

*Production Organization.*—The organization and inter-relationship of the sections concerned with planning, estimating, rate-fixing, tool design and manufacture, material purchase and inspection, stores, manufacturing, progress, wage systems, bonus, piece work and time study, costing, works engineering, labour bureau, welfare, canteens. Routes of essential documents through the organization and of work through the shops; division of labour.

*Factory Layout.*—Ideal layouts of work and offices, based on work and document routing. Practical modifications. Heating, ventilation, lighting, and power supply of workshops.

*Factory Sites.*—General considerations as to suitability of land, service, and local government regulations. Proximity to materials, labour, markets, and communications.

*Management.*—The art of directing human activities. Application of scientific method to management by reference to work of pioneers. Social responsibilities of management (*a*) to the community, (*b*) to those it directs. Position of management relative to capital and labour. Training for management, relative values of theory and experience. Graduation of potential managers through operative and staff grades. Supervision, selection of staff; qualities. Modification of theoretical organizations to take account of individuals.

*Labour.*—Trade-unions; their development and legal status. Trade-union regulations regarding employment. Negotiations with unions. Works committees. Shop stewards. Selection and training of operatives. Vocational guidance tests. Apprenticeship schemes. Engagement of labour. Labour turnover. Discharge of labour. Discipline and handling of personnel. Effect of long hours and monotony on efficiency. Attitude of labour to status and working conditions. National and local agreements between employers and trade-unions. Arbitration Court, conciliation, tribunals, and awards. Industrial fatigue. Accident causes and prevention.

*Industrial Legislation.*—Review of the development of industrial legislation; the underlying aims and objects. The Factories Act; detailed knowledge of the current New Zealand Act and of the more important statutory Orders in so far as the engineering industry is concerned. Workers' Compensation Acts, strikes, stop-work meetings, and lockouts.

### *Line Communication.* (Four papers—three hours each)

#### *Papers (a) and (b); Theory and Measurements*

Basic equation of the uniform transmission-line. Attenuation and phase constants. The neper and the decibel. Characteristic impedance. Reflection and transmission coefficients, at a termination. Loaded lines. Equivalent  $\pi$  and T networks. More advanced treatment of electrical network and transmission-line theory. Electromagnetic and electrostatic interference in lines, transposition, balancing of cables, phantom circuits. Waveguides.

Principles of operation and characteristics of thermionic valve amplifiers, oscillators, modulators, and demodulators, frequency changers and rectifiers.

Telegraph transmission; signal distortion; frequency band-width related to speed of signalling. Composite circuits; principles of multi-channel working over a single circuit using alternating current.

Telephony; characteristics of the instruments involved in the conversion of sound energy to electrical energy, and *vice versa*; sound-levels. Frequency bands required for various classes of service. Repeaters; echo-suppressors. Principles of carrier working.

Methods of measurement of amplifier gain and of the attenuation and phase constants and of the characteristic impedance of lines, cables and filters.