

Correspondence.

A Name for the Aborigines.

To the Editor of the SCIENTIFIC AMERICAN:

Only recently I saw an article from your magazine on the subject of a suitable scientific name for the aboriginal tribe of America, considered as a whole. It seems to me that the proposed term *Amerind*, formed from the leading syllables of "American Indians," now erroneously used, has the same objectionable feature that the latter expression has. Would it not also "perpetuate an error"?

I venture to suggest that the word Westmen could be applied to all the races inhabiting the Western Continent before the advent of Europeans. The adjectival form would be Westmenic or Westmenian.

MARY ISABEL SMITHSON.

East Orange, N. J.

The Biltmore Forest.

BY GEORGE E. WALSH.

Private forests in the United States are not all conducted on the wasteful plan of converting the available commercial timber into money without consideration of the future supply. Some of the earliest attempts to conserve forest interests were made by private owners, who realized that successful timber culture should be placed in the same class with corn or wheat growing.

In recent years owners of large private forest lands have been the most progressive in adopting systems of forest culture which would increase the value of the woods. Dr. W. Seward Webb owns a forest tract in the Adirondacks where extensive forestry culture is carried on successfully. As the greatest danger in the Adirondacks comes from fires, the owner of this tract has established a system of fire protection, the most complete in the country. The tract is divided up into four sections, and an experienced woodsman watches over each section. The houses of the forest rangers are all connected by telephone with the superintendent's, and should a fire break out in one place they are all summoned to extinguish it. The latest fire-extinguishing apparatus is used by the rangers. On a tract of this size the damage by forest fires would be sufficient in the course of ten years to pay for the cost of the rangers.

A great number of other private forests are scattered throughout the country, including those owned by Mr. William C. Whitney, the Havermeyer estate, the Girard estate near Pottsville, Penn., that of Mr. H. C. Russell at East Greenwich, R. I., and of Mr. G. W. Vanderbilt at Biltmore, N. C. This last estate is of special interest to forest students and lovers because of the remarkable success obtained. The work was first organized at Biltmore in 1891 by Gifford Pinchot, now the forester of the Department of Agriculture, on about 4,000 acres of land. Additional tracts have since been added to the estate, until the whole extent of forest land brought under systematic treatment consists of over 100,000 acres. Dr. C. A. Schenck took up the work when Mr. Pinchot accepted the position as forester for the Department of Agriculture, and under his careful culture the forest has demonstrated many practical lessons to lumbermen and private owners of forests.

The forests of the Biltmore estate comprise to-day about 110,000 acres, 10,000 of which are located close to Asheville, with Mr. Vanderbilt's mansion in the midst. This home tract, as it is called, is made accessible by macadamized roads and dirt drives so that every acre of land can be worked by the foresters. According to Dr. Schenck's figures the \$20,000 expended in building the roads through the woods have practically increased the value of the stumpage standing on the land by \$40,000, owing to the accessibility of the trees for commercial purposes. Trees have no value so long as they stand out of the lumberman's reach, and forestry as a business enterprise must first bring them within the reach of a market. The annual output of this home tract of 10,000 acres is about 3,000 cords of wood, which finds a ready market at Asheville.

The large tract of 100,000 acres consists largely of virgin forest, and it has heretofore been entirely inaccessible for the lack of roads; the country, moreover, is so rough that railroad building is impossible. The tract lies in parts of four counties, bordering the head-waters of the French Broad River. In this immense forest the yellow poplar, or liriiodendron tree, reaches an unusual size, and there are besides white oak, chestnut, hemlock, cherry, and other native forest trees. The work of building dirt roads, 16 feet wide, is now under way through this mountain tract to make the stumpage more accessible, the roads following as near as possible the main water courses. Several sawmills are located in the forest, cutting away the mature timber; after its removal, the young growth of yellow poplar, oak and chestnut springs up rapidly. This young growth is husbanded carefully and protected from fires—the greatest danger to forest culture

in the South—at an expense of a few hundred dollars a year. Dr. Schenck estimates that for every mature tree removed the foresters give rise and life to about a thousand young seedlings.

