AIR BRAKE INSTRUCTION CAR ON THE "BIG FOUR ROUTE."

Railroad men are justly proud of the splendid organization which distinguishes the operations of the great railroad systems of the United States. With the possible exception of the army and navy, there is no sphere of human activity where the necessity and advantage of order and method have been recognized and realized more fully than in the control of the finances, the equipment and the large army of employes of our first-class modern railroad system.

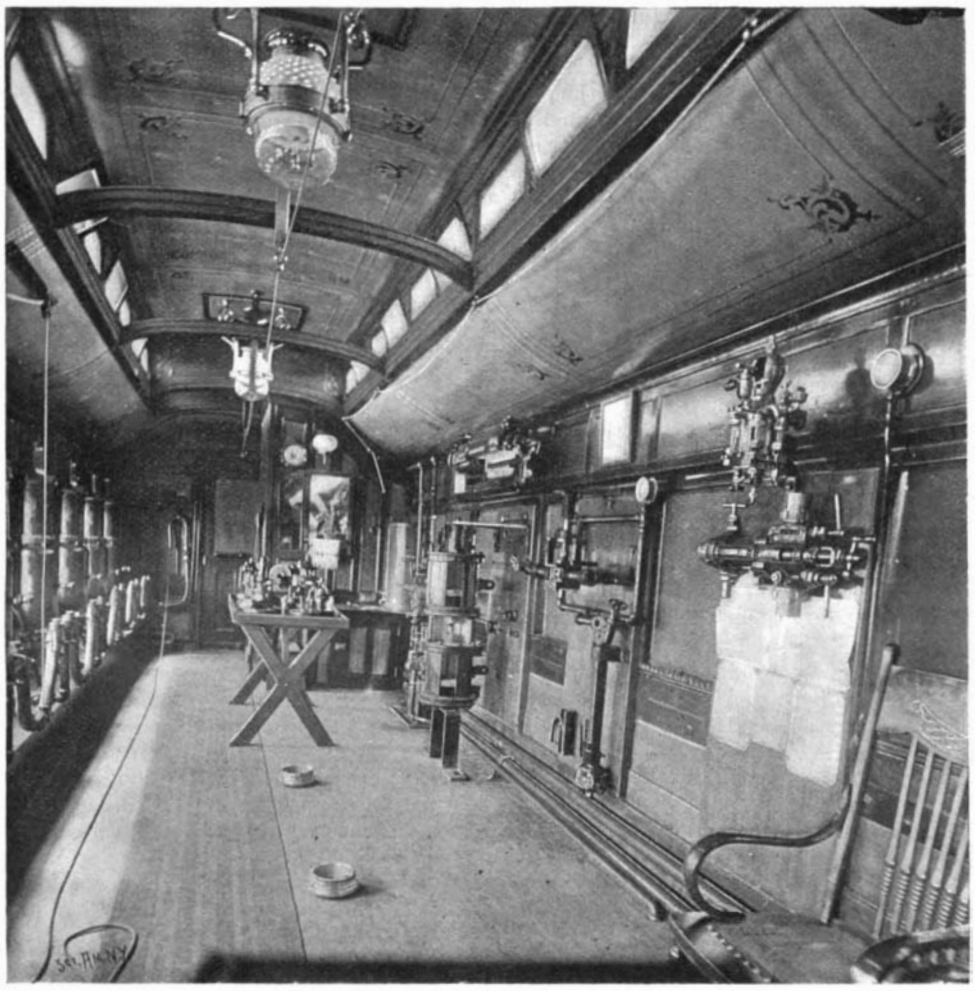
If one were asked to name the department where these features are most necessary and conspicuous, he would probably select that which is in charge of the superintendent of motive power; for it is upon the efficiency of this department that the safety of the public and the profit of the shareholders depend to a degree that characterizes no other branch of railroad service.

During the past dozen or fifteen years there has been a steady advance in the men and methods of this department. The employes are more thoroughly trained, and greater care and better judgment is used in selecting candidates for promotion. Greater effort is made to give the employes instruction in the theory and use of the plant and equipment which is intrusted to their care. A premium is put upon education and intelligence, at least so far as it relates to the work of this department, and a green hand is encouraged to do something more than merely "catch on" to the mechanical handling of the equipment—he is expected to acquire a knowledge of its parts, so that in cases of break-down he may be able to locate the difficulty and not be entirely dependent upon the round house or the repair shop.

