THE NEW STEAMER PLYMOUTH OF THE OLD COLONY STEAMBOAT COMPANY.

The steamer Plymouth, now in process of construction for the passenger and freight service of the Old Colony Steamboat Company, of Boston, Mass., is rapidly approaching completion. Soon after this reaches our readers the trial trip will be made, and the boat will be placed upon the line. The new steamer is not so long as the Puritan or Pilgrim. In the construction, all the features of merit developed in the building of the Pilgrim and Puritan, whose consort she is to be in the fleet comprising these vessels and the Providence, have been kept in view, while in many points new departures in construction are introduced.

In the matter of external appearance a difference from existing models is to be observed. The paddle wheels are inclosed, but not by the usual semi-circular or semi-elliptical paddle boxes. The regular lines are not disturbed.

This feature was introduced originally in the Puritan. It confers a more ship-like aspect to the vessel. The boiler furnaces all discharge into a single central smokestack. These details principally affect the design, and have little reference to the structure proper.

The general dimensions of the hull are the following:

Length on water line 351 ft. 8 in. Length over all 366 ft. Beam moulded 50 ft. Width over guards 86 ft. Depth moulded at lowest point of sheer 21 ft. Draught of water loaded 12 feet. Distance from keel to topmast head 119 ft. Distance from keel to top of house on dome deck 59 ft. 4 in.

The hull is of steel with a double bottom, the space between inner and outer skins being 3 ft.

The cross frames are of the bracket plate type, and longitudinal frames with solid webs run fore and aft. Solid web transverse frames are introduced, so that the bottom is cellular. Transverse water-tight bulkheads, six in number, are also used to make the vessel still more secure against sinking.

Two complete systems of wrecking pipes and valves are carried over the bottom. These represent suction pipes. One set communicates with numerous points between the skins of the double hull. The other set communicates with a number of points in the bottom of the hold. The systems connect with one main wrecking pump, which is a duplex Blake pump with 8 in. suction, with a donkey pump of the same make with 7 in. suction, and with a Cameron pump with 5 in. suction. The latter is devoted more especially to pumping out the inner bilge. The wrecking and donkey pumps are on the main deck, far above the water line, and can be run from the main boilers or from the donkey boiler. The latter is also placed on the main deck. Thus the steamer can never be placed in the predicament of the City of Paris, where the pumps and wrecking appurtenances were under water and inaccessible. Sea cocks with connections are provided for the same pumps, so that they can be used to extinguish fire.

The engine is of 5,000 H. P., and is the first one of its kind as regards combination of cylinders. It is a four-cylinder, triple-expansion, double-inclined engine. It has one high pressure cylinder of 47 in. diameter, one intermediate cylinder of 75 in. diameter, and two low pressure cylinders of 81½ in. diameter each. The stroke is 8 ft. 3 in. The shaft is in three sections. Each outer section carries one crank arm, to which the outer end of each of the two crank pins is keyed. These arms are the driving cranks. The central section carries the two other crank arms, to which the inner ends of the crank pins are secured, the latter section with the arms acting as the drag cranks. The cranks are at right angles. The starboard crank pin has upon it two journals and receives the connecting rods from the high pressure and from one low pressure cylinder. The port crank pin comprises three journals. The connecting rod from the intermediate pressure cylinder is journaled to the central portion; the outer journals receive the connecting rod from the second low pressure cylinder, which rod is forked at the end. Thus, for the four cylinders there are five crank pin bearings. The low pressure cylinders are placed aft of the shaft; the other cylinders are forward.

Owing to the inclination of the cylinders and the oscillation of the connecting rods, only one of the cylinders can be thrown upon a dead point at the same time. The power is therefore very well distributed, and the shaft rotates with great regularity. The weight of the cranks, etc., would tend to disturb this motion, but this is obviated by another peculiarity. The air pumps, of which there is one for each low pressure cylinder, are worked from the low pressure crosshead. As the cranks, connecting rods, etc., reach a position where their weight tends to accelerate the motion, the air pumps are working at their hardest, so that the overbalance is corrected.