Pisgah Forest is one of the roughest and wildest parts of the large mountain tract, and the task set in making the trees of commercial value is not merely that of the lumberman. It is an engineering problem as well, and requires large resources and much study to make it at all profitable. In the rich bottom-lands made accessible by roads, the land will be cleared for farms, and it is the purpose of the owners to bring settlers there, who will furnish help as loggers and teamsters in the proper season and raise farm and food products for self support. Both agriculture and commercial forestry will thus be carried on at the same time. On the wind-swept mountain tops, where the tree growth of red oak and chestnut is stunted, there is found splendid pasture for cattle and sheep. These tracts have already been fenced in and considerable numbers of sheep and cattle are grazing there. The number of both is restricted, however, so as to prevent any permanent damage to the productiveness of the soil pastured. The idea of the forest management is to make every square foot of land pay permanently, and to bring up the investments in stumpage, roads, farms, buildings, and pasture fences to a figure which will prove remunerative.

There are many old abandoned farm tracts on the estate which have been planted with white pine. There have been planted already a great number of acres, and the work proceeds at the rate of 50 acres per year. About 4,000 white pines are planted to the acre at an expense of \$12. These plantations will not be cut for fifty or sixty years. In 1900, Dr. Schenck says, this plantation should yield about 20,000 feet board measure of lumber, worth about \$100, and yielding 3½ per cent interest on the capital invested. This is a long time to wait for return on an investment, and it is this which deters the average farmer from taking up practical forestry as a living. Nevertheless, on a large estate where capital is plentiful, the returns are sure, the investment is gilt-edged.

Combined with the management of the forests of the Biltmore estate there is now a local forest school. This is not intended to be a college of forestry. It is rather a gathering of young men interested in forestry, and anxious to make forestry their life's profession. In the course of a few years the students get acquainted with the theoretical and practical side of forestry work. Every second year Dr. Schenck takes the students abroad to show them forestry methods as practised in European countries.

The Biltmore forests, and the management thereof, have been of special interest to the Forestry Bureau of the Department of Agriculture, both because of the excellent example set by the Biltmore estate for other owners of private woods, and because of the personal associations existing between the workmen in the two different fields. As the forester of the Department of Agriculture, Mr. Pinchot originally started the work on the Biltmore estate, and he has always felt a personal pride and interest in the growth of the enterprise under his successor, Dr. Schenck. Incidentally it may be said that many of the workmen and student assistants in the Forestry Bureau are sent down to the Biltmore estate at different times to make practical studies of forestry as exemplified there. The Forestry Bureau is making plans to co-operate more and more with owners of private forests, both for the instruction of their student assistants and for the better preservation of the woodlands. The bureau is preparing working plans now for about 1,250,000 acres of forest lands owned by the different states, a good deal of which is in New York; and in addition to this there are applications for similar working plans for some 2,500,000 acres belonging to private owners. The Forest Bureau is thus rapidly expanding in its work, and the demand created for foresters who understand their work well enough to manage private forests exceeds the supply.

The torpedo destroyer "Viper" of the English navy, which ran on the rocks off the coast of Alderney, in the English Channel, in a fog during the recent English naval maneuvers, owing to its being abandoned, has been blown up by the Admiralty. Guncotton was utilized for this purpose, and the work was carried out thoroughly at high tide. The object of this course was to prevent the foreign fishermen who frequent this part of the Channel from obtaining any information regarding the secret mechanism of the destroyer. The court martial upon the officer who was in charge of the "Viper" at the time of the catastrophe has been held at Portsmouth. He attributes the disaster to the dense fog which was prevalent at the time, underestimation of the tides, which at this point at the time of the accident were running at five knots per hour, combined with the fact that he was keeping a sharp lookout to avoid one of the hostile cruisers which was in his vicinity. The court, considering the responsible nature of the work upon which the officer was engaged at the time, only reprimanded him.

THE TEMPORARY FOOTWAYS OF THE NEW EAST RIVER BRIDGE.

One feature of the new East River Bridge which illustrates the great labor and cost of erecting these long-span suspension bridges is the fact that the suspended structure, shown in position in the photographic views on the front page of this issue, is, all of it, temporary, and will have to be removed after the four great cables themselves have been completed. Of the two views, one is taken from the roof of a tall building to the south of the bridge on the Manhattan shore, and in taking the other photograph, the camera was placed at the center of the erecting platform on the summit of the Manhattan tower. From this point, 335 feet above the water, the view, as may well be imagined, is superb. Beyond the graceful sweep of the suspended footways, the view extends far to the eastward over Long Island, and northward up the Sound to New Rochelle and Larchmont, while to the south there is a magnificent panoramic view of New York Bay, Sandy Hook, and the New Jersey and Long Island shores.

