute. Among the most prominent are sewing machines of great variety, the contributions of the Singer Sewing Machine Company alone amounting to one hundred cases. Then there are knitting machines, scroll saws, wood working machines, windmills, pumps, steam engines, water wheels, safes, pianos, school furniture, etc., besides ores, bales of cotton, hemp and other products from various parts of the country, representing the growth and industries of the sections from which they come.

On the main floor of the American department will be shown, in actual operation, shoemaking, bucket, brush, and nail making machines, stone breaking tools, flax cleaning machinery, rock drills, circular looms, machines for making pipe elbows, boot heeling machines, and numerous kinds of wood working machines. General Newton has sent a perfect model of the engineering works now carried on under his direction at Hallett's Point, and the United States Lighthouse Board has forwarded their best specimens of lighthouse larterns, and the Navy Department their new improved apparatus for hoisting and lowering boats.

About seven hundred exhibitors have space assigned to them, and some who were unprepared to send by the government ships will forward their goods at their own expense by steamer. Commissioner Van Buren has been untiring in his efforts to have our country represented, and it is believed that the American department of the Vienna exhibition will be creditable to the nation.

THE DETROIT RIVER TUNNELS.

We regret to learn that work upon this great enterprise has been indefinitely suspended, for lack of funds, and the expected union of Canada and the United States, by the bonds of an underground railway, is for the present abandoned. This is a great pity, especially as much work had already been done. The original plan contemplated the connection of the Great Western Railway of Canada with the Michigan Central Railway, at Detroit, Mich., by means of two independent circular tunnels of masonry, each 15 feet in diameter, executed by borings under the bed of the river. Each tunnel was to have been 8,568 feet in length.

The preliminary work consisted in drifting a small tunnel 5 feet in diameter, intended as a drain for the two larger works, and it is upon this small tunnel that considerable labor has been expended. Headings were made on both sides of the river, and, up to a recent date when orders were given to stop, these headings had been carried 1,709 feet in all, or 1,220 feet on the American side and 480 feet on the Canadian side.

Mr. D. D. McBean, Superintendent of the works, has published, in a recent number of the Detroit *Post*, an interesting review of the practical operations so far as they were carried, showing that the works might be easily completed if the money were forthcoming. We hope that an improvement in the exchequers of the companies concerned will enable them hereafter to proceed with the works and bring them to completion.

SCIENTIFIC AND PRACTICAL INFORMATION.

BLEACHING BY TURPENTINE.

It is well known that turpentine generates ozone, and the fact has been used for bleaching purposes. The turpentine is violently whipped by dashers and the ozone is blown from the generator into the vat containing the paper stock or other goods to be bleached. How far this operation is successful we do not know, and only throw out the suggestion for some one to give it a trial and report the result.

HARDENING BURNED STEEL.

For hardening the steel points of tools of boring machines, etc., when burnt, J. Jossi proposes the following method: 10 parts of tallow, 2 parts horn filings, 1 part sal ammoniac, 1 part pulverized charcoal, and 1 part soda are mixed together and placed with a piece of wood on the parts to be hardened, after they have been exposed to a cherry-red heat. The mixture dries under the influence of the heat, and the steel parts may then be hardened again in the usual manner.

ARTIFICIAL MILK FOR CALVES.

Successful experiments have been made in raising calves by means of a soup or milk prepared according to the recipe of Baron Liebig, which is as follows:

Seven pints of water and three and a half pints of milk are boiled with 10 ounces of wheat flour to an ordinary pap; three and a half more pints of milk are then added, with an ounce and a quarter of a potash solution consisting of two parts of bicarbonate of potash dissolved in 11 parts of water. The same quantity of bruised malt as of wheat flour is added to the hot pap, which is well stirred and allowed to settle for half an hour near the stove or other warm place, when it is boiled again and filtered through suitable gauze.

The calves are fed for about 6 weeks on pure milk, and gradually they are allowed less, some of the substitute being added. At last they are given about 7 quarts of artificial milk per day and no pure milk. After three months, only one half of this quantity is given, half a pound of linseed cake being added; in the fall some boiled potatoes are mixed in. The calves gain about two pounds in weight per day. A calf which was weaned on February 22 gained on an average 2·12 pounds per day. Should calves dislike to take the milk of the cow, the substitute is given immediately. No disadvantageous effects of feeding with this milk were observed. Diarrhœa did not occur at all. The milk was also applied to the raising of pigs, and was in their case useful in the cure of diarrhœa, which so often fatally attacks them.

NEW METHOD OF CLEANING GLASSWARE.

Dr. Walz sends us the following correct description of his new method of cleaning glassware, published on page 151 of our current volume: The vessel to be cleaned is filled, or, if large, rinsed with a moderately dilute solution of potassium permanganate, the contact of the liquid being prolonged till a film of hydrated manganic oxide has been deposited; the solution is then poured away, and the glass vessel rinsed with some strong hydrochloric acid. Chlorine is then formed, but not enough to cause inconvenience; and acting in the nascent state on the organic matters, it speedily converts them into substitution products, which are soluble in the slight excess of acid or water.

PRESENCE OF SILVER IN SUBNITRATE OF BISMUTH.

M. Ch. Ekin observes that this preparation often contains silver, of which, however, no notice is taken in most works on pharmacy. Having tested it for the purpose of detecting a silver compound (subchloride), he found some samples of the subnitrate to contain from 3·9 to 6·5 per cent of subchloride of silver; and in other samples he found metallic silver, but in small quantity.

KIRCHER'S REMARKABLE OBSERVATIONS CONCERNING THE SUN.

The great English philosopher Isaac Newton, and, in fact, all the astronomers from the middle ages down to the end of the last century, had a much more correct idea of the nature of the sun than was the case with William Herschel and his followers, who, in order to keep step with the current of public opinion of their time (which favored a plurality of inhabited worlds), tried to prove not only all the planets but even the sun itself inhabitable, at any cost, even at the expense of common sense. For that purpose Herschel invented the phosphorescent cool atmosphere which, from its under surface, gave only sufficient light and comfortable heat to the inhabitants on the solar surface, but from its upper surface projected radiations which, at a distance of over 92,000,000 miles, could develope, with the help of our atmosphere, the burning heat of our tropical zones. Notwithstanding that the idea was absurd in the extreme, and without any foundation on analogous facts positively known about the properties of matter and of heat, it was accepted on the authority of the elder Herschel, who (when we render him impartial justice) must be considered as only a successful telescope maker, and a very poor philosopher. This absurd doctrine about the nature of the sun is, even now-a-days, not expunged from our school books on astronomy,