By the kindness of Mr. William Garstang, superintendent of motive power on the Cleveland, Cincinnati, Chicago and St. Louis Railway, familiarly known as the "Big Four Route," we are enabled to illustrate the interior of the air brake instruction car used on that system. The car was specially built, as its name implies, for the instruction of the train crews on the road. To this end it is fitted up with a complete, full-size train equipment, such as the air brake, the steam heating apparatus and the lighting equipment, as further explained below. Externally the car is of the standard style and color of the first-class coaches on this system. It is 54 feet long on the inside and is finished in ash and walnut. It is divided into two compartments, one of which is carpeted and is used as an office and reception room. This is furnished with a desk, chairs, one lower and one upper berth, the former being of the portable lounge pattern, and there is also a wardrobe and toilet.

The other and larger compartment forms the lecture room, which contains the Westinghouse and American air brake appliances, full size. It is furnished on one side with a long row of cane-seated chairs for the use of the instruction class. On the opposite side, next the office, is the complete air brake equipment of two locomotives (one 8-wheeler and one 10-wheeler), and also complete driver-brake models, driven by a small motor and made to operate in conjunction with the other appliances. Then, in their order, down the side of the car, are one passenger car and six freight car equipments, complete with all pipe fittings and hose cocks in their regular position, the same as upon a train of the same length. To compensate for the shorter pipes, the full brake-pipe volume on each car is represented by small reservoirs which are placed out of sight. This apparatus is placed on the wall in such a way that each car equipment is separated from its neighbor by a window which affords plenty of light and ventilation. Directly above each appliance is a large photograph indicating the design of vehicle for which the appliance is intended.

At the opposite end of the car from the office is an upright boiler and a coal bunker, which are partitioned off from the lecture room by folding doors, an arrangement which prevents heat, noise and dirt from entering the main room, and, at the same time, gives easy access for repairs and cleaning. Adjoining this partition is the 8 inch pump which supplies the air, and this, with the duplex boiler feed pump, is supplied with the necessary drainage. Mounted on pedestals and placed on a strongly built table are a set of cut sections of air valves, painted red. There are also cut in sections a 9½ inch air pump mounted on a revolving pedestal, an entire freight car brake and a Nathan No. 9 injector, triple sight feed, nickel plated lubricator and a Gold Car Heating Company's steam heat apparatus for locomotives and cars. There is also a working model of the latest improved Leach sanding device.



AIR BRAKE INSTRUCTION CAR LOOKING TOWARD BOILER ROOM.

In a large case are six blackboards, each containing working templates of all the air valves, pump valve motion, Hodge & Stevens brake foundation gears, diagrams, etc., which are used in the elementary lessons and referred to in explaining mechanical effects.

The car is equipped with Pintsch gas fixtures, having four 4-flame lamps in the body of car and two side bracket lamps, one over the instructor's desk in office room and the other in front of the steam gage at boiler. The lamps are supplied by two gas receivers, which, together with the water tanks, are placed beneath floor and in such position as to cause proper distribution of weight to all springs. The car is heated with the Gold system of steam heat, supplied with the standard valves, gages and traps, but so arranged as to return the condensed steam to its own water tank. The car's steam heat, signal and air brake foundation appliances are connected with those in the instruction room and used in this connection.

The plan of operating the car is to have it go from one division point to another, where previous notice has been given, and those whose duties bring them in contact with such appliances are requested to attend the lectures as often as possible during its stay. Classes of twelve each are instructed and examined, and certificates of proficiency are issued by the instructor to each individual and a duplicate sent to his superior officer. The men all take a lively interest in the matter, some to the extent of laying off their runs and taking a regular course. The latter, in addition to greatly increasing their knowledge and their record of attendance, obtain a higher grade of certificates, etc., due recognition of which is made by the company when choosing from the ranks for promotion.

