

### CAREER OF GEO. WESTINGHOUSE

AN OBJECT LESSON OF AMERICAN POSSIBILITIES.

Though Born of Well-to-do Parents He Was Not Content to Drone Through Life but Became One of the Foremost Benefactors of His Race—His Devotion to His Work.

The relations which the Westinghouse company of Pittsburgh have to Scranton and Northeastern Pennsylvania through their connection with the new Cannon Ball Trolley system and the developments expected to grow out of it give special interest to a sketch of George Westinghouse, appearing in Cassell's Magazine for December, a journal largely devoted to applied science and the men who do the applying. Some extracts follow:

In these days, when there are so many instances of millionaires who have started as poor boys, there is a tendency to think this true of everyone who is not known to be the son of a rich man; but Mr. Westinghouse's career lacks that touch of romance. His father was a successful manufacturer of agricultural machinery, and the old factory is still in operation at Schenectady, N. Y. His family moved to that town in 1856 from Central Bridge, Schoharie county, New York, where he was born in October, 1846, so that he is now about 56, still a young man as we count age in these days, and certainly a splendid specimen of physical and mental vigor, for he works harder than any of his numerous assistants, and finds his relaxation rather in a change of work than in complete cessation. He is a man of large frame, which probably explains how, although only a boy he was allowed to take part in the American civil war, seeing service in the cavalry and infantry of the army, and, towards the end of the war, as an engineer officer in the navy, where his mechanical aptitude found a congenial occupation; for it must not be forgotten that the basis of his success is in his great mechanical genius, both in the manipulative skill and in that bent of mind which, seemingly by intuition, sees at once the practicable and the reasonable in mechanical contrivances, and does not have to grope after a proper solution of mechanical problems.

Evolution of His Career. Mr. Westinghouse's career is an illustration of evolution throughout. His first invention was a railroad frog, which was quite successful, and it was while exploiting this and naturally studying railroad problems that his attention was drawn to car brakes. They were crude enough before his great invention of the air brake, which has made his name known throughout the world wherever the railroad has gone. His first thought was a steam brake, but his knowledge as an engineer showed that condensation would make this a failure.

About this time the Mont Cenis tunnel was building, and the technical papers told of the successful transmission of power by compressed air. Everybody had the same chance to see what this meant; but his was the mind that grasped the hint, and the result was the air brake. Of course, it was crude as compared with the perfected brake of today, but it revolutionized railroading by enormously increasing the safety of operation and by making higher speeds possible. His later invention of the triple valve and of setting the brakes by releasing the pressure in the train-pipe was almost as important as that of the air brake itself, securing, as it does, simultaneous action of all the brakes in a train, with the added benefit that if the train separates, the brakes are set at once. If he had never done anything else, the invention of the air brake would entitle him to a high rank among the benefactors of humanity, for it has made modern high speed railroading possible and safe.

There are three marked characteristics in Mr. Westinghouse's traits, as an inventor or mechanic, as an executive and organizer, and as a financier. The first was shown in the invention and improvement of the air brake. The second had its first illustration in the works which he organized for its manufacture. These have, of course, grown with the years, like everything else he operates, and they now present one of the most efficient cases of highly specialized industry in the world. They have proved a veritable gold mine for the stockholders, and yet, such is the economy of manufacture that the workmen get high wages, and the product is cheaper than any competitor, unless organized on such a perfect scale, could turn out. This was demonstrated to be a fact by a large railroad which, for a time, made its own brakes on a very low royalty. They found it cheaper to buy them from the Westinghouse works.

Compressed Air to Electricity. His mastery of pneumatic devices led him to adapt compressed air to railway switches and signals, out of which came the Union Switch and Signal company, which has installed the complicated stations at the great South Terminal at Boston and the Union station at Pittsburgh. Electricity came to take a place in this work for the automatic signals, and it was through the acquaintance thus gained that he was led into the field of electric development, where the history of his work is even more romantic than that of the development of the brake.

