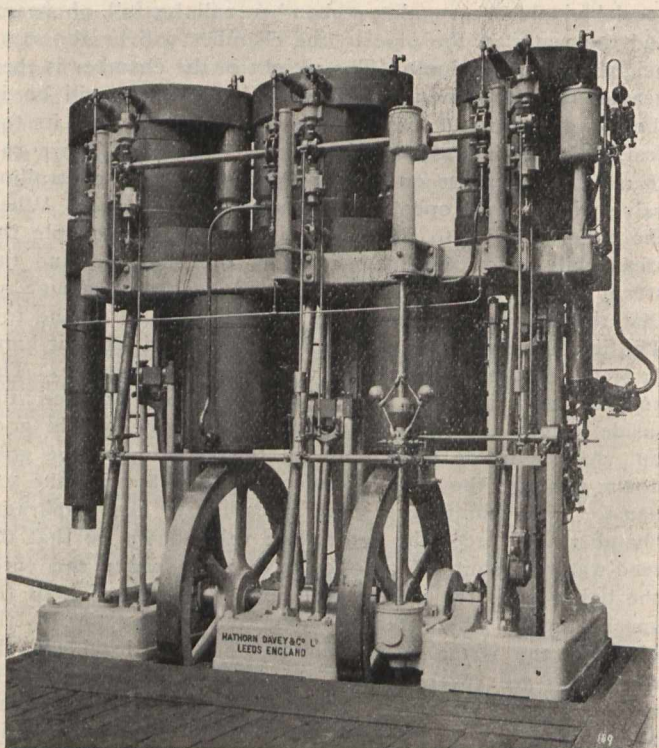


covered reservoirs, situated in Chumka, a suburb of Odessa; a river pumping station with settling tanks and filter beds, situated at Beleivka on the river Dniester, with a new 30-in. main from Dniester to Odessa. The Chumka pumping station contains: Four triple expansion, inverted, vertical, Corliss pumping engines, made by Hathorn, Davey & Co., Limited, Leeds, England, each having cylinders 15-in., 25-in., and 40-in. in diameter, and three single acting ram pumps 18½-in. in diameter, all by 3 feet stroke, each capable of pumping five and one-half million gallons in 24 hours from the covered reservoirs direct into the service main, against a mean head of 160 feet, together with feed heaters, economizers and five Lancashire boilers, was officially opened May 20th, 1901.

The Dniester pumping station contains: Three triple expansion, inverted, vertical, Corliss pumping engines, made by Hathorn, Davey & Co., Limited, each having cylinders 20-in., 36-in., and 54-in. in diameter, and three single acting rams 17-in. in diameter, all by 3-ft. 6-in. stroke, each capable of pumping five and one-half million gallons in twenty-four hours, against a head of from 380 ft. to 460 ft., including friction through twenty-eight miles of 30-in. main, with steam at 180 lbs. pressure.

Filter Engines.—Two triple expansion, inverted, vertical, Corliss pumping engines, made by the same firm, each having cylinders 12-in., 20-in., and 31-in. in diameter, and three single acting rams 32-in. in diameter, all by 2-ft. 6-in. stroke, each capable of pumping twelve million gallons in twenty-four hours, against a head of 35 ft., including friction, with steam at 180



lbs. pressure. There are five feed heaters, two Green's economizers, eight Babcock water tube boilers, fitted with superheaters. The steam and feed pipes are on the ring system, and the whole plant is so arranged that any unit can be stopped without interfering with the working of the rest of the plant. Russian coal is used, which costs 24s. per ton, delivered at the pumping station.

With respect to the comparative duty of the old and new pumping plants, the following figures, which are a fair average of every-day working, have been furnished us by the engineering manager, Theodore Platts:

Week ending June 20th, 1903.

Duty in foot pounds per pood (36 lbs. of coal.)

Old engines 16,880,700

New engines 34,271,000

This is equivalent to a duty of 52,517,733 foot pounds and 106,620,888 foot pounds, respectively, by the English standard of measurement.

Head pumped against old engines 323.17 feet.

Head pumped against new engines 314.74 feet.

The difference in the heads pumped against by the old and new engines is accounted for by having a clean main in the case of the latter, but this difference is taken into account in the duty, the measure of work done being in foot pounds.

All the engines were guaranteed by the makers to use not more than 16 lbs. of steam per pump horse-power per hour, and all of them have now been officially tested and are well within the specified guarantee.

Hathorn, Davey & Co. are represented in Canada by Peacock Bros., engineers, Canada Life Building, Montreal.



THE ST. LOUIS EXPOSITION SERVICE PLANT.

The contract for the main service plant for the Louisiana Purchase Exposition was awarded to the Westinghouse Electric and Manufacturing Company shortly after the plans for the Exposition had assumed final form. It called for the designing, installation and equipment of a complete central station to supply electric power for general use throughout the Fair—for the night illumination of the 1,240 acres and countless buildings of the Forest City, for pumping the water for lagoons and court basins, cascades and fountains, for operating exhibits and concessions in various parts of the grounds. The entire steam and electric station was designed and installed by Westinghouse, Church, Kerr & Company, and constitutes a plant of 14,000 horse-power capacity, representative of thoroughly modern practice at minimum cost, such as may be seen in only a few large cities. The four 3,500 horse-power Westinghouse-Corliss vertical cross-compound reciprocating engines at the west end of Machinery Hall, the smaller engines driving excitors in Machinery Hall, the engines driving pumps, stokers, and cooling tower fans in the service plant section of the Steam, Gas and Fuels Building, or Boiler House, just west of Machinery Hall, and the mechanical stokers in the latter building were manufactured by the Westinghouse Machine Company. The auxiliary electric apparatus and switchboard equipment was supplied by the Westinghouse Electric and Manufacturing Company.

The plant has been in continuous operation since April 15th, maintaining its own load, and from time to time carrying extra loads which exhibit plants have been unable to sustain. The station records show the exacting character of service rendered and the number of hours run.

The progress achieved in the manufacture of electric generating units of great capacity has been a very important feature of mechanical and electrical engineering since the time of the World's Columbian Exposition. The great central station at Chicago in 1893 was of about the same total capacity as the present plant, but the twelve generators, although then the largest polyphase alternating current machines ever constructed, were each of only 750 kilowatts, or 1,000 horse-power capacity, while to-day the four 3,500 horse-power units of the Louisiana Purchase Exposition service plant, although three times as large as the largest at Chicago, are regarded as of only medium size. The Westinghouse Electric and Manufacturing Company now has under construction generators for the Ontario Power Company of 10,000 kilowatts, or about 13,500 horse-power capacity, and steam turbines are being built in sizes up to 10,000 horse-power. It is interesting to note that the floor space occupied by the Westinghouse-Corliss engines and their direct-connected generators in the present Exposition service plant, 15 by 35 feet each, is proportionately only about one-ninth of that required at Chicago for six of the twelve 1,000 horse-power generating units there which were belt-driven, each of the latter, with only one-third the capacity of the present units, covering a space 27 by 65 feet.

The Exposition service plant, although it furnishes the main source of power for the world's greatest Fair, and carries all of the commercial operating and lighting load on the grounds and Pike, as well as a large part of the decorative night illumination of the main exhibit buildings, is of interest to engineers not so much for its size as for its completeness.

The Switchboard.

Electric current from the Exposition service plant and from exhibit power plants in Machinery Hall is transmitted