In designing the car, care has been taken, not only to have the apparatus of instruction completely and conveniently shown, but also to make the car comfortable for those giving and receiving instruction. Attention, therefore, has been paid to light, ventilation and seating capacity, and those in attendance are not obliged, as is frequently the case in cars of this sort, to stand crowded together during the lecture and to endure the heat of the boiler as well as the inconvenience of standing.

The car is in charge of Mr. W. J. Hartman, who for six years traveled for the Westinghouse Company as instructor and expert, and previously was instructor of engine and boiler management at the Rose Polytechnic Institute, Terre Haute, Indiana. We are informed that the car has already made one tour over the system, in the course of which some 3,000 men received instruction with results which have been very satisfactory to the company.

AIR BRAKE INSTRUCTION CAR LOOKING TOWARD OFFICE.

It has been known for some time that red hot iron is pervious to carbon dioxide. M. Gréhant has found by experiment that the carbon dioxide does not only freely pass through the iron, but is decomposed, carbon monoxide being set free. This may account for some of the accidents which the monoxide has caused. Rooms must not be heated by a red hot iron stove.—Revue Industrielle.

Saving a Town and Cape.

BY GEORGE ETHELBERT WALSH.

The Harbor and Land Commissioners of Massachusetts are making systematic efforts to reduce the danger and prevalence of sand storms which sweep across Cape Cod whenever a high wind blows up from the sea, and incidentally to protect Provincetown from threatening destruction. There is probably no immediate possibility of Provincetown being overcome by the sand; but if the encroachment of the belt of sand upon the wooded section next the harbor and town should be allowed to continue undisturbed for the next half century, the place would be depopulated. It is not the first time that the inhabitants of Provincetown have been compelled to exert themselves to stop the encroachment of sea and sand. Many years ago it was made compulsory by law for the citizens of Cape Cod to turn out every spring and plant marram grass to shut out the sea, and Provincetown owes its existence to-day to wise laws which empowered a "beach grass committee" to enter any man's inclosed garden or field and plant marram grass, if the sand was uncovered or movable.

The purpose of the Harbor and Land Commissioners now is to make the work of laying the sands permanent and endurable. Most of the land troubled by the drifting sand storms is owned by the State, and it is only just that the State should perform the work for which Provincetown has so long been held responsible. The tract of land comprises between 3,000 and 4,000 acres on the extreme northerly point of the cape, and it was purchased by the Colony of New Plymouth from the Indians in 1692. The land faces the Atlantic Ocean on one side, and stretches back to a belt of woods, which the early inhabitants of Provincetown planted to protect their town and harbor from the sand storms. Recently, however, the sand belt has been steadily encroaching upon the wooded tract, and it is to prevent the destruction of work already accomplished that the commissioners have set out to reclaim the sandy beach from the sea and wind.

A sand storm on Cape Cod, back of Provincetown, is something more to be dreaded than a Western blizzard. When the wind blows in a gale from the northeast the soft, light sand drifts in immense clouds, completely obscuring all objects around further than ten feet away. It is worse than snow in many respects. It not only covers up the road or trail in a short time, but it changes the general features of the landscape permanently. People get lost in the sand storms, and often, when the storm subsides, the landscape is so altered that they are bewildered and puzzled in trying to locate their homes. The sand may not be as freezing cold as the snow, but it is far more injurious. It cuts and grinds the face as it strikes it, and performs about the same operation as a sandblast. Men who have been lost out in the furious sand storms, and members of the life-saving patrol, have returned home at night with their faces lacerated and discolored so that they resembled raw beef. Even the glass windows of the houses are so ground by the flying sand that they have to be replaced often by new ones. After one heavy storm it is almost impossible to see through the glass. People now shut the blinds of the houses facing the wind during sand storms in order to save the glass. No man can face the sand clouds and endure the pain for long.

As the prevailing sea winds are from the northeast on the cape, the sand dunes are drifting steadily and persistently toward Provincetown. The reclaimed belt of woods is thus in imminent danger of destruction and burial. This growth of woods is unmistakably very remarkable for a sandy beach, and the variety of plants and trees is a genuine surprise to every botanist who visits the region. The commissioners cite this condition of affairs as good evidence that the sand is very fertile if once held in place, and that their scheme of reclaiming the rest of the beach is not only feasible but eminently practical. The black oak, pitch pine, and beech are the leading trees that have obtained a sturdy growth on the beach; but underneath them there is a most interesting flora of smaller plants. The privet, bayberry, and wild rose especially predominate. In the summer time the woods are gay with rich colored wild flowers that carpet the ground and hang in festoons from the trees and bushes.

