

## THE GREAT EDISON SCARE

Under the above title the following article, which it is reported was written by Professor Tyndall, appeared in the *Saturday Review* of the 10th ult:

What a happy man Mr. Edison must be! Three times within the short space of eighteen months he has had the glory of finally and triumphantly solving a problem of world-wide interest. It is true that each time the problem has been the same, and that it comes up again after each solution, fresh, smiling and unsolved, ready to receive its next death-blow. But this peculiarity of his triumphs, though interesting from a practical point of view, is doubtless of too trifling a character to damp the joy of victory in Mr. Edison's own mind, since it appears in no degree to interfere with the plaudets with which his followers hail each fresh achievement—or, we should rather say bull in—from Menlo Park. And thus not only is Mr. Edison to be congratulated on the happy past, but his friends may look forward to a long and equally happy future, crowned at periodical intervals by similar dazzling and final triumphs; for, if he continues to observe the same strict economy of practical results which has hitherto characterized his efforts in electric lighting, there is no reason why he should not for the next twenty years completely solve the problem of the electric light twice a year without in any way interfering with its interest or novelty.

But all this, we are told, is altered now. We are given to understand, by accounts from headquarters, that this time Mr. Edison really has done it, and descriptions of the perfection and economy of the light are showered upon us which quite take away one's breath. That the light itself is all that its inventor could by any possibility desire will not surprise any one who has had experience with inventors; but it does startle us to be told that its cost will be only 1-40th that of gas. In the face of such definite assertions incredulity would seem to be a crime, and it would appear to be the duty of all gas directors to make forward contrasts to deliver old iron in view of the immediate future when gas will be spoken of as a thing of the past. Curiosity, however, is such a persistent trait of the human mind, that one cannot repress a desire to know the exact details of this all-transforming discovery, and to form one's own opinion of the sources of its transcendent merits. Fortunately, the veil of mystery that has so long hung over the doings of Mr. Edison's laboratory has at last been drawn aside, and we are in full possession of the magic secret. It does not sound very wonderful after all. There is nothing new in the lamp. It is an ordinary incandescent lamp with a slip of carbon as the substance to give forth the light. The sole secret is that Mr. Edison makes the carbon out of burnt paper.

The discovery bears strong marks of Mr. Edison's handiwork. Like all the other so-called discoveries of his in connection with electric lighting (with one exception, of which we will speak presently), it is wholly without novelty, unless there be some unimportant details in the particular form of the connections and regulating mechanism, in which he has chosen to exhibit that ingenuity which he undoubtedly possesses, but which could have been as well arranged in a thousand other ways. The idea of a lamp consisting of a piece of carbon placed in a vacuum and rendered incandescent by the passage through it of a strong galvanic current is as at least as old as 1845, when it was patented by King, and similar devices have since been continually proposed and employed by others. Experience however, taught inventors (as it will probably teach Mr. Edison when he has a little more acquaintance with the subject) that a vacuum is a very awkward thing to deal with, and that much more satisfactory results could be obtained by placing the carbon in a non-combustible gas, such as nitrogen or carbonic acid. Accordingly recent lamps in which incandescent carbon has been used have generally been of that type. Such was the Sawyer and Mann lamp which excited so much attention in New York some twelve months ago, and which consisted of a thin rod of carbon in a receiver full of nitrogen. Or late we have heard nothing of this lamp, and we very much fear that it is another instance of the fatal gulf between theory and practice, and that its disappearance from public view is due to the existence of some practical difficulties in the application of what seemed to be an ingenious idea. Other lamps are upon similar principles; the most successful one, so far as we can judge by report, is a French one, in which there are three small carbon rods in a closed receiver, the oxygen of which is consumed by the combustion of one of the rods, leaving the atmosphere in the receiver incombustible during the incandescence of the other two. Nor is there any more originality in the idea of procuring the carbon for such lamps from burnt paper or cardboard. That such carbon was very suitable for producing light by incandescence has long been known to electricians. Mr. Swan used it 15 years ago for an electric lamp on the incandescent principle, and, curiously enough, used it in the shape of a horseshoe, exactly as Mr. Edison is now using it; so that there must be something more than a resemblance between the two lamps, seeing that the carbon and the enclosing glass vessel (which may be of any shape) constitute the whole of the lamp proper. The use of this carbon was given up because of its want of durability—a difficulty which, however, Mr. Swan says that he has now got over; and it seems to be tolerably evident from Mr. Edison's own account that he has done little or nothing to remedy this defect, of which he is probably not fully aware. At any rate, it is clear that the carbons he uses are fragile in the extreme, for he says they must be taken out of the mould with the greatest care, to prevent their falling to pieces.

