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GAS AND ELECTRIC LIGHTS.

The New Style of Illumination Rapidly Growing in Public Favor.

ECOMOMY OF THE STORAGE BATTERY.

An Ingenious Electric Light House Invented by an Australian—Electricity and Milk—A Six Million Candle Light.

It may perhaps be interesting if we refer to the relative position of gas and electric lighting, and in order to do this we must review the status of the two illuminants during the past three years, says the London Electrical Review. In 1887, 1888, and during the first half of last year, gas companies and the supporters of the older light regarded with indifference the gradual increase in the use of the electric light, and the concensus of opinion arrived at by them was that there was not the slightest fear that electricity for illumination purposes would be a formidable competitor of gas. Statements to the effect were frequently made at the meetings of the gas companies and the shareholders were assured that the possibility of the use of the electric light acting detrimentally to their undertakings was entirely out of the question. As time passed away there came into existence numerous companies for lighting by electricity the most remunerative—to gas companies—London districts and provincial towns. In some instances the gas companies opposed the applications made by electric light companies for parliamentary powers, but their opposition was unsuccessful. Such was the state of affairs some time ago.

At present, however, the position is entirely changed. The inauguration of new central electric light stations and the erection of others throughout the country have caused some gas companies to recognize the fact that the electric light is not only a competitor but that it is also gradually superseding gas in many large establishments, which were formerly considered among the most profitable customers to the gas companies. To show to what extent this condition now prevails, we may mention that in the metropolis alone the two largest companies, the Gas Light and Coke and the South Metropolitan have sold considerably less gas during the half year ended June 30 than in the corresponding half of last year. The amount of the dividends paid has also diminished, that of the former company being 13 per cent, as compared with 13¾ in the corresponding half of 1889, and that of the latter being 12 per cent, as against 13½. Moreover, the gas light and coke company found it necessary some time ago to increase the price of gas by 3d. per thousand. In these two instances the diminution in the consumption is, of course, not considered by the companies concerned to be due to the competition of the electric light; but it is significant that they are seeking new openings for the use of gas, a fact which leads to the conclusion that the two companies are fully aware that in certain districts they cannot possibly expect to increase the sale of gas for lighting purposes, and that the diminution already taken place must to a certain extent be attributed to the gradual adoption of the electric light by those who are prepared to pay for it. Again, the directors of provincial gas companies no longer consider their position impregnable, and they are therefore following the example of the London companies by endeavoring to extend the uses of gas, and at the same time keeping a watchful eye on the progress of the "coming" light.

It may appear surprising that the shareholders in gas undertakings should take the trouble to ascertain the position of the electric lightning industry; yet such is the case. We know of instances where the holders of gas stocks have asked financial journals, representing the gas industry, to explain the present position of the electric lighting business in so far as it related to the supply of gas, in order that they might decide whether to increase their shares or otherwise. Actions of this kind distinctly indicate the feeling of distrust on the part of some gas shareholders, for although in some instances where the electric light has been introduced the consumption of gas has augmented owing to its being used for other than lighting purposes, yet in others the reverse has been the result.

It would appear from this that the use of gas for lighting is slightly diminishing, but that for cooling and heating and motive power purposes it is increasing. It is therefore in these directions that gas companies will be able to augment the consumption, and to these three branches great attention is being devoted. The days of the "no competition" theory have passed away and it is satisfactory to find that many gas companies realise the important fact that, notwithstanding its higher price, many consumers prefer to have the electric light.

Economy of the Storage Battery.

L'Electrician furnishes some light on a practical problem which frequently vexes the users of storage batteries. It supposes a typical case, and says:

A consumer supplied nominally by a machine with a constant potential of 110 volts wishes to keep four of five lamps lighted for some hours in the daytime, or when the machine is stopped for repairs or cleaning.

It is evident, in this particular case, that he must have recourse to accumulators; but the solution that suggests itself, a priori, and which consists of establishing a series of fifty-five accumulators in derivation on the dynamo, is far from being either the most economical or the most simple method.

