INSTITUTE OF MARINE ENGINEERS

INCORPORATED.

SESSION 1903-1904.

President—SIR JOHN GUNN.

VISIT

TO

WEST HAM ELECTRIC

POWER STATION

On SATURDAY, OCTOBER 17, 1903.

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SESSION 1903-4.

President—SIR JOHN GUNN.

VISIT TO WEST HAM ELECTRIC POWER STATION.

BY invitation of the Mayor, Deputy-Mayor, and the Electric Lighting and Tramways Committee of the Borough of West Ham, a visit was paid on Saturday afternoon, October 17, to the new electric power station in course of erection at Canning Town. At the entrance we were met by the Mayor, the Deputy-Mayor, several of the Members of Council, and Mr. James K. Bock, the Borough Electrical Engineer, who, with the other engineers connected with the station, accompanied the members over the building, explaining in detail the machinery which has been, or is being, installed. The new generating station was rendered necessary by the introduction of electric traction and the rapid growth in the demand for electricity. The choice of the Canning Town site was made for the following reasons: (1) Saving in capital expenditure on the cost of extending the existing station at Abbey Mills, as that course would have necessitated the diversion of Abbey Road, costing about £25,000, together with the purchase of several properties in Abbey Lane.

(2) Saving in the cost of coal, and convenience in handling the large quantities that will be required—about 400 to 500 tons per week. (3) Certain supply of condensing water. Two of the engines were tested under steam the day previous to our visit, and were started to show their action. The engines are by Messrs. Ferranti, Hollinwood, and are vertical compound condensing, with grid valves actuated by gear fixed between the cylinders. The alternators, by Messrs. Ferranti, generate single phase alternating current at 2,000 volts, fifty periodicity for lighting and general power purposes. The dynamos are by Messrs. Bruce, Peebles and Co., of Edinburgh, and they will generate continuous current at 500-600 volts for tramway purposes. The condensing plant and the electric motors for driving same have all been manufactured and supplied by Messrs. Allen, of Bedford. The air pumps are of the Edwards' type, and are driven direct by motors attached to the crank shaft. These pumps discharge into a tank from which the condensed water is delivered to the purifying plant by means of a single acting force pump driven from the air pump crank shaft. The circulating water system is entirely separate from the condensers, and consists of four 15-in. electrically driven centrifugal pumps which draw water from a suction tank outside the engine room end wall. These pumps discharge into two circulating water mains, which supply the condensers, after passing through which the water is discharged into one end of the cooling ponds. The suction tank is fed from the opposite end of those ponds, which are so arranged that the water has ample time to cool before being used again. In addition to this plant two steam driven self-contained condensing sets will be installed to deal with the steam when continuous current is not available, which will be the case when the tramway generators are shut down. The engines are arranged in two rows with the condensing plant in a railed-in space in the centre of the engine room. The condenser floor is

15 ft. below the level of the engine room floor, and extends the whole length of the engine room. To commence with there will be two 1,700 h.p., two 900 h.p., and two 450 h.p. engines and alternators for lighting purposes, whilst for the tramways there will be three 750 h.p. engines and dynamos. The condensing plant will consist of the following: four condensers to condense 40,000 lb. of steam per hour each, two condensers to condense 20,000 lb. of steam per hour each, together with the four 15 in. centrifugal pumps for the circulating water. Seventeen Babcock and Wilcox water tube boilers are to supply steam; superheaters are fitted to each boiler to raise the steam temperature 100° F. Each of these boilers is capable of evaporating 15,000 lb. of water per hour. With the exception of four, which will be fitted with chain grate mechanical stokers, the boilers will be hand fired. Coal will be delivered by means of a Temperley conveyor direct from the barges alongside into the bunkers over the firing floor, and travelling shoots are fitted which will weigh and discharge the coal where required. The ashes fall from the grates into a sloping shoot and from thence will be emptied into trucks running on rails in the ash tunnel below the firing floor. Two steel chimneys 125 ft. high have been erected by Messrs. Babcock & Wilcox, and these are lined throughout with fire brick. The boilers are arranged in four self-contained sections, each with economiser, flues, and piping. A 60 in. Sirocco fan driven by a 55 b.h.p. Allen compound high speed engine discharges the gases into the chimneys from each section. There are four economisers of 480 tubes each. These economisers are by Messrs. Green, the scrapers being driven by means of electric motors. The feed tank is placed in the centre of one side of the boiler house and the feed pumps (consisting of two Weir's to pump 60,000 gallons per hour each, two Hall ditto, and four Weir's to pump 30,000 gallons per hour each) are arranged alongside the tank. An artesian well will supply the make-up

water required and a Harris feed water purifier to extract the oil from the condensed steam and capable of dealing with 15,000 gallons per hour is being added. All drains from the steam pipes, separators, etc. (the water in which is pure) are taken direct back to the feed tank, and drains from the engines, the water from which contains oil, are taken to the purifier, and thence to the feed tank. All make-up water will be softened by means of a water softening plant supplied by Messrs. Mather and Platt. This water softening plant is capable of dealing with 8,000 gallons per hour. The air pumps for the four large condensers, the centrifugal pumps, and the economiser scrapers will be driven by continuous current motors. The old sewage tanks will be used as cooling ponds and will provide a certain supply of water for condensing purposes. The coal bunkers will be fitted above the boilers and will provide a four weeks' supply. The installation has been so designed without duplication of parts that the failure of any portion of the system will in no case interrupt the supply of electricity.

A storage battery, having a capacity of 400,000 Watt-ohms, has been installed to supply current when the tramway generators are shut down.