Those who have known him best and longest have constantly remarked upon his wonderful foresight and prevision, of which a few instances appear as we proceed. Nearly twenty years ago he seemed to grasp the possibilities of electrical development, when the art was truly in its infancy. It was evident that the field for direct current was limited, and that for transmission over long distances alternating current

must be used; but something was necessary to change the small current of high potential to the stronger current of practicable voltage. The Gaulard and Gibbs patents were brought to his notice, and he purchased them for the United States. Just here we may note another trait in his character, the readiness, although an inventor himself, to purchase and use the inventions of others. With the control of these patents he organized the Westinghouse Electric company, which has grown until it is now one of the greatest manufacturing companies in the world. The history of the introduction of alternating-current machinery is truly that of the "strenuous life" for Mr. Westinghouse. It was the direct opposition from the makers of direct-current apparatus, who tried to get laws passed in some states forbidding its use, and they went so far as to secure the use of a Westinghouse dynamo for the first electrocution plant, hoping thereby to bring down upon the alternating current what would be essentially more deadly than direct current. What a commentary on this action is the fact that all the great power plants today are using the alternating current.

How Tesla Was Aided. The new form of current (in the sense that its practical application was later) had demonstrated its usefulness for lighting. It remained to develop a practical and simple motor so that it could be used for power, for the synchronous motor needed more skill for its attendance than could be given in the ordinary machine shop. Then came Tesla, who found in Mr. Westinghouse a friend and backer, whose faith did not weaken while the induction motor, Tesla's great invention, was perfected. This solved the problem of the transmission of power for it gave a machine as simple as a gas engine, and of the highest efficiency, and almost "fool-proof." At the present time the great majority of industrial plants using electricity for power are equipped with these motors.

What has been said would give some idea of Mr. Westinghouse's greatness under great discouragement, and the story of the lighting of the Chicago world's fair is another illustration. He believed this a great opportunity to show what could be done by alternating current, and made a tender offer by \$1,000,000, more than any other bidder. Then his troubles began. Competitors made such charges as to his inability to carry out the contract that he was forced to give a bond for the full amount of the contract. Then he was enjoined from making the old familiar glow lamp. He actually had to invent a new form of lamp, and to this he added a new air pump. Old employees tell with much admiration, how at this time, he worked day after day, in his shirt sleeves, perfecting the various details. But the lighting of the fair was a great success, and, curiously enough, the only return to the stockholders of the fair was the \$1,000,000 dollars he had saved them.

Growth of the Plant. The present works of the Westinghouse Electric and Manufacturing company at East Pittsburgh were built in 1895, and consisted then chiefly of two main buildings 750 feet long, one 230 feet wide, and the other 150 feet wide. There was an almost universal opinion that the buildings were too large ever to be filled with work. So far from sharing this view, Mr. Westinghouse located them so that they could be extended at both ends, and with enough room at the side to duplicate them. In 1899 they were extended at one end; in 1900 at the other; in 1901 the space between was turned into another bay 1,200 feet long. Now, in 1902, the duplication of this already huge plant is in progress.

It might seem that the work thus far mentioned would be more than enough to keep one man busy; but meanwhile this tireless man developed and exploited the use of natural gas in the Pittsburgh district, selling out his interest after the undertaking had been fully developed and made a success. To show what could be done in electric lighting with alternating current, he organized the United Electric Light and Power company in New York, the Allegheny County Light company in Pittsburgh, and another in Baltimore. After these had all been made successful he withdrew from them to be able to give more attention to his other great undertakings. While out of the chronological sequence, or it may be mentioned here that, under his guidance and his expense, the first lamp has been made a commercially successful article. He is also the backer of Peter Cooper Hewitt in the development of the mercury vapor lamp.

Works in Foreign Lands. Besides the plants already mentioned, there are the great shops of the Westinghouse Machine company at East Pittsburgh, for building steam and gas engines and steam turbines, of which Mr. Westinghouse is principal owner; and there have been for years works for making air brakes in England, France and Germany, while electric works were established at Havre in 1898. The most important of the works outside of the United States is the great plant of the British Westinghouse Electric and Manufacturing company, at Manchester, which is almost a duplicate of the works at East Pittsburgh. These works have attracted marked attention from their size and from the rapidity with which they have been erected.

Long as this list is, we have not mentioned all the works, for there are mentioned at Cleveland and Allegheny, with new ones of great size in course of erection at Trafford, a few miles from East Pittsburgh, and works in Newark, New York and Pittsburgh. There is also a Russian Westinghouse company for handling the products of the various factories. It is estimated that the various works and companies which bear his name represent a capitalization of about \$75,000,000, and give employment to more than 20,000 people. This sketch has attempted to show that the success of Mr. Westinghouse has been due to his own talents, industry, prevision and courage. It has not been a case of good luck; indeed, at a number of stages in his career luck seemed to be decidedly against

A Timely Suggestion. This is the season of the year when the prudent and careful housewife replenishes her supply of Chamberlain's Cough Remedy. It is certain to be needed before the winter is over, and results are much more prompt and satisfactory when it is kept at hand and given as soon as the cold is contracted and before it has become settled in the system. In almost every instance a severe cold may be warded off by taking this remedy freely as soon as the first indication of the cold appears. There is no danger in giving it to children for it contains no harmful substance. It is pleasant to take—both adults and children like it. Buy it and you will get the best. It always cures. For sale by all druggists.

