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SCIENTIFIC AMERICAN SUPPLEMENT

No. 662.

For the Week Ending September 8, 1888.

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DOES EXCITEMENT SHORTEN LIFE?

Whoever may have studied man's earthly tenure and the causes which tend to lengthen or curtail it, will have scarcely failed to notice how contradictory is the evidence of those we naturally look to to explain them, and that their evidence, even when they agree, does not always accord with what would seem to be the facts, as they appear around us. One authority says general physical development is necessary to prolong life, while another insists this is not required if the day's employment does not call for physical exertion.

Dr. D. B. Richardson, an eminent English authority, whose remarks before the Sanitary Institute of Great Britain on the storage of life we quoted recently, declares, among many obvious though scarcely novel propositions, that everything that quickens the action of the heart, any kind of excitement, taxes and reduces the storage of life.

If this were said of those naturally feeble, or inheriting disease, or even of those leading sedentary lives, and living from day to day without the invigorating benefits of fresh air and exercise, it would seem reasonable, for one does not have to be a skillful physiologist to know that excitement affects the nerves as well as the heart. But is the statement strictly true when referring, as here, to the entire human family? Surely soldiers engaged in actual warfare and sailors in peace as well as war live among excitements, besides being notoriously addicted to indulgences as to drinking and smoking, yet are they long-lived. Statistics show it and observation corroborates them. The pension list of the British army, giving the ages of the beneficiaries, men who have served in all climates for from 20 to 40 years, and excluding those pensioned sooner because of "wounds received while in the performance of duty," shows that soldiers do not die as other men do; so it is with the naval pensioners of the Greenwich Hospital, now scattered over Great Britain, because of its abolishment.

In the merchant service to-day it is no uncommon thing to find a man 70 years old in charge of a vessel —a post requiring activity of body as well as of mind. Here in New York we have the proof near us, for at Sailors' Snug Harbor, on Staten Island, are 800 aged but for the most part hearty sailors. Most of these are between 70 and 80; active old fellows they are, with clear minds and good appetites. They will tell you they are not by any means the sole survivors of our one time merchant fleet; that many, if not most, of their mates are yet living, but distributed over the country, living with their grandchildren, perhaps wherrying for a living or engaged in other employments along a water front. From this it would appear that a sound human body can withstand hunger and exposure and even frequent excitement, if only there is plenty of fresh air and exercise of a vigorous kind thrown in.

ELECTRICAL LIGHTING CONVENTION NOTES.

At the Electrical Lighting Convention, an account of which will be found elsewhere, President Duncan advised the companies to enlarge their plants at the earliest moment in order to enable them to supply power as well as light—a timely suggestion, be it said; indeed, some companies are already doing this, though yet in a small way, for the possibility of obtaining cheap power, like all other economical expedients, has only to be understood by the manufacturers to produce a large and steady demand. We have not, unhappily, yet reached that point where large parcels of power can be transmitted by wire in the form of electrical energy to great distances. But in shops where not more than say five horse power is required—and such shops may be counted by the thousand—the project of electrical transmission is already practicable.

The economy of the plan is immediately obvious. However small the steam engine, an engineer must be employed. Then there is the expense of fuel, the removal of its attendant ashes, not to mention the smoke and dust and grease. Under the transmitting system, a small manufacturer can get what power he requires at far less expense and annoyance, doing away with engine and engineer and getting more or less power, according as his business is brisk or dull. The electric lighting plant is peculiarly fitted for supplying power, because, during the day hours, when power is wanted, it may be devoted exclusively to that end, instead of, as now, lying idle, its great energies of steam engine and dynamos uncalled for. Thus a plant may be turned to double use, supplying power during the day, when light is not required, and light at night, when the workshops are closed.

In the paper on "A Basis from which to Calculate Charges for Electric Motor Service," a pretty broad hint will be found, not only to the vendors of power, but as well to the user. We are told that mill and shop people invariably order and pay for far more horse power than they use, and that though the price per horse power received by the vendor may seem inadequate, in reality he is well insured against loss because the demand for power never comes up to the maximum paid for. Thus, in a shop doing lathe and bench work, the full demand on the shaft would scarcely ever be called out, yet the amount of power seemingly required, and therefore paid for, would be the sum of the demands made by each lathe and roller.

