THE
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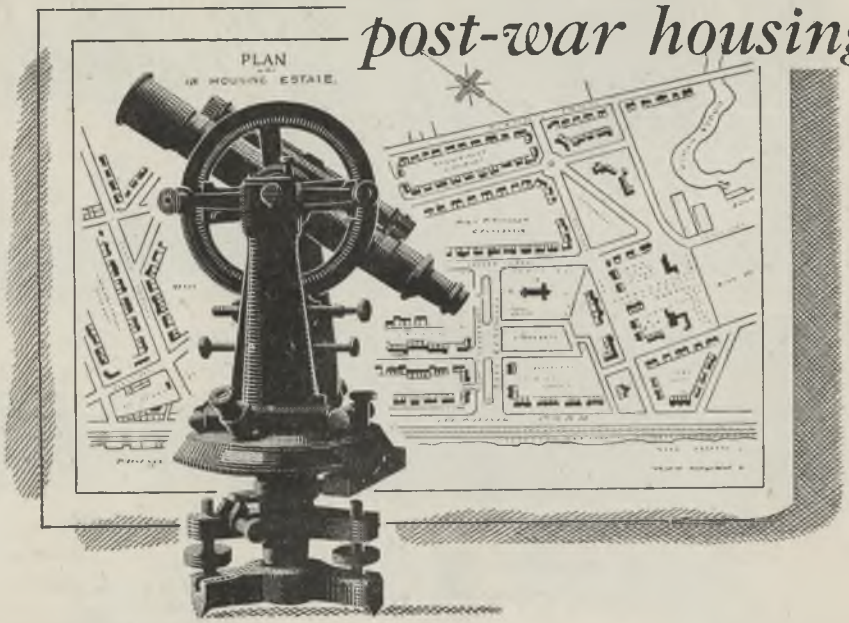
The New Craftsmanship for post-war housing



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OVERSEAS EMPLOYMENT.

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2. Appointments will be made on a civilian basis at salaries within the range of £350 to £550 per annum (plus Civil Service War Bonus, at present £60 per annum), plus Foreign Service Allowance designed to meet the extra expense of living abroad and varying according to the particular circumstances. Selected applicants will be given a period of up to three months' training in one of the Royal Dockyards in the U.K. When serving abroad they will be required to wear the uniform of a Lieutenant, R.N.V.R., and will receive an allowance towards the cost of uniform.

3. Candidates should be qualified to organise and control sections of work and to supervise labour in one of the following categories :—

(i) *Ship Construction*, including : the construction and repair of hull structures and fittings; dry docking; charge of modern ship plate machine shop; application of electric welding technique. (Ref. O.S. 441.)

(ii) *Ship Fitting*, i.e., the manufacture, overhaul and repair of the mechanical portion of ships' installations, including machining of hull fittings (but excluding steam and internal combustion engines, gunnery mountings and mechanisms); operation, use and maintenance of machinery in engineering workshops. (Ref. O.S. 442.)

(iii) *Marine Engineering*: repair work on steam and internal combustion engines and their auxiliary machinery, gun mountings, refrigerating machinery, etc., on H.M. Ships. (Ref. O.M.P. 1582A.)

(iv) *Boilermakers*: repair work on boilers, both water tube and fire tube, of high and low pressure, with super heaters, including such plating and welding (electric and gas) as is necessary to deal with repairs to propelling and gun machinery of H.M. Ships. (Ref. O.M.P. 1582B.)

(v) *Electrical*: electrical installations on ships and on shore. (Ref. O.M.P. 1582C.)

4. Candidates should have had a secondary education or equivalent and technical education appropriate to their duties. This should include not less than two years' study at a Technical College in mathematics, strength of materials, applied mechanics, with specialisation as under:—

Ship Construction.—Practical and theoretical Naval Construction.

Ship Fitting.—Practical theoretical Naval Construction or Marine Engineering, Metallurgy, Physics, Elementary Electricity.

Marine Engineering.—Marine Engineering and Elementary Electricity.

Boilermakers.—Boiler Construction.

Electrical.—Electrical Engineering subjects, including Physics.

5. Candidates should also have had at least five years' practical experience of the duties they will supervise in the workshops or shipyards of firms of repute, and should, in addition, have had experience of supervision and organisation of labour on similar work.

Written applications (no interviews), quoting reference number and giving the following essential details: (1) Full name. (2) Date of birth. (3) National Service Registration number. (4) Local Office shown on address side of Registration Card, N.S.2. (5) Medical grade if known. (6) If discharged from the Forces, particulars of Service number, rank, unit, and reasons for discharge. (7) Industrial training and experience. (8) Name and address of present employers. (9) Details of present work, should be sent—(*a*) Where an O.M.P. reference is quoted—to The Secretary, Overseas Manpower Committee (Ref. O.M.P. 1582), Ministry of Labour & National Service, York House, Kingsway, London, W.C.2, and (*b*) Where an O.S. reference is quoted—to Appointments Department (Ref. O.S. 441 or 442), Ministry of Labour and National Service, Sardinia Street, Kingsway, London, W.C.2.

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Candidates must be under 40 years of age and medically fit; for Tradesmen a full trade apprenticeship followed by practical experience essential; study at evening classes an advantage; SALARY not less than £600 per annum with free bachelor accommodation, free passages out and Home, free medical attention and kit allowance; no accommodation for wives and families available.

Written applications (no interviews), giving the following essential details: (1) Full name; (2) Date of birth; (3) National Service Registration number; (4) Local Office shown on address side of Registration Card, N.S.2; (5) Medical grade, if known; (6) if discharged from the Forces, particulars of Service number, rank, unit and reasons for discharge; (7) Training and experience; (8) Name and address of present employers; (9) Details of present work, should in the case of O.M.P. Ref. be sent to The Secretary, Overseas Manpower Committee (Ref. 480/40) Ministry of Labour and National Service, York House, Kingsway, London, W.C.2, and in the case of O.S. Ref. to Appointments Department (Ref. O.S. 474) Ministry of Labour and National Service, Sardinia Street, London, W.C.2. Applications will not be acknowledged.

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The Offices of THE ELECTRICIAN *are closed on Saturdays in accordance with the "Five-day Week" plan adopte by Benn Brothers, Ltd., and its associated publishing organisations. Until further notice the offices will be ope between the hours of 9 a.m. and 5.30 p.m. rom Monday to Friday.*

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CHIEF CONTENTS OF THIS ISSUE

Fuel Economy

WHILE no fuel rationing scheme was announced by the Ministers of Fuel and Power and of Production at their conference on Monday, both emphasised in no uncertain terms that unless there is a 10 per cent. reduction in the current consumption by industry on a voluntary basis, the Government will be compelled to issue a direction. As unfortunate as the position may be from the point of view of both industry and electricity supply, it is obvious with the load approaching the maximum of 8 400 000 kW, that something has to be done if a general breakdown of the grid system is to be avoided, and a voluntary cut in consumption seems the most practical solution.

With respect to the Government threat of direction, it must not be overlooked that there is already a fuel rationing scheme for electricity supply in existence, based upon the arrangements laid down in the White Paper on Coal, published on June 3, 1942, though whether the scheme would be efficacious in operation is another matter.

The same White Paper which dealt with coal, also brought into being the Ministry of Fuel and Power as an answer to the fuel problems of those days, and our present position is evidence of the success which has atended its formation. We said at the time that though the electrical industry had no liking for the new Ministry it would in the national interest, give it full support, and that it has continued to do without stint. Should the Ministry decide to introduce the rationing scheme as laid down for current consumption in the 1942 White Paper, however, it might be asking too much of the supply industry, for with their depleted staffs the operation of a rationing system of any sort is beyond the practical ability of most undertakings.

No one is more conscious of the necessity for fuel economy than the supply industry, but whether the threat of a Government direction which has little practical possibility of bringing about the desired result is the right way to approach the problem is doubtful. A compulsory reduction of consumption by industry would of necessity reduce output, and with a total war still to be won such reduction is inconceivable. What then can be done?

The consumption of current by industry has increased by over 50 per cent. compared with the pre-war figure, while of the present-day demand industrial consumption accounts for 70 per cent. of the total load. Industry has made a gigantic effort to meet the war-production needs of the country, and if in so doing its current consumption has increased, surely that was to be expected and is no justification for the Ministers' threat of direction.

Industry has done well in its economy

drive already, though the achievements of the different sections have not, it is admitted, been equal. With suitable encouragement as opposed to the "big stick," even greater efforts will be made. As recently as last May, both the Minister of Fuel and the Minister of Production, congratulated industry on its zeal in complying with the 10 per cent. cut then imposed, and the appeal for further economy will not, we feel, go unanswered. The official hope is that another 10 per cent. cut will be made and though it is realised that there must come a time when no further economy can be made without prejudicing the most important categories of war production, common-sense suggests that rationing of any sort must be avoided at all costs, in that its operation would be futile in results and an unjustifiable strain upon our little remaining man-power.

What Else Can be Done ?

IN an earlier paragraph we asked what could be done to relieve the position, and short of hastening the generating station extensions projected for completion during the next three years, there is little beyond curtailment. In the past when a critical situation has been explained to the country, measures have been taken by the public to meet it. In the case of electricity consumption and the need for further economy, the response will be equally satisfactory provided the Minister of Production is sufficiently explicit, and prepared to take industry into his confidence. Industry is not for economic reasons of its own extravagant in current consumption, and the extra economies so far made in the national interest have in many cases been extremely difficult to bring about. A correct approach to the problem of even greater economies seems to us to be not along the road where lay threats of direction, but where may be developed even further, the persuasive methods already being exercised by supply undertakings and the E.D.A.

Good Work at Edinburgh

THE Edinburgh Housing Committee has set an example which might well be followed by others concerned with post-war dwellings, for at a meeting last week they recommended that 810 temporary houses on the three sites in the city should be all-electric in their servicing. The recommendation is all the more interesting because both gas and electricity advocates presented their cases, and shows the result of unbiased argument by a Committee whose objective is to give to the housing public the best possible service and consideration. Some of the reasons given for the installation of gas were, however, worth noting, chief among them being that, in Edinburgh the two departments (gas and electricity) have worked together most harmoniously for the past 25 years and it would be a pity to do anything that would upset things.

Electricity at Belfast

FROM small beginnings in January, 1895, with an installed capacity of 427 kW, the Belfast undertaking has during fifty years grown to be one with a maximum demand touching 128 000 kW. During the first year of the undertaking's working, the revenue from sales of current was just over £2 000, whereas last year it was £1 750 000. And so we could go on giving comparisons which would do no more than show that the far-sightedness of those who brought the undertaking into being was not without its reward. The undertaking celebrated its fiftieth birthday last week, and some of the happenings which attended the festivities are dealt with in this issue. The fifty-year mark in the electricity supply services of many of our undertakings has, on account of the war, passed with little to record the occasion. In the case of Belfast, however, a brochure recalling the days when such things were commonplace, has been prepared and in this are given details of the extensions which have been made at the Harbour power station, and of the new station which has been erected at Ballylumford. An interesting souvenir.