# HOLIDAY CIGARS

From 25c For a Box of 12 to \$5.00 For a Box of 25.

We are now prepared to give you figures on cigars in large quantities for the Holidays. Parties contemplating purchasing large quantities will do well to place orders now, especially on imported and High-Grade Havana Cigars, as these lines will be difficult to obtain satisfactorily in a short time owing to the present troubles in Cuba.

STANDARD BRANDS ONLY THAT YOU KNOW ARE WORTH THE PRICE YOU PAY

Full Line of Pipes, Tobacco Jars, Cigar Holders, Etc  
O'HARA'S CIGAR STORE,  
.....431 SPRUCE STREET.....

him. There was once a time when his friends had all concluded that he must go under and sacrifice his fortune, which even then was counted with seven figures, but even this did not daunt him, and his ability as a financier enabled him to reorganize so as to go on to the great success of today. He has never contemplated stock watering or schemes of that kind, and today the capital of all his properties represents actual value.

#### INCANDESCENT LAMPS.

Details of the Process, Long Regarded as a Trade Secret.

From the Electrical World. The manufacture of an incandescent electric lamp is of special interest because many of the operations have heretofore been regarded as trade secrets and carefully kept from the public.

The delicate filaments which produce the light are formed by squirting a paste made from cellulose (wood pulp) through dies, from which it emerges in the form of fine threads, which when dried are tough and flexible. These threads before they are dry are formed into the desired shape.

They are then packed in carbon dust and subjected to intense heat for many hours. The cellulose is completely charred, and the filament now practically consists of charcoal. It is then suspended in an atmosphere of hydrocarbon vapor, in a vessel in which a partial vacuum has been made, and a current of electricity sufficient to bring it to incandescence is sent through it. This decomposes the hydrocarbon, and a carbon soot somewhat resembling graphite is deposited on the filament. This is technically known as "flashing." After this treatment the filament has a metallic lustre resembling polished steel.

The glass bulbs are blown in moulds to secure absolute uniformity, and as they come from the glass-house they are perfectly smooth at the rounded ends and have a long open neck. To the rounded end is fused a short length of glass tubing opening into the interior of the bulb. This is subsequently used for connecting the bulb to the exhaust pump.

For making the connection through the glass between the carbon filament and the wire the most satisfactory material is platinum, because it adheres firmly to fused glass and because it expands and contracts at the same rates. If this were not the case when it got hot through the passage of the current it would either expand more or less than the surrounding glass, and either break it or make a space through which air would leak. So through the little glass stopper which will eventually project down into the neck of the bulb are fused two platinum wires. This stopper, which has a flange at one end, is now called the mount or stem.

Next the filament is fastened to the ends of the platinum which projects from the stem. This is accomplished by means of a special cement which will stand up to red heat. Over this paste is deposited a layer of carbon. The paste is then dried in an oven, and the stem, with its attached filament, is fastened onto the bulb by fusing the flange on its upper end about the neck of the bulb.

After this joint is carefully tested to be sure there are no leaks, the exhaustion of the air is accomplished by means of a mechanical air pump, the last traces of gas or air being removed from the bulb by chemical means. When the vacuum is sufficiently high the tube through which the air has been exhausted is sealed off by means of a small lamp, leaving the small round tip seen on the spherical end of the finished lamp.

The lamp is now practically completed, and is sent to the testing department. Here it is subjected to a series of severe tests before it is considered ready for the market. If it passes these successfully the base (the portion by means of which it is screwed into a bracket) is cemented on, and the completed lamp goes to the shipping department.

#### THE PACIFIC CABLE.

England Can Now Snap Her Fingers at Foreigners.

From the London Times. The much-talked-of, much obstructed, and long-delayed Pacific cable has at last been actually opened for the transmission of messages. The history of the enterprise is in substance the history of every great undertaking, a history of patient effort by a few energetic and far-seeing men fighting the ob-



Did you ever wear "Goodyear Glove" Rubbers or Rubber Boots?