The paper by S. S. Wheeler, expert of the Subway Commission, led to a protracted discussion, during which Mr. Wheeler admitted he could not explain how by any system of connections and distribution a system of underground electric lighting could be made to compare as to economy and efficiency with that now in use. He said the terms it was proposed to charge lighting companies was $1,000 per mile for 3 inch duct, $800 per mile for 2½ in. duct, $750 per mile for 2 in. duct, $550 for 1½ in. duct.

The president of an electric lighting company asked him if his company had really decided to charge $800 per mile for a year's use of a duct that only cost $500, to which Mr. Wheeler answered that they had.

Several experts, both as to technique and cost, interpolated Mr. Wheeler as to the practicability of burying the lighting wires by means of any of the systems now known, and the discussion that followed was listened to more eagerly than any other that was had during the sitting of the convention.

Facts were pointed out and figures exhibited showing the obstacles in the way; the danger of running high tension currents so near to gas mains, water mains, and telegraph and telephone wires was explained, and the costliness of connecting up, with the amount of precaution necessary, was illustrated. Mr. Wheeler did not answer these, fairly admitting he could not, and could only say that, if his company were given a chance, they would, he believed, after practical experimentation, find a means of accomplishing what was required.

But the expense of these experiments would come out of the lighting companies, and even in the case of failure, and a suspension, by reason of this, of all electric lighting, the subway company would not consider itself liable for the resulting loss, but would only agree not to charge any rent for the time when good service was not rendered. The electrical lighting men objected to the monopoly being given to one subway company, believing the plan left room for exorbitant charges, as had already been seen, and had other objectionable features.

A suggestion that seemed to meet with no little favor was made during this discussion, as a means of avoiding many difficulties now presenting themselves in the problem of burying the lighting mains. It was to reduce high tension currents three-fourths in intensity, thus leaving out the element of danger to human beings, though not to animals.

The Watkin Position Finder.

The Watkin position finder, for which the British government paid $225,000, proved its value recently in some experiments with an old pattern 9 inch muzzle-loading gun, polygrooved and mounted on a carriage admitting of upward of 35 degrees elevation. The position finder, worked by Major Watkin himself, was on a hill 230 feet above the sea level, and about a mile and a half from the battery. The target, which consisted of a raft 100 feet long by 40 feet wide, was sent drifting with the tide, which was running between five and six knots an hour. At ranges extending up to 10,200 yards (or close on six miles) most accurate shooting was obtained, several hits being recorded by observers placed on a tug close to the target, the greater portion of the forty rounds falling close round the object, which could not be seen from the battery.

A Perpetual Railway Pass.

When the Boston and Providence Railroad Company was chartered, Mr. John C. Dodge, of Attleboro, conveyed a portion of his land in consideration that he and his family should ride free over the line as long as the land was used for railway purposes. A granddaughter of Mr. Dodge now claims that she is entitled to the privilege named in the deed, and that the word family meant "descendants" of the grantor. The railway company demurred on the ground that the remedy of the plaintiff is at law, and not in equity. Judge Allen, however, has overruled the demurrer, and expressed an opinion that under the deed the Boston and Providence Railroad Company would be required to carry free the descendants of Mr. Dodge for all time.

English Cotton Spinning.

Owing to the perfection of her spinning machinery and the large amount of capital invested in the business, England spins more woolen and cotton yarn than all the other countries combined, and yarns are among the most important of her exports. The quality of cotton yarn in England is expressed by counts or numbers denoting the number of hanks in a pound, signifying coarseness or fineness. This rule of numbering is very simple, being the number of hanks, each 840 yards long, requisite to form one pound in weight. Thus No. 40 denotes yarns of which forty hanks weigh one pound.—*Dry Goods Chronicle.*

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Convention of the National Electric Light Association.