Littlebrook Power Station

WHEN the foundations of the Littlebrook power station of the Kent Electric Power Co., Ltd., were commenced in 1937, little did we think that we should not have an opportunity of seeing the station until the winter of 1945. However, though the station was commissioned just after the outbreak of the war, the Defence Regulations prohibited publication of the details which go to make up a power station, and so

it was not possible until this week to indicate in what way this station differs from any other. The description given on another page shows that there are several items of special interest, including the fact that the low-oil content 66 kV switchgear was the second installation of its type to be erected in a power station; the first having been installed at Leicester in 1937-38. Littlebrook it will be remembered is among the stations directed by the Central Board to be extended by 120 000 kW, and this with its present capacity will raise the station to two-thirds of the 360 000 kW scheduled in 1937.

Electrical Travellers

THE electrical industry has gathered about itself an army of salesmen unrivalled in their success, and though many are away in the Forces sufficient numbers are left to justify the Electrical Trades' Commercial Travellers Association holding its annual luncheon at the Connaught Rooms, on February 16. The occasion will present an opportunity for an exchange of views on trade which will stand the industry in good stead in the post-war period, with the added advantage that since the last annual luncheon, the chances of the traveller again coming into his own have been brought appreciably nearer. With certain relaxations in the export trade field, with some materials becoming available for meeting domestic needs, the salesman will find the problem of satisfying his many customers even more difficult than in the days of complete scarcity, in that to establish a balanced distribution will be no small achievement. The industry is well aware of the value of its salesmen and the date of their meeting should be noted.

Tip-and-Run Raiders at Brighton

THE most serious menace that the Brighton undertaking has had to contend with during the war has been low-flying aircraft that bombed and sprayed with machine gun fire the power station at Southwick. These attacks occurred with little or no warning, and the technical staff and other personnel are to be commended upon the manner in which they "carried on." Standing as it does on the edge of the sea, and screened from the seaward view by the hills behind, the station was usually attacked from the inland side. While forming a well-defined landmark, the tall chimneys afforded some protection, in that it was noticed that when making bombing runs 'planes were, by their presence, diverted from their course. Whether this was due to avoiding action by the pilot or the effect of hot gases emitted by the chimneys is not known. During the quieter spell that followed these attacks Brighton has been preparing plans for the future, and indications are of a very big expansion of of the domestic load.

Machine Tool Industry

THE machine tool industry absorbs an enormous number of electric motors in the course of a year, and the fact that the industry is now in a position to manufacture for export on competitive terms with any other country is worthy of notice. The change in circumstances has come about by the Government purchasing outright machine tools delivered from the United States under Lend-Lease, and replacing comprehensive control by selective control. The new conditions it is anticipated, will thus enable the manufacturers to look ahead and re-equip their plants without the complication that would otherwise have arisen from the fact that Lend-Lease machine tools in other circumstances remained the property of the American Government.

Factory Requirements

OWING to the war the tool trade has grown considerably, and though the question must not be overlooked as to how far machinery largely designed for special war purposes can be transferred to peace-time activities without the trade suffering from a redundancy, much of the plant used on war work has been operated to a state of needy repair and much scrapping of worn out and outdated machines will be necessary. For British industry to outpace its competitors, nothing but the best equipment will find a place in our workshops; this, coupled with the advances which have been made in machine and cutting tools, means that the opportunities for makers of small electric motors have been appreciably improved by the altered conditions of Machine Tool Control.

Littlebrook Power Station

Brief Description of Generating and Switchgear Arrangements

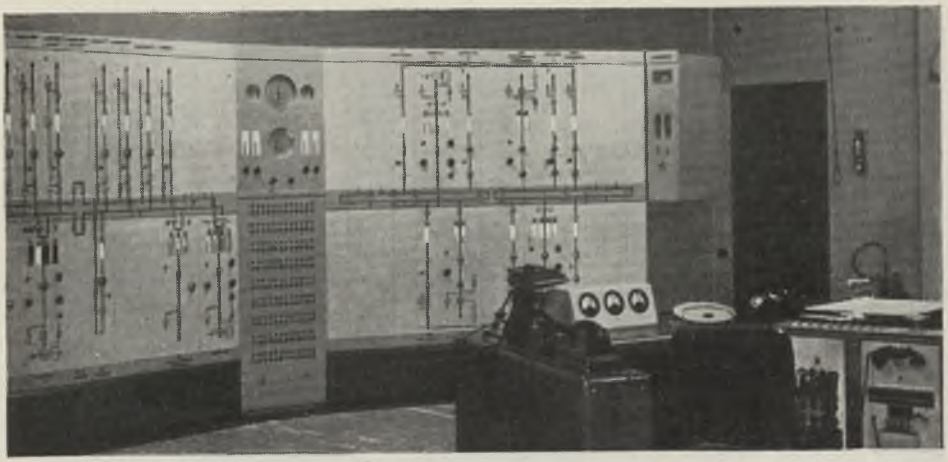
THE Littlebrook power station of the Kent E.P. Co., the foundations for which were commenced in 1937, was commissioned just after the outbreak of the war. The station has about it much of interest, in particular the 66 and 132 kV switchgear, and the fact that the marshy ground on which the station stands was built up to the required level by some 1 000 000 tons of filling, while all structures are carried on piles of reinforced concrete driven into ballast.

The station has a generating capacity of 120 000 kW, made up of one 60 000 kW B.T-H. 2-cylinder single-exhaust turbo-alternator, for operation at a speed of 1 500 r.p.m., and generating at 15 kV; and two 2-cylinder, double exhaust Parsons turbo-alternators, each rated at 30 000 kW, for operation at 3 000 r.p.m., and generating at 13.2 kV. The 60 000 kW machine has five-stage feed heating, with a final temperature of 355 deg. F., while the two 30 000 kW units each has four-stage feed heating, with a final feed pump temperature of the same value. All machines have 3-pass twin condensers, while the B.T.-H. unit has two 3-stage ejectors, one condensate cooled, and the other c.w. cooled. The Parsons machines each has a 3-stage condensate cooled ejector, and a 2-stage unit, c.w. cooled. The 60 000 kW set is delta-star connected to a 15/132 kV three-phase transformer rated at 75 MVA, and the 30 000 kW sets are directly-connected to 13.2/66 kV three-phase transformers, rated at 36.5 MVA.

The boiler capacity comprises three B. and W. stoker-fired units, and three p.f. fired units by International Combustion, Ltd., each of an evaporative capacity of 256 000 lb./hrs. m.c.r. for operation at 600 lbs. per sq. in. at 825 deg. F. The B. and W. units are of the 3-pass vertical headed type, with Bailey water-cooled walls, and double loop-type superheaters arranged in separate halves; superheat control is by attemporators fitted with Tate automatic control. The stokers are Ward-Leonard controlled, and each boiler unit has two forced draught, and two induced draught fans driven by 2-speed Lancashire Dynamo a.c. motors, and two secondary fans driven by a single speed a.c. motor of the same make. The dust collectors are Davidsons' D-type arranged in two groups, each consisting of three collectors, while soot blowing is, in the case of the furnace, carried out by means of six B. and W. Clyde retractable single blowers operating at 350 lbs. per sq. in.; in the case of the boiler and superheater by eighteen Diamond multi-jet blowers operating at 160 and 100 lbs. per sq. in.; and for the economisers, three B. and W. single nozzles, operating at 350 lbs. per sq. in.

The pulverised fuel units, each comprises a four-drum boiler with furnace, water-cooled by Murray fin tubes. The superheaters are of the Melesco multi-loop type,

Two views of the Reyrolle 66kV switchgear, with the maintenance control panels on the left



The main panel in the control room

controlled by desuperheater on the Kent automatic system. Senior twin type economisers, two per boiler are installed, together with two i.d., and two f.d. fans driven by two speed Metrovick a.c. motors. Soot blowing equipment by the Ivor Power Speciality Co. provides eight single nozzle retractable blowers for each of the furnaces, four multi-jets per superheater, and two multi-jet traversing blowers for each economiser. The pulverising plant in the case of two of the boilers is of the International Combustion type LM12, with revolving table feed and a pulveriser comprising a horizontal table below two conical rollers, 2 mills per boiler. Airborne coal from the pulverisers passes through revolving classifiers, vertical shaft driven, through reduction gearing by a variable speed d.c. motor of 7 H.P. with a speed variation of 200 to 80 r.p.m. The fuel fan, driven by a 125 H.P. a.c. motor, has a speed variation of 1 470 to 970 r.p.m. The third p.f. boiler has two Kennedy horizontal ball mills, with a feeder of the revolving table type. The pulveriser is driven through worm gearing by a 200 H.P. motor. The fuel fan is of Keith Blackman design, driven by a 125 H.P. a.c. motor at 1 450/725 r.p.m.

All p.f. boilers have corner firing, with oil lighting-up equipment at each corner. Two Wallsend-Howden, pressure type, oil pumping units with thermostatically controlled heaters raise the oil temperature to approximately 140 deg. F., each unit being driven by a ½ H.P. motor.

Flue gases are carried away by two 315 ft. chimneys and Sturtevant electrostatic dust precipitators are installed. Ash and dust handling is carried out by hydro-jet equipment by Ash Co. Ltd., and the h.p. pumping plant comprises two high pressure, two-stage Medivane pumps, each driven by a 190 H.P. motor capable of supplying 1 600 g.p.m. at 120 lbs. per sq. in.; the ash pumps are two single-stage centrifugal horizontal spindle type, driven by a 200 H.P. motor.

All water is taken from the Thames.

Coal intake is by rail or by water transport, a side discharge type wagon tippler by Henry Lees and Co. and a travelling bridge with belt conveyors by Fraser and Chalmers being provided, together with gravity bucket conveyors by Robt. Dempster and Sons. For handling water-borne coal, two electrically-operated four-motor travelling and balanced luffing type cranes by Stothert and Pitt, Ltd. are installed on the jetty.

In addition to the step-up transformers already referred to as being connected to the alternators, there are also connected to the Parsons sets, two 3 MVA, 13.2/6.15 kV unit transformers, and to the 60 000 kW set a 4 MVA, 6.15 kV unit, all being star-delta solidly connected to the alternators. The unit reactors comprise three 6 kV components of 4 per cent. reactance, and 4 000 basic kVA, one per set, all oil-immersed. Three 350 kVA, 6 000/400 V unit auxiliary transformers are provided, together with two 45 MVA, 132/66 kV busbar interconnectors, star/star and tertiary connected. Two 10 MVA, 66/6.15 kV station transformers are also installed.

Switchgear of 66 kV Reyrolle type MS is provided in two separate buildings some distance from the main building. This gear, which was among the first of its type to ever be installed in the country, is of the

low-oil content type, and is operated by compressed air at a pressure of 60 lbs. per sq. in.; the rupturing capacity at 66 kV is 2 000 MVA.

Each phase is separately enclosed in earthed metal, and each circuit breaker is pseudo-oil operated. All the components of the three-phase switchgear panel are supported on a bedplate containing three cable chambers, each carrying two orifices, into one of which the feeder-side bushing of the circuit-breaker projects and into the the other the lead-in bushing of the voltage transformer. The bus-bar chambers are mounted on the bedplate adjacent to the orifices mentioned, and each chamber forms a bus-bar section comprising a main chamber and an auxiliary chamber arranged for the insertion of a sluice gate, the purpose of which is to provide an earthed barrier between sections during maintenance. Three single-phase single breakers are assembled as a three-phase unit with a common top-plate and can be isolated by lifting the complete unit vertically. The operating mechanism consists essentially of a piston actuated by compressed air and operating three oil pumps to open and close the moving contacts of the three single-phase breakers simultaneously.