In short, these fifty-five accumulators entail at the outset an expenditure which cannot be less than 800 francs, as the smallest industrial type of accumulator costs at least 15 francs.

We should prefer to substitute for the four or five lamps that are to work while the motor is stopped, double the number of lamps working at twenty-five or thirty volts, for instance, requiring only from thirteen to fifteen accumulators for their maintenance. The four or five lamps working at seventy-five or eighty volts are connected in derivation from one to another, but in series with the battery of accumulators, and in derivation on to the terminals of the dynamo, which then charges the battery at the same time as it supplies the lamps connected in series with the accumulators.

At the moment of stoppage a single commutator cuts off the communication between the accumulators and the machine and the lamps of seventy-five volts, and places the lams of thirty volts in derivation on the accumulators. We thus realize a consider, able saving on the cost of the accumulators and we are sure of charging them with a current that is very constant, which is favorable to their preservation. The doubling of the lamps may be avoided by installing lamps of fifty volts which, during the charge, would be connected in series with the accumulators, and in derivation on the terminals of the dynamo. During the discharge the accumulators and the lamps would be separated from the dynamo, and the accumulators would supply the same lamps of fifty volts. By this second method twenty-seven or twenty-eight accumulators would be required instead of fifty-five; but the first plan is more advantageous, for, taking into the high price of the accumulators and their depreciation it is still more economical to double the number of accumulators.

If the attendant should happen to forget to use the commutator at the moment when the dynamo stopped, the accumulators would only be discharged very slowly over the resistance represented by the lamps of seventy-five volts introduced in the circuit charged. It is, moreover, easy to arrange that an automatic disconnector should effect the commutation at the moment of the stoppage of the dynamo, for the current supplied by the accumulators being of an opposite sign to that supplied by the dynamo during the charge, it must pass through zero in order to change its sign, and thus the disconnector cannot fail to act at the moment required.

We will suppose that lamps of fifty watts (sixteen candles) are required, each calling for twenty-five volts and about two amperes. The output will be fifteen amperes. We shall require to use only thirteen accumulators instead of thirty-two, in order to supply this special service. These accumulators containing 100 available ampere hours, will insure the working of the five lamps for ten hours, which is more than sufficient in this particular case.

The method which we have described of lessening the number of accumulators required in an installation with a potential of 110 volts may be applied in all cases in which these accumulators are only required to supply a limited number of lamps late at night, for example.

An Electric Lighthouse.

Consul Connolly at Auckland has sent to the state department a sketch of the Hannaford electric lighthouse. He thinks it is going to revolutionize the lighthouse system of the world. Mr. Connolly says so many competent engineers and electricians in New Zealand who have examined the plant and working models unhesitatingly declare their belief in the practicability of the scheme. The "Hannaford light" invention embraces a number of improvements in the construction of cast iron towers for beacons or lighthouses, including wind mill attachment for generating electricity to be stored and used in the form of light for the lantern, and of power to turn the wind mill in times of calm and ring a bell during fogs. Mr. Hannaford, the inventor of the light, has worked it privately for some years before making it known to the world, until now it is as nearly perfect as possible. Not only are the foundations and frame work designed with great care and skill, but the electric and other attachments are so devised as to be almost entomatic in their action.

A letter from the inventor, Mr. Hannaford, accompanies Consul Connolly's report. Mr. Hannaford, in describing his lighthouse, says: "It is in three tiers up to the revolving cupola (which carries the lamp), but, although the lamp, of course, revolves with the cupola, the arc within does not, but is always broadside to one desired direction, the lense pully at its back facing (that is the back of the lens) the land. Now, the lense has spring sides, which, when operated, send electric flashes that can be plainly discerned a distance of at least thirty miles inland. Each set of flashes are different from each other, and represent the letters of the alphabet. An expert within the lighthouse can communicate with an expert many miles inland anything of importance—a supreme value in the event of a marine disaster or in time of war. Again, the arc can be bent downward and upward, swayed to right or left, or all around the compass, thus making it a great 'ocean searcher.'

