

IN THE FIELD OF ELECTRICITY

Long Distance Transmission.
INSTRUCTIVE facts regarding the distance electric power can be transmitted were given in a paper read at the last meeting of the National Electric Light association. The writer described a transmission plan of 5,000 kilowatts, 100 miles in length, operated at a pressure of 90,000 volts, and said: "The spontaneous sparking distance in air of an effective sinusoidal discharge of this pressure is about five inches, at 90,000 volts seven inches, at 100,000 volts ten inches and at 150,000 volts fifteen inches. It has been noted by Steinmetz that the sudden opening or closing of a switch in high tension plants is a frequent cause of destructive discharges before which insulators and insulation as it were become temporarily worthless. If this is the case we begin to realize that the limit of high pressure transmission are being reached.

"The high tension plant at times develops other unique characteristics," says Electricity, commenting on the paper. "An engineer examining a western plant states that at night while a mist clung to the mountain side he saw emanations from the wires in the form of luminous discharges which radiated to a distance of over two feet from the power lines.

"The transformers are also difficult to design with reference to pressure and economy and call for direct experience in high tension lines. The lightning arresters if ineffective would be a constant menace to life and property, and at present it must be said no arresters are built to stand these enormous pressures. A group are generally connected in series.

"The double or triple petticoat insulator, the wooden pole, the ordinary forms of lightning arrester, must undergo reconstruction. When pressures of 100,000 volts and over are to be employed on power lines, and they must be employed if power is to be economically transmitted over the distances in prospect, which exceed 100 miles, we may expect radical changes in lightning arresters and insulating methods or admit that the limits of high power transmission have actually been reached.

Speedy Electric Motors.
 Electric locomotives now building differ radically in their electric features from any locomotives hitherto shown. The motors are bi-polar gearless, the magnetic circuit, the field windings, and the motor poles being integral with the locomotive frame and spring-supported. The laminated pole faces are vertically congenial to the armatures, thus providing for the vertical movement of the locomotive frame, with attached poles, without affecting the armature air gap. The armature is assembled on a quill which is pressed solidly on the axle. Including the armature, axle and wheels, the dual weight of the assembled rotating parts is less than on many steam locomotives and there being no uncompensated reciprocating parts, rotative balance approaches perfection. The new electric locomotive will have four pairs of motor wheels and two pairs of pony truck wheels, the length of the total wheel base being thirty-seven feet and of the rigid wheel base thirteen feet. Driving wheels will be forty-four inches in diameter and the truck wheels thirty-six inches, with the driving axles eight and one-half inches. The locomotive will be a double ender, obviating the use of a turntable, and will be provided with all the usual accessories of a steam locomotive. The interior of the cab will also be heated by electric coils. In performance the engine is expected to give better results than any hitherto placed on rails. With a light train the locomotive is expected to give speeds up to seventy-five miles an hour, and with heavier trains similar speeds can be attained by coupling two locomotives together and working them as a single unit. Its tractive force will be greater than any passenger locomotive now in existence and

It is believed that in the simplicity and accessibility of its parts and in the provision made in its design to insure continuous operation with the minimum chances of failure it marks an entirely new and successful type of electric locomotives.

Trolley Ash Carts.

In handling the ashes of Brooklyn a most remarkable system has been established. This system is the more interesting just at present as it is an innovation on the methods formerly employed by the city, and has been in perfect working order for only a comparatively short time. Until last February the city authorities removed the ashes in Brooklyn to vacant lots or any temporary dump that offered. At that time, however, a contract was entered into with the Brooklyn Rapid Transit company to take care of all the refuse with the exception of the garbage. This was undertaken through a branch organization operated as the American Railway Traffic company, and under the superintendence of Captain A. R. Piper, formerly deputy police commissioner. The city collects the ashes at the houses and delivers them in carts to thirteen collecting stations on the line of the street railway tracks, thus increasing the daily capacity of the carts and enabling quicker and better work to be done in the borough.

At the collecting stations huge iron tanks holding ten cubic yards of refuse and weighing one and one-half tons, when filled, according to the material, are placed in a subway under roof to the number of twenty just below the surface of the street. Into these tanks the city ash carts dump their loads. On a side track entering the building from the street the flat cars are run and upon these the tanks are hoisted by an electric crane. Each car holds four tanks with a total capacity of about forty cubic yards, or twenty-six tons. At present seventy carloads of refuse are being carried out to the dump a day, but during the winter season this will be increased to 100 cars.

Although the refuse has been already pretty well separated at the houses a still further separation is made at these collecting stations by the man who has secured the privilege from the railway company to dispose of the rags and the junk. He has a regiment of ragpickers at each station who work rapidly and tie the rags in great bundles and pack the old bottles and scraps of iron into boxes and barrels ready to be carted away. Some of the rags and the paper, however, is even too poor for the ragpicker, and this part of the refuse is haled by the employes of the railroad company and loaded on the cars. At the station at Third avenue and Third street a baling machine has been just put in operation and is doing such satisfactory work that others will probably be added to the other stations.

At the great fifty-horsepower electricity crane a gang of men are waiting for the car. When it comes in at the sidetrack the long arm of the crane reaches down and is fastened to the handle, raising the big tank into the air as easily as a man can lift a basket of eggs. The next moment the tank is turned upside down and the ashes are dumped on the mighty pile that is constantly forming.