An appropriation of $3,000 was obtained by the commissioners in 1894 to experiment with their work on the cape, and in the two following years appropriations of $3,500 each were obtained. When the first appropriation was made the commissioners started a small nursery of plants and trees on the cape, and these have grown large enough now to supply most of their needs. The beach grass, plants, and trees were planted almost immediately after the first sum was obtained from the State, and every fall and spring since then plantings have been made.

The commissioners started on the windward side of the beach at the northeast end of the cape. The beach is divided at this point into three huge dunes or waves, across which the sand drifts like the foam and spray of the sea. The windward side of the first dune has been almost entirely covered with beach grass and vegetation. The grass thus extends along the face of the water for nearly a mile, comprising about fifty acres of land. A good roadway has also been made on the sand, which makes driving along the beach more than passable. Across the movable and unprotected sands driving is reduced to a complex labor problem. The horses sink in the soft sand up to the fetlocks, and the broad-tired wagons with a slight load on go down several inches until they strike the strata of wet sand, which seems to underlie the whole beach at Cape Cod. This wet, moist condition of the under layers of sand is responsible for the profuse vegetation in the belt of woods, and the commissioners build much of their hope upon this peculiarity of nature in the vicinity.

Several plantings of grass have been made up to date, and while spring planting will be practiced in the future, the commissioners are convinced that fall planting gives the best results. The grass that was planted a year ago last fall is found to be in a more flourishing condition than the grass put in the preceding or succeeding spring. Very little of it has died in either case; but in spots the wind has succeeded in burying bunches of the grass with the sand so that they have been smothered.

Along the edges of the water a wind break of young trees was planted to test their ability to withstand the cold, stormy winds and weather of the ocean. These trees were mostly pines and silver poplars. They were taken from the belt of woods back of the beach, or from Provincetown, so that they were thoroughly acclimated before transplanting. The pines have become well established in the soil, and the poplars are holding their own. It was not expected that the trees would grow vigorously in the sandy soil until the whole surface was matted over with the fibrous roots of the grasses, and consequently the present condition of the trees is an agreeable surprise to all.

Behind the wind break of trees broom and tamarix plants were put in to test their hardiness, and though they have a little, stunted growth, they are growing and spreading. A few white birches planted in the sand seemed to be unable to stand the heavy gales, and they show signs of injury and decay. None of these will probably be planted again. Willows were also tried back of the wind break, and another planting of them will probably be made the coming fall. They were whipped about by the wind, so that many of the old shoots were killed; but new branches have started up and are growing vigorously. The commissioners are pushing their work actively, but, in view of the necessity of experimenting as they proceed, the project cannot be accomplished in a day.

If the enterprise proves successful—and nobody doubts in the least that it will—some 3,000 acres of worthless sand will be converted into excellent building sites. The popularity of Cape Cod for a summer resort is growing and extending every year, and it has been nothing but the sand storms and instability of the land that has kept this region from being built up with summer cottages and settlements. If the commissioners succeed in establishing fine woods all along the coast, the value of the land for building purposes will be doubly enhanced.

Possibilities of Liquid Air in Electrical Work.*

BY ELIHU THOMSON.

The well-known effect of cooling by liquid air or like gases a conducting metal like copper is to almost abolish its resistance. Consequently a conductor so cooled is able to carry very much larger currents with less loss than at ordinary temperatures. This fact has attracted the notice of electricians and physicists for a long time past.

It has recently been found that liquid air is one of the most perfect insulators, and that most insulating materials cooled to the temperature of liquid air are greatly improved in insulating qualities. It is known also that cooling renders it more difficult to cause a spark to occur between oppositely electrified conductors, the striking distance for a given pressure being diminished.