"Again, the arc is automatic, does its own lighting and extinguishing to an hour, a minute or a second. The storage of electricity is so novel that it is absolutely impossible to run short, even for an hour, of the full strength of the 15,000 candle power, not even if there were a dead calm of six months' duration.

Mr. Hannaford claims that he can manufacture, test and deliver on shipboard these lighthouses for $31,433 apiece. He proposes to letter and number all of the parts, so that the lighthouse can be put up, taken down and re-erected in a new site by intelligent laborers. If any portion is broken it can be supplied from the manufactory by sending on the number with the order. One of these light-houses, the inventor claims, can be put up easily anywhere in a week. The parts are held together by bolts and nuts. The American Brush electric light company has such faith in the invention that it is prepared to enter into bond for a given time to produce 15,000 candle-power light and the motor to toll the warning bell without a break.

The Influence of Electricty on Milk.

The following paragraph from the British Journal has been going the rounds, but is still worthy of reproduction: The effect of thunder storms in turning milk sour is a matter of constant observation in every household. It is not certainly known to what element in the air this souring action on milk is to be directly attributed, and most are content to ascribe it to the "electricty in the air." An Italian savant, Prof. G. Tolomei, has lately made some experiments with the view of elucidating this question. He found that the passage of an electric current directly through the milk not only did not hasten but actually delayed acidulation, milk so treated not becoming sour until from the sixth to the ninth day, whereas milk not so electrified became markedly acid on the third day. When, however, the surface of a quantity of milk was brought close under the two bails of a Holtz machine the milk soon became sour, and this effect he attributes to the ozone generated, for when the distharge was silent the milk soured with greater rapidity than when the discharge was explosive—in the former case more ozone than in the latter. The souring of milk is generally attributed to the growth of a ferment (bacterium), which converts the milk sugar into lactic acid. It is possible, then, that the presence of ozone in the air, overlying the milk hastens the growth and multiplication of the dacterium. The first observation—namely, the retardation of souring by the passage of a current through the milk—may be a point of practical importance to milk traders.

Any methods of preserving milk from its first retrogressive changes, which does not involve the addition of extraneous substances (antiseptics) to the milk, and which is at the same time cheap, effective and not likely to prove injurious to the consumer, is sure to be welcomed at a time when milk is sent long distances to market, and is often stored for a considerable time before it reaches the consumer.

Electric Tramway in Halle.

The urban horse tramway in Halle, Saxony, has just been transformed into an electric tramway on the well known Edison overhead system by the Allgemeine Elektricitats Gesellschaft of Berlin. The tramway is probably the longest in Germany, being four miles in length, says the Electric Railway Advertiser. It consists of a single line with crossing places arranged at intervals to allow of a six minutes' service. It is proposed to place eventually twenty-five cars on the line, but at present only one-third of that number is in use. The generating station, which is located in the tramway depot, contains three combined steam engines and boilers, the engines driving four dynamos, each of 100 h. p. In the wide streets the conductor is carried on standards eighteen and one half feet high, arranged close to the curb, but in narrow thoroughfares it is supported on insulators attached to wires arranged transversely, the wires being fixed on insulators to the walls of the houses. Thus the lead is doubly insulated. Each car, which will carry twenty-two passengers, has bolted in its under frame two motors of together thirty h. p. This allows of the car easily ascending the numerous gradients, and also permits of an additional car being coupled to it and yet maintain the speed of five and one-half miles an hour, which is the local maximum rate. The rails form the return.

A Six-Million-Candle Light.

The most powerful artificial light in existence is the property of the English government, and is to be found in the Isle of Wight. The lamp referred to is that of the lighthouse of St. Catharine's Point, where there is also a large foghorn. The plant has three engines of thirty-six horse power each. Two of these are used for working the dynamos, and the other for the fog-horn. The current is conducted by wires across a road direct from the dynamos to the lamps, there being no accumulators.

