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WHAT IS THE BEST INSULATION?

What is the best insulation for voltaic arc lighting wires? is an all-important question just now. It might even be called a serious one. There are, it is true, electricians who think, and indeed have publicly avowed, that the wires in their present condition do not threaten life, if only proper care is used in their distribution. Others, whose opinions are quite as worthy of attention, insist that with the present means of insulation and the present strength of currents, these wires are a constant menace. The public, it seems not unfair to assume, is as a unit with these latter, and though it might be said, perhaps with truth, that the public is as unfamiliar with the question as it is easily alarmed, the fact that there is a general lack of confidence in the protection afforded by the present means of insulation ought to be, and indeed is, enough to urge the projectors of this system of lighting to bestir themselves.

At the recent meeting of electric lighting men, the committee long since appointed to inquire into this question of insulation admitted through its chairman, Mr. Elihu Thomson, their inability to make a report. The disappointment thereof was good circumstantial evidence, if such were wanting, to prove how sincere is the desire of the companies to improve their insulation, some members of the association coming from distant parts with the single purpose of listening to this report and profiting by the information which, because of the personnel of the committee, there was reasonable hope it would contain.

The reasons for the unusual reticence on the part of this committee are not far to seek; but whether or no they are satisfactory, each interested person must determine for himself, the question being one on both sides of which much may be said. Here are the bare facts gleaned from what was admitted at the convention.

Being practical men, the committee not only examined the relative values of the known kinds of insulation from a laboratory standpoint, but sought information from station superintendents. In both directions the evidence was meager and conflicting. If the name were given of the device which acquitted itself best in the laboratory, it might lead many to adopt a system more certain in small, carefully guarded tests than in general employment, while if the evidence of those who might be interested was accepted, certain manufactures might be praised above their merits and given an undeserved prominence above their rivals.

It might be urged against this that if the committee is afraid to name a manufacture, even if the best of the evidence collected is in its favor, no benefit may be hoped for from its exertions, and all its learning and skill but discover for it a path by which it may depart from its purpose. On the other hand, it seems immediately obvious that it would be hazardous as well as unfair to come to a decision in so difficult a question as this, where reliable evidence is hard to find, and where that which may be had conflicts with experiments made by disinterested hands.

ADDITIONAL POSTAL FACILITIES NEEDED.

We pride ourselves upon being an enterprising nation of liberal and progressive ideas, considerably in advance of our neighbors, especially those of Europe. But in some respects this pride of ours has no basis except self-conceit.

Take for example the matter of postal facilities. We plume ourselves upon the progress we have made. But it required the teachings and example of England and the Continent for nearly half a generation before the Americans opened their eyes and understandings to the success and immense advantages of cheap letter postage.

We have at last got the idea into our heads, and at the present time our people may transmit their letters as cheaply as do the English.

But there is still one branch of the postal service to which we remain blind, although it is of the greatest importance to the public and of enormous value to our postal revenues. We allude to the parcels post, which has long been in successful operation abroad.

The dull Germans have been working the parcels post for several years with great satisfaction. Merchandise of almost any description may be forwarded by mail in Germany, and the public convenience is promoted thereby in a wonderful manner. The rate charged is a little over one cent per pound. Packages of 110 lb. can be sent for \$1.20. In 1885 almost seventy millions of packages were transported by mail, the average weight of each being 9 lb., or over six hundred millions of pounds, a quantity greatly in excess of the entire American mails, and fifty times more than the weight carried by our present puny and expensive little package post system.

The postage yielded by the German parcels, for the year mentioned, was \$7,776,272.

For many years past, the expenses of the American Postal Department have exceeded the revenues. For the year 1885, the deficiency was \$8,318,696. For the present fiscal year, the shortage will be much less. It is evident if a parcels system something like the German were established, the receipts of the department would always be in excess of the expenditures.

One of our great political parties lately adopted as a plank in its platform the idea of a general one cent letter postage. As the chief portion of the revenue of the postal department is derived from letters, the immediate effect of such a reduction would be to knock down the revenues and increase the deficiency. But if we were to add [the parcels post, then the receipts would be so much increased that the one cent letter rate could be easily sustained.