The valves are double-balanced vertical poppet valves. For the high pressure cylinder an adjustable drop cut-off is used. The other cylinders have fixed Stevens cut-offs. The valves are worked by double eccentrics and links. The latter are shifted by a special steam engine.

Each low pressure cylinder has its own air pump and surface condenser, with an independent centrifugal circulating pump. The air pumps are vertical, 40 in. diameter and 30 in. stroke. The combined cooling surface of the condensers is 9,050 square feet. The condensers can be connected in case of an accident to either of the air or centrifugal pumps.

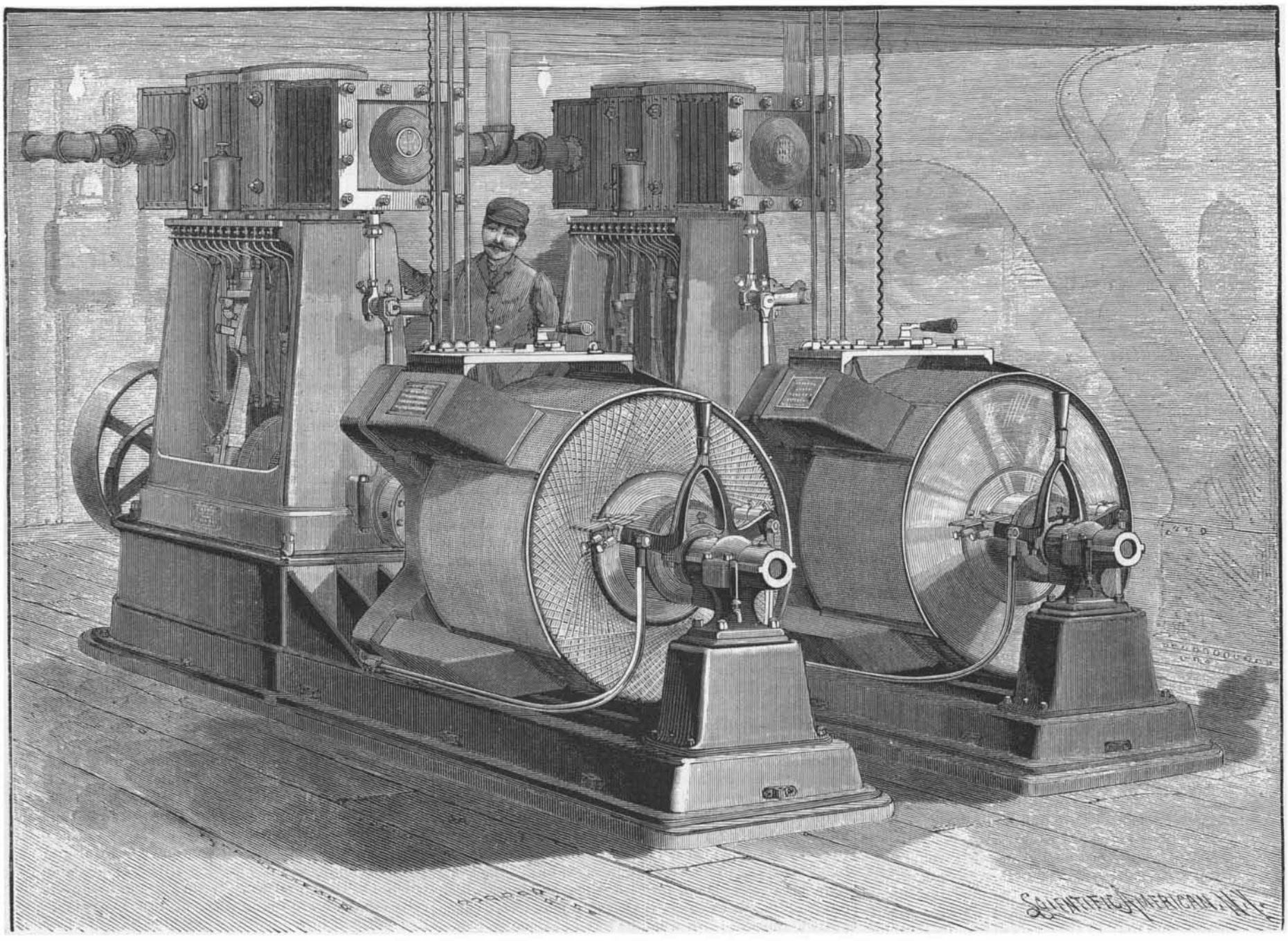
There are two independent duplex feed pumps, the suction and discharge pipes of which are connected so that either or both can be used.