The stability or permanence of liquid air in bulk, even when it is fully open to the ordinary atmosphere or kept at atmospheric pressure, is, of course, simply dependent upon the heat insulation provided, and if this could be made perfect, the air would never evaporate.

Recent methods, such as those of Hampson and Linde, make it possible to obtain large quantities of liquid air by simple means and with moderate expenditure of power.

Niagara power is twenty-four hour power, and as there are but few industries demanding power for the whole day, it must follow that surplus power is either not used or wasted, and that to keep the plant working night and day at full capacity is desirable, even if some of the power only yields a moderate return. Can it not be used in making liquid air? Cannot the excess at certain times of day be put to use in compressing air to be afterward liquefied on the large scale?

It would seem that large tanks of liquid air can be heat-insulated very perfectly by layers of air and fibrous material properly placed outside. The evaporated air from the tank could traverse the jacketings in successive order from within outward, so as to help keep down the temperature of the jacketings. A furnace with an internal temperature of 2,000° to 3,000° above the normal temperature of the air is easily insulated by moderate thicknesses of asbestos or other fibrous coating, so that the outside temperature is but slightly above the normal. The temperature difference between liquid air and normal air is, say, one-eighth of that between the interior of the furnace assumed and the normal, so that it ought to be possible to insulate so that but little heat would enter. In most electric long distance transmission lines a loss on the line of about 10 to 15 per cent is suffered. With 18,000 horse power this would mean from 1,000 to 1,500 horse power lost in resistance of line. If the conductors were immersed in a pipe with liquid air, the loss might fall to not over 1 to 2 per cent, perhaps, leaving available a large power for condensing air to supply evaporation. Just how far 1,000 horse power would go in keeping the conductors supplied with liquid air coatings is a matter requiring data to determine. But if it were not sufficient for the purpose, there is a surplus of power during certain hours to supplement it.

But it may be possible that a much higher voltage than is now used (10,000 to 20,000 volts) may be successfully used with conductors cooled and insulated by liquid air. If the potential could be raised to 50,000 volts, either the loss on the conductors for a given power transmitted would fall off as the inverse square of the voltage, or the conductors could be made smaller in the same proportion, or the distance of transmission increased with the same section of conductors as the square of the potential. These are matters worthy of experimental determination.

The limit to the capacity of an electric transformer to transfer energy from its primary to its secondary circuit is found in the heating and loss involved in the copper conductors comprising these circuits, and upon the nearness with which the two circuits may be placed one to the other, which is in turn governed by the insulating material used to separate them.

Could the conductors be kept cool by liquid air, and thereby their conductivity and insulation greatly increased, the work of transfer in a transformer could be much greater for a given size than it now is, or the loss could be even less than it now is, although but 3 per cent is sacrificed in ordinary practice.

Transformers in liquid air might be made entirely of copper without iron, and their light load efficiency become nearly equal to full load efficiency.

A transformer without iron would avoid the loss in the iron and would permit such a saving in material that changes in design or disposition of the copper could be made to suit the conditions.

We need not touch upon the possibilities of liquid air as a means of energy storage, for they are self-evident enough, since liquid air is virtually compressed air which remains compressed, as it were, even when exposed to atmospheric pressure; that is, addition of heat gives to it pressure and the ability to do work in suitable engines in the usual compressed air motors. Our object has been to briefly point out what may be termed possibilities in electric engineering, assuming that data favorable to the ideas presented be the outcome of experiment.

It is too early to make any predictions or calculations concerning this object. It must be confessed that it has a certain fascination. Perfection of heat insulation seems to be the key to the situation. All else seems to depend on that, the main questions being what will it cost in power and machinery to supply the necessary evaporation waste in a system of the kind outlined, and whether the voltage of transmission can be raised in consequence of the new conditions.

*Modern Machinery, July, 1897.

Electric Power at Richmond, Va.

A project for utilizing the immense water power at Richmond, Va., for the production of electricity is now assuming definite shape. It is believed that when the enterprise is established it will do more for the material development of Richmond than all the other enterprises attempted. There is more than 10,000 undeveloped horse power in the James River at this point, which if converted into electric power would be of great benefit, not only to present manufacturers, but would also tend to bring other manufacturers to the city.