Independently, however, of its financial success, the parcels post system would be of extraordinary advantage to the country in promoting internal commerce. It is true we have admirable and effective means for transportation of parcels through the express companies; but they are only a drop in the bucket compared with the requirements of our great country. We have now over 55,000 post offices and 400,000 miles of mail routes; of the latter, less than one-third are traversed by railways.

The great need of the day is the extension of the parcels post system so as to render its benefits available wherever a mail route exists.

It behooves our legislators to cast an occasional glance at the proceedings of other nations and promptly adopt the latest improvements. In regard to mail facilities and war vessels we are greatly behind the age. We originate little in these branches of the public service; we only copy from Europe, and in doing this we are very tardy.

Report of the Commissioner of Patents for the Fiscal Year 1887-88.

Commissioner of Patents Benton J. Hall in his financial report to the Secretary of the Interior, under date of August 31, 1888, renews the recommendation contained in the report of 1886-'87 relative to the legislation needful in amending sections 4,885, 4,887, 4,898, and 4,930 of the Revised Statutes.

He also calls attention to the urgent need of increased facilities for the conduct of the business by providing additional room. This is a matter becoming more and more serious each succeeding year, as the work increases in consequence of the advancement of every branch of industry. The present space allotted to the bureau in this building is wholly inadequate to secure a prompt dispatch of the business. The importance of providing more room cannot be overestimated, if the business of this bureau is to be conducted as successful commercial men conduct theirs.

The following statements exhibit in detail the business of the office for the fiscal year ending June 30, 1888:

Number of applications for patents.....	34,570
Number of applications for design patents.....	1,068
Number of applications for reissue patents.....	140
Number of applications for registration of trade marks.....	1,309
Number of applications for registration of labels.....	682
Number of caveats.....	2,408
Total.....	40,277

Number of patents granted, including reissues and designs.....	20,653
Number of trade marks registered.....	1,083
Number of labels registered.....	365
Total.....	22,101

Number of patents withheld for non-payment of final fees.....	2,957
Number of patents expired.....	11,611

Receipts and Expenditures.

Receipts from all sources.....	\$1,122,994 83
Expenditures (including printing and binding and contingent expenses).....	953,730 14
Surplus.....	\$169,264 69

On July 1, 1888, there were 7,227 applications on file still awaiting action on the part of the patent office.

The Eucalyptus for Boilers.

In their official report to Rear-Admiral Gherardi, commandant of the navy yard, a board of naval engineers stated they considered the use of the eucalyptus boiler scale preventive of great advantage in lessening the deposit of scale and in rendering what is deposited soft and easily removable, preventing as it does the scale from adhering to the surface of the boilers. The test had been employed in the steaming boilers of the Richmond for over a year, and the interior surfaces had been kept free from scale without the use of scaling tools, it being only necessary to wash the boilers out with a strong jet of water from the steam hose. In distilling boilers the deposit of scale was also lessened. The interior surfaces of the boilers, these officers reported, show no sign of pitting or corrosion.

THE Hudson River tunnel is about to be completed by British capitalists and by British engineers, viz., Sir J. Fowler and Mr. B. Baker. In a report on the subject the latter state that the work already done is substantial and well designed. They estimate that remaining to be done can be completed in about eight months, at an expense of 190,000*l.* for the north tunnel and 250,000*l.* for the south tunnel.

Richard A. Proctor.

With the deepest regret we have to announce the death of Richard Anthony Proctor, the noted astronomer, who died on the 12th of September in the Willard Parker Hospital, this city. He arrived here on the 10th after a journey by rail from his home and observatory at Oak Lawn, near Orange Lake, Marion County, Fla. Mr. Proctor left his wife, who is suffering from malaria, at Oak Lawn with other members of his family, and was to have sailed on the Umbria on the 15th, for England, where he had engagements to lecture this fall. He traveled alone, and was obliged to pass through the yellow-fever district on his way North. He received a certificate of health from a physician at Orange Lake before he left there.