For isolating the complete three-phase panel, two circular pneumatic lifting cylinders are mounted on the bedplate, one round each feeder side orifice on the outer phases only. The panel is held positively, either when isolated or when plugged in, by means of mechanically operated locking bolts. The section isolators are operated simultaneously by hand, and when they are open and the sluice gate is in position they may be withdrawn completely from the bus-bar chambers for inspection or maintenance.

The breakers can be controlled from the main control board, or from an emergency control board, or, in the isolated position, from a maintenance control panel; electrical interlocks ensuring that only one of the operating points is in use at a time.

132 kV Switchgear

The 132 kV switchgear is of the Metropolitan-Vickers impulse outdoor type, air-operated at 160/200 lbs. per sq. in.; its rupturing capacity is again 2 000 MVA, with three separate single-pole breaks.

The 6 kV switchgear, of the B.T-H. QF and MF types, has a rupturing capacity of 75 MVA and 250 MVA respectively. The 400 V switchgear is also of B.T-H. manufacture, type AJ, air-break 600 A.

Star points of the 132 kV windings of each of the 45 MVA inter-connector transformers, and of the 75 MVA generator step-up transformer are earthed solidly while the star points on the 66 kV windings are earthed through two earthing resistances of the metal grid type, each rated at 1 000 A for 15 secs. Star points on the alternators are earthed through single-phase potential transformers, while the 6 kV station transformers are earthed through potential transformers as for the alternators; the unit transformers, by means of fuses having potential transformers connected across them. All 400 V systems are earthed in each case through a fuse in the star point of the transformer feeding the system; in parallel with the fuse is a spark gap. Voltage regulation is by B.T-H. "quiescent rheostatic" type units, with control of the motor-operated field rheostat by means of sensitive relays. The control is duplicated so as to give normal control from the control room, and emergency control from a relay room.

H.T. Switching Arrangement

Each section of the 66 kV and 132 kV switchgear can be controlled from its individual relay room, by means of change-over switches which cut out the controls and wiring from the central control room. The 6 kV switchgear is normally operated from the control room, but it can in emergency be operated from the turbine house. All protective relays and similar equipment are housed at emergency control points. For station supplies the two 10 MVA 66/6 kV transformers are solidly connected to the 66 kV side of the bus-bar interconnector transformers; each feeds a station board which may be coupled by a section switch. They can also supply the unit boards via reactors.

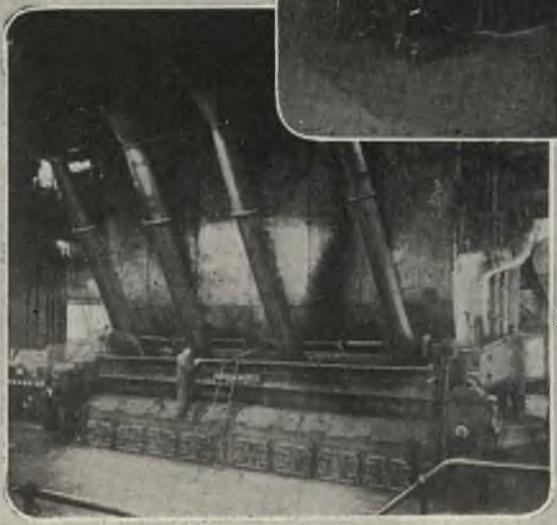
The consultants were Messrs. Merz and McLellan, and Messrs. Sir Alex. Gibbs and Partners. The main electrical contractors other than those already mentioned included:—Pipework: high pressure, Aitons; low pressure, Stewarts and Lloyds. C. W. Plant; pumps, Drysdale; screens, Bracketts. Cranes, Sir Wm. Arrol. Transformers: Fuller Electrical and Manufacturing Co., British Electric Transformer Co., and Hackbridge Electric Construction Co. Cables: W. T. Henley's Telegraph Works Co. Fire fighting equipment: Walter Kidde.

We are indebted to Mr. W. J. H. Wood, engineer-in-chief of the Kent E.P.Co. for permission to publish the information given in this description, to Mr. Helms, the station superintendent, for his courtesy in showing our representative round the station, and to the staff at Littlebrook for their assistance in obtaining the photographs reproduced.

London.—The Metropolitan Water Board is to renew the wiring at Battersea works at a cost of £250.

Left :—View of part of the pulverised fuel boiler platform at Littlebrook

Right :—The B.T-H 60 000 kW turbo-alternator



Left :—One of the stoker-fired boilers at the Littlebrook station

Electrical Personalities

We are always glad to receive from readers news of their social and business activities for publication in this page. Paragraphs should be as brief as possible.

WE reproduce below photographs of **Mr. W. W. Vinsen,** manager of the Coventry works of the British Thomson-Houston Co., Ltd., and **Mr. E. S. Little,** comptroller and head of the B.T-H. accounting department, who, as was announced in our last issue, have been elected directors of the company.

Mr. W. W. Vinsen

Mr. E. S. Little

Mr. Hugh V. J. Harris, G.P.O. traffic superintendent at Liverpool, has been chosen out of 76 applicants to be telephone manager at Hull, the only municipality possessing its own telephone undertaking.

Mr. F. W. Purse has agreed to continue in the temporary service of the London and Home Counties Joint Electricity Authority as chief engineer for another twelve months from February 5.

Mr. Leslie Gamage, vice-chairman, General Electric Co., Ltd., has been elected president of the Institute of Export for the third year, and has also been made master of the Worshipful Company of Glaziers, for 1945.

At a recent luncheon attended by the directors and departmental chiefs of W. T. Henley's Telegraph Works Co., Ltd., the secretary, **Mr. A. H. M. Jacob,** presented to **Sir Montague Hughman,** chairman of the company, two carved oak plaques reproducing the well-known Henley "Argosy" trade mark. The wood from which these were made was recovered when clearing wreckage, resulting from enemy action, at the former head office in Holborn Viaduct, and the rubber cable works.

Henley "Argosy" plaque

The Southern Railway have appointed **Mr. Charles M. Cock** as deputy to Mr. A. Raworth, the company's chief electrical engineer. Mr. Cock holds the position of divisional transportation (operating) superintendent in charge of the Bombay division of the Great Indian Peninsular Railway.

Miss Ruth Victoria Buckley, aged 20 years, is the first woman graduate to obtain a degree in electrical engineering at Leeds University.

Sir Philip Wigham Richardson, vice-chairman of Swan Hunter and Wigham Richardson, Ltd., has been appointed chairman in succession to the late Sir Charles Swan.

Mr. D. H. Thomson, principal in the Telecommunications Department at Post Office H.Q., has been appointed Controller of Telegraphs, London Telecommunications Region, in place of **Mr. F. Riley,** who is retiring.

The Electricity Commissioners announce the retirement, on January 15, of **Mr. R. T. G. French,** who has been secretary to the Commission since its inception in 1920, and the appointment as secretary of **Mr. A. E. Marson,** the former assistant secretary. **Mr. C. J. Hornsby** has been appointed assistant secretary.

Obituary

Major Hugh P. Samwell, managing director of Scottish Radio Industries, Ltd., on active service in Western Europe.

Mr. N. S. Holland, on January 22, a director of A. C. Cossor Ltd., until last year, when he resigned owing to ill-health.

Lieut.-Col. Denys L. Selby-Bigge, aged 80 years. He studied electricity at Oxford University and assisted the late Sir Charles Parsons in the earliest stages of his invention and development of the steam turbine.

Prof. John Keats Catterson-Smith, University Professor of Electrical Engineering, King's College, London, on January 25, aged 63 years. He received his early electrical training at Siemens' Dynamo Works, Stafford, between 1904 and 1907. In 1912 he became chief assistant to Prof. Sylvanus P. Thompson at Finsbury Technical College and then to Dr. W. H. Eccles until 1915. After the last war Mr. Catterson-Smith was appointed lecturer in electrical machinery, at Faraday House, where he remained until 1922. In 1923 he went to India as professor of electrical technology at the Indian Institute of Science, Bangalore. He founded "Electrotechnics" in India and was editor from 1926 to 1930. He was a member of the Council of the I.E.E.

Britain's Petroleum Grid

Some Details of the Electrical Industry's Contribution

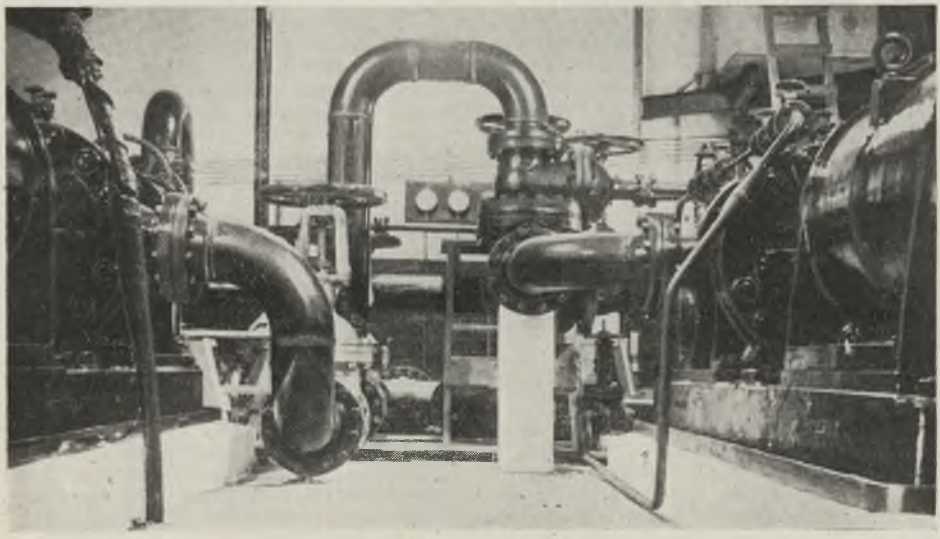
IT is now possible to mention that the electrical industry played a big part in the equipment of the 1 000-mile-long pipeline system forming the petroleum grid, constructed at a cost of about £7 000 000 in this country, during the critical days of 1941 to facilitate and safeguard the supply of oil to allied Forces based in Great Britain. With the aid of electrically-driven pumps, 5 000 000 gallons of petroleum flow daily through the pipe network, and thus a tremendous saving in transport is effected.

Already over 2 400 000 000 gallons of aviation spirit, petrol, paraffin, and vapourising oil for agriculture, have been pumped through the pipeline grid, which is studded with underground storage tanks for holding large reserve stocks.

Soon after the outbreak of war it was realised that Great Britain would have to become an oil dump to meet the needs of the allied Forces. Oil, imported in vast quantities, would have to be rapidly discharged, distributed and stored, and there was clearly indicated the need for improving facilities for handling the steadily increasing war requirements and ensuring speedy tanker turn-round. Early in 1941 plans for the first pipeline, prepared by the Petroleum Department in collaboration with the Service departments, were submitted to the Oil Control Board.