The superstructure of the 1,600-foot main span of the bridge will be hung from four cables 18¾ inches in diameter. Each cable will be made of thirty-seven strands, and each strand will consist of 282 steel wires, 0.16 of an inch in diameter. Therefore, in each cable there will be 10,434 wires whose aggregate breaking strength will be 20,000 tons. The cables are being built by the John A. Roebling's Sons & Co., of New York, and the method of stringing and assembling the cables will be as follows: In the first place there will be four endless wire ropes extending across the bridge from anchorage to anchorage, which will be capable of being moved in either direction by steam power. There will be one of these ropes in the plane of each cable, and each will pass around sheaves at the anchorages and will serve to carry a bight of the cable wire across the river. The wire will be carried to and fro from anchorage to anchorage, passing each time around shoes which will be made fast at a point several feet back from the anchor pins. When the end of the one coil of wire is reached it will be spliced to the end of the next coil, and the strand of 282 wires will be made continuous throughout. During the process of making, the strand will hang from 12 to 16 feet higher than its final position in the finished main cable; and as soon as it is completed, it will be slacked away at the anchorages until it has been lowered and included among the thirty-seven strands that form the cable.

To accommodate the numerous workmen who will be scattered throughout the whole length of the cables, and who will have to see that the wires are laid parallel under an even tension, and properly lashed together into strands, a working platform, or foot-bridge, has been built from anchorages to top of towers and across the main span of 1,600 feet. The foot-bridge affords a working platform, placed in the vertical plane of each cable for its full length, and it is so arranged that two strands of each cable, or eight in all, can be made at one and the same time. In the middle span, the foot-bridge consists of two parallel, double-decked bridges, which are about 70 feet apart and are connected by transverse truss bridges which are 160 feet apart. These connecting bridges are very clearly seen in the view of the bridge taken from the top of the tower. Each of the footways is carried on two temporary cables, each of which is made up of three 2¼-inch steel-wire ropes. The upper deck of the foot-bridge will be used for the construction of the strands and the lower deck for the assembling of the strands in the finished cable. The platforms are 3½ feet wide between the centers of the handrails, and they are made continuous throughout the whole 1,600 feet of the main span.

In order to stiffen the main span and prevent violent swaying and distortion in strong winds, there are four 2¼-inch storm cables, which are attached to the towers and curve upward to meet the underside of the foot-bridge at the center of the span. There is also a series of ¾-inch guide-ropes, extending diagonally from the point of connection of the storm cables to the tower, to a connection with the bottom floor of the foot-bridge. The storm cable is also tied at regular intervals to the foot-bridge by vertical 5/8-inch suspenders. At the top of each tower there is a large working platform measuring 36 feet x 107 feet. Over each pair of saddles is a heavy wooden frame with a hydraulic lifting gear to raise the strands, as they are completed, from their temporary saddles, and transfer them to the main saddles. When the whole thirty-seven strands of a cable have been thus assembled, they will be bound with a special pattern of steel clamp at intervals of every 20 feet, the clamps having formed in them saddles to receive the suspenders by which the floor of the bridge is carried. Half-round, steel covering plates, or shields, will then be clamped over the cables to protect them from the weather.

Science Notes.

The Alfred millenary will be celebrated at Winchester, England, September 20, and the statue of King Alfred, by Thornycroft, will be unveiled.

A new product prepared from the coconut, and known as "vegetaline," is being manufactured by a Marseilles firm. The product is a kind of butter, and is stated to be particularly adapted for bakers and confectioners. It is much cheaper than butter, and is stated to be better adapted for pastry, and more especially biscuits. It consists of refining the oil extract from the dried coconut. It is perfectly pure and nourishing. It only resembles butter in its fatty nature, but it is pure white and much harder than the dairy product.

The seventy-five Eskimo dogs which are to accompany the British Antarctic expedition are being dispatched to Melbourne by a fast liner, and at that port will be transferred to the "Discovery." The problem of safely conveying the animals through the tropics presented many difficulties, but it has finally been solved by housing the animals in the refrigerating chamber while crossing the equator. By this means they will be maintained in an atmosphere, the temperature of which will be similar with that of Greenland, whence they were brought.

Mr. J. G. Rhodin, of Manchester, England, has discovered an economical method of manufacturing potassium salts from feldspar. The feldspar is primarily finely ground, and is then mixed with slaked lime and sodium chloride, the mixture being subsequently heated to 900 deg. C. By this means about 85 per cent of the potassium in the feldspar is extracted in the form of potassium chloride. It is stated that the process is very cheap and is well adapted for commercial purposes. It is proposed to carry out a series of further experiments with the process prior to erecting a factory in Sweden for the manufacture of potassium salts upon an extensive scale. The latter country is peculiarly adapted as the center of such an industry owing to the abundance of feldspar which is to be found there, and for which so far there has been no commercial utility. Another prominent feature of the process is that the insoluble residue that remains after the potassium and sodium salts have been extracted by water constitutes an excellent material for glass manufacture by the addition of a little sand and alkali.