Electric Celebration in Maine.

The celebration of the invention of the electric motor car was held on July 26, at Eliott, Me., in connection with the summer meeting of the American Institute of Electrical Engineers. The celebration was in honor of Prof. Moses G. Farmer, who on July 26, 1847, exhibited in Dover, N. H., what was considered the first electric car. The exercises included an interesting exhibit of early apparatus, and addresses by Professors Dolbear, Barker, Duncan, Pupin, etc.

Patent Office Employes Cannot Take Patents.

A very important decision was given on the 9th inst. by the Commissioner of Patents, Hon. Benjamin Butterworth, in regard to the impropriety of a Patent Office examiner or other official applying for patents in their own behalf, the application perhaps being assigned to them for consideration, and it is worthy of the attention of the inventive public. The Commissioner says, as reported in the Washington Star:

"The applicant, John H. McElroy, while an assistant examiner in this office, examining in the class of voting machines, filed this application complete in all its parts on February 15, 1895; on June 2, 1896, he resigned his position, and on the day following paid the government fee of $15 to secure the examination of his application, which application presents an invention claimed to be an improvement on a voting machine for which other joint applicants had filed an application, which was before Mr. McElroy for examination and action while he had charge of that class in this office. This earlier application is still pending.

"Acting under instructions, the examiner states that on August 5, 1896, and on December 23, 1896, he rejected the claims on reference to the pending applications, and also in view of the provisions of section 480 of the Revised Statutes, which is as follows:

"'All officers and employes of the Patent Office shall be incapable, during the period for which they hold their appointments, to acquire or take, directly or indirectly, except by inheritance or bequest, any right or interest in any patent issued by the office.'

"A case on all fours with this was before me on February 5, 1884 (26 O. G., 337), in which I held that in view of the statute above quoted it was not competent for an employe of the office to file an application for a patent while he was employed in the Patent Office. The reason for not permitting this to be done has special force in case of an examiner who seeks to file an application covering an improvement on an invention disclosed in some pending application of which he, as such examiner, has charge or may have charge, and the objection derives additional force from the fact that his application, if filed, wouldor might be referred to the division in which he is employed as an examiner. In the case mentioned I directed that the application then under consideration be stricken from the files and returned to the applicant, and that the fee be returned to him.

"Notwithstanding this decision, it seems that it is not wholly exceptional in the office for examiners to file applications which are properly referable for examination to the division in which they are employed. But whether an application so filed is properly referable to the division where the applicant is employed as an examiner makes no difference in the conclusion I reach. Whether the former decision was right depends upon the proper construction of section 480 of the Revised Statutes, hereinbefore quoted. The question is, whether the spirit and intent of the statute is intended to reach and embrace only an interest in a patent that has actually been issued.

"I do not so construe the statute. To so construe it would be to defeat in a large measure, if not wholly, the obvious purpose and intention of Congress, which was, and is, to prevent persons employed in the Patent Office from improperly utilizing their knowledge of the inventions of others, acquired as a result of their official connection with the Patent Office, and from utilizing the opportunities they have, as a result of their employment, to become rivals or competitors of inventors whose applications they have before them for examination, or in any wise to take undue advantage of the knowledge they have acquired of pending applications in their capacity of examiners or officials.

"The reason of the statute which prohibits an officer or employe of the Patent Office from acquiring, either directly or indirectly, any interest in a patent issued would seem, by fair intendment, to prohibit him from filing an application for the interest he is not permitted to acquire. The application is the evidence of an inchoate right to a patent—and the ownership becomes complete when the patent is issued. Any other construction would obviously permit, if, in fact, it did not encourage the very mischief the statute was clearly intended to prevent, as examiners might make some slight improvement or modification in inventions covered by applications pending before them for examination and file an application, change or modify it from time to time, negotiate the sale of the whole or a part interest in the invention or application, or the patent to be predicated thereon, and resign and prosecute the case and take out a patent whenever such course seemed to offer greater pecuniary advantages than to remain in the office; and thus the office might become freighted with applications filed by examiners or other employes, in contravention of the spirit if not of the strict letter of the statute, and thus become a prolific source of scandal.