The light is obtained from a carbon lamp of special pattern. The ordinary light is equal to 3,000,000 candles, but a light of 6,000,000 candle-power can be and has been obtained. It is impossible for any one who has not seen it to imagine the wonderful brilliancy of the light, but some idea may be formed from the fact that it can be distinctly seen forty-five miles away, and that at the Needles, fourteen miles distant, it is quite easy to read very fine print by means of the reflection.

On one side of the lamp room is a quantity of very thick glass for repairing the windows broken, not by storms so much as by wild ducks and sea birds which are attracted by the light. A singular feature of the lighthouse tower is a plummet and line hanging from the ceiling of a lower chamber, the plummet pointing to a spot on the floor. This is for the purpose of enabling the man in charge to tell when the tower is out of the perpendicular. The lighthouse was built on an under cliff, formed by a gigantic landslip which occurred in 1799 and some portions of this cliff are still slipping.

Hard on the Butcher.

An amusing story is told of the early days of the telephone by one of the first subscribers of the Chicago exchange, says the New York Sun. One day on answering the call he discovered that the talker at the other end of the line was one of the prominent society ladies of the South Side, who was under the impression that she was talking to her butcher. "What do you mean," she said, "by sending me such a roast of beef as that of yesterday?" "I asked her what was the matter with it," says the narrator of the story, "and she replied that it wasn't fit for a dog to eat. I sallied into her right there, saying that I had more trouble about her trade than that of all my other customers combined. I told her that she not only did not know a good piece of beef when she saw it, but that she did not know how to prepare it, and that she didn't know how to eat it after it was prepared. Of course she rang me off, and I went to my desk and rolled over with laughter. In a few days I had occasion to go into the butcher's shop, and I asked casually, 'Does Mr. —— trade here now?' mentioning the name of the husband of the lady who had talked to me over the 'phone. 'No, sir,' the butcher replied. 'He came in here and said that I had insulted his wife over the telephone. I tried to explain, but he wouldn't have it. So I have ordered the confounded thing to be taken out of here. I was afraid of it in the first place and told the fellow that it wouldn't work. It is a humbug. I suppose I ought to have told the butcher the truth, but I couldn't summon the nerve. Besides, I enjoyed the tongue-lashing which I gave the lady on the South side, although I always feel guilty when I meet her."

Telegraph Lines.

The length of telegraph lines at the end of 1889 had reached a total of 1,680,900 miles, says the Electrical Review. Of this total the United States had 770,500 miles of wire, on which, in 1888, no less than 30,500,000 messages were sent. France has 220,890 miles of wire, on which 30,050,000 dispatches were transmitted last year. Great Britain possesses 180,000 miles of metal line, and in 1889 sent 50,000,000 messages. Russia has spun out 170,500 miles, and in one year dispatched 10,280,780 missives. Astralia has strung across its surface no less than 105,360 miles of wire, and transmitted in 1889 11,000,000 messages. Canada has 58,500 miles and made an annual record of about 4,027,581 dispatches. Italy owns 19,500 miles and did a business in 1889, of about 7,000,000 electric messages. Egypt has 5,500 miles and is in connection with India and England by submarine cables, on which last year 1,600,905 communications were transmitted from one end of the globe to the other. China has 5,500 miles of wire across Mongolia, and Japan owns 16,500 miles, over which 5,000,000 messages were sent in one year. New Zealand has covered itself with 12,575 miles of metal cord and dispatched 1,835,394 messages. Tasmania has 2,500 miles of telegraph wires. Persia claims, in partnership with European wires, about 6,124 miles. South Africa has a credit of 4,310 miles of wire. There are, besides, 942 submarine cables, exclusive of the seven Atlantic cables, with an aggregate of 112,740 nautical miles.

Electricity the Motor of the Future.