More than 200 men connected with the electric lighting, motor, and kindred industries met at the Hotel Brunswick, New York, last week, to discuss matters relating to their vocation. The meeting lasted three days: Wednesday, Thursday, and Friday, August 29, 30, and 31; and in attendance and interest it far surpassed any preceding it. In opening, President Duncan said that in February last there were 4,000 isolated electric lighting plants and central stations in the United States, which operated 175,000 arc lights and 1,750,080 incandescence lights. Since then there have been added 1,361 new isolated plants and stations, operating 35,201 arc lights and 392,944 incandescence lights.

A complete record is kept of these, and from it appears that now there are 3,351 plants and stations, operating every night 192,500 arc and 1,925,000 incandescence lights. There are also 459,495 horse power of steam engines devoted to electric lighting. The capital invested in the electric lighting companies during the past half year has been increased to the extent of $42,210,100. In February there were in this country 34 electric railways, with 138 miles of track, operating 223 motor cars, and utilizing 4,180 horse power for stationary engines. 49 new roads are now being built, having a total of 189 miles of track, and to use 244 motor cars. There are also several motor factories, some of them employing as many as 1,200 men. The president advised the lighting companies to reach out and arrange for supplying power as well as light, ere this business was taken out of their hands by separate companies.

Mayor Hewitt, being presented, explained his position in regard to burying the wires. He said that it was absurd to remove the wires from the streets before a practicable means of operating them underground was found, dwelling on the importance of the work they performed and how greatly it would embarrass affairs to render them useless. Some one had found a means of burying low tension current mains, but those of high tension could not yet be disturbed. He would not, even if he had the power, force the companies to sink their wires now. If the convention, after studying the matter, agreed that the time had come, he would act in accordance. There was little danger, he thought, from overhead lighting wires, if proper care was taken, and thought that the public as well as the companies should have inspectors. If the convention could not suggest a practical means of burying the wires, he hoped it would explain how they could be made safe."

In an exhaustive paper on "Overhead and Underground Wires in New York," S. S. Wheeler, electrical expert of the Subway Commission, explained the plan by which it is proposed to bury all the wires. "The question of distribution of electrical currents from the main subway," he said, "had been largely left by the authorities in the city of New York to the preference of the electrical companies. Two systems of distribution are at present actually in use in New York by the Metropolitan Telephone Company. These are known as the house top system of distribution, an example of which may be seen at the corner of 6th Avenue and 55th Street, and the manhole system, at Broadway and Exchange Place. In addition to these there are five modes of distribution which can be readily applied to the subways as constructed in New York, and which will be allowed in cases where they are severally most expedient; to wit, the lamp post, the house front, the house vault, now used in Chicago, the back yard, and the manhole system."

The telegraph and telephone problem is practically solved. It is found necessary to resort to subways in order to get sufficient space for wires, and wires for this service are being drawn into the tubes as fast as the labor can be performed. There are about four thousand miles of telephone and telegraph wire already underground, and twelve thousand miles of cables about to be laid in the fall. It is estimated that the saving in cost of maintenance will be about $100,000 per year, owing to the permanence of the style of work which is possible underground. The problem for laying of electric light mains, he admitted, was not yet "fully developed," and, naturally, none of the companies cares to bear the expense of the first experiment. But after the initiative has been taken, the difficulties will be overcome as they arise, as in the development of all other enterprises, and the undergrounding will become a settled and accepted fact.

A Basis from which to Calculate Charges for Electric Motor Service.

BY E. P. LUFKIN.

There is a general average controlling the use of machinery which it will be safe for electric light and power companies to follow in making their charges for motor service, rather than adopt an arbitrary price per horse power, regardless of the character of service required of the motor. Fully three-fourths of the trouble found in electric motors arises from improper shafting and belting. On all installations in basements and cellars, or where there is the slightest tendency to dampness, raise the motor off the floor on a frame or stand, and build around it on all sides of possible approach a low platform, using glass insulators as standards to support it. Single thread sewing machines, which are lightest running, consume the most power in operating. It is because this kind of machine is used on light work and operated at a higher speed than any other class. At equal speed, the volts consumed in a single thread machine as compared with a shuttle machine are about as 2 to 3. In average commercial use the positions are reversed, and the ratio of volts consumed in the single thread, as compared with the shuttle machine, is about as 5 to 3. To double the speed on a sewing machine requires about 2½ times the power. The author describes the work done and the power supplied in some big workshops. He then concluded that an electric lighting company would make money by presenting the customer (a manufacturer) with 30 small motors, charging him $1 per month per motor for current, rather than let him buy a 2 horse power motor to operate the same machine, with the necessary shafting, at a charge of $18 per month for current, counting 2½ volts per machine. From a 50 light machine you could run not less than 900 sewing machines, or about 18 to the arc lamp. At $1 per month per machine an income of $900 per month would be derived from a 50 light machine, without any lamp expenses, such as carbons, etc. Can we sell current for $1 per month for a small motor driving a sewing machine, and make a profit?