"In my judgment, the construction I give to the statute is necessary in order to give force and effect to the obvious intent and purpose of the law, and to avoid scandals which would be injurious, not ruinous, to the integrity of the office. Nor does this construction do violence to the letter while enforcing the spirit of the statute. I adhere to the former ruling and direct that the application under consideration be stricken from the files and the fee returned to the applicant. He may, of course, file his application now that he has severed his connection with the office, but it was originally filed in violation of the statute, and cannot be recognized in pursuance of such filing as a pending application."

Pan-American Exposition, 1899.

There is every promise that the Pan-American Exposition which it is proposed to hold in 1899 will prove worthy of record as being one of the greatest of such events the country has ever seen, says the Iron Age. The company under whose direction the exposition will be conducted has but recently been incorporated, and among the members are Chauncey M. Depew, ex-Governor of New York Roswell P. Flower, ex-Lieutenant-Governor of New York William F. Sheehan, E. B. Thomas, President of the Erie Railroad; Edgar Van Etten, general superintendent of the New York Central; H. Walter Webb, vice-president of the New York Central; Daniel O'Day, vice-president and general manager of the United Pipe Lines Company; John M. Brinker, president of the Niagara Falls and Lewiston Railway; F. C. M. Lautz, vice-president of the same road and president of the Ellicott Square Bank, of Buffalo; J. T. Jones, president of the Niagara Falls and Suspension Bridge Railway; W. Caryl Ely, president of the Buffalo and Niagara Falls Railroad; Charles R. Huntley, general manager of the Buffalo General Electric Company; Charles R. Haskins, of Milwaukee, Wis.; Henry J. Pierce, of the Manhattan Spirit Company; Howard H. Baker, postmaster of Buffalo; Hobart Weed, F. S. McGraw, R. C. Hill, Herbert P. Bissell, of Buffalo. The company are officered as follows: President, John M. Brinker; first vice-president, Roswell P. Flower; second vice-president, Chauncey M. Depew; third vice-president, E. B. Thomas; treasurer, F. C. M. Lautz; secretary. R. C. Hill.

Cayuga Island has been selected as the site for the exposition. This island is situated in the upper Niagara River, a few miles above Niagara Falls. In size the island has about 175 acres, which is ample room for all purposes; but, should more land be desired, it can easily be obtained on the mainland. The railroads recognize in Cayuga Island an ideal spot for a great gathering of exhibits and people, and the transportation facilities promise to excel anything ever before enjoyed by Americans on such occasions. Within 200 feet of the island run the tracks of the New York Central and Erie roads, which are used by the New York Central, the West Shore, Michigan Central, Grand Trunk, Erie, Lehigh Valley, R., W. & O., Canadian Pacific, Lake Shore and Wabash roads. Between the steam railroad tracks and the island the tracks of the Buffalo & Niagara Falls electric road are laid, which assures trolley car connections without any trouble. On the outside shore of the island there is ample water to allow of boats coming down the lake and river to land, thus assuring the possibility of running excursions by water as well as by rail, and establishing all kinds of transportation facilities. A good portion of the land is covered by woods, which if cleared up, as it is proposed, will make delightful spots for excursionists to rest while at the exposition. The Little Niagara River and Cayuga Creek will afford fine runs for electric launches. On the mainland, immediately opposite Cayuga Island, is the village of La Salle, which is a suburb of the city of Niagara Falls. This village takes its name from the famous French explorer who, on December 6, 1678, landed at the mouth of the Niagara River and proceeded through the forest to the mouth of the small stream now known as Cayuga Creek, where he is said by some historians to have built the Griffon, the first vessel, other than Indian canoes, to sail the waters of the Great Lakes. Thus the locality is rich in historical interest.

The reports of the Commissioners of the State Reservation at Niagara are authority for the statement that 500,000 people annually visit the State reserve to see the falls. It is reasonable to suppose that many of this number would go to the exposition, while it is still more reasonable that the number of visitors would be largely increased by the holding of the exposition, and therefore it is estimated that during 1899 Niagara Falls will see the greatest influx of visitors it has ever known in a single year.