On the 10th, Mr. Proctor went directly to the Westminster Hotel. On the following morning he remarked to the landlord, Mr. Schenck, that he was not feeling well, and was advised to send for a physician. He retired to his room, and was visited by Dr. George S. Conant, who found him in a semi-delirious condition, and discovered symptoms which led to a suspicion of yellow fever. He called in Dr. Cyrus Edson of the Health Department, and afterward Dr. A. Jacobi. As the result of their examination, it was decided that Mr. Proctor's disease was so much like yellow fever that he ought to be removed immediately from the hotel. He cheerfully consented to go wherever the physicians thought best, and they resolved to send him to the Willard Parker Hospital, whither he was quietly removed in an ambulance that night. When Dr. Edson had made his report to President Bayles of the Health Board, a corps of physicians and fumigators went to the Westminster Hotel and thoroughly disinfected and fumigated the room which had been occupied by the astronomer. Then they ripped up the carpets, tore down the curtains, took the bed apart, and carted everything away. The furniture and other contents of the room were burned.

Richard A. Proctor was born in Chelsea, England, on March 23, 1837. His taste for mathematical studies was evinced at an early age. After studying in an academy at Milton-on-Thames, and serving as a clerk in a London bank, he entered King's College, London, and then St. John's College, Cambridge, where he was graduated in 1860. In the same year he was married. For some time after taking his degree he studied history and literature, and then devoted himself assiduously to astronomy. In 1863 he wrote an essay on "Double Stars," which appeared in the *Cornhill Magazine*. In 1865 he published a monogram on Saturn, and early in 1866 his "Gnomonic Star Atlas" and "Handbook of the Stars." In 1866 he was elected a member of the Royal Astronomical Society, and in 1868 he obtained a seat in its council. In 1874 he was chosen one of its honorary secretaries. "Other Worlds than Ours," his first book of science designed for popular circulation, was published in 1870, and was remarkably successful. It has been followed by many other works from his pen on astronomical subjects, most of them so written as to be attractive to lay readers. His chief scientific work has consisted in the investigation of the evidence available for determining the structure of the stellar and nebular universe. Having analyzed results collected by the Herschels, Struve, and others, and carried out a series of original researches, including the construction of a chart of 324,000 stars, Mr. Proctor was led to a new theory of the structure of the stellar universe. He put forth in 1869, on theoretical grounds, the since established theory of the solar corona, and also that of the inner complex solar atmosphere, afterward discovered by Prof. Young. Since 1878 he had published several volumes of essays on scientific and general subjects, with two treatises on "Whist." For some months before his death he had been at work in the preparation of a popular "Astronomy" on an extensive scale.

In addition to his other work he was a special contributor to the *SCIENTIFIC AMERICAN*. He prepared for us specially, at one time, a series of twelve original star maps for this latitude, showing the positions of the stars for each month in the year. Added to all his other labors, Prof. Proctor was the editor of *Knowledge*, a popular monthly scientific magazine, published in London.

Mr. Proctor made lecture tours in this country in 1873 and 1875. In 1879 he lectured extensively in Australia. His first wife having died, he married a lady of St. Joseph, Mo., in 1884, and for some time he made that city his home.

Mr. Proctor was perhaps the most prolific writer of his day on scientific subjects, and, as might be expected where an author produces works on such topics with amazing rapidity, his works were not marked by exhaustive research or by so complete and exact accounts of the subjects discussed as would stand the closest scrutiny by experts. In comparison with the mass of popular scientific publications, however, his writings are remarkable for their general accuracy and thoroughness. He wrote with great clearness, with an enthusiasm which communicated itself to his readers, and with a fullness of detail and illustration which are very welcome to the student not already a scientist. All his

reasoning was that of a highly disciplined mind, possessing a complete understanding of the mathematical relations involved in the problems considered. As a lecturer he was less successful from a scientific point of view than he was as a writer, being too incautious in his statements, unnecessarily diffuse, and inclined to be rash in his speculations. With the general public, however, his lectures were fortunate efforts, his hearers being always pleasantly entertained, while their minds were enriched with many new ideas.