The Petroleum Board, the war-time organisation of the petroleum industry, undertook the work of construction, and the first part of the network, a line linking the south-west oil ports with the London area, was undertaken. The route was surveyed on May 1, and six months later oil was flowing eastwards. On the average not more than 900 casual labourers working under experienced engineers drawn from various British oil interests, had been employed. The speed with which this link-up was effected gave encouragement for further progress, and the next section was put in hand immediately. This had as its objective the linking-in of the oil ports on the north-west coast by a pipeline from that area, running southward to meet the first line. Facilities for pumping in either direction were provided, and storage depôts, which had been increased in size during the war, were also connected. In the event of damage to either of the main west coast oil terminals, supplies, with the additional line available, could be pumped from the north or the south, according to which end of the line was in the better position to operate, and the eastern area was thus provided with two sources of supply. Constructed during the trying winter of 1941-42, this second section was in use by May 30, 1942.

To meet the impending needs of D-Day a spur from the original line was run to



Inside one of the oil-pumping houses where the motive power is electricity

the south coast, and from this point onwards the network was developed as an offensive medium. Forty miles of line started on May 1 was in operation by the end of June.

Up to this point the new system had enabled the railways to cope with the growing demand by the R.A.F. for aviation spirit, but with the big bomber offensive beginning, more and more high octane spirit was needed by the R.A.F. and the United States Air Force based on this country. The Oil Control Board accordingly decided that a new series of pipelines must carry aviation spirit from the west coast depôts within easy reach of the many airfields already built or then building in large numbers. About this time lines running from the west coast ports handling incoming tankers were linked up to form an aviation spirit circuit over 350 miles long. Physical difficulties were many —at one stage the line crossed terrain well over 1 000 ft. above sea level—but work on the circuit, which started on October 1, 1942, was completed by the end of August, 1943, though lines from the west were in operation five months earlier. Many important storage depôts were linked into the circuit. In the autumn and winter of 1943 further extensions to the pipeline system in the south and east of England were undertaken, partly to meet Air Force needs and partly for the Continental requirements of the Allied Armies. The shortest of these is 22 miles and the longest nearly 120, and all were in use by the middle of March, 1944.

The Electrical Equipment

Less in the limelight, but of vital importance was the part played by the electrical industry in supplying the equipment for the realisation of this wholly British achievement.

The pumps are of centrifugal type, driven by either flame-proof or dip-proof induction motors, depending on the site of the pumping station. In the majority of stations the pump-house is divided from the motor-house by a 14 in. brick wall and the motor and pump coupled together by a jack shaft which passes through a gas-tight stuffing box in the wall. The brake horse-power of the motors varies from 275 to 1 000 B.H.P. and the voltage from 400 to 6 000 V. We understand that the 1 000 B.H.P. 6 000 V motors are the largest flame-proof types so far constructed.

The motors are all wound for direct-on starting, and the starting equipment is of the air-insulated metal-enclosed, solenoid-operated switchgear type, and controlled by flame-proof push-button switches in the pump-house and an emergency stop button in the motor-house.

The starting equipment is housed in a room built on to the transformer house. The starting panel is fitted with the following protection relays:—Stalling, negative phase sequence, under voltage, overload and tripping, and, as a general rule, an over-pressure relay which is connected to the pump-house for protecting the line.

A low flow alarm, which lights a red lamp on the instrument panel and rings a flame-proof bell outside the pump-house, is provided to warn the operators of any abnormal change in flow conditions.

The starters and motors are connected by a three-core paper insulated, lead covered, double steel tape armoured cable.

The lighting and heating installation is of the flame-proof type and carried out in heavy gauge conduit.

In all cases power is supplied from the grid.

It is also of interest to note that in the new British oilfield, of which details were broadcast a few weeks ago, electrically-driven pumps are again used.

Correspondence

The Editor welcomes the free expression in these columns of genuine opinions on matters of public interest, although he disclaims responsibility alike for the opinions themselves and the manner of their expression.

Cooker Design

[To the Editor]

Sir,—I have read with interest and I hope with profit, the article by Mr. F. G. W. Tree entitled "The Psychology of the Electrical Trade," appearing in the January 5 issue of The Electrician.

I was particularly impressed by the author's condemnation of a suggestion put forward by an electrical engineer at a recent meeting of a professional body, in which the engineer referred to suggested the provision of a canopy and exhaust fan to remove food vapours from the oven of electric cookers.

It so happens that just previous to reading The Electrician I had scanned the pages of one of your contemporaries for January 5, and noticed that there is illustrated a circular cooker, described as a complete break-away from conventional design, which is obviously fitted with a very prominent canopy; showing that the professional engineer referred to by Mr. Tree is not alone in his ideas, but on the contrary is supported by a South American engineer, that is to say from a country where strong cooking smells are even more appreciated than they are in this country.

—Yours faithfully,

L. F. Fogarty.

London, N.W.2.

Brighton in the Front Line

Attacks on Power Station by "Sneak" Raiders

THE two 254 ft. chimneys of the Brighton electricity undertaking's generating station at Southwick, probably saved the station from complete destruction by low flying enemy aircraft in repeated deliberate attacks. Usually coming in from the east, west or north, and rarely direct from the sea, the attacking 'planes were unable to dive immediately over the station, but were forced to swerve to avoid the chimneys, and there were, as a result, few direct hits on the buildings. Serious damage was caused on two or three occasions, but only once was the working of the plant really interfered with, when electrostatic precipitators were damaged and four boilers put out of action. Even then alternative arrangements for the continuation of supply to Brighton prevented interruption or loss of load.

Altogether there were 17 incidents in the area shared by the electricity undertaking and the gas works, and 52 bombs were dropped by sneak raiders, dive bombers and high flying night raiders.

Loss of Collier

The two colliers owned by the Corporation at the beginning of the war—the "Henry Moon" and the "Arthur Wright," named after the first chairman of the Electricity Committee and the first engineer and manager—also played a gallant part in maintaining supplies by carrying coal from the north-east coast and Wales. The former was sunk in a dive-bombing attack in the Straits of Dover in June, 1940, losing a member of the crew, but the "Arthur Wright" has survived several such assaults and also avenged the destruction of its partner with a shrewd blow at the enemy, the gunner shooting down an attacking airplane. As a result the Town Clerk received from the Lords Commissioners of the Admiralty a letter commending the good services of the ship, and an award was made by the Ministry of War Transport to the master and crew for their meritorious service, with the expressed desire that the gunner should be given special recognition.

Recently a representative of THE ELECTRICIAN visited the Southwick station, through the courtesy of Mr. H. Pryce-Jones, engineer and manager, and learned details of some of the major incidents and how at the time when invasion of this country was threatened a plan was prepared for putting the station out of action to prevent its use by the enemy.

The possibility of the north side of buildings being menaced by flames from burning oil spreading over the surface of the canal was foreseen, and provision was made by the installation of piping over the north face of the power station for it to be protected by a complete curtain of water. Fortunately this danger did not arise.

Because of its exposed position on a narrow neck of land between the sea and the harbour the power station, although screened by hills at the back, offered an ideal target for "hit-and-run" raiders, which usually came in low over the sea, swept inland a short distance and then dived to attack on their way out. Only a very short warning of the attack could be given.

According to the record of enemy action, the first bomb dropped by a low flying aircraft landed on the emergency coal store on the wharf on the opposite side of the harbour, north of the power station, immediately above the main feeders to Brighton, in the evening of November 9, 1940. Beyond disturbance of the coal no damage was done.

In the evening of the 13th of the same month five H.E. bombs fell on the eastern end of the power station site and the western end of the gas works. Slight damage was caused to the piling of the coal silo and to the foundations of the track of the overhead travelling crane; a 1½ ton ash handling grab was destroyed, as was also a considerable quantity of material that had been deposited on the site for the erection of two 215 000 lb./hr. Babcock and Wilcox boilers. A large piece of timber with some ironwork was lifted over the boiler house and entered the turbine room but caused only slight damage to the roof. The German's report of the raid was "Brighton power station has been destroyed."

Damage to Boiler House

On April 24, 1942, a H.E. bomb from a low flying 'plane landed on the beach to the south-west of the power station and within a few yards of the circulating water outfall to the sea. Slight damage was caused by blast and splinters to windows, wall and roof sheeting, and one transformer tank was punctured. Considerable damage was caused on May 12, 1942, when two H.E. bombs were dropped at the south end of the boiler house, and one man was killed, another seriously injured and four others less seriously hurt. The structure of the end block of the boiler house was badly damaged, the chemist's laboratory, offices, instruments and other equipment were

destroyed, but the boilers escaped serious injury. The station continued to operate and no supplies were lost. The personnel on shift acted coolly and efficiently under the direction of the charge engineer, and members of the technical staff were speedily on the scene. A number of men off duty returned to the works of their own accord when they heard that the power station had been damaged. After complete cleaning down and overhaul the two boilers were in full commission again in the following July and August, respectively.

Loss of Records

On June 16 two bombs were dropped by low flying aircraft, one hitting the administrative offices at the north end of the power station, and the other the wharf on the other side of the harbour. The first destroyed, among other premises, the power station superintendent's office, and all the drawings and records were completely destroyed, and the low voltage distribution to the adjacent areas of Portslade and Aldrington was temporarily interrupted. The bomb that struck the wharf blew up the concrete coping for about 30 yards and did considerable damage to the sheet steel piling, thereby affecting the submarine pilot cables, one of which had to be abandoned.

There was further extensive damage in the early evening of August 24 of the same year, caused by a bomb dropped by the same type of raider. It exploded on penetrating the concrete structure of No. 12 boiler electrostatic precipitator, which was utterly destroyed. Two other precipitators were badly damaged structurally, mechanically and electrically, and a fourth was slightly damaged. The flue ducting to all four boilers was badly buckled and in some places destroyed, the lagging was damaged or blown off, and the supply cables to the precipitators and induced draught fans damaged or interrupted. The base of the 254 ft. chimney was chipped. The effect of the explosion was to put the major portion of the south boiler house out of service for many months.

The station also suffered a number of near misses and several bombs fell into the canal.

The distribution system received damage on thirty-seven separate occasions, resulting in some interruption of supply for varying periods of duration. In no case has a consumer been without supply for more than a few hours, it being restored by prompt temporary measures. In the early days of the war damage was caused mainly by high flying night bombers, but subsequently "tip-and-run" raiders gave considerable trouble to the undertaking's personnel. The last occasions when damage was suffered was in February, 1944, when a night raider dropped a stick of bombs over the Kemp Town area, and in March, 1944, when a day attack brought down some overhead lines in the vicinity of Ovingdean.

The close co-operation of the three public utility services—water, gas and electricity—proved to be of great value. They were in continuous touch, there were frequent conferences by the three engineers, and a workman from each with a knowledge of the location of water or gas mains, or electric cables, accompanied every repair party after a raid incident. This greatly facilitated repairs.

The old generating station at North Road escaped damage. In addition to housing some of the early machinery, which is still in operation, it contains the distribution centre and control room for the whole of Brighton. A system indicator panel by means of coloured lights shows the state of the complete network and sub-stations. Smoke and fire detection apparatus gives indication of smoke or fire in any of the cable culverts. The former strong room served for the A.R.P. control room for the undertaking, and the other utility services were connected by telephones installed by the electricity department. Reports from four observation posts in the town enabled the officer on duty to plot on a map the location of any incident.