German papers speak of an annual plant growing in tropical Africa, belonging to the leguminous class, which is largely cultivated by the negroes as a food article. It has also been introduced to some extent in Southern Asia and in Brazil. It is called woandsu by the African negroes; the botanical name is *Glycine subterranea*. A French expert chemist of aliments has recently analyzed the fruit of the woandsu with reference to its chemical composition and its value as food. The fruit, like the peanut, matures under ground. The eatable kernel has the shape of an egg and is dark red, with black stripes and a white hilum, like most beans. It furnishes a very white flour, whose flavor after cooking much resembles that of chestnuts. The chemical composition is 58 per cent of starchy substance, 19 per cent nitrogenous, 10 per cent water, 6 per cent oily, 4 per cent cellulose substance, and 3 per cent ashes. It will be seen that two pounds of these beans would supply the daily requirements of the human system. M. Baland, who has had wide experience in the chemistry of nutriment, calls this fruit the first one found by him in a natural state which shows all the chemical properties of a perfect nutriment.

The British Association will meet this year at the Glasgow Exhibition under the presidency of Prof. Rücker, who was recently appointed principal of the reorganized London University. He is the leading expert on magnetism in Great Britain, and his address will include references to the voyage of the Antarctic exploration ship "Discovery," and its searches for the South Magnetic Pole. The zoological section will be under the presidency of Prof. Ewart, the great authority upon hybrids, and the results of his experiments, together with those of Lord Edward Cecil, will provide interesting material. The physical science section will be presided over by Major Macmahon, whose reputation is based upon abstruse mathematics purely. Prof. John Milne will read a paper devoted to his seismological instruments, and his observances of earthquakes. Mr. Horne, the chief of Scotland's survey, takes the chair of the geological section. He is the most prominent savant on cataclysms, eruptions, submergences, etc. The geographical chair, owing to the dearth of travelers, will be presided over by Dr. H. R. Mill, the well-known rainfall expert. The engineering department will be under Col. Compton, and the main discussions will be devoted to automobile transit and the Panama Canal. Prof. Cunningham will take the anthropology section, and educational science, the new ramification which the British Association have recently taken up, will be undertaken by Sir John Gorst.

Engineering Notes.

The new Italian submarine vessel "Delfino" has proved very satisfactory. It is provided with an instrument which permits a submarine vessel navigating below the surface to have a view of the whole horizon while it is under water. It is called a cleptoscope, and was invented by two Italian engineers.

The manufacture of chilled wheels is now in full operation at Barrow in Furness, by the British Griffin Chilled Iron and Steel Company. This firm is attempting to introduce the American method of manufacture into England, but there is no demand upon the English market at present. These new works, which were only started two or three months ago, are making a determined attempt, however, to prove the value of this system of manufacture, and already have supplied thousands of wheels for tramways both in England and her Colonies.

Sir Raylton Dixon & Co., of Middlesbrough, Yorkshire, have completed the construction of the repair ship "Assistance" for the British Admiralty. This vessel is a new type of war craft, and in reality consists of a floating workshop, for the undertaking of those repairs to battleships while at sea which do not necessitate a visit to the drydock. The "Assistance" is 436 feet in length by 53 feet beam, and has a displacement of 9,600 tons. Her engines are of 4,200 horse power, and she has a speed of 13 knots per hour. She is to be attached to the Mediterranean fleet.

The total number of vessels lost during the last quarter in 1900 was 224, representing a tonnage of 171,996. Of this number 126 were wrecked, 15 are missing, 8 foundered, 13 went down in collisions, and 10 were burned, 28 were broken up, condemned, etc. Out of the total tonnage lost, 61,715 tons were vessels belonging to the United Kingdom of Great Britain. Norway is second, with 24,704 tons; followed by Italy with 21,287 tons. The United States is fourth on the list, with 13,617 tons. The losses of the other countries do not exceed 10,000 tons. The proportion of loss sustained by the Italian merchant service is much higher than that of any other country mentioned.