For most of the foregoing particulars we are indebted to the *Evening Post* of this city.

Joseph Francis.

The venerable Joseph Francis, who for years has pleaded with Congress for recognition of his claim as the inventor of the life-boat, which recognition other governments had already given, has been informed that Congress, a few days ago, passed a resolution which says that "in view of the lifelong services to humanity and to his country of the now venerable Joseph Francis, in the construction of life-saving appliances, by which many thousands of lives have been saved, the director of the mint is hereby authorized and required to strike a gold medal, with a suitable device and inscription, prepared under the direction of the Joint Committee on the Library, to be presented by the President of the United States to Mr. Francis in recognition of his eminent services."

The "venerable Joseph Francis" is now eighty-six years old, and for many years lived at the Stevens House on lower Broadway, but went to San Diego, Cal., last winter. He has spent the whole of his life, since he was eleven years old, in the study and perfection of life-saving appliances. Those who see him for the first time are reminded of some of the genial old characters in Dickens' works. He has a broad and high forehead, with his moderately long gray hair brushed smoothly back from the temples, a neatly trimmed gray mustache and a wee bit of goatee. Add to the pleasing expression of his face his pale blue eyes, which twinkle beneath his shaggy eyebrows, and his old fashioned black frock coat, black trousers, and high standing collar, and one has the quaint appearance of a member of the old school.

"Joe" Francis used to spend his time after school hours reading stories of the terrible shipwrecks, and he was finally encouraged to devise some means of saving life. It was shown that when only eleven years old he made a small boat of his own model, and made compartments in the bow and stern which he filled with old pieces of cork. He then filled the boat with water, and was surprised to find that it would not sink, even after four men got into it. It was the first life-boat ever built in this country. He kept on making improvements until 1819, when a life-boat which he sent to the Massachusetts Mechanical Institute received "favorable mention." This was his first bit of encouragement.

Six years later he brought to New York the first buoyant wooden boat, which he called a life-boat, and exhibited it in the presence of the leading shipping merchants at the foot of Wall Street. He tossed it overboard, bottom up and endwise, and she righted at once. Then he dropped her from the end of a yard-arm of a ship and she went out of sight, but almost instantly rose to the surface, right side up. He filled her with men who tried to capsize and to sink her, but to no use. The boat was exhibited in other cities, and his first order was for two boats from Canada. From that time his fortune began. The Emperors of Russia and Brazil gave him orders for two state barges, and he had orders for pleasure boats and yachts. He continued to improve upon the life-boat, and in 1845 he had perfected an iron life-boat, but the United States government refused to order any of them until he had given it a practical trial.

Finally, on January 12, 1850, the British ship *Ayrshire*, with 200 people on board, went ashore on the Jersey coast, and he threw a line to her and ran his new life-car back and forth several times, and saved all but one. This made him the hero of the day, and when he went abroad to recuperate his health, the crowned heads came forward to do him honor. Emperor Napoleon, before whom he gave a special exhibition of the life-car, knighted him and gave him a gold snuff box. The box bore the imperial monogram and crown, and was studded with eighty-six diamonds. The Emperor of Russia created him a knight of St. Stanislaus. He received medals of honor and diplomas from all of the crowned heads, and when he returned home he found that his life-car and pontoon wagons for naval and military purposes had been adopted by this government.—*N. Y. Tribune*.

Etching Liquid for Steel.

Mix one ounce of sulphate of copper, one-fourth of one ounce of alum, and one-half teaspoonful of salt reduced to powder, with one gill of vinegar and twenty drops of nitric acid. This liquid may be used either for eating deeply into the metal or for imparting a beautiful frosted appearance to the surface, according to the time it is allowed to act.

Compulsory Insurance in Germany.