When the extensions at Southwick are completed at the end of the year, the commissioning of the new plant will bring the total capacity of the station up to 192 000 kW.

Mr. Pryce-Jones said there had been a considerable reduction in the number of units sold in Brighton as a result of the war and the fuel economy campaign, but there had been a marked increase since the lifting of the ban on visitors, and there was every indication that as soon as the war was over the demand would shoot up. There was no doubt that Brighton would be a highly electrified town. There was little difference now between the industrial peak in the week and the domestic peak on Sundays. While there had been a reduction in the Brighton load, the load on the station had not decreased.

Tribute to Staff

Paying a tribute to the personnel at the power station, Mr. Pryce-Jones said there could be no question that theirs was a front line job. The conditions of lighting and ventilation, adversely affected by the black-out, were in themselves sufficient to produce strain, but day by day there was also the risk of enemy planes which came over bombing and machine-gunning. One could not speak too highly of men who had steadfastly carried out their duties in such conditions.

What Manufacturers are Doing—V

A Ferranti Record—Transformers for Grid and Northern Ireland

DELIVERIES by Ferranti, Ltd., during the last year included a number of 15 000 kVA 110 000 V transformers for the Government of Northern Ireland. These were fitted with remote control on-load tap-

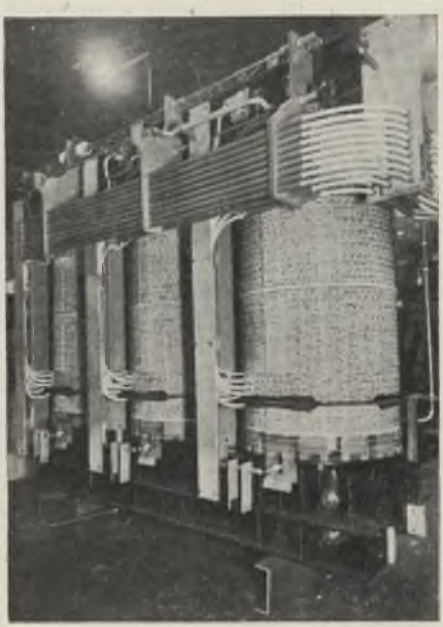


Fig. 1.—Interior view of 15 000 kVA, 110 000 V Ferranti transformer

changing gear for a voltage range of 20 per cent. Further units are in course of manufacture. Fig. 1 shows an internal view of one of these transformers. An additional 60 000 kVA, 132 kV, three-phase transformer is in construction for the Central Electricity Board; the usual on-load tap-change gear for a range of 20 per cent., is fitted. This order makes a total of 40 Ferranti transformers of 45 000 kVA, or over, in service on the grid system—a proud record.

Work for the export market includes eight 10 000 kVA single-phase units, forming 30 000 kVA banks having a ratio of 110 000/50 000 V.; these units are self cooled; and ten 11 100 kVA single-phase units forming 33 000 kVA banks. These units are water cooled with internal cooling coils and have a ratio of 110 000 /11 000 V. A considerable number of smaller units fitted with on-load tap-change gear are also in hand.

Experimental and development work on this method of design introduced by Ferranti, Ltd., to give increased protection against lightning surges has progressed steadily during the year. The range of voltage and kVA ratings to which it can be applied has been greatly extended. Both the recurrent-surge and the continuously-evacuated high speed oscillographs have been constantly employed in checking calculations and determining the values of constants and coefficients. It is now possible to pre-determine the surge strength of any design of transformer winding in accordance with " stress-control " principles.

In the new field of industrial heating by radio frequency great progress has been made both in the production of equipments and in the extension of its application to a wide variety of heating problems. Equipments have passed the development stage and are now in commercial operation for soldering and brazing purposes, for the surface hardening of gear wheels and other mechanical surfaces subject to severe wear,

Fig. 2.—Typical equipment for pre-heating moulding pre-forms

also for the pre-heating of synthetic resin moulding pre-forms. A number of equipments have been supplied to national research bodies for development work and the illustration, Fig. 2, shows a typical equipment for pre-heating moulding pre-forms. There is a larger equipment for the manu-

facture of plywood and synthetic resin laminated boards.

An outstanding feature of recent years is the application of the automatic moving coil voltage regulator to the control of individual loads as distinct from installation in a feeder for supply voltage improvement. The new principle envisages a general change in policy from endeavouring to maintain constant potential throughout the system to allowing relaxation in the transmission and distribution circuits, with several advantages, and applying local control by means of automatic voltage regulators at, or near, the consumer's terminals, where the constant voltage is required.

The characteristic features of the Astatic voltage relay have now been extended to relays for current control and for resistance or impedance control. In addition, all types are now available.

The method of obtaining a number of variable speeds from small induction disc motors, which was developed last year, has now been extended to permit continuously variable speed control over a wide range with a highly stable ratio of stalled torque to running torque under all conditions.

Whilst the demand for high-speed operation of voltage regulators is limited in extent there are important applications for which it is essential. Operating speeds far beyond what was considered practicable a few years ago are now possible. To achieve this a simple mechanism has been developed in which the exponential acceleration and linear retardation of the induction disc motor have been combined with an accelerated reset control relay to give speeds believed to be faster than any other mechanically operated regulator.

The replacement of human labour by automatic means in industrial and manufacturing processes has been growing steadily for many years. For simple automatic control of electrical characteristics one of the Astatic relay family is employed.

High voltage electrostatic metal rectifiers for precipitation work were originated by Ferranti Ltd., in 1928. Recent developments include the construction of self-contained shock-proof units in which transformer and rectifier are included.

Work during the year included the design and construction of a surge or impulse generator for 1 200 000 V for testing cables and allied insulation under artificial lightning surge conditions. A high voltage continuous d.c. generator for 500 kV is also under construction for cable testing.

Very heavy uni-directional impulse currents for the magnetisation of large permanent magnets have proved to be effective and efficient. An apparatus employing an Ignitron with ignition controlled by a gas-filled strobotron tube developed last year has been improved and extended in range. It is now possible to obtain 200 000 A turns of excitation which is sufficient for existing demands, although larger values are attainable.

Extensions at Portsmouth

THE one good thing that bombing did for the Portsmouth electricity undertaking was to clear the ground and make room for further extension, on the direction of the C.E.B., of the generating station, and excavations have started for the foundations of the new building to accommodate a third 30 000 kW turbo-alternator set, which should be in commission by the winter of next year. The new building is to be of attractive modern design in brick. The boiler house chimney is to be 275 ft. high with an internal diameter of about 19 ft. and into it will be diverted some of the existing chimneys.

The third 30 000 kW turbo-alternator will be of the same type as the other two and is to be made by the British Thomson-Houston Co., Ltd. This will bring the total capacity of the high pressure plant up to 90 000 kW, all operating at 600 lbs. per sq. in. steam pressure, with feed heating equipment giving a final temperature to the economiser of 320 deg. F. The generation is at 11 kV stepped up to 33kV by a transformer directly-connected to the alternator. In addition there is 30 000 kW of low pressure plant operating at 250 lbs. per sq. in. steam pressure. The circulating water is taken direct from the sea by Mather and Platt's pumps, and discharges into the sea about a quarter of a mile from the intake. The question of chlorination is under consideration. A new water softener is to be put in. It will be capable of dealin with 4 000 gallons of water per hour. The water from the softener will be evaporated in a unit evaporator. The condensing plant and feed heating equipment is by Hick, Hargreaves and Co., Ltd., and the motor-driven feed pumps are by Mather and Platt, Ltd., with a stand-by steam feed pump of the same make to operate automatically in the event of pressure in the feed mains failing. The feed pumps are remote operated from the boiler house and are direct-on starting. It is proposed to instal three Bennis quadrum boilers, each with a maximum continuous rating of 150 000 lb./hr., with stokers of the same make, and automatic combustion controller by George Kent.

Belfast's Electrical Jubilee

Fifty Years of Progress Celebrated

THE Belfast electricity undertaking, which held a jubilee celebration last week, was started with surplus profits from the Corporation's gas undertaking, and a station using town's gas was decided upon.

Prof. A. B. W. Kennedy, chief enginer of the Westminster Electric Supply Corporation from 1890 to 1926, was appointed

Belfast electricity department, chief officers: (Standing)—T. D. Oswald (chief technical assistant), R. P. Watson (sales engineer), J. McClay (construction engineer). Seated—J. A. Parker (commercial secretary and chief clerk), J. McCandless (deputy city electrical engineer and general manager), W. J. McC. Girvan (city electrical engineer and general manager), H. Weston (power station superintendent)

to report on a system to suit the conditions obtaining in Belfast, to prepare the necessary specifications, and to advise the Committee regarding the purchase of plant. A d.c. three-wire distribution system was adopted, the pressure between the outer conductors being 250 V. In October, 1892, a sub-committee, which had visited the larger electrical installations in the London area and the Electrical Exhibition at the Crystal Palace, recommended the establishment of an installation to supply 10 000 lamps each of 8 c.p., on a site, with room for extension, in the centre of the city. The first Electricity Committee met on January 4, 1894, and accepted tenders received to Prof. Kennedy's specifications. In the following April Mr. V. A. H. McCowan, who came from Tralee, was appointed electrical engineer. The supply was switched on without public ceremony, at 4 p.m. on January 23, 1895.

Bare copper strip in concrete culverts formed the original distributing system of the city. The strip was supported on earthenware insulators placed six feet apart and held in position by pitch. As the culverts were liable to flooding and formed pockets for escaping gas, troubles due to short circuits and explosions caused the system to be abandoned after four years' endurance of its shortcomings. Cables drawn into metal and earthenware pipes were substituted.

During the first year of the electricity department's working the number of units sold was under 100 000, bringing in a revenue of just over £2 000. The average price per unit sold was under 6.34d., and the working cost was 5.417d. per unit sold. The weekly wages bill was in the region of £30. Last year the revenue from the sale of current was over £1½ million and the total net capital outlay was over £5½ millions. The working costs were 0.566d. per unit delivered and the average price obtained .913d.

The electricity department continues to expand, and recent reports by the Engineer recommending improved coal-handling facilities and the installation of 30 000 kW of generating plant are now before the Ministry of Commerce for consideration.

In 1939, when measures to be taken for safeguarding electricity supplies in times of emergency were under consideration, the Engineer recommended that the proposed extensions to the Harbour station be proceeded with and suggested that to meet the Government's wishes to safeguard supplies plant be transferred from the Harbour station to the East Bridge Street station. Two 6 000 kW turbo-alternators, together with two of the original Harbour station boilers, were so transferred. These two boilers were replaced at the Harbour station in 1943 by two 75 000 lbs./hr. units. A project for a further dispersal to a site at Annadale had to be abandoned because, owing to the effects of enemy action over certain English south coast towns early in January, 1941, the Electricity Commissioners in London refused to allow any steam-raising plant to leave Great Britain. As progress on the foundation work at the Harbour station was very slow, the Ministry of Commerce decided that in the national interest it would be expedient to suspend all work on that site and to erect the 30 000 kW turbo-alternator and boilers on order by the Corporation on a site remote from the city and less vulnerable to enemy attack. The new station at Ballylumford—the alternative source of supply—was in operation and connected to the Belfast system on January 1, 1943, the

Ministry delegating its powers to operate the station to the Electricity Board.

