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Steam versus Ether.

We sometimes receive communications expressing dissent to opinions we have presented, simply, because some works and some professors whom these correspondents have looked up to as first authority, have presented opinions and made statements contrary to our own. We received a letter from a correspondent last week, expressing his dissent from the opinions we expressed on page 214, respecting the use of ether vapor as an economical agent in propelling machinery, in comparison with steam.

"You have scarcely devoted" he says, "sufficient thought to the subject, else you would have perceived that the density of the vapor (that is, the density of ether vapor in comparison with steam,) could have very little bearing upon the question, beyond the variation in the proportion between the volume of the vapor and that of the liquid from whence it is derived." He then quotes an article from Silliman's *Journal*, November, 1854, which states, that in an experiment with Du Tremblay's boat, by steam alone, 9·51 lbs. of coal per horse power were consumed per hour; while with steam and ether, only 2·24 lbs. of coal were used per hour for each horse power. We must say, that we have not the least confidence in such a statement. The gain stated to have been obtained by Du Tremblay's engine, is simply by the use of ether in a separate cylinder expanded into vapor by the exhaust steam. But how this exhaust steam applied to the ether effected such a gain—more than quadruple the amount of steam alone (9·51 ÷ 2·24 = 4·25)—we are not informed.

Our correspondent, in order to enlighten us further, quotes an article of Prof. Apjohn's, on the economy of ether over steam, taken from the *Chemical Gazette*, Oct. 5th, 1852. Instead of not having, as our correspondent supposes, *devoted sufficient thought to this subject*, we criticised that very article on page 117, Vol. 9, SCIENTIFIC AMERICAN, and showed that Prof. A. did not know what he was writing about. The following is the concluding part of our correspondent's letter:—"The data most to be relied on are, water—specific heat = 1·00; latent heat of steam 961·8, boiling point 212°; ether, specific heat 0·50, latent heat 163·8, boiling point 100·4°, hence, by calculation, we find the caloric necessary for formation of a volume of the vapor of water is 1129°, that of ether 534·7°. That is with ether somewhat less than one half required for water. To its practical use, however, there are obvious objections, such as its cost, inflammable character, difficulty of surface condensation, &c., which exclude it from its possible usefulness." M. P.

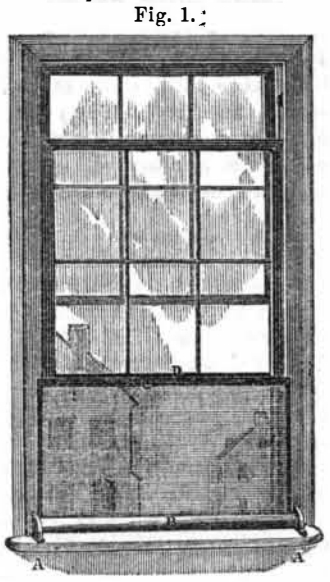
Our correspondent is right in his last sentence, respecting its practical application, but he is wrong in all that precedes it. Allowing him to be correct in his statement, wherein he alleges that a little less than one half the heat only is required for ether vapor in comparison with water vapor, he ought to have seen how untrustworthy the statement in Silliman's *Journal* is, which makes the gain twice as much as he does.

Our correspondent must dip a little deeper in chemistry than he seems to have done in taking Prof. Apjohn's reviews for his guide, before he can enlighten our readers on this subject. We must tell both him and Prof. A., that equal volumes of the vapor of ether and water (steam,) contain equal amounts of heat—there is not the difference, as he states, of 1129° ÷ 534·7° in equal volumes, though there may be in *a volume*, but the distinction between the two is as great as cheese and chalk. Graham (far better authority than Apjohn) says, "the same bulk of vapor will be produced from all liquids with the same expenditure of heat; hence there can be no advantage in substituting any other liquid for water, as a source of vapor in the steam engine." Why did Graham come to this conclusion? Simply because an equal weight of water and ether do not produce an equal bulk of vapor. Our correspondent and Professor Apjohn repudiate a *unit* or proper base of measurement, hence they have come to as sensible conclusions as the man who estimated, that of two men, one was head and shoulders taller than the other, because he was standing on a bench, while the other stood on the ground.