You can't tell by looking at a Rubber how good it is—all have the same outside appearance. You've bought Rubbers at some time or other that broke after a few days' wear. They were a rubber composition, not a pure rubber by any means. We believe the average man or woman wants the best. That's the reason all our Rubber Goods have the "Goodyear Glove" trade mark stamped on them; it's a guarantee to you, and to us, that they are pure all the way through.

Men's to Fit All Styles of Shoe, Women's to Do the Same.

All sizes in Children's, Youth's and Men's Low and High Cut Rubber Boots.

### Rocktan Shoes

The prominent feature of this shoe is its oak tan sole. Costs a little more than the ordinary sole leather, but we think that the sole of a shoe should receive as much attention as the style. If you give this "Rocktan" Shoe a fair trial we know you will recommend it to others. Don't tell our shoe salesman your size, just let him measure your foot.

"Rocktan" \$3.50 a Pair

SAMTER BROTHERS, Complete Outfitters.



Who Wants \$20.00 For a Christmas Present?



Twenty Christmas Presents \$50.00 To Be Given by The Scranton Tribune to the Children of Scranton and Northeastern Pennsylvania.

One Present.....	\$20.00 in Gold.....	\$20.00
One Present.....	10.00 in Gold.....	10.00
One Present.....	5.00 in Gold.....	5.00
Two Presents.....	2.50 Each.....	5.00
Five Presents.....	1.00 Each.....	5.00
Ten Presents.....	.50c Each.....	5.00
Total—Twenty Presents.....		\$50.00

### THE TRIBUNE'S SECOND ANNUAL Junior Educational Contest

A Contest in Word-Building. Who Can Make the Most Words Out of the Letters in T-H-E H-O-M-E P-A-P-E-R.

THIS IS much easier than last year's contest, and twenty of the brightest boys and girls will secure Christmas Gifts in cash for making the largest number of words out of these letters. It is lots of fun to think of the words and hunt them up in the dictionary, and besides it will help you with your spelling. You will be surprised at the number of different ways these twelve letters can be used.

Rules of the Contest. Presents will be given to the boys or girls, whose parents or guardians are subscribers to THE TRIBUNE, building the largest number of words out of the letters contained in "The Home Paper." No letter must be used any more times than they appear in these three words. As an example, only one "A" could be used, but there might be two "H's" or three "E's." Only words defined in the MAIN PORTION of "Webster's International Dictionary" (edition of 1898) will be allowed. Any dictionary can be used, but in judging the contest THE TRIBUNE will debar all words not found in Webster's. Proper names, or any other words appearing in the "Appendix" will not be allowed. Obsolete words are admitted if defined in the dictionary. Words spelled two or more ways can be used but once. Words with two or more definitions can be used but once. No single letters counted as words except "A" and "O."

How to Write Your List. Write on one side of the paper only. Write very plainly; if possible, use a typewriter. Place the words alphabetically. Write your name, age, address and number of words at the top of your list. Write the name of parent or guardian with whom you live and who is a regular subscriber to THE TRIBUNE. Fold the list—DO NOT ROLL. CONTEST CLOSES SATURDAY, DECEMBER 20TH at 5 P. M. All letters of inquiry for information will be promptly answered. Address your list of words, or any question you wish answered, to CONTEST EDITOR, SCRANTON TRIBUNE, SCRANTON, PA.

stacles of official dulness, public apathy and vested interests. It is always the same thing. The innovation is first declared impossible and visionary; then it is is declared as superfluous, because somebody already in the field is prepared to give the facilities obstinately withheld; then it is opposed might and main by people whose monopoly is in danger; and, finally, it is carried out amid a chorus of exclamations about the almost incredible delay that has occurred in securing a thing so obviously indispensable. This new cable brings the Australasian colonies ten thousand miles nearer Canada than they were before, and at the same time opens up possibilities of other substantial improvements in imperial communications. Across the

Pacific, from Vancouver to Queensland, it touches none but British territory; and now there is completed a telegraph line of the world which touches foreign territory only at Madeira and St. Vincent, in the Cape Verde Islands, both belonging to our old ally, Portugal. Thus the empire is bound together by what is all but an all-British line, giving a great advantage in speed, since it has only three transmissions across the Pacific, all on British soil, in place of over a dozen belonging to various nationalities. Its tariff will be less than half

Linotype Composition Book or News Done quickly and reasonably at The Tribune office.