The celebration of the jubilee was marked by a luncheon given by the Electricity Committee, of which Councillor Andrew Scott is the chairman, on January 23. The Lord Mayor (Sir Crawford McCullagh) presided.

Councillor Scott, who gave a resumé of the history of the undertaking since its inception fifty years ago, suggested that the Government should consider giving financial assistance for the supply of electricity in the new houses about to be built, and where it would help agricultural development. While he would like to see electricity supplied to every cottage and farmhouse it would mean heavy maintenance expenditure. Belfast had pioneered bulk supplies to Lisburn, Lurgan, Helen's Bay, Holywood and Bangor before the setting up of the E.S.B., Northern Ireland. He was convinced that the proposals for electrical development agreed upon between the Ministry of Commerce and the representatives of the Corporation, if carried into effect, would be for the good of the Province.

In proposing the toast of "Belfast Corporation," to which Councillor Scott had replied, Mr. Edward Warnock, Minister of Home Affairs, said that the undertaking was a credit to the city, a monument to those who built it, and a source of pride to the Corporation and the citizens. In the last quarter of a century units had increased ten-fold; the consumption of fuel now was only a third of what it was, and in 1938—the year before hostilities broke out—the cost of production challenged any but two stations in Great Britain.

Mr. Browne, Dublin, said he was looking forward to the time when there would be greater co-operation between the electricity undertakings of Belfast and Dublin.

Tributes were paid to the work of the city electrical engineer and manager. Mr. W. J. McC. Girvan, who has completed 31 years' service in the department, and his staff.

News in Brief

Business Item.—The Melford Radio and Battery Service of 58, Windmill Road, Middlesex, are extending their business and opening shop premises at 181, High Street, Hampton Hill, for the retail sale of radio and electrical accessories.

Rate Relief Allocation.—The Croydon Corporation Electricity Committee recommends the allocation to rate relief of £23 000 from the profits of the electricity undertaking for the year.

Social Item.—The social and sports club of the Wessex Electricity Company at Wallingford, Berks., recently gave a party in the Town Hall to the children of employees, including tea, games and a film display.

Electricity at the Coalface.—The Council of the Yorkshire Mineworkers' Association has decided to oppose a plan by the colliery owners to introduce electricity at the coalface in the Barnsley Seam at Yorkshire collieries. The association contends that the plan would increase the danger to mineworkers.

TWENTY-FIVE YEARS AGO

FROM THE ELECTRICIAN *of January 30. 1920: It is announced that the Italian Government, having found the wireless service between Carnarvon and Rome more efficient than others, has instructed its delegation in Paris to adopt the Carnarvon-Rome route for all its important messages. It is understood that these messages are cabled from Paris to London and there handed over to the Marconi system for transmision to Rome.*

Kepier Power Station Site.—It is reported that the Amenities Committee of the House of Commons has suggested that the proposed new power station at Kepier, Durham City, should be transferred to the Hartlepools.

Temporary Housing Equipment.—Oxford temporary houses are to be lit by electricity, and will also include electric immersion heaters. For a household of four people the cost of electric lighting, cooking, heating and refrigeration in a temporary house is estimated at 4s. 5d.

Wireless Components Exhibition.—It is announced that a comprehensive private exhibition of British radio and communications components is to be held in London from February 20 to 22 inclusive, for the benefit of designers of equipment for the Services. The exhibition will be under the auspices of the Radio Component Manufacturers' Federation and admission will be restricted to those with official invitation cards.

Part-time Further Education

Continued Discussion on the Report on Training of Engineers

THE discussion on part-time further education at technical colleges, including courses for those returning from the services, which began at the I.E.E. on January 18, was resumed on January 25. The subject will also be considered by the Students' Section very shortly, and there will be further discussions on various aspects of this report of the Post-war Planning Committee of the I.E.E.

Sir Arthur Fleming, chairman of the Education and Training and Personnel Sub-Committee (No. 1), opened the resumed discussion with a brief review of the principal points raised on the previous occasion. He stressed the nature of the overseas competition which this country will meet after the war and the imperative need for a personnel in the industry having the highest possible educational and practical attainments. The 1939 standard, he said, would not be sufficient, and we must adjust ourselves to the new needs which would arise after the war. This brought in the question of responsibility. Industrialists had failed entirely to appreciate their responsibility in certain directions. Industry must decide what its needs were regarding the technical training of its personnel and should not unfairly throw the burden on the technical colleges. That was one of the reasons for this Report. It was also the responsibility of industry to provide facilities which would enable technical education to be obtained in the best possible way, and industry must assist in the selection and training of teachers. The sub-committee would search with great interest the contributions to this discussion. There had already been interviews with the Board of Education, the Association of Principals of Technical Institutions and other bodies, and it was hoped, through these conferences and discussions, to make a definite step forward in the direction which industry really needed.

Sir George Nelson (English Electric Co., Ltd.) urged that there should be no snobbery as between those who went to the university and those who went to the technical college and filled the less highly technical positions, because it was only by the combined efforts of all grades of personnel that we would be able to acquire the position this country should hold in the future. As an industrialist, he felt that industrialists should play a much more prominent part in engineering training than had hitherto been the case and they must accept responsibility both during the educational period and afterwards.

Dr. J. Greig (head of electrical engineering department, Northampton Polytechnic) said that the division into the three categories set out in the report might not be so simple in practice as it seemed on paper. In the past, technical education had been mainly of a too academic character and there had been no special courses for the craftsman. Therefore, it was essential that the recognition of the importance of craftsmanship courses should be backed up by the employers and, even more important, by trade unions. As to the classification into the three grades, it was better to have some direction intelligently applied than none at all and he felt the main need was greater provision for the craftsman, and it should be possible to have supplementary courses for those who subsequently proved to be suitable for one of the higher grades.

Mr. T. R. Goldup (Mullard Radio Valve Co., Ltd.) said that it was in the group of technicians that we required a combination of technical skill and general education, and he looked upon this group as of greater importance, perhaps, than the other two. He regretted that the report dealt with practical training in only a few paragraphs and suggested that manufacturing organisations which had run their own schools for years would do well to get together and see what could be done in speeding up and raising the level of this essential practical training. The problem of dealing with men returning from the Forces was a serious one, because during the war years there had been a complete alteration in the technological methods of manufacture.

Lord Eustace Percy (King's College) thought the craftsman presented the most important and most difficult problem. We suffered by comparison with America in that our young men were not machine minded, and that was one of the considerations which must be taken into account in discussing this problem.

Mr. W. C. S. Phillips (head of the electrical engineering department, Borough Polytechnic) disagreed with Sir Arthur Fleming that industry had not played an important part in technical education in the past. Whilst the training of engineers, no matter what branch was involved, should be as broad as possible, there was a tendency to introduce too many subjects

and that applied to the courses set out in the report, with the result that it meant something like cramming. He also thought that the suggested period of 40 weeks' training each year, especially if applied to evening classes, would be liable to kill the whole scheme, and even 40 weeks' part-time day courses would introduce many difficulties in the matter of organisation and administration at the technical colleges.

Mr. A. H. Jackson (General Electric Co., Ltd.) emphasised the paramount importance of the economic factors underlying the report.

Mr. C. W. Robson (head of the electrical engineering department, South East London Technical Institute) did not share the fears of previous speakers with regard to directing students into some particular form of training. He thought it was a practical and reasonable solution to segregate students into three groups on the understanding that there should be easy transfer from one group to another. He suggested that the professional type of examination should be restricted to the technical colleges, whilst the craftsman's and technician's course would suit the City and Guilds of London Institute.

Mr. W. G. Bass (Ferranti, Ltd.) did not think the scheme could be considered to be on sufficiently solid foundations, because it had been built on primary education. Mathematics were badly taught in the elementary schools and the student who was ill-equipped in mathematics would not benefit from the proposed course to the extent he should. He therefore suggested that the institution should endeavour to secure the support of the Board of Education to obtain such improvements and modifications as were thought necessary.

Mr. R. V. Darton (Johnson and Phillips, Ltd., and nominated by the London Students' Section Committee) suggested the need for the introduction of cultural subjects into the syllabus.

Brigadier F. T. Chapman (War Office) said that greater attention to general science was desirable in the course for professional engineers than the Committee had had the courage to express in their report, and he suggested that the student should be allowed to finish at a later age than set out in the report, say at the age of 23. Then the part-time student would have nearly as many hours training as the full-time university student would get. Therefore, the age for the first National Certificate might be fixed at 18, for the second at 21, and for the third at 23.

Dr. S. Whitehead (E.R.A., and Institute of Physics) expressed regret that there was not more in the report regarding the teaching of mathematics, and the view that sandwich courses were of mutual advantage to the employer and the employed and, not the least, to the executive staff who had the responsibility of looking after the apprentices.

Mr. L. W. Phillips (lecturer in electrical engineering, Northampton Institute) expressed his disappointment with the report because he felt it did not reflect the vision and outlook of the members of the institution.

Mr. G. F. Freeman (head of the electrical engineering department, West Ham Municipal Technical College) viewed the scheme outlined in the report with the greatest sympathy, but with some misgivings. In the Metropolitan area, he said, there were a large number of colleges, and students were perplexed at the multifarious number of courses available to them, with the result that they took the subject which interested them in different courses at different colleges. Some means must be found for remedying that position. He thought 40 weeks' courses were too long if the students were to be given opportunities for recreation and cultural studies.

Mr. W. F. Giddings (head of the electrical engineering department, Acton Technical College) also complained that 40 weeks was too long especially as there were some colleges holding day, evening and week-end classes. In his view, evening classes were an anachronism, and part-time education should be part-time day education. The 40 weeks would not be too long if the evening and week-end classes were removed.

Mr. K. R. Sturley (Marconi's Wireless Telegraph Co., Ltd.) asked why no mention had been made of the student who was directed into industry and had suffered from a very shortened course. He also enquired what plans were being made for facilitating the exchange of technical teachers into industry to assist in development work.

Mr. S. E. Goodale (assistant chief engineer, Henley's Telegraph Works, Ltd., and a member of the Sub-Committee) summed up the discussion and assured those who had asked for more consideration to be given to practical work, that it was the intention to ask the hard worked members of the sub-committee to prepare a further report on that subject.

BOOKS RECEIVED

"A Treatise on Applied Hydraulics." By H. Addison. 3rd Ed. Revised and Enlarged. (London: Chapman & Hall). Pp. 614. 32s. net.

High Frequency Transmission Lines. By Willis Jackson. Methuen's Monographs on Physical Subjects. (London: Methuen & Co.) Pp. vii + 152. 6s. net.

Electricity Supply

St. Pancras (London).—E.h.t. mains to link up sub-stations at a cost of £4 900 are to be supplied for the purpose of maintaining the continuity of the supply in case of emergency.

Preston.—The offer of the Electricity Committee to provide service cables for electric street lighting free of cost within the borough and conversion of existing gas lamps is to be considered.

Lichfield.—The Electricity Committee is to provide supply to Concrete Ltd. at a proposed works in Dovehouse Fields at a cost of £3 500, the scheme taking into account future developments in the area.