I answer yes. 50 cents per month for small motors driving sewing machines yields a better profit to the company supplying the current than $10 per month per horse power in large motors to drive the same machines, besides the advantage which the small motors possess of keeping the circuit in much better balance, the fluctuations due to the stopping and starting of large motors being at times a serious matter. One electric light company, making a specialty of these small machines, rent the motor and supply the current for $1.25 per month per sewing machine, and report that at this price the motor service pays them a better percentage of profit than their lamps.

Machine shops doing principally lathe work use a larger percentage of their contracted power than shops doing lathe and bench work with the same bands. In no case will the service of the motor exceed 65 per cent or 70 per cent of its contract use; for machine shops, like sewing machine shops, will never average over 75 per cent of the shop capacity for operators the year round. The average, where there is much bench work, will fall as low as 40 per cent.

A paper by S. S. Leonard, of Minneapolis, Minn., on "Petroleum Fuel," was read by the secretary.

The author quoted C. E. Ashcroft, who says:

The calorific power of petroleum, for the purpose of generating steam, and the evaporation of water, is several times greater than that of ordinary coal. The successful use of oil as a fuel has, however, been of very recent date, yet so rapidly has it grown in favor, that to-day it is regarded as a strong competitor of coal for steam generating purposes, or where heat and fire are wanted. It was with a great many knowing winks and nods of the head from the engineers and firemen, who laughed at the idea of making steam by the use of oil, says Mr. Ashcroft, that I attempted the use of petroleum as a fuel. Of course it would not work, and it did not work. Why? Because those who were using it did not want it to, as they were afraid some one would lose his job.

We had seen enough of its workings to satisfy ourselves that we could make it a success, and the result is that to-day we are saving from 20 to 25 per cent on the cost of the fuel and 50 per cent in labor, and these same men who laughed so hard in the start at our attempt to use oil would feel that this world was a poor place to live in were we to return to the use of coal. Its advantages over other fuels are many: it is easier handled, a steadier fire is easily kept up under your boiler, consequently the steam is kept at a more even pressure, a very important thing in the running of electric lights; there is no opening of furnace doors allowing cold air to come in contact with the boilers, and there are no impurities in the oil such as abound in coal.

When through with it, by a simple turn of the wrist your fire is put out and your ash pits are as clean as they were before firing. In less time than it takes to tell it, you can start your fire. It is only rivaled in handling by natural gas, and even then unless we have all the modern appliances for the handling of this gas, it is far easier to manipulate. This is how we use it: The oil is received in tank cars holding from 90 to 125 barrels each (42 gallons to barrel). From these cars it is drawn off through a valve in the bottom of the car to a storage tank or tanks, there being two of them, holding about 320 barrels each; these are placed underground, so that the oil runs from the car into them by gravity.

In the top of each tank are man-holes and a vent pipe. These tanks, boiler shaped, are placed end to end with a space of about 8 feet between; this gives room to get at the various pipes. They are joined together at the bottom by a pipe which also connects with the supply pipe running to the boiler room; in the bottom of each is a drain pipe to allow for cleaning. The burners are fed by gravity. A hotter fire can be had from oil than from coal or wood, and there is absolutely no smoke. In economy of fuel, oil has an advantage, as said before, of from 20 to 25 per cent, and from 40 to 50 per cent in labor. Here are figures from tests recently made by Mr. Leonard: 111·34 H. P., running six hours, used 250 gallons oil, costing $5.50, or at the rate of 70 cents per 100 H. P. per hour; 104·8 H. P., running 6 hours, used 3,461 pounds coal, costing $5.45, or at the rate of 86 cents per 100 H. P. per hour. Another test gave the following figures: 96·45 H. P., running 8 hours, used 4,014·75 pounds of coal, costing $6.32, or 80 cents per 100 H. P. per hour; 115·54 H. P., running 7 hours, used 233 gallons of oil, costing $5.05, or 62 cents per 100 H. P. per hour.