While the exposition will not be entirely devoted to electricity and electrical subjects, it is already announced by the management that the electrical features will predominate. The electrical power supply will be transmitted from the great power house of the Niagara Falls Power Company, a few miles below and almost in sight of the island, and its influence and presence will be demonstrated in almost every part of the exposition grounds. There will be no boilers and ugly smoke stacks to mar the beauty of the spot, but all machinery will be operated by the subtile current from the falls. Electric cooking will be the order and all restaurants will be fitted with electrical apparatus necessary to the conduct of their business. The object of the exposition is to make fitting display of the progress made in the Pan-American countries during the century that will close with 1899.

Do People Have a True Conception of Their Looks?

It has been said by one who ought to know that no man has any clear conception of how he himself looks. The expression of the face is continually changing. No artist, no camera, can catch this changing, fleeting, evanescent expression. When you look in the glass, the very intent to find out how you look is depicted on your face. The more you strive, the more the intent is intensified, and such an expression is not natural to your face. How often do we look at a photograph and find only disappointment in it? Why is this? The camera depicts the sitter just as he is at the moment the picture is taken, but very seldom can the instrument catch and record that subtile thing called "natural expression," because few persons are natural when seated before the camera. Well, what of all this? Simply this. If you are noble, loving and true, such virtues will light up your face; if you are sordid, mean and selfish, your face proclaims it to the world. Anything in your life that is active for either good or evil will impress itself upon your personal appearance. Pride, scorn, hate and lust write themselves indelibly in the physiognomy. When such ignoble qualities rule the life and have become habitual, they are impressed on the face and finally become habitual to the countenance, and the features themselves become permanently changed to accord with such expressions. It has often been remarked that persons who have been married for a long term of years come to look something alike, nor is this surprising when we call to mind that their life and environment is one, made up of the same joys and sorrows, the same hardships and trials, and the same successes and pleasures—in short, the intellectual and spiritual atmosphere of both is to a considerable extent identical, and we know that these things affect the physiognomy often to such a degree as to mould the physical features of the face into the same shape.—Extract from an editorial in the Journal of Medicine and Science.

Advances of Modern Science.

There are some that imagine that the Victorian age has been destructive of the belief in miracles. In reality it, more than any other since the world began, has brought home to the average man the stupendous miracle of the world. They call it a materialist age, which has chained the soul of man to inert matter. But almost before the reproach is heard, science proclaims that there is no such thing as inert matter, that every atom is alive, and that our mortal bodies are vast composite conglomerations of living organisms, upon whose pitched battles in our veins depend our health or our disease. To take but one instance. Imagine all that we understand by the word microbe, and then recall the fact that the microbe was practically unknown when the Queen came to the throne. In a very special fashion, science has revealed to us a new heaven and a new earth, infinitely marvelous, testifying to an understanding so vast that the mind of man cannot by searching find it out. Behind each discovery that advances our knowledge, the infinite unknown indefinitely recedes. We weigh the stars, analyze their composition in the spectroscope; we photograph the moon and make maps of the canals in Mars. But far more stupendous are the discoveries that have been made, not in the infinitely distant abysses of space, but in the infinitesimally small molecules which are all around. Science has sent its Roentgen ray through the darkened veil, and revealed the invisible and summoned all men to enjoy it as their inheritance.—"A Retrospect of Sixty Years," by W. T. Stead, in June Review of Reviews.

The University of California.

The University of California has $4,000,000 already pledged for its support, and asks architects to compete for the plans for the new buildings, and a jury of famous architects has been secured to pass upon the plans. The jury is to meet at Antwerp as soon as the plans are completed. The competition is to be international. An advisory board has been selected to fix upon such location as will best suit the landscape. On this board are Alma Tadema, Puvis de Chavannes, Andre, Luciain, and Knaus.

A Big Cannon Casting.

At the Otis Steel Works, Cleveland, Ohio, August 4, the casting of a smooth bore gun on the methods suggested by Dr. R. J. Gatling, of Hartford, Conn., inventor of the Gatling gun, was successfully performed. The government thought so well of Dr. Gatling's method that Congress appropriated $40,000 for the test. The casting weighed 30 tons and the gun, when completed, will weigh 16 tons and will carry a 400 pound projectile.