If we take 10 lbs. of water and convert it into steam, we find it will occupy a space of 1728 times its former bulk, with an expenditure of 1184° of heat. Now, if we take 10 lbs. of ether, we find that it can be converted into vapor with only an expenditure of 258° of heat. "A vast saving," Prof. A. will say. but this is not so, for this vapor having just six times less the elastic force of the steam, will only occupy a space of 288 times its former bulk, for it is six times denser than steam. It will, therefore require 60 lbs. of ether converted into vapor to do the same work of 10 lbs. of water converted into steam. "Equal volumes of vapors possess equal quantities of latent heat." The latent heat of ether vapor is 162°, that of steam 972° therefore a gallon of steam and a gallon of ether vapor, of the same pressure, contain 972° of latent heat. The specific gravity of vapors is in proportion to their latent heat, therefore [s. 972 ÷ e.162 = 6] the vapor of ether is six times heavier than steam. But it may be said, "the boiling point of steam is 212°, that of ether 96°, therefore there must be a gain of 116° in the use of ether." If we reasoned like our correspondent and Prof. Apjohn, we would, indeed, come to such a conclusion; but be it remembered, that it takes six times the quantity of ether to produce the same amount of vapor as water, therefore it requires more heat to use ether vapor than water vapor as a motive agent. Ether boiling point 96° + latent heat 162° = 258 × g.6 = h.1548° = or 364° more than steam. These figures are very different from those of our correspondent. There are others besides him who have been equally deluded by trusting to unlearned Professors and unsubstantial authorities respecting the economy of the vapors of ether, alcohol, &c., as substitutes for steam. The foregoing, we trust, will cause the scales to drop from their eyes.

Mosquito Window Screen.

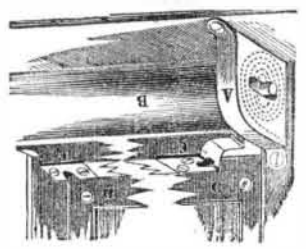
Fig. 1.



The annexed figures represent an improvement in window screens for excluding musquitoes and flies in summer, when a portion of the window is left open for proper ventilation. The inventor is B. B. Webster, of Boston; a patent was granted for the improvement on the 4th of last October.

Fig. 1 is an inside view of a window having the improved mosquito curtain attached—the lower sash being partly elevated, in order to exhibit the curtain. B is a roller (moved by a spring in boxes, A A,) around which the gauze curtain is wound when the window is closed. The spring is indicated by the dotted lines in fig. 2 (a perspective sectional view) at A. C is a movable bar that may be easily detached from the sash, D, to allow the window to be easily opened, when desired, without using the curtain. C C, fig. 2, shows this bar detached. When the window is partly open, the space between the glass and the bottom of the upper sash is effectually closed by some flexible material, to prevent insects from entering the room in that way. A like insect curtain may be applied to the upper sash, if desired The common mosquito curtains are fixed to a separate frame made for the lower sash of windows, which has to be removed, and the curtain frame set in. This invention is certainly a neat and convenient improvement over the common kind. This curtain has only its

Fig. 2.



small spring and roller box, B, secured to the window sole by screws, and the bar, C, to which the upper end of the curtain is attached, clasped upon the lower part, D, of the sash, so that when the window is raised, as shown in fig. 1, the curtain is drawn up and covers the space, to prevent the ingress of insects. When the window is lowered, the springs in the roller box wind the curtain by self-action on the roller, B. The tension of the springs can be regulated in a minute, to suit any window to which a curtain is attached.

More information may be obtained by letter addressed to Mr. Webster, at No. 9 Blackstone street, Boston.

Progress of the Telegraph.

The last number of the *North British Review* contains an able article on the "Electric Telegraph," in which the claims of several inventors are criticised. It gives the credit of suggesting the first electric telegraph, and publishing a description of it, to a correspondent of the Scott's *Mechanics Magazine*, as far back as February, 1753, more than a hundred years since. This communication no doubt describes a working telegraph, the power being frictional electricity, for the voltaic battery was not discovered for fifty years afterwards. For public purposes, this old telegraph could not be used, but it is certainly a scientific curiosity.