The wheels are of the feathering type, 30 feet in diameter outside of the buckets. Each wheel has twelve curved steel buckets, each bucket being ⅞ inch thick, 4 feet wide, and 13 feet 3 inches long.

There are eight main boilers of the "Scotch" type. Each one is 11 feet 4 inches in diameter and 13 feet 1 inch long, made of 1 inch steel. There are two furnaces for each, of corrugated steel. They are arranged to be worked together or independently, and can be used to drive the pumps in place of the donkey boiler. Forced blast under the grates can be used if desired, as fans are supplied which can be connected for this service, and which are also to be used for ventilating the forward hold, furnace room, and engine room. The boilers have been tested up to 260 pounds pressure, giving a working pressure of 170 pounds. The maximum pressure, however, is placed at 160 pounds. The boilers are inclosed in a steel chamber to prevent the possibility of danger from fire. They are placed back to back in the center of the vessel, making two fire rooms, one on each side of the hull. The coal is contained in bins, whence it descends in chutes by gravity to the fire room. Ashes are discharged by ejectors through pipes.

The smokestack is 10½ feet in diameter, and rises to a height of 86 feet above the water line, or 98 feet above the keel.

The interior finish is very ornate. The dining room is 84 feet long, and can seat 140 people. There are 250



ELECTRIC LIGHT GENERATING PLANT OF THE STEAMER PLYMOUTH.

staterooms, which is more than the Pilgrim contains, although the latter steamer is the longer.

The general design of the Plymouth was made by Mr. George Peirce, supervisor of the Old Colony Steamboat Company.

The contractors for the boat complete and builders of engine were the W. & A. Fletcher Co., New York.

The hull was built by the Delaware River Iron Ship Building and Engine Works, Chester, Pa., and the joiner work, including painting and plumbing, was in the hands of Wm. Rowland, New York. The designs for the decorations are by Mr. Frank Hill Smith, of Boston, Mass.

The electric lighting plant was put in by the Edison General Electric Co. under the special superintendence of Mr. W. H. Peirce, to whom our thanks are due for courtesies extended. Two dynamos, driven each by an independent compound Ball engine of 65 horse power at 120 pounds pressure, are used as generators. They are connected directly to the engine shaft, and run at 400 revolutions per minute. The field terminates in eight poles, four external, all of one sign, and four internal of the opposite sign. Within the zone marked by the eight pole pieces the armature, which is a Gramme ring, rotates. The core of the ring is of laminated sheet metal. Each dynamo has an output of 350 amperes at 115 volts potential, enough to supply 700 lamps. Each dynamo weighs 6,563 pounds, each armature 1,950 pounds, and the dynamo and engine and appurtenances about 13,000 pounds. The commercial efficiency is 89 per cent, and the heating is only 36° F. above the atmosphere. They are compound wound, and show a maximum variation in their characteristic curve of 1 volt. They are of a type conforming to specifications originally issued by the United States government.

The installation is on the two-wire system. The dynamos are connected in parallel so that one or both can be used to supply the current. From the generating plant double transit leads are taken fore and aft, and branching so as to terminate at four cut-outs. From these cut-outs the lamps are supplied directly or by feeders. The main leads are not tapped. As more work might be thrown upon one main lead than on the other, equalizing mains are carried from each forward cut-out to each of the after cut-outs. This gives four distributing points. Risers are carried through the decks to supply the lights at different elevations.