The British House of Commons has finally sanctioned the Behr Monorail between Liverpool and Manchester. As the bill has already met the approval of the House of Lords, it is anticipated by the promoters that the scheme as permitted by the Lower House will be ratified by the Lords. It is intended to commence work upon the railroad early next year. The contract will occupy about three years. Electricity will be the motive power employed, and as the road will be constructed with easy gradients it is proposed to maintain a high speed with perfect safety. The journey of 35 miles between Liverpool and Manchester will be covered within 20 minutes without any intermediate stoppages. The brake arrangements which the Parliamentary committee previously contended to be inadequate are now such that it will be possible to pull the train up within 500 yards while traveling at 110 miles per hour.

A fast line of steamers is contemplated to ply between New York and Berehaven, in the southwest of Ireland. This is the nearest British port to this country, and the journey between the two points would be accomplished in four and a half days. Passengers disembarking at Berehaven will be dispatched across Ireland by rail to Dublin, and thence by steamer to Liverpool. The establishment of this service will thus considerably curtail the journey between the two countries and will probably prove of great commercial value. Berehaven possesses a magnificent natural harbor, so that the erection of the necessary wharves and docking accommodation can be carried out expeditiously. A bill, authorizing the construction of piers and other harbor works, is now being passed through the English Parliament. The realization of this scheme, which has been contemplated for years past, has hitherto been opposed by the Admiralty, since extensive naval works are being undertaken at this port. When the harbor works have been authorized the erection of the steamers for the traffic will be proceeded with. The vessels will be built in England.

One of the most practical laws passed this year by the New York State Legislature was the Elsberg Fire Drill Law, which makes it the duty of every person in charge of an educational institution within the state, having more than 100 pupils, to instruct and train the pupils by means of drills, so that in a sudden emergency they may be able to leave the school building in the shortest possible time without confusion or panic, says Insurance Engineering. Such drills shall be held at least once in each month. Neglect by any principal or other person in charge of any such public or private school to comply with the provisions of the act shall be a misdemeanor, punishable at the discretion of the court by a fine not exceeding \$50. The provisions of the act do not apply to colleges or universities. The value of such fire drill has been repeatedly demonstrated in isolated cases, and it is to be hoped that the provisions of Senator Elsberg's bill will be very generally enforced,

Automobile News.

It is reported from Paris that Major Krebs has invented and will shortly bring out an extra light motor weighing hardly 10 pounds, intended specially for aerial navigation.

An interesting excursion across the Alps has lately been made by a party of chauffeurs in a 12 horse power machine—Messrs. Leuchantin, Director of the Pignerol Tramways; Agnelli, Secretary of the Turin Automobile Club, and Storero. Starting from Turin at 7 o'clock A. M., they passed by Pignerol, Fenestrelle and Sestrière, crossed Mount Ginevro and arrived at Briançon (France) at 11 o'clock. Here they halted for dinner, and then left Briançon at 3 o'clock in the afternoon and following the Sesana-Oulx-Suse route, returned to Turin at 6:15 P. M. The total length of the route is over 180 miles, and it has many grades which gave a severe test to the machines. The time required to make the trip (not counting the halt) was 7 hours and 15 minutes.

The British War Office, for the purpose of ascertaining the efficiency of motor cars for military transport purposes, propose making a number of exacting trials with self-propelled vehicles through the southeastern counties. The routes have been prepared by Captain Lloyd, R.E., secretary to the War Office Committee on Mechanical Transport, and the roads that have been selected include some of the steepest gradients to be found in the country, while their conditions are so varied in character that an adequate comprehension of the utility of motor cars for transport will be obtained. It is expected that no lorry when fully loaded with fuel, water, and carried load, will exceed 7 tons in weight. This weight will probably be borne on four wheels, and the driving wheels will have to sustain the major portion of the load—approximately 5 tons. The tires of the driving wheels must measure at least 9 inches in width. The trailers, which may possibly be two-wheeled vehicles, will not weigh, when fully loaded, more than 3½ tons. About thirty vehicles will participate in these elaborate trials, and they will follow in procession with large intervals between each competitor.