In the above figures, oil is from 17 to 32 per cent cheaper than coal. The highest evaporation made with oil was 14·8 lb. water per pound of oil with feed water at 103, and with coal 5·38 lb. of water per pound of coal, feed water at 103. The coal used was a good grade of Illinois lump, costing $3.15 a ton, but usually worth $3.25. In the matter of labor, one man can easily attend from seven to ten 150 H. P. boilers, and then have less to do than firing one boiler with coal.

Chinese Restaurants.

Mr. Wong Chin Foo, an Americanized Chinaman, and a well known journalist of New York, contributes a very interesting article on "The Chinese in New York" to the August number of the *Cosmopolitan*. In speaking of the gastronomic habits of the Chinese, Mr. Wong (the Chinese put the family name first) says that in their restaurants these people do not generally pay by the dishes ordered, but by the tables or spreads, called *gzuh*. A first class spread includes about forty courses, which it takes two days to finish, and which costs fifty dollars. A second class spread, with twenty-eight courses, costs forty dollars. A third class spread, with eighteen courses, costs twenty-five dollars. The cheapest spread includes eight courses, and costs eight dollars. This is the lowest price for which a man can order a formal dinner in a first class Chinese restaurant (of which there are eight in New York City); but then the spread is made for any number of people within twelve. If a person simply wants to eat a short meal for himself and a friend or two, he can get ready made dishes of fish, chicken, ducks, pigs' feet, rice, tea, etc., cheaper than in any other restaurant. The foods are all chopped in small pieces, rendering knives and forks unnecessary. The Chinese table implements are chopsticks of ebony or ivory, a tiny teacup, and a porcelain spoon.

A staple dish for the Chinese gourmand is *chow chop suey*, a mixture of chickens' livers and gizzards, fungi, bamboo buds, pigs' tripe and bean sprouts stewed with spices. The gravy of this is poured into the bowl of rice and makes a delicious seasoning for the favorite grain. The tea is made by pouring hot water over the fresh oolong in a cup, and covering the latter with a smaller saucer to draw. Then, pushing back the saucer a little, the fluid is poured into a smaller cup, and more hot water is added to the grounds. This may be repeated five or six times, and the last cup will be nearly as strong as the first. The Chinaman always takes spirits with his meals, pouring rice whisky into a tiny cup from a pewter pot; but he always drinks moderately, and never apart from meals. When a party of Chinamen sit around a table, one dish of each kind of food is served, and all pick from the same dish with chopsticks. When there are several courses, the earlier dishes are never removed, and, by the time a good dinner has been served, the table is literally buried under dishes.

The walls of the restaurant are hung with long scrolls of Chinese writings—maxims from philosophers for the entertainment of those who eat—and from the ceiling hang large fantastically painted Chinese lanterns, and flower baskets that resemble bird cages.

To the rear is the kitchen, which is always scrupulously clean. The stoves are curiosities. They are long ranges built of thin broad bricks. In the top there are great pits into which are firmly set iron gridirons imported from China. Two of the ranges have open pits only, and there are places where whole hogs are occasionally hung upon iron bars and roasted. Coal is never used in these Chinese kitchens, but only hay or hickory wood.

"At least five hundred Americans take their meals regularly in Chinese restaurants, in orthodox Chinese fashion, with chopsticks."

A CORRESPONDENT writing from Johnson, Nebraska, says: Shortly after 8 o'clock P. M., on the 16th of August, a meteorite, large, and of a green color, started a little north of east, and, about 25° above the horizon, fell slowly (apparently) to within about 5° of the horizon and vanished. It was in sight likely 6 or 8 seconds. I suppose it was moving nearly from west to east.

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