Below the main deck wherever moisture may be present lead-covered wires and water-tight brass junction boxes containing safety fuses are used. Elsewhere Habirshaw marine core wire is employed.

The staterooms are grouped in eight divisions. For each of these a marbleized slate tablet placed so as to fill an alcove transom is provided, on which the switch boxes and general branch connections are made. This is done not only for the decorative effect, but also to provide security from deterioration by moisture and from fire.

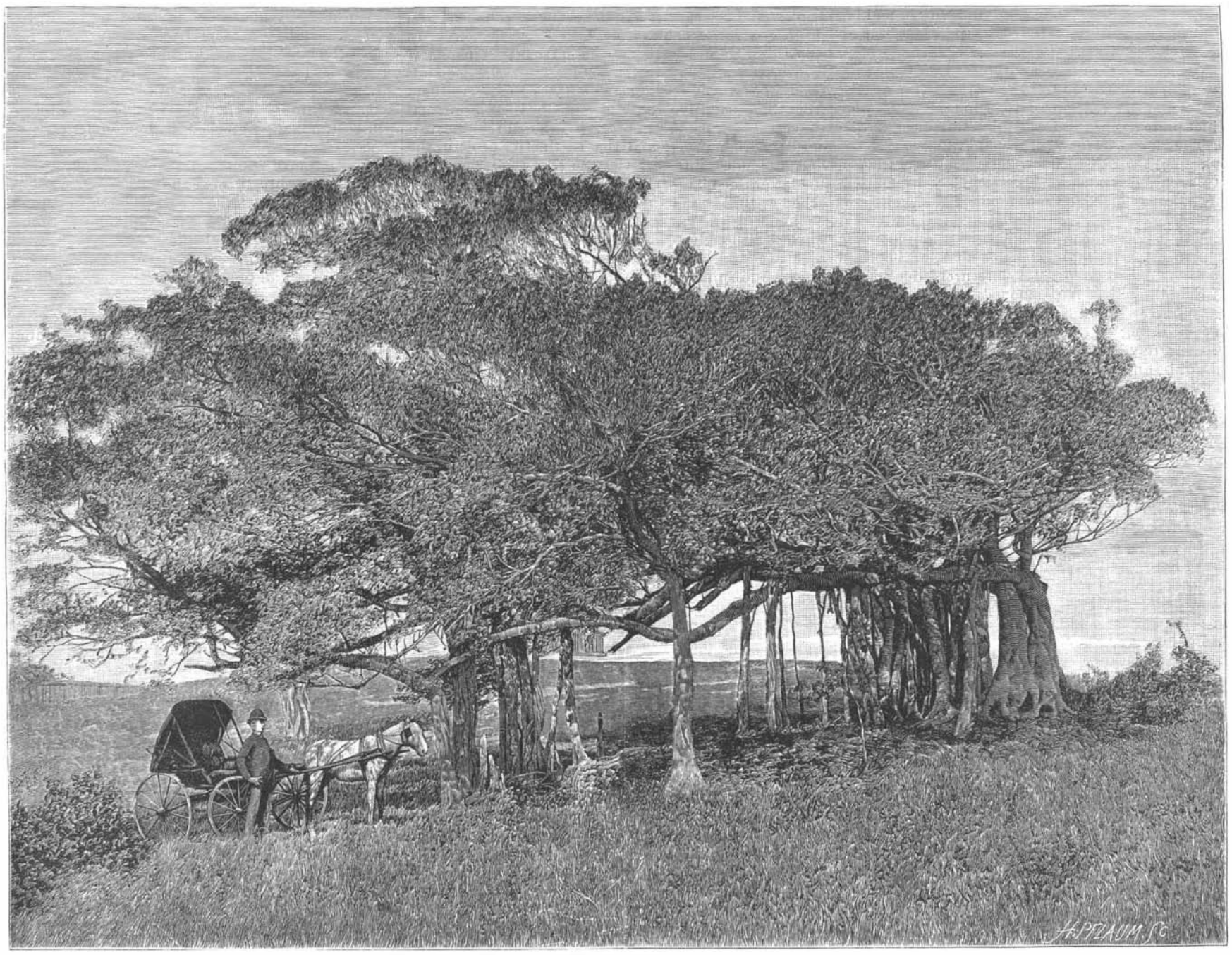
There are 1,250 16 c. p. 110 volt lamps. The maximum variation in potential will not exceed 1½ volts. Each lamp has its own switch, so as to be individually controllable. In the dining saloon the lamps are arranged in groups of ten, and connected with a main switchboard by which they can be turned off ten at a time as desired. The very elaborate electroliers and fixtures were supplied by the New York works of the Edison General Electric Co.