The assumption seems fair that the locomotive engine will have been superseded when we double our speed, and that we must find ways to utilize the weights of the cars themselves for adhesion, and to make each carry its own motor, writes Prof. R. H. Thurston in The Forum. This evidently points to electric traction, the only method as yet discovered of keeping the horse in the stable and yet of making him do his work without taxing us for his own carriage. I have very little question that, where railways are carrying large numbers of passengers on short routes, as on our elevated system of road—where, if ever, we may reach enormously high speeds—the electric motor, or some advance even on that latest marvel of invention and engineering, must come into use. Heat, light and electricity will then conspire in that coming revolution which shall combine for us the speed of the bird, the comforts of home, and the safety of the hermit's cell. And what must come will come.

Electric Light for Miners.

The long list of mining casualties bears witness to the readiness of the miner to risk his life and that of his fellows rather than use the safety lamp which has been employed in "gassy" mines ever since Humphrey Davy gave it to the world, says the Chicago News. The miner's objection to this lamp is that its glimmering light strains and injures the eyesight, and that half the time he is working he cannot see what he is doing. The consequence is that he lights a candle and sticks it into his cap and coolly plies his pick, even though the bottom half of the mine be filled with the deadly gas which sinks there, being heavier than the atmosphere, and actually within a few feet of the light, contact with which would fire the mine. It is said that an electric safety lamp has now been devised which meets all the exigencies of mining operations. The principle involved is an ingenuious application of the storage battery. The lamp is smaller than a Davy and weighs about three pounds. It is protected by a very strong glass lens, capable of withstanding any ordinary knocking about. The great advantage of the lamp is that, as its incandescent filament burns only while in a perfect vacuum, if the globe should be broken by an exceptionally heavy blow the light is instantly extinguished and the filament becomes cold before the gas can come in contact with it. The accumulator which supplies the current, though small and compact, has great storage capacity. When charged it is equal to ten hours lighting.

Volts.

Stuttgart, Germany, has a line of electaic cabs is operation.

There are now 10,000 electric motors in use in the United States distributed among 300 industries.

An electric gyroscope has been devised in Paris and applied to show the rotation of the earth and to correct ship's compasses.

American ingenuity leads in the storage battery race. Recent tests of Prof. Main's system show that his cells have more than twice the working storage capacity per pound of plate than the best English batteries.

SINGULARITIES.

A negro woman at Dryline, La., named Anderson, recently gave birth to four children, who are all alive and doing well.

A cauliflower measuring fifteen inches across the top and weighing seventeen and a half pounds is the latest important farm product in Multnomah county, Oregon.

A golden eagle weighing thirty-five pounds was killed a short time ago on the Sisseton reservation, Montana. The bird stood three and a-half feet high and measured nine feet from tip to tip.

John Burger of 2204 South Sixth street, St. Joseph, Mo., has a black Spanish rooster, whose head is topped—over and above the usual flamboyant scarlet "top knot" and "comb"—with a pair of slightly curved and well developed flinty horns.

The wild cockatoos of Queenland, when plundering a cornfield, post sentinels to give an alarm. If one bird is shot, the others, instead of at once taking to flight, hover screaming over their dead comrade until many of them share his fate.

When some boys and a dog were chasing a rabbit at Rich Hill recently, it took shelter under a hen with a brood of chickens. The old hen nearly picked and scratched the eyes out of the dog, and from that day to this the hen and the rabbit are inseparable.

A story of a fire at Savannah was rendered novel by the addition of this little incident: A cat and several small kittens were huddled up for the night in Campbell's restaurant, the building adjoining where the fire was, and as soon as the fire alarm rang the old cat, with motherly instinct for the protection of her kittens, carried them outside of the building.

A man while digging a well on the farm of C. H. Moore, west of Deland, Platt county, Illinois, came to a strata of clay so hard that he was compelled to use dynamite for fifteen feet to remove it. After digging down sixty-five feet and boring twenty-two feet he struck a lake of water, which forced him to get out of the way of the rushing current, which rose fifty feet in thirty minutes, and is still rising.