The general result therefore, is that Mr. Edison leaves the subject of the electric light precisely where he found it, so far as discovery is concerned. He has added nothing to our knowledge. The next thing to consider is, whether or not his lamp performs the practical service claimed; whether, in short, the method he adopts—by whomsoever invented—will in fact accomplish what is alleged of it. Considered in themselves, there can be no doubt that the tales that have come over to us about Mr. Edison's new discovery are in the highest degree improbable. The use of incandescence as a means of procuring light from electricity, without breaking the continuity of the circuit, has been known from nearly the beginning of the century, and all its advantages and disadvantages thoroughly studied. The result has always been to show that it is a very wasteful method of using the electric current when compared with the electric arc or the broken circuit of such lamps as the Regnier and Wer-

dermann, which hold an intermediate position between the two classes. It possesses great advantages, which are obvious at first sight; but so great is the disadvantage of which we have spoken, that its use has been very limited, except for special purposes, as, for example, the little medical lamps for illuminating the cavities of the body to facilitate diagnosis. That this principle should turn out to be the enormous commercial success that Mr. Edison's lamp is represented to be, is in the highest degree unlikely, seeing that, as we have said, his lamp differs, but slightly, if at all, from lamps previously known. Nor do the accounts themselves that have reached us tend to reassure us much. They show clearly that this lamp is more fragile and more difficult to handle than any of its competitors. They do not give us the least reason to think that it has any elements of success in it other than the bright character of the incandescence of carbon made from paper; and as such carbon cannot materially differ in its qualities from other kinds, and is even more liable to be heterogeneous and uncertain, this small advantage seems to be a very slight matter to build such high hopes upon. They do not suggest any way of getting over the difficulty which is met with in lamps constructed on this principle, of keeping the glass from getting dulled by particles of carbon coming off from the incandescent mass within it—a difficulty which would be peculiarly fatal to a vacuum lamp like Mr. Edison's, which cannot be cleaned on the inside. But, above all, there is a strong flavour of humbug about the whole matter. Every account—even those which Mr. Edison himself seems to have authorized—is written in a way in which no good electrician could write. We have a sensational account of the supposed discovery, where a thin filament of carbon is represented as having been accidentally tried with a strong current, and we are told, as of a newly-discovered marvel of science, that this carbon filament resisted an intense heat, and "proved in reality more infusible than platinum, or indeed than any other substance. Then there are references to other electrical phenomena which have about as much to do with the matter as the processes of electrotyping would have, but all of which are ingeniously identified with the so-called discovery, as though they specially belonged to Mr. Edison's lamp. Thus it is explained that the current can be made to run a sewing-machine; and other potentialities are vaguely shadowed forth which are said to be dependent on a knowledge of the laws of electricity. Of course a continuous current can be made to do work in a thousand different ways; but what have the marvels of electricity in general to do with the question whether Mr. Edison's lamp is a good one? Again, there is the new dynamo-electric machine. Mr. Edison must, of course, come before the public in a state of complete independence of all other inventors; so he must not even get his electricity from the same sources as others. Hence, for a second time, he produces a dynamo-electric machine which he calls by the pompous title of the Faradaic Machine. It merits this title only in virtue of its representing a state of knowledge more nearly that of Faraday's time than any machine in use at present. It is strange how Mr. Edison's efforts in electric lighting seem cursed with a total absence of originality. The machine, both in its separate parts and general arrangement is the merest copy of other machines. Its principle, its arrangement and everything about it are so utterly unoriginal, that it really is difficult to understand how Mr. Edison himself can fancy he has any claim to be considered its inventor. It only differs from the machines at present in use in that it is much what they must have been in their early forms, before their makers had learnt how to intensify the magnetic field in which the armatures rotate. He drops hints of machines that utilize 90 per cent. of the power applied to them. The correctness of this figure, if it is intended to apply to this machine, we cannot believe in. Such a percentage is about what is expected from a good machine on the Siemens, Gramme, or Brush principle, and it is simply absurd to suppose that this blundering imitation, which is destitute of all the special improvements which experience has suggested to their makers, can contend with those machines on equal terms.