THE BANYAN TREE.

The Banyan tree (*Ficus religiosa* or *Indica*, Linn., *Urostigma Benghalense*, Gaspar.) is familiar to all from the pictures given in the geographies. In the school books it is shown spreading its branches far and wide, and sending down vertical depending rootlets, that, on reaching the ground, take firm hold and develop into large supporting trunks. There seems to be hardly any limit to the size it may attain. In Hindostan, where it reaches the greatest perfection, a famous tree stood on the banks of the Nerbudda. It was said that formerly 7,000 men could find shelter beneath its shade. It is supposed to be the tree which is described by Nearchus, the admiral of Alexander the Great. While greatly diminished in size by floods, what is left of it is 2,000 feet in circumference, and has over 3,000 trunks. (Forbes' "Oriental Memories.") Others are cited which cover over thirteen acres of ground.

It bears an abundant crop of small figs, not much larger in size than peas, insipid in taste, and possessing medical powers of rather low degree. The leaves, dark green in color, are so thick and cast so dark a shade that they prevent the growth of underbrush, thus, to an extent, favoring the attachment of the aerial roots. The fruit is devoured by the birds, who deposit the minute seeds far and wide on the ground and in crevices of stones or on trees. The seeds germinate, and the roots creep downward until the ground is reached. The tree then begins to take shape, and as it grows it sends down other roots from its branches. These develop until some of the new trunks are as large or larger than the original. In Hindostan, the vicinity of temples or suttee mounds, where Hindoo widows were formerly burned, are favorite localities for them, as the birds, the principal agents in their dissemination, were formerly attracted to these places.

The specimen here illustrated is probably the best developed specimen of this curious tree on this side of the Atlantic. It is about two miles east of Nassau, N. P., on the road along the shore, one of the most picturesque drives out of the city. If it had been properly protected and trained, and the shoots left to drop to the ground and take root, instead of being cut off and carried away by visitors, and eaten off by sheep and cattle, there is no doubt it would have been a much larger and finer-looking tree than it now appears. It is to be hoped that such a finely developed specimen of so rare a tree will in the near future receive the attention it requires, and be assisted in its onward march in trying to spread itself. It is worth one or more visits, and is a decided curiosity to those who have never seen a forest of one tree. Our engraving is from a photograph by Mr. J. F. Coonley, of Nassau.



AN AMERICAN BANYAN TREE.—(From a photograph.)

History of Electric Lighting.

Electric lighting, says M. Fontaine, did not make its appearance until near the close of the year 1873. It was in Paris, in November, 1873, in the workshop of M. Gramme, that the first installation on a really industrial scale of electric lighting took place, by means of a continuous current dynamo and Serrin regulators. It was also in Paris, in 1877, that the Jablochkoff candle was first employed; sixteen lights, distributed over a distance of about 1,100 yards, being supplied by a single alternate current Gramme machine. Paris, therefore, had the honor of possessing the first public and private lighting produced by means of electric currents. M. Fontaine thinks that in 1891 or 1892 the electric lighting in Paris will require for its production motive force equal, in round numbers, to 32,000 horse power.

ANY mechanic who feels like despairing, because the world has not gone well with him, should try, first of all, to figure out to what extent the world is to blame for his failure, and to what extent he himself is to blame. If he has not fitted himself for success, it is his own fault that success has not come to him.