C. Hagermann, a well known resident of Morrisville, has lost the use of his right hand in a singular manner, says the Philadelphia Record. He went to bed as usual one night a week ago and fell asleep with his right hand under his head. On awakening in the morning he could not raise his arm. It was paralyzed, and all efforts thus far to put the blood in circulation have failed. It is thought it will be months before he will be able to use his hand again.

A funny story of elephants comes from the Philadelphia zoological garden. A few days ago three elephants were discovered quietly chewing gum, with all the apparent enjoyment of the school girl. They had supplied themselves with the article in the shape of fifty feet of rubber garden hose, which is attached to a hydrant in the building and used for cleaning out the stalls. When not in use the hose is stretched at length on the floor, immediately beneath the elephant cages. In reaching for nuts one of the beasts had accidentally found the hose and drawn it into the cage. All had then taken a share, and when discovered had succeeded in ruining the entire length of hose.

Birghevia Vielomosti, a St. Petersburg daily, reports that one of the students in the University of Kharkov is a living anatomical curiosity. He has his heart on the right side of his breast, his liver under the left ribs, the spleen on the rigat side, and the right lung is longer than the left. The physicians who have examined him believe that his whole inside is just reversed; they say that he is the only specimen of this kind which they have heard of.

Some years ago a farmer living near Rowton, in Shropshire, noticed on a path in a field a hole which had been suddenly made by some mysterious and unknown agent. The laborers who were near told him that they had just heard a remarkable noise or explosion, and when the farmer put his hand down into the hole he felt something hot at the bottom of it. He took a spade and dug up the strange body and found it to be a piece of iron weighing about five pounds.

James Arthur, the giant of Wisconsin, died the other day at his home in Linden, that state. Arthur lacked a little of being seven feet in height, was symmetrically built, and weighed, when in health, an average of 350 pounds. He could lift an 800-pound weight without straps, and toss a full barrel of whisky into a wagon by the chines. Although frequently offered large sums to travel as a freak, he preferred the life of a granger and had one of the finest farms in southern Wisconsin.

Nearly nine months ago L. C. McMahon, a locomotive engineer living at Meadville, Pa., was caught in a collision and so badly injured that he has been a confirmed invalid, unable to work, ever since. He could scarcely stand, and suffered intense pain constantly. His case puzzled the physicians and seemed hopeless. Sunday evening McMahon fell asleep on the sofa at his home. In changing position he rolled off heavily on the floor. He felt something snap, suffered an instant of excruciating pain, and then sprang to his feet a well man. He is now recovering his old robust health rapidly.

The Winter of Our Content

is the title of a recent charming paper by that brillant writer Charles Dudley Warner, wherein the glories of the Pacific coast, as a winter resort, are most graphically described. The American people are beginning to understand that the Puget Sound country is one of our most splendid possessions and that the name of the "Mediterranean of the Pacific" is a happy title not misapplied. In speaking of Mount Tacoma, Senator George F. Edmunds says:

"I would be willing to go 500 miles again to see that scene. The continent is yet in ignorance of what will be one of the grandest show places as well as sanitariums. If Switzerland is rightly called the playground of Europe, I am satisfied that around the base of Mount Rainier will become a prominent place of resort, not for America only, but for the world besides, with thousands of sites for building purposes, that are nowhere excelled for the grandeur of the view that can be obtained from them, with topographical features that would make the most perfect system of drainage both possible and easy, and with a most agreeable and health giving climate."

Thousands of delighted tourists over the Union Pacific the past year bear ample testimony to the beauty and majesty of this new empire of the Pacific northwest.

Weather Probabilities.

For December—Indications point to cold, frosty weather. That, however, will make no difference to those who travel in the steam-heated and electric-lighted, limited vestibule train which is run only by the Chicago, Milwaukee & St. Paul Ry. between Omaha and Chicago. This elegant train leaves Omaha at 6:10 p. m. arriving in Chicago at 9:30 a. m., in time to make all eastern connections. For further information apply at city ticket office, 1501 Farnam st., Omaha.

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