AN ELECTRICALLY-OPERATED GAS PLANT.

WHAT THE ELECTRIC DRIVE CAN DO IN GAS MAKING

BY DR. ALFRED GRADENWITZ.

THE extent to which electricity is utilized by some gas-works, which were formerly the keenest competitors of electric power stations, is exemplified by the municipal gas-works recently installed for the city of Görlitz, Germany, where direct current at 220 volts tension is generated in a special power house and distributed by a double conductor system. The installation comprises an extensive inside and outside lighting plant, covering the whole of the gas-works, in addition to a number of electric drives.

The electric power station contains horizontal tandem steam engines with valve gear and injection condenser, each of which yields a normal output of 125 horse-power, with 130 R. P. M., a maximum permanent output of 160 horse-power and a maximum temporary output of 190 horse-power. The engines are direct-connected with a direct-current dynamo of 110 kilowatts, the armature of which is carried on the extension of the crank shaft.

The boiler plant comprises four double-well tubular boilers of 910 square feet heating surface each, the steam pressure being 170.64 pounds per square inch.

ment, gas reservoir, and power house respectively.

Electric motors have been used most extensively for the operation of the most varied auxiliary machines, to an aggregate yield of upward of 100 horse-power. The most important drives, for each of which a special electric motor has been provided, have the following capacities: The coke driving and hauling plant close to the oven house, 18 horse-power; the coke chute in the oven house, 6 horse-power; the coke chute of the coke crushing and sorting plant, 17 horse-power; the coke-shaking sieve below the night reservoir, 2 horse-power; the coke chute above the night reservoir, 5 horse-power; two coke elevators of 4 horse-power each; a high-pressure blower, 25 horse-power; a tar centrifugal and an air pump in the ammonia room, of 5 horse-power, etc.

Those electric motors which, while protected on top by corrugated sheet roofs, are otherwise isolated, are of the entirely inclosed type, the starter and switch-boxes of each of them being located in a sheet metal cupboard, fitted with sliding doors. The motor driving the air pump in the ammonia room is likewise entirely

hours each. The size of the drive was 5 feet by 7 feet. One white man and six Chinese were employed on each shift, and one round was drilled per shift, each round gaining an average of 4.82 feet. The number of feet broken per case of gelatine consumed was 4.52, and 11.06 pounds of gelatine were used per foot. Of the 61 rounds drilled, 59 had 14 holes each and two had 12 holes each. The nature of the ground driven through is not mentioned.

THE WORLD'S LUMBER TRADE.

Few people have the slightest conception just how important a part timber and unmanufactured wood play in the trade between the world's great nations, and doubtless it is news to many to learn that the lumber importations of the various countries amount to \$285,600,000. This is according to estimates for the whole world compiled by Dr. Ernest Friedrich of the German commercial high school at Leipzig.

Notwithstanding the fact that it finds its own supply dwindling, the United States furnishes about 20

COKE CRUSHING, CONVEYING, AND SORTING PLANT IN FRONT OF THE RETORT HOUSE.

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A tower, installed beside the engine-house, serves to cool the condensing water, the cooling water being raised by a centrifugal pump, operated by a directly connected electric motor of 5 horse-power capacity.

Outside of the boiler and engine rooms, the power house comprises an accessory hall accommodating the water cleaners and steam feed pumps, in addition to a common wardrobe and washing room for the staff. The engine room has been given ample dimensions to accommodate a third steam-driven dynamo, while space for two additional boilers has been provided in the boiler room.

The switches are arranged on a masonry pedestal on one of the short sides of the engine room, and are mounted on five panels. The space required for installing any apparatus entailed by a future extension has been provided for. All fuses for upward of 40 amperes are arranged behind the switchboard, where the shunt regulators of the dynamos, operated from the front by means of hand-wheels, will likewise be found. Connection between the dynamos and the switchboard is effected by iron-armored cables, laid out below the ceiling of the engine house cellar on a corrugated sheet base.

The lighting plant comprises 125 incandescent lamps and 20 arc lamps, the latter being arranged in five circuits of four each as follows: 2 arc lamps of 10 amperes each both in the engine and boiler rooms; 4 arc lamps of 10 amperes each in the coke yard; 8 arc lamps of 8 amperes each in the oven house, and 1 arc lamp of 10 amperes for the coal-dressing plant, railway embank-

ment, while that operating the tar-centrifugal is surrounded by a ventilated housing, sufficient air being supplied through tubes.

Four main feeders branch off from the switchboard at the central station, two of which are intended for lighting and two for power supply. In addition to these, a number of smaller circuits have been provided, especially for the lighting of the power house and for some smaller motors.

The capacities of the motors located in the neighborhood of the oven house, especially those intended for the coke crushing and sorting plant, as well as the lighting conductors supplying the oven house, have been designed as underground cables, and all the remaining conductors, in so far as they are situated outside the buildings, as overhead conductors.

Most of the conductors traversing the buildings are located in pipes, rubber strands in steel-armored pipes being used in all rooms subject to the risk of explosion, in accordance with the regulations of the Association of German Electricians. All the switches and fuses are arranged outside those rooms. The lamp filaments, which are fitted with porcelain armatures and inclosed globes, are screwed directly to the piping and the lamp pendulums through the intermediary of gas-tight ball joints.

A remarkable performance in mining work is recorded in the South African Mining Journal. At the Simmer Deep, a Rand property, two miners carried a drive 294 feet in sixty-one consecutive shifts of ten

per cent of the lumber imported by other countries. Austria-Hungary furnishes 19 per cent, Russia 16 per cent, Canada 13 per cent, Sweden 18 per cent, Finland 10 per cent, and Norway and Roumania a small quantity.

The countries importing wood are those on the highest economical plane, which were themselves in earlier times densely wooded, but whose forests have been denuded to a greater or less extent to make room for agriculture and other industries, says Vice-Consul James L. A. Burrell, of Magdeburg, in a report to this government. Only 4 per cent of the territory of Great Britain is covered with forests, and during the year 1906 that country imported lumber to the value of \$135,561,750. Germany has still 26 per cent of its territory covered by forests, but imported in 1906 lumber valued at \$61,285,000. Belgium and the Netherlands, that have but 8 per cent forest lands, Denmark that has 7 per cent, France and Switzerland, with a small percentage, are all compelled to import lumber.

Besides these countries, those lands lying on the dry western side of the sub-tropical zone lacking forests are forced to import wood. Egypt imports wood and coal to the value of about \$16,660,000 annually; Algeria, Tunis, Spain, Portugal (with only 3 per cent forest land), Italy, Greece (with 9 per cent forest land), the eastern part of Asia, British South Africa, the western part of Chile and Peru, the Argentine Republic, and Australia, all poor in wood, are dependent upon import