From the description given of it in the *Contemporary Review*, one can hardly wonder if the system of compulsory national insurance in Germany finds admirers. Let us put the case as briefly as possible:

A workman earning 20s. a week has to pay out of that sum—or, rather, it is deducted for him by his employer—a fraction under 5d. as an insurance against sickness and death and 2½d. as an insurance against old age and infirmity. There is also a special fund against accidents; but to this he contributes nothing. In return he is entitled, as a matter of right, to the following benefits:

1. In case of illness, thirteen weeks' free medical advice and treatment, including dentistry and accouchement fees should he be married; free medicine and minor surgical appliances; a money allowance amounting to one-half of his average wages; or, in place of all this, free board and treatment in a hospital, with, in certain exceptional cases, a modicum of sick money.

2. In case of death, an amount equal to twenty times the local daily wages of an ordinary day laborer is paid to the survivors.

3. In case of accident, the insured workman receives the sick benefit, with the addition of compensation for partial or total disablement or (to the survivors) on death. This, for a workman earning 20s. a week, amounts to a pension of 57s. 10d. per month if he is totally disabled; while, if he is killed, 80s. is allowed for burial expenses, and his widow, say with two children, receives 43s. 4d. per month till the children are fifteen years old.

4. When old age or infirmity comes on, and the workman is no longer fit for labor, he can claim a pension of £6 a year, annually increasing to £12 10s., according to the length of time he has been employed.

Thus the German workman, by the compulsory deduction from his income of less than eightpence in the pound, is secured against everything which can prevent him from following any employment he can get. Sickness, death, disablement, and infirmity are all provided for. The sick insurance system is understood to be self-supporting on the whole. If there should be any deficiency, provision is made for its being supplied by the employers or by the commune. The accident fund, as we have seen, is maintained wholly by the employers. The old age fund is supported by the workmen, the employers, and the State in equal proportions—that is, each pays a third. It will be seen that the only financial liability undertaken by the State is for one-third of the amount of the pensions payable to the aged and infirm; and these, unless some provision be made for them, the State is bound to support in any case. But, of course, the whole scheme is State created, and undoubtedly there is State socialism in it. The deductions from wages are compulsory; so are the payments and the responsibilities which the employers have to bear in the first place and the general community afterward. Some show of non-interference by the State is made by the provision under which the various existing clubs, guilds, and unions are incorporated into the machinery of the system, and are left under the management of the members; but still it is all under the supervision of the Imperial Insurance Bureau. The individual workman has no more control over the amount which goes to his insurance than he has in this country over the payment and disposal of the tax imposed on his beer and tobacco.

"No act has to be done by the workman in order to place himself under insurance; he has literally nothing to do, neither to give notice of membership nor to pay personally any subscription. He enters the insurance by taking work; it is only when he desires not to enter that he must make a declaration and give proof that membership in another club exempts him from compulsion. The employer is responsible for the working of the act with regard to his employes; he has to pay the whole subscriptions, and is also responsible, under penalty, for the due notifications of entrance and exit of members of a club when required."—*London St. James Gazette*.

Trials of Rapid Firing Guns.

A report has just been made to the British War Office upon the experiments recently carried out with the Maxim gun at 600 and 800 yards, in comparison with fire from Martini-Henry rifles. At 600 yards fifteen men, all first or second class shots, fired ten volleys and made 52 per cent of hits in 3 min. 36 sec., while the Maxim, firing the same number of rounds at the same targets, made 81.56 per cent of hits in 2 min. 36 sec. At 800 yards the results were: 15 Martini-Henrys, 40.66 per cent of hits in 3 min. 40 sec.; Maxim, 80 per cent in 1 min. 30 sec. The targets were arranged so that the volleys fired by the men were directed alternately a quarter right and a quarter left, the intervals between the targets being 12 yards; the Maxim fired 15 shots alternately on each target. Further experiments are to be made at unknown distances, and as nearly as possible under service conditions, at ranges between 1,000 and 1,200 yards; and on this occasion the new service rifle, with dial sight, is to be tested.