In the meantime the cable machine is busy with another car. There the tanks are raised by the hoisting machinery, swung across on a cable and dumped into great pockets in the wall of ashes that cannot be reached by the crane, which in time piles up so much debris that it interferes with its own work. And all the time workmen are tossing the refuse with pitchforks into lower grades, and an army of ragpickers and junk men are on hand hurriedly sorting out the rags and the old bottles and the old iron. When the big

tanks are emptied a queer assortment of discarded household utensils are revealed. Full sets of bedsprings, bits of parlor furniture, carpets, mattresses, pillows, cast off clothing, boots, shoes, gloves, love letters, bills, stovepipes, invitations to weddings, last year's straw hats—everything that was once useful or ornamental—is turned up in full view of the curious. But it is all fish that comes to the pick of the ragpicker, and so over all the stretch of rubbish and amid the stifling clouds of ashes the persevering sons of Italy pick and dig and jabber endlessly.

There is plenty of room among the marsh lands on the outskirts of Brooklyn for filling in purposes and the Brooklyn Rapid Transit company will have no difficulty in finding dumping places and land owners who are willing to pay for the work. In this way Riker's Island has been built up from the ashes and refuse of Manhattan. Something like sixty-five acres of land have been made there and some of the holes that have been filled in were sixteen feet deep, the level of the ground being raised twenty feet. This land is now valued at \$10,000 an acre, so that the work of the ashman in that particular place has resulted in an increase of land values of \$650,000. From present indications the increase in the value of the made land about Brighton Beach will be no less great. Bergen Beach land was formerly worth \$30 to \$40 an acre. Now that it is filled in and improved it is sold from \$80 to \$200 a lot, twenty feet wide and 100 feet deep.—Brooklyn Eagle.

Wireless Telephony Coming.

A new system of wireless telephony is being experimented with by G. J. de Guillein Garcia, a Spanish engineer, and his son. It was the son who noticed that in the telephone of the Tommasi coherer located at the receiving station, there was a sound difference, according to the air gap in the interrupter of the Ruhmkorff apparatus. This suggested the idea that a similar apparatus would be susceptible of transmitting the human voice to a distance without the agency of the wire. The arrangement used in the subsequent experiments is simple. At the transmitting station is a Ruhmkorff coil giving a spark 13-15 inches in length, as well as the necessary oscillation, a small antenna and a grounded conductor. Between the induction coil and a small battery of Grenet cells is a special microphone, acting as transmitter and interrupter. The automatic interrupter of the inducing coil is stopped and the condenser is used for enhancing the oscillator spark. At the receiving station is a Tommasi coherer connected to the receiving antenna and the grounded conductors. In a telephone receiver the noise produced by the Heftzian waves on traversing the coherer is plainly heard. On applying the mouth to the microphone and singing or speaking every sound vibration was attended by an interruption in the passage of the electric current through the primary circuit of the induction coils, the number of sparks at the oscillator thus being varied. The underlying principle shows, therefore, some analogy with the mechanism of an ordinary telephone. The weak point appears to be the difficulty of getting a microphone of sufficient vigor. While with Garcia's condenser the present apparatus transmits singing tones with satisfaction, it leaves much to be desired in its transmission of ordinary speech.

New Kind of Microphone.

A new kind of microphone was recently described by the inventor, M. Tardel, before the French Physical society. The novel feature of the instrument is the special way of preparing the carbon grains and other similar bodies. After taking carbon plates only 0.15 to 0.2 millimeter in thickness, having a perfectly plane and polished surface, and breaking them by hand

into small pieces, the fragments are passed through a sieve, the meshes of which can be traversed only by particles of less than one millimetre. This powder is introduced into a microphone, arranged as follows: A movable electrode, constituted by a carbon plate of the same thickness as the particles, is connected with one of the terminals of the telephone line, while the other electrode is formed of a carbon block in the neighborhood of which the particles are placed; this electrode is arranged on a thin carbon plate, to which the other wire of the line is connected. The distance separating the electrode is just 1-16 millimetre, the whole being solidly fixed in an ebonite box. The following merits are claimed for this new device: On account of the great number of contacts between the plane and light particles used, the apparatus is highly sensitive. The vibrating surface is diminished as compared with other types of microphone, and there are no insulating bodies retarding the vibrations between the two electrodes, such as felt, wool, etc. There are further no polarization phenomena, and the apparatus will not give rise to the production of electric arcs. It will finally be possible to construct microphones of smaller weight, smaller dimensions, and at the same time of a sensitiveness at least identical with that of other types of apparatus. When connecting with this microphone a small receiver, the terminal of which is introduced into the hearing circuit, a complete microtelephonic apparatus of the minimal weight of twenty-seven grammes is obtained, which can be held to the ear by means of a spring.

Water Power and Electricity.

San Francisco can do its power work cheaper with transmitted electricity from the waterfalls and melting glaciers of its mountain ranges than it could do with coal if it were deposited without cost at the factory and furnace doors. A few years ago the price delivered in San Francisco was 15 cents for one horsepower an hour, but it has since been reduced to one-seventh of that sum and is still going down. Lord Kelvin's dictum that the waterfalls of a country could be turned into power to do all its heavy work is thus illustrated and verified on the shores of the Pacific, as it probably will be before long beyond its waters, in Japan and the Oriental countries. The generation which sees all the east lit up with electricity produced by its own hill and mountain cascades will witness a display of fireworks to surpass anything ever told about in regard to Oriental pyrotechnics. That is what things are coming to over there, and considering the progress in that and other ways which Japan has been making in the last generation, it need not long be delayed.—New York Tribune.

Tabloid Philosophy

An overworked conscience is apt to lose its voice.

It isn't always the naughty child that comes to naught.

In the railroad business everything depends on the training.

It takes a lot of imagination to write a successful love letter.

If love is blind, courting may just as well be done in the dark.

It is an effort for some people to look pleasant, even when they face a camera.

A premature explosion of dynamite often demonstrates that you can't keep the working man down.

When it comes to a question of fees marriage is more profitable to the divorce lawyer than to the minister.

"I've had enough of this monkey business," remarked the Italian, as he sold his hand-organ outfit and invested in a street piano.—Philadelphia Record.