Hull.—The Electricity Committee has obtained sanction to borrow £1 312 for electricity supply to the Hessle Road trolley-bus system, and is seeking sanction to borrow £2 403 for overhead line and substation equipment.

Newcastle-on-Tyne.—The report of Mr. H. C. Godsmark, general manager of the transport and electricity undertaking, for the year ended March 31 last, stated that the net surplus was £80 852 compared with £102 277 the previous year. Mr. Godsmark stated that increased costs of operation had now exceeded the rise in revenue, and this together with taxation, accounted for the reduction in the surplus.

Edinburgh.—The Public Utilities Committee has authorised the City Electrical Engineer to proceed with the proposed extensions of the city system. It is intended to execute a scheme at a cost of £365 130, plus the cost of a proposed switch house and its equipment, to cover post-war extensions. Involved in the scheme is £127 393 for a 30 000 V cable and pylons, and £62 500 for excavations.

Tasmania.—In THE ELECTRICIAN of January 19, mention was made of the graceful tribute from Tasmania to the workers of Britain in connection with the recent installation of some large hydro-electric generating plant, and it is interesting to note that the units referred to comprise four English Electric water-turbine driven alternator sets of the horizontal impulse type, two sets being installed at each of the two stations at Tarraleah and Waddamana. At the former site each turbine has a rating of 21 000 B.H.P. at a speed of 428 r.p.m., operating with a 940 ft. head. Each alternator has an output of 18 750 kVA at 11 kV, three-phase, 550 cycles. At the latter station the rating of each turbine is 17 600 B.H.P. at 500 r.p.m., with a head of 1 070 ft., and the output of each alternator is 15 000 kVA at 11 kV, three-phase, 50 cycles. The current is used to produce zinc and carbide and an ancillary feature of interest is the inclusion of 'English Electric ' Aerofoil water flow recorders.

East Ham (London).—The abstract of accounts of the East Ham electricity department for the year ended March 31, 1944, shows that the net profit was £14 077, as compared with £1 767 for the previous year. The total number of units purchased was 35 882 729 (33 429 343) and units sold, 32 136 235 (30 436 336). Consumers numbered 30 448 (30 397). The average price per unit obtained for electricity supply was 1.632d. (1.724d.) for prjvate light, power and heat, 1.148d. (1.213d.) public lighting 1.193d. (1.131d.) traction, .500d. bulk, giving an average of 1.588d. (1.662d.) From October, 1943, the war surcharge was reduced from 20 per cent. to 10 per cent. and the cash discount was increased from January 1, 1943, to 5 per cent. in lieu of 2½ per cent. The following revision in charges for prepayment supplies, operating from February 1, have been made:—Lighting rate (Code B) 4d. per unit plus 10 per cent. to 3½d. per unit plus 10 per cent; lighting inclusive (Code H), 7d. per unit, covering current and hire of lighting installation, revised to 6d. per unit, current in excess at 3½d. per unit plus 10 per cent.; domestic inclusive (Codes J and K) 1½d. or 1¾d. per unit revised to 1½d. or 1¾d. per unit up to 300 units in any quarter, current in excess at ¾d. per unit, plus 10 per cent. for 200 units, then at ½d. per unit, plus 10 per cent.

Part of English Electric hydro-electric plant installed in Tasmania

Machine Tool Control

Altered Arrangements to Facilitate Re-equipping of Industry

TWO announcements made at the week-end are of special interest to manufacturers planning the reconversion of their industries to peace-time production. The first was that some 58 000 American machine tools, delivered to this country under Lease-Lend arrangements had been sold to the British Government, and when no longer required for war production could be disposed of. In connection with this statement it must be understood that Lease-Lend in any case provided only a relatively small proportion of the total number of machine tools used in this country for war production, in that 73 per cent. have been manufactured in Britain, 14½ per cent. were purchased for cash in the United States and 12½ per cent. were provided under Lease-Lend. The second official announcement was that the Government has decided to replace comprehensive control of machine tools by " selective control " applied to " scarcer " types and to the most vital requirements. This, it is hoped, will facilitate the re-equipping of industry and reduce the administrative burdens on both the Government and manufacturers. As from February 1 it will, therefore, no longer be necessary to obtain a purchase certificate before placing an order for any metal-working machine tool, or for any measuring instrument or measuring machine coming within the purview of the Machine Tool Control.

Machines in Short Supply

The production and allocation of scarce types of machines will be covered by placing these machines on a " nominated list " and orders will only be accepted by suppliers under the authority of supply certificates. It has also been decided that new orders for new metal-working machine tools will not be subject to statutory price control. Price control will, however, continue to apply to all firm orders for home and export outstanding at January 31. The Machine Tool Control will retain all general powers of control, and the power to re-impose price control, should the trend of prices justify it, is also being retained.

At the present time the Government has a surplus of used machine tools to the value of £3 000 000 in a pool, and the abolition of licensing for used tools will give users greater freedom for the purchase of such Government surplus machines as are not held in reserve for possible war uses. As from February 1, sales from the pool will be on a new price basis, the sales, however, being restricted to requirements sponsored by a Government department. By March 1, however, Machine Tool Control will have complete lists of all available surplus machines in at least five disposal centres outside London so that intending purchasers in the provinces can investigate availability and prices without travelling to London. Long term disposal plans are under consideration, and there will be full consultation with the trade interests concerned.

Contracts Open

WE give below the latest information regarding contracts for which tenders are invited. In the case of overseas contracts, particulars are to be had from the Department of Overseas Trade, Millbank, London, S.W.1 (corner Horseferry Road), unless otherwise stated.

Gellygaer U.D.C., February 3.—Supply and delivery of (a) indoor and outdoor transformers; (b) kiosk complete with switchgear and accessories; (c) e.h.t. and l.t. cable; (d) overhead line equipment and (e) wood poles. Specification from the Electrical Engineer, Electricity Offices, Hanbury Road, Bargoed, Glam.

Tottenham (London), February 9.—Supply of electric lamps. Particulars from Mr. E. Townson, Town Hall, Tottenham, N.15.

Beverley C.C. February 13.— Supply, laying, jointing, connection to mains and sundry work in the installation of a new electric ring main cable to serve the Beverley Emergency Hospital. Particulars from County Architect, Beverley.

INDUSTRIAL NOTES

A.E.I. News.—Among the features of last month's issue are articles on the qualities and applications of " Metrosil," B.T-H. self-contained transportable turbo-alternators and jet propulsion for aircraft.

Control of Lac.—Under the Control of Lac (No. 3) (Revocation) Order, 1945, which revokes the Control of Lac (No. 2) Order, 1943, licences are no longer necessary for the disposal, acquisition, and use of lac.

Electrical Equipment.—The Control of Industrial Electrical Equipment (No. 3) Order, 1945, which came into force on Thursday, February 1, exempts the acquisition and disposal of all used industrial electrical equipment from the licensing requirements. Regulations applying to new electrical equipment are unchanged.

Company News

QUEBEC POWER.—Fourth div. 25 cts. on com., payable Feb. 26, mkg. $1.00 (same).

YORKSHIRE ELECTRIC POWER CO.—Fin. div. 5% on ord., mkg. 8% (same) for yr.

ELECTRICAL AND INDUSTRIAL INVESTMENT. Fst. and fin. on defd. ord. 12% (same). Net pft. 1944, £21 881 (£21 175).

SHAWINIGAN WATER AND POWER CO.—Fst. mort. and collateral trust skg. fund gold bonds series " D ", 4½% bonds due 1970, will be repaid at 102½, plus accrued interest, on Feb. 26.

INTERNATIONAL COMBUSTION LTD.—Fin. div. 15% (same), plus cash bonus 12½% (10%), mkg. with intm., 32½%, less tax (30%), for yr. ended Sept. 30. Gross pft. £218 172 (£212 249). Taxatn. for current yr. £127 361 (£105 860).

BROOKE TOOL MANUFACTURING CO. LTD.—Tradg. pft. to Sept. 30 (after deprecn., tax and fees) £33 626 (£32 932). Brot. in £30 162 (£37 230). Div. 20% (same) £20 000, to war conting. res. £20 000 (same), fwd. £23 788.

J. AND E. HALL, LTD.—Div. on ord. 10% (same). Net pft. for yr. ended Sept. 30 is stated as £94 705 (£95 036), after mkg. prov. for E.P.T. £27 000 (£140 000), and before chargg. for inc. tax £50 000 (£55 000). Carry-fwd. £81 809 (£63 104).

WESTINGHOUSE BRAKE AND SIGNAL CO., LTD.—Fin. div. 10% and bonus 4%, mkg. 14% (same) for yr. Net pft. for yr. to Sept. 30 is announced as £161 894 (£173 274). Pensions again receive £15 000, but contings. £10 000 less at £70 000. Cost of yr.'s distributn. is £78 566 (same). Fwd. blc. £93 872 (£95 544).

TECALEMIT LTD.—Dirs. propose to increase cap. from £500 000 to £750 000 by creation of 1 000 000 5s. shs. A/cs. for the yr. to July 31 last show pft. of £97 958 (£91 055). To deprecn. £40 514 (£40 293). £2 533 (£1 918) written off patents, licenses and designs. Dirs.' remuneratn. £5 000 (same). Carry-fwd. £43 556.

CARRIER ENGINEERING CO., LTD.—Tradg. pft. to June 30 £90 870 (£94 862), plus invstmt. income, etc., £4 467 (£4 299), mkg. £95 338 (£99 161). To patent fees £274 (£232), deprecn. £3 685 (£9 232), leavg. net pft. before taxn. £91 380 (£89 697). Prov. for taxn. £24 737 (£29 194), pref. div. absorbs £3 000 (same), ord. div. 25% (same), to res. £15 000 (£10 000), fwd. £113 856 (£107 401).

ADELAIDE ELECTRIC SUPPLY CO. LTD.—Gross rev. to Aug. 31, £1 533 734 (£1 532 603). Deduct exes. and taxes £1 023 697 (£1 032 868), leavg. net rev. £510 037 (£499 735). After providg. deb. service, there remains £410 017 (£393 780). Intm. divs. absorbed £130 000 (same), and fin. pref. div. £68 750 (same). Fin div. 4% on 8% prefd. ord. £30 000 (same) and on ord. 5% (same). Carrd. fwd. £159 116 (£155 651).

R. A. LISTER AND CO., LTD.—Tradg. pft. to Sept. 30 £399 221 (£399 383). To deprecn. £43 029 (£43 503), dirs.' fees £1 000 (same), to employees' pension scheme £6 476 (£6 005), taxn. £220 981 (£212 036), leavg. net pft. £127 735 (£136 839), plus £72 524 (£71 475) brot. in. Pref. div. absorbs £9 000 (same), intm. ord. div. 5% (same) £17 500, fin. ord. div. 5% and bonus 6% (same), mkg. 16% (same), to gen res. £50 000 (£35 000), to contings. res. nil (£35 790), to write-off entire cost goodwill in purchase price of new businesses £11 500 (nil), fwd. £73 759.