The merit of inventing the modern electric telegraph, and applying it on a grand scale, for public use, is awarded, "beyond all controversy," to Prof. Morse, and the reviewer seems to make this award in a most candid manner. He says, "while men high in office, and even men of science on both sides of the *Atlantic*, entertained doubts of the applicability and practical use of the telegraph, Prof. Morse was actively engaged in pressing the importance of his invention on the attention of Congress, and though only half convinced by his earnestness and demonstrations, the Federal Legislature appropriated a sum of money for the construction of a telegraph forty miles in length, between Washington and Baltimore. This may be considered the parent telegraph of the trans-atlantic world, from which a system has sprung, which, in its extent and achievements, is well calculated to fill both native and foreigner with astonishment."

The credit of inventing and constructing the most rapid working telegraph is given to Alex. Bain. This machine was illustrated on page 273, Vol. 3, SCIENTIFIC AMERICAN.—Respecting it, Dr. Lardner says: "The system of Bain is to the common telegraph what the steam engine is to the horse—the power of the hand loom or the stocking frame to the knitting needle." The *Review* seems to anticipate a time when the Post Office will give place to the telegraph, and that the former will only be employed for sending heavy orders. "When the sixpenny or penny telegraph comes into play," it says, "Mr. Bain will stand forth as the greatest of telegraph inventors." It makes this assertion upon the authority of Dr. Lardner, who states, that 20,000 words can be sent in one hour, by one wire, on the chemical telegraph, and to a greater distance than by the magnetic telegraph.

We have always been given to understand that the whole credit of inventing, erecting, and introducing the telegraph in England was due to Professor Wheatstone, of London; all the historical accounts of the telegraph award him that honor. But it now comes out that such credit is more justly due to W. F. Cooke, his partner, who has been unjustly robbed of such credit through the connivance of the friends of Prof. W.

We learn that the Morse telegraph is used in Prussia, but not in England, the signal telegraph being the one principally used there. Switzerland is at present that country of Europe which possesses the most complete net of telegraphs. There is a telegraph office there for every 25,000 inhabitants, in England one for every 56,060 inhabitants, in Sardinia for every 70,000, in Belgium for every 130,000, in France for 290,000, in Prussia for 320,000. The moderate single tax of one franc for a despatch of twenty-five words in the whole territory of the Swiss Union, has thus far found a complete imitation in no other land. No less than 37,000 miles of telegraph wires extend through Britain and Ireland. Our American lines are estimated at 41,392, but the wires, we suppose, are more than double this length. Distant Hindostan now bears testimony to the sway of the telegraph. A line was opened on the 1st of last month (February) between Bombay, Madras, and Calcutta, embracing a distance of more than 2000 miles. It is to be carried through Egypt, and will soon be in communication with the European lines, so that messages will then be transmitted from London to ancient India in a few seconds. The telegraph is one of those inventions which tends to change the social conditions of society, and the habits of mankind. Its power and influence are now felt in every department of life. The press, the mercantile world, and the administrators of law and justice rely upon it daily for the most important information. When we recollect that ten years ago there were only thirty miles of telegraph lines in our country, and that now there are a thousand times thirty miles in operation, we have no hesitation in asserting that we firmly believe the whole earth—through ocean and overland—in ten years more, will be girdled with the lightning rail, and man will communicate with his fellow man, in a few minutes, from the most distant portions of the globe.

Testing Lubricating Oils.

H. L. Kendall & Co., of Providence, R. I., have a delicate machine for testing oils, &c., both as it regards their anti-friction qualities, and durability when applied to lubricate machinery. All those who have patent and improved oils for such purposes, and wishing to have them tested, can have this done by sending samples to Mr. Kendall. This will confer a favor upon us, and upon all our railroad superintendents, and manufacturers, as Mr. Kendall will make a report, through the columns of the SCIENTIFIC AMERICAN, of his experiments, and thus spread abroad, throughout the length and breadth of our land, a particular kind of information of the most important character. The subject of lubricating oils is becoming of more importance every day. We do not know how much is expended every year for oils on our railroads alone, but it must amount to an enormous sum. And when we take into consideration the number of steamships, steamboats, woolen and cotton factories, saw mills, printing presses, and all the other machines in our country, which consume oil, for lubrication, we should not be surprised if the sum total amounted to five millions of dollars annually. If any saving can be effected by a knowledge of what is the most economical lubricating material, a great good will be accomplished. The price, anti-friction, and durable qualities of each oil will form the data of comparison, and the *unit* of the tests will be the best quality of sperm oil. We hope and trust that great benefits will result from this notice. Those who send samples of oils to Mr. Kendall will be pleased to pay the expense of transport, as his labors are to be given without fee or reward.