The following figures dealing with the progress of the undertaking are of special interest:

Supply from the old station at Abbey Mills commenced December 19, 1898.

Units generated for the year March, 1900	741,435
,, ,, March, 1901	1,246,585
,, ,, March, 1902	2,021,463
,, ,, March, 1903	2,632,100
Income for year ending March, 1900	£9,288
,, ,, March, 1901	£12,424
,, ,, March, 1902	£23,022
,, ,, March, 1903	£27,057

FINANCIAL RESULTS.

Year ending March, 1900	£196	profit
,, March, 1901	£2,499	deficit
,, March, 1902	£1,137	profit
,, March, 1903	£2,503	profit

Cost of original generating plant (including buildings)	£37,000
Cost of existing generating plant	£63,000
Cost of new generating plant	£164,000 (approximately).
Capacity of original generating plant	850 H.P.
Capacity of existing generating plant	4,850 H.P.
Capacity of new generating plant with plant at present on order	9,100 H.P.
Space in buildings to increase this to	14,000 H.P.

The installation has been designed by the Borough Electrical Engineer, Mr. James K. Bock, A.M.I.E.E., to whose specifications and under whose supervision the work is being carried out. The buildings were designed by the Borough Engineer, Mr. John G. Morley, A.M.I.C.E., and Mr. C. J. Walker has acted for Mr. Bock as resident engineer and clerk of works for the engineering portion of the work from the commencement.

After the inspection of the Canning Town station the existing station at Abbey Mills was visited and the plant there examined while at work. The party then drove to the Langthorne Rooms, Stratford, where tea and refreshments were served and the hospitality of the Deputy Mayor, Mr. Councillor Byford, was enjoyed. At the conclusion of the repast

Mr. BYFORD said they were delighted to think that such an important body of marine engineers should desire to see over their works, and they were pleased to have the opportunity of inviting them to their electric power station. He trusted that the visit had been interesting. It was gratifying to them to have ratepayers like themselves come and visit the works and see what was being done. No doubt from time to time they had criticisms in the papers regarding the electric lighting and tramways department, but their visit that day would show them what they had for the money expended. The engineering work was being carried out by Mr. Bock, in whom the Council had the greatest confidence. Their station, when completed, would, he thought, be one of the biggest in the country, and one of the most up-to-date.

They were also taking up the roads with the object of laying down a track for the trams. The estimated cost of the electric power station, the trams, the track, and the road widenings would be close on £1,000,000 or more, and that was an enormous sum of money for a body of men to be entrusted with. He thought they were spending it judiciously and economically; they looked upon it with the hope that it would be remunerative as well as being of great benefit to the public. He moved that a hearty vote of thanks be accorded Mr. Bock and his assistants for conducting them over the building that afternoon.

Mr. J. R. RUTHVEN (Member of Council) seconded the vote of thanks, which was carried unanimously.

Mr. BOCK responded. Referring to the boilers at the new station, he said they would perhaps be surprised that they had gone in so largely for hand firing, when the modern practice was for mechanical stokers. He should have liked to put in mechanical stokers for many reasons, but he had to study the economical working of the station. He had found, however, at the existing works at Abbey Mills, where both hand firing and mechanical stoking were in use, there was a saving of about ·1 per cent. of a penny per unit generated in favour of hand firing. Six mechanical stokers would be fixed to take the steady load, and hand fired boilers would deal with the peak. The question as to which type should be adopted depends on the distance from the works of a coalfield, as the cost of carriage for large or small coal is the same per ton, and consequently when this carriage is high it pays to use a coal of high calorific value, and therefore to use hand firing. They heard it said that electricity was in its infancy. He thought that they would all agree from what they had seen that it was growing a pretty big infant.

Councillor AITKEN BROWN, Messrs. W. LAWRIE, and W. MCLAREN, also added their quota of thanks.

Mr. W. C. ROBERTS proposed that a very hearty vote of thanks be accorded to Mr. Kettle, the Mayor, for being with them that day, and to Mr. Byford for his personal kindness in entertaining them in such a handsome manner, entirely at his own expense.

Mr. A. H. MATHER (Member of Council) seconded the vote of thanks, which was most heartily carried, thus bringing to a close a most enjoyable afternoon and evening.

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Local President (B. C. Centre)—LORD TREDEGAR.

Volume XV.

ONE HUNDRED AND THIRTEENTH PAPER
(OF TRANSACTIONS).

GRINDING MACHINERY AND ABRASIVE WHEELS.

BY

Mr. KEITH C. BALES (Member).

READ AT
THE LONDON INSTITUTION, FINSBURY CIRCUS, E.C.,
ON
MONDAY, NOVEMBER 23rd, 1903.

CHAIRMAN—SIR JOHN GUNN (PRESIDENT).

ADJOURNED DISCUSSIONS
ON
MONDAYS, DECEMBER 14th and 21st, 1903,
AT
58 ROMFORD ROAD, STRATFORD, E.

PREFACE.

58 ROMFORD ROAD,

STRATFORD,

December 12th, 1903.

A MEETING of the Institute of Marine Engineers was held in the London Institution, Finsbury Circus, E.C., on Monday evening, November 23rd, when Sir JOHN GUNN, President, gave an address and then presented the Denny Gold Medal to Mr. C. W. BARNES (Associate Member) for his paper on "Ship Electric Lighting," read during the previous session.

A paper on "Grinding Machinery and Abrasive Wheels" was afterwards read by Mr. K. C. BALES (Member). The discussion was adjourned till Monday, December 14th, at our own premises here.

JAS. ADAMSON,

Hon. Secretary.