Company Meetings

TURNER AND NEWALL, LTD.—In his statement submitted at the annual meeting held in Manchester, on January 25, Mr. W. W. F. Shepherd, the chairman, pointed out that the company's business was to supply some of the vital requirements of other industries, principally the engineering, building and shipbuilding industries,

(*Continued on page 110*)

Metal Prices

		Monday, January 29. Price.	Inc.	Dec.
Copper—				
Best Selected (nom.)	per ton	£60 10 0	—	—
Electro Wirebars ...	„	£62 0 0	—	—
H.C. Wires, basis ...	per lb.	9 5/16d.	—	—
Sheet	„	10 7/8d.	—	—
Phosphor Bronze—				
Wire(Telephone)basis	per lb.	1s. 0 5/8d.	—	—
Brass (60/40)—				
Rod, basis	per lb.	—	—	—
Sheet „	„	—	—	—
Wire „	„	10 7/8d.	—	—
Iron and Steel—				
Pig Iron (E. Coast Hematite No. 1)...	per ton	£6 18 6	—	—
Galvanised Steel Wire (Cable Armouring) basis 0.104 in. ...	„	£27 10 0	—	—
Mild Steel Tape (Cable Armouring) basis 0.04 in. ...	„	£20 0 0	—	—
Galvanised Steel Wire No. 8 S.W.G. ...	„	£26 0 0	—	—
Lead Pig—				
English	per ton	£26 10 0	—	—
Foreign or Colonial	„	£25 0 0	—	—
Tin—				
Ingot (minimum of 99.9% purity) ...	per ton	£303 10 0	—	—
Wire, basis... ...	per lb.	3s. 10d.	—	—
Aluminium Ingots ...	per ton	£110 0 0	—	—
Spelter...	„	£25 15 0	—	—
Mercury (spot) Warehouse ...	...per bottle	£69 15 0	—	—

NOTE.—Above prices are nominal only, no allowance being made for tariff charges, charges for insurance, etc. Prices of galvanised steel wire and steel tape supplied by Cable Makers Association. Other metal prices by British Insulated Cables Ltd.

and in so doing it had provided an adequate living for 30 000 employees and their dependents, and also a reasonable investment return for 23 000 others.

C. LINDLEY AND CO. LTD.—The annual meeting was held in London, on January 17. In the statement circulated with the accounts the chairman, Mr. T. F. Nash, said the accounts submitted pointed to a steady year's work, and, having regard to the prevailing conditions, the directors considered the result of the year's trading to be satisfactory. The Board had been active in the interests of post-war business, and all steps that could be taken, prior to the relaxation of controls from both labour and materials, were receiving their attention.

Commercial Information

County Court Judgments

NOTE.—*The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be actions. But the Registry makes no distinction. Judgments are not returned to the Registry if satisfied in the Court books within 21 days.*

BENTLEY, E. (male), 2, Amberley Buildings, Tang Road, Leeds, 12, electrical engineer. £13 5s. 9d. Nov. 29.

STAFFORD, Stanley, 25, Smithson Av., Bolsover, radio dealer. £13 18s. 8d. Dec. 8.

FOX, Cedric W., Tudor Cot., Station Lane, Pitsea, wireless dealer. £70. Dec. 6.

EDMUNDS, R. S. (male), Sherrard St., Melton Mowbray, electrical dealer. £21 8s. 7d. Nov. 27.

HORNER, Joseph H., 15, Paradise Sq., Sheffield, electrician. £70 19s. 11d. Dec. 1.

GOVEITE, —. (male), Ashport, Sully, Glam., radio engineer. £19 8s. 2d. Nov. 29.

Satisfactions

STEATITE AND PORCELAIN PRODUCTS LTD. —Sat'n Jan. 13, of debs. reg. May 3, 1933, to the extent of £15 500.

ELECTRICAL UTILITIES LTD., Richmond, (Sy.). Sat'n. Dec. 29 of mort. reg. Nov. 6, 1942.

GLOBELITE BATTERIES LTD., London, S.W. —Sat'n. Jan. 1, £1 500, deb. reg. May 20, 1943.

Applications for Discharge

LUCKCUCK, Herbert Joseph Charles, 755, Welford Road, Leicester, and carrying on business at 328, Welford Road, Leicester, under the style of Herbert Luckcuck, Junr., radio dealer. Date of hearing, Feb. 8, 1945. 12 noon. The Castle, Leicester.

CHEATLE, Eric Sidney, 307, Lyndon Road, Sheldon, Warwick, and lately carrying on business at 580, Coventry Road, Small Heath, Birmingham, under the style of "Apex Radio and Electrical Service," radio and electrical dealer. Date of hearing, Feb. 13, 1945, 11.30 a.m., the County Court, Corporation Street, Birmingham.

Coming Events

Friday, February 2. (To-day.)

I.E.E., N.E. STUDENTS' SECTION.—Newcastle-on-Tyne. "Carrier Wave Telephony," C. A. W. Marriott. *6.30 p.m.*

ROYAL INSTITUTION OF GREAT BRITAIN.—London, W.1. "Metal Crystals and Crystal Strength," E. N. da C. Andrade, F.R.S. *5 p.m.*

Saturday, February 3.

I.E.E., LONDON STUDENTS' SECTION.—Lecture and demonstration of stage lighting at the Strand Electric and Engineering Co., Ltd., Floral Street, W.C.2. *2.30 p.m.*—I.E.E., N.W. STUDENTS' SECTION, Manchester. "The Students' Lecture," "The Cathode-Ray Tube and Its Applications," Dr. W. Wilson.

JUNIOR INSTITUTION OF ENGINEERS, N.W. SECTION.—Manchester. Annual general meeting. "Factory Management," F. Burgess. *2.30 p.m.*

Monday, February 5.

I.E.E., S. MIDLAND CENTRE.—Birmingham "The Operation, Maintenance and Testing of Overhead Lines and Associated Outdoor Equipment on A.C. Systems," R. C. Hatton and J. McCombe. *6 p.m.*

Tuesday, February 6.

COVENTRY ELECTRIC CLUB.—Electricity Showrooms. "Radio Frequency Heating." E. T. Norris. *6.30 p.m.*

Wednesday, February 7.

I.E.E., RADIO SECTION.—London, W.C.2. "Aerials for Use on Aircraft: a Comparison between Fixed and Trailing Types on the 900-Metre Wave-Band," Fl.-Lt. C. B. Bovill. *5.30 p.m.*

JUNIOR INSTITUTION OF ENGINEERS, MIDLAND SECTION.—Birmingham. "Possibilities of Light Alloys in Engineering," A. Russell. *6.30 p.m.*

Thursday, February 8.

I.E.E., INSTALLATIONS SECTION.—London, W.C.2. "The Development of Motor Control Gear," D. Rudd. *5.30 p.m.*

A.M.E. and M.E.—Junior Institution of Engineers, 39, Victoria Street, S.W.1. Discussion meeting. *4.30 p.m.*

DIESEL ENGINE USERS' ASSOCIATION.—56, Victoria Street, London, S.W.1. Symposium on "Engine Cooling Water Systems."

Saturday, February 10.

I.E.E., LONDON STUDENTS' SECTION.—Visit to Battersea Power Station. *2.30 p.m.*—I.E.E., N.W. STUDENTS' SECTION, College of Technology, Manchester. Dance. *6 p.m.—10 p.m.*

ASSOCIATION OF SUPERVISING ELECTRICAL ENGINEERS.—E.L.M.A. Lighting Service Bureau, London, W.C.2. Lecture, "Distribution of Electricity in London," E. H. Jesty. *2.15 p.m.*

THE Aberdare GROUP

The Aberdare Group has brought a thriving new industry to the coal valleys of Glamorgan. The rapid growth of the allied undertakings which form this Group is noteworthy, the more so when it is realised that this growth is not due to special wartime demands, but rather in spite of them.

In the short space of six years, cable drums stencilled 'Aberdare' have become familiar in many lands, from South America to China and from Scandinavia to New Zealand. The prospect of development when export trade is no longer restricted by the exigencies of war is one which augurs well for the future of this well-equipped factory.

At Treforest, not far away, another young firm, operating in a new factory with a staff of keen designers and highly trained workpeople, is rapidly establishing a reputation for competence and reliability where all kinds of switchgear is concerned.

These firms are directed by the same leadership, and though they operate under separate managements, the same progressive spirit prevails throughout both organisations.

ABERDARE CABLES LTD. *AND* **SOUTH WALES SWITCHGEAR LTD.**

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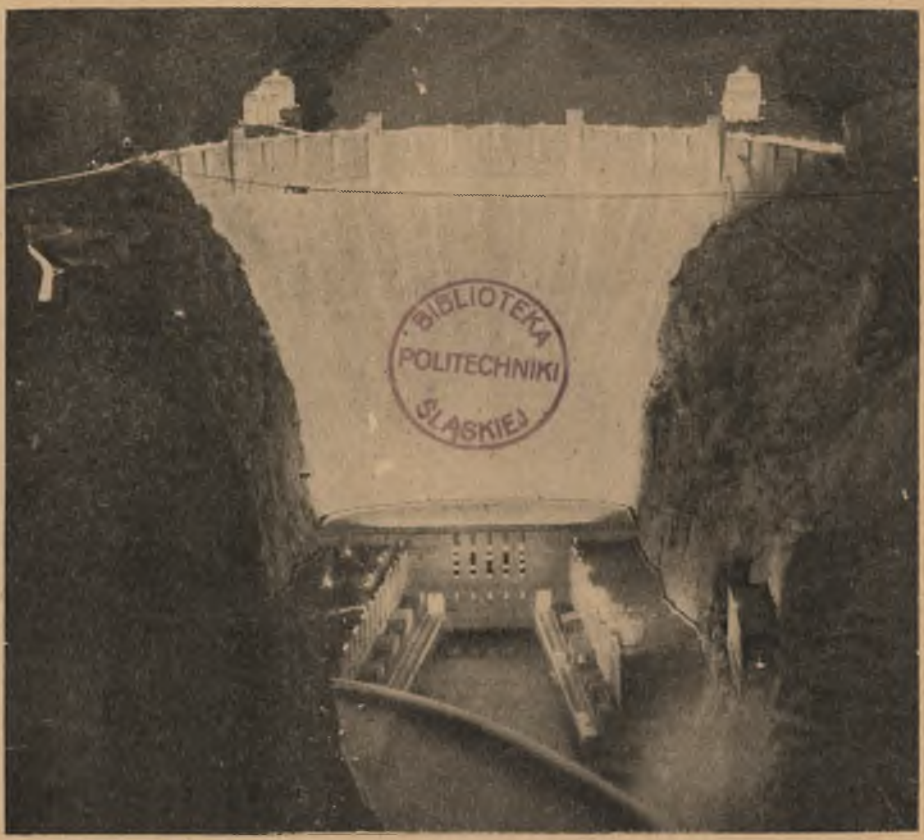

FAMOUS HYDRO-ELECTRIC STATIONS.

The Boulder Dam, Nevada, U.S.A., supplies water to most of Southern California for irrigation and electrical power. Completed in 1935 the Boulder Dam employed 4,000 men for 4½ years. The reservoir (capacity 30,500,000 acre feet) is the largest artificial reservoir in the world, with an electrical power initial capacity of 1,835,000 H.P. This impressive photograph shows the dam lighted by its own power.

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