All these circumstances and many others cause us to regard with utter distrust the glowing accounts of Mr. Edison's invention (if it is entitled to be called such) that reach us from New York. And, added to this, there is the remembrance of what happened some eighteen months ago at the beginning of Mr. Edison's experiments on the electric light. Every one recollects how, in October, 1878, there came a telegram from New York that Mr. Edison had completely solved the problem of electric lighting, and how this telegram caused a tremendous panic in gas shares, sending them down to two thirds of their previous value. Even the instructed, who could detect, in the very language in which the telegram was couched, evidence that it was framed either by or for persons who were ignorant of the subject, scarcely dared to imagine that such a telegram could have been allowed to go forth or to remain uncontradicted unless Mr. Edison had really obtained most important results, and was in a position to practically effect electric lighting at a reasonable cost. It is fortunate for Mr. Edison that public attention cannot remain very long fixed upon any one subject, and that by the time that a few months had elapsed people had ceased to think of him or his telegram. For we now know in what position he stood when that outrageous telegram was sent. And it is well that we are able to arrive at this from sources directly connected with Mr. Edison himself, for it would otherwise be impossible to convince any one of the true state of the case. Some six or eight months after this telegram, two patents, representing the latest completed results which even then Mr. Edison had obtained, came over to this country, and were made public amid the universal derision of all who knew anything about electricity.

The wonderful secret that was to solve completely the problem of electric lighting was the use of incandescent platinum (or an alloy of platinum and iridium, we forget which) to give light. It would seem that Mr. Edison has an irresistible passion for electrical antiquities. Not only is this one of the very oldest devices known, but it was actually patented in 1845 by Staitte, though we doubt whether such a principle could even then have been the subject of a valid patent unless there had been something special in the form in which it was applied. We forget whether Mr. Edison attempted to patent his lamp, or even if he had any lamp at all at the time; but he certainly patented a regulator, which was intended to turn off the current when the heat of the platinum got too intense. This was a simple instrument of little or no merit

and deserving of no notice. We really do not know whether it was able to do its work; we have heard that it failed even to do that; but whether or not this was the cause is of no moment, for so far as we have been able to learn, both the lamp and the regulator have, for all practical purposes, proved abortive. We have never heard of their being tried on any practical scale, or even of their being used at all outside of Menlo Park; and whatever may be Mr. Edison's love of perfection, we do not believe for an instant that if he had got a really practical lamp capable of doing a fraction of what it was represented to do, he would have let months pass without its coming into the market.

But these two were not the only precious gifts which were then bestowed on the world by Mr. Edison. There was a third, which no disparaging remarks as to its extreme simplicity could be applied. The second patent then taken out by him was for a wonderful dynamo-electric machine of a wholly new construction. We willingly give Mr. Edison credit for originality in this machine. Coils were fixed to the vibrating arms of a monstrous tuning-fork more than a yard long, and those, by the vibrations of the fork, were made to approach or recede from magnets, and thus currents were generated. If it were not actually in a patent taken out on Mr. Edison's behalf, all instructed persons would hesitate to believe that such an absurd arrangement could be seriously proposed at a time when such machines as the Gramme, the Siemens, the Linton, the Brush, and a host of others were in existence, much less that it could be proposed by a man of Mr. Edison's advantages and fame. It is difficult adequately to express the ludicrous inefficiency of the arrangement; but one thing is abundantly certain, and that is that the person who seriously proposed it was wholly destitute of a scientific knowledge of either electricity or the science of energy. It is clear that he was tempted by the hope of getting out of the vibrations of the tuning-forks something more than the force he expended on them. No doubt he thought that vibration was so confirmed a habit with tuning forks that they would vibrate on the merest hint being given to them. To those who remember the amusement that this wonderful invention excited among English electricians, it will be interesting to read the following passage from the latest authentic American account:—"Mr. Edison's first experiment in machines for generating the electric current did not meet with success. His primal apparatus was in the form of a large tuning-fork, constructed in such a way that its ends vibrated with great rapidity before the poles of a large magnet. These vibrations could be produced with comparatively little power. Several weeks of practice proved, however, that the machine was not practicable and it was laid aside." We should very much like to know when these weeks of practice (not a very long trial for a new invention) took place. Not before the patenting, or it would never have been patented. Then it must have been after the patent was taken out—a matter which confirms the opinion held by most persons in England who are competent to judge of it, that no such machine had at the time ever been made (except, perhaps, on a small scale), and that the whole matter was a pure speculative suggestion. Remembering the unrivalled opportunities for experiment possessed by Mr. Edison, the fact that he took out this preliminary trial—and we are convinced that a most superficial investigation would have demonstrated its worthlessness—is a striking lesson as to the reliance that should be placed on the accounts of the extent of the preliminary experiments to which his so-called inventions are subjected. We can assure Mr. Edison that it will require a long list of successes, not only announced but realized, to counteract in the minds of those capable of judging of it the effect of that absurd patent in convicting Mr. Edison of being a man of no scientific knowledge of electricity, and either so incapable of judging of the value of his work or so careless of his own reputation as to be ready to patent a machine which on a few weeks trial proves itself, on his own confession, to be an utterly worthless device.