The hill-climbing race at Laffrey, organized by the Dauphinois Automobile Club, took place on the 11th of August, and was a great success. The Laffrey grade is well known in France, and is considered a good test for the machines. The route starts from Vizille, at 863 feet altitude, and passes through Laffrey, which is at 2,867 feet altitude. The part laid out for the race includes the first 20,040 feet, and the grades vary from 7 to 13 per cent, with an average of 9.3 per cent. There were 31 machines entered, of which 23 started and 19 were able to finish. The starts were made from Vizille every 2 minutes, beginning at 7:30 A. M. The race was divided into two sections, speed and touring. In the former the results are as follows: Voiturettes up to 880 pounds, 2 persons. Winner, Maudiguet, on a George Richard 8 horse power machine, in 23 min. 10 sec. Light machines, 880-1,430 pounds, 2 persons. Winner, Rigoullot, with a Peugeot 8 horse power machine, in 22 min. 7 1/5 sec. In the heavy machine class Kraeutler made the best time of the race in 16 min. 2 3/5 sec. Among the tourists Boissy was the winner in the light vehicle class for 4 persons (Peugeot 8 horse power), in 26 min. 2 sec. In the heavy machine class, 4 persons, the best time was made by Ribes, in 26 min. 37 sec. The race afforded a good proof of the power and good working of the machines, and besides the above-named makes the Rochet, Darracq, Cottareau, Panhard, and Delehay showed a good performance.

A public automobile service has been lately inaugurated between two towns in the neighborhood of Vienna, Payerbach and Reichenau. The electric system is used, and the vehicles are of the large omnibus pattern, very comfortably arranged, and make good time. They are built by Jacob Lohner & Company. The system is said to have already met with great favor by the inhabitants, and especially by the foreigners who pass the summer at Reichenau, which is a watering-place of some importance. In England the night service for the distribution of freight from London to Tunbridge Wells, a distance of 35 miles, was commenced a short time ago, and is now in successful operation. Another automobile passenger and baggage system is that which has been inaugurated in Corsica, between Bastia and the Cape. An omnibus starts every day from Morsiglia to Bastia at 6 A. M. and at Bastia at 2 P. M. for the return trip. Each passenger is allowed 22 pounds of baggage, and pays 2 cents per pound for extra amount, but the total is limited to 66 pounds. Several automobile passenger systems are in project for connecting the coast towns of Tunisia. That from Sfax to Soussa (85 miles) has made the greatest progress, and the first vehicle, called "La Sfaxienne," made its trial trip on July 30. The system is controlled by the Société d'Etudes des Messageries Automobiles. A series of trials will be made to determine the best conditions of running. It is proposed to have two classes; at present there is but one class, and \$3 is charged for the trip.

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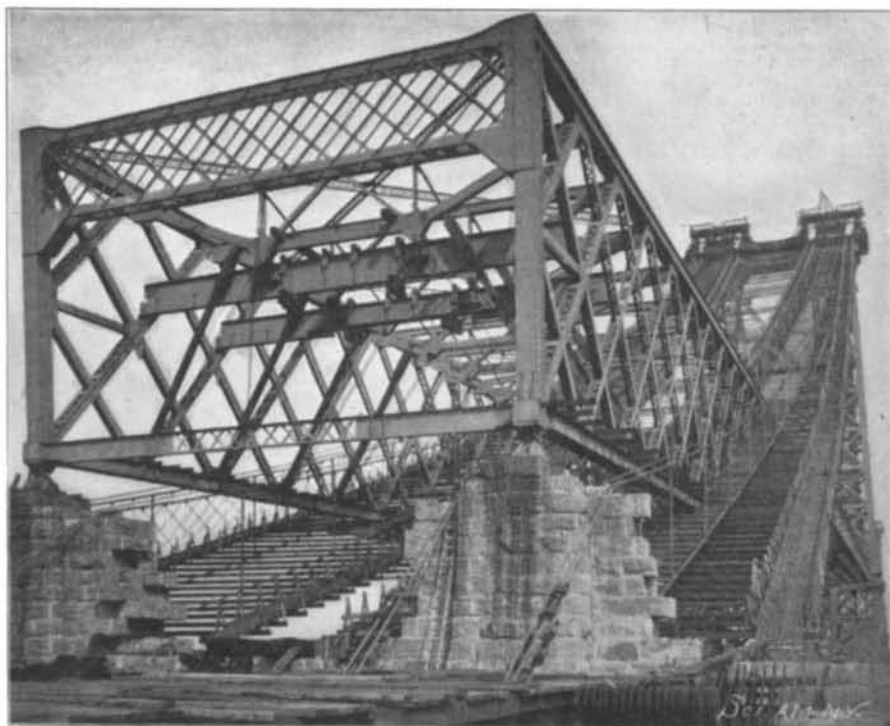
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View from Manhattan Shore.



Looking Up Temporary Footways from Anchorage.



View from Top of Manhattan Tower.

FOOT-BRIDGES FOR TEMPORARY CONSTRUCTIVE USE ON THE EAST RIVER BRIDGE.—[See page 166.]