These petty results, or rather the small fraction of them that he had obtained six months previously to their publication, represent all that Mr. Edison had actually completed when the famous telegram was sent. In other words, he had not the slightest ground for announcing that he had made any substantial advance in the treatment of the electric light, much less that he had completely solved its difficulties. Now we do not suppose for a moment that Mr. Edison would aid in giving currency to a report which he did not believe to be true. The most probable hypothesis is that he is an inventor who is absolutely intoxicated with his own reputation, and who has an unlimited belief not only in the efficiency, but also in the novelty of all that he proposes. In no other way is his conduct comprehensible. The exciting cause of the celebrated telegram could not have amounted to more than that, having thought a little over the difficulties of the rival plans for producing the electric light, he resolved to concentrate his efforts upon the oldest and the easiest—namely, incandescence in the continuous circuit. Having resolved in his own mind that this was the best form, his vanity treated success as certain that we honestly believe he viewed it as a grand new departure in electricity, whereas it was only what hundreds had done before and hundreds will do again. Then he went on pondering through all that his predecessors had gone through before him; advancing knowledge not one whit, inasmuch as all his results were old, but still pressing on with the profoundest conviction that everything that came upon him as a novelty was new also to the world. It is only by keeping these things in mind that we can judge of the value of the recent reports of his successes, and we can come to no other conclusion about them than that without independent confirmation they are not worthy of credence. It is not that we do not think that Mr. Edison is likely to help in the development of electric lighting. On the contrary, considering his unexampled advantages, it is matter for surprise that so ingenious a man has not discovered something worthy of remark by this time. For he is undoubtedly an inventor of exceptional merit. Independently of the important share he has had in the development of quadruplex telegraphy, his success in the carbon and loud-speaking telephones shows that he is possessed of great inventive power and remarkable mechanical ingenuity. His other great achievements, the phonograph, would alone go a long way towards justifying his enormous reputation. But these successes seem to have completely turned his head. He allows the wildest reports of his doings to obtain currency. The same account to which we have referred speaks of his having recently invented an air pump, a method of utilizing mining tailings, a sextuple telegraph, and a specific against headaches. This last child of his fertile brain is old enough to be christened, and rejoices in the mysterious name of Polyform, and the reporter goes so far as to state that Mr. Edison takes it himself. But this must surely be an exaggeration. Altogether he reminds us forcibly of the White

Knight in "Through the Looking-Glass," and we expect soon to hear that he has

"Completed his design To save the Menai Bridge from rust By boiling it in wine."

It will be remembered that the White Knight also had invented devices for the preservation of his health. All these things make us feel that Mr. Edison is not capable of judging of his own performances, and confirm us in the belief that his latest idea is but a doubtful rival of many lamps that are already in the market. The calculation as to its costing 1-40th the price of gas is an utterly absurd one, even when read by the light of the meagre details on which it professes to be based. The most economical form of electric light is, and in all probability always will be, the arc-lamp, where it can be used on a large scale, and no form of incandescent lamp can approach it in economy of production. Yet engineers are very well satisfied if they can bring down its cost, even under the most favorable circumstances, to between 2-5ths and 1-4th the price of gas. We feel tolerably certain that the cost of Mr. Edison's lamp, even if it is otherwise practicable (about which we have a good deal of doubt) will be many times this. The only good point about the news is that Mr. Edison seems at last to have settled down to the useful detail work of trying various methods of improving the manufacture of carbon for electric purposes. This is much wanted, and Mr. Edison is exactly in a position to do it. But, supposing that a manufacturer of artificial carbons were to discover that it was better to use barley-meal than wheat-flour, or lump sugar than moist sugar, in their preparation, we should be considerably surprised to find him announcing himself to the world by telegram as being the greatest inventor of the age. In our opinion Mr. Edison's pretentious announcements are as little justified by the fact that he has satisfied himself as to what is the best form of carbon to use in the ordinary and well-known incandescent method of electric lighting, as a candle manufacturer would be justified in announcing that he had completely solved the problem of domestic lighting because he had devised a slightly improved candle-wick.

The New York correspondent of the "Daily News," telegraphing last Thursday, says: "Mr. Edison is in fresh difficulties, owing to the liability of his carbon horseshoes to break in use. He has stopped making the lamps until he finds the cause, which is supposed to be the admission of air to the globes by the cracking of the glass at the point where the wires enter."

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At Georgetown, P. E. I., on 6th Feb., of diphtheria, Hazel, aged 3 years and 3 months, youngest child of R. Munro, Esq.

At Georgetown Royalty, on the 3rd inst., Christina Murray, aged 80 years, relict of the late Angus Sutherland, formerly of Pictou County, N. S.

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