POLITICAL AND ECONOMIC PLANNING IN PAKISTAN

A BROADSHEET recently issued by Political and Economic Planning deals with Pakistan's second Five-year Plan*. After reviewing the first Five-year Plan, it describes briefly the size and objectives of the second Plan and the aims of the various sector programmes, concluding with a brief critique. The fundamental problem for the second Plan is, under severely limiting conditions, to liberate the people from the crushing burden of poverty by ensuring that the rate of growth of the economy exceeds the present 2 per cent annual increase in population. The second Plan, amounting to 1,900 crore rupees, is about 75 per cent larger than the first, a real increase of about 50 per cent, and the methods used are a development of those employed in making the first Plan. Within the various sector programmes, priority is given to schemes already in an advanced state of preparation, or which have already been the subject of foreign government aid; the emphasis is on schemes designed to give quick returns through the better use of existing resources.

Essentially the Plan seeks to make maximum use of the market mechanism, and to employ fiscal and monetary measures rather than direct controls. It adopts a pragmatic approach as between public and private development, with public investment supplementing, rather than displacing, private enterprise, and seeks to develop labour-intensive rather than capital-intensive methods, where a choice is feasible, according to the relative real scarcities of the factors of production. Only a limited call is made on the extra wealth of the community, as the economy progresses, for still further investment, and within the broad priorities of the programmes proposed a substantial element of flexibility has been built into the Plan to meet unforeseeable changes. Of the numerous programmes, those aimed at developing education,

health and social welfare services (estimated to cost some 130 crore rupees), like the housing programme, would seem to be out of scale with the needs when judged by contemporary standards and are limited by the resources available. It may be observed that during 1960-65 it is proposed to improve existing social services and to inaugurate schemes for research and training social workers, as well as to attack vigorously such main diseases as malaria, tuberculosis, smallpox and leprosy, to improve greatly the existing schools in East Pakistan, provide more in West Pakistan and extend and improve the universities, as well as extend technical training.

Although the second Plan is regarded as ambitious in the Broadsheet, and requiring devotion, intelligence and hard work if it is to be applied effectively, it is not considered wildly out of scale with the resources, foreign and indigenous, likely to be available. A great effort has been made to improve both the personnel and the systems of administration; a new generation of administrators has been trained and is gradually displacing weak elements from senior positions, while there is some sign that foreign managerial expertise is more warmly welcomed. There is a critical shortage in skilled technicians of all kinds, and a good deal of dilution and improvisation will be needed as well as the full and most effective use of whatever foreign technical services may be available. By and large, it is difficult to find the Plan unsuitable, in any major respect, to Pakistan's needs to-day. There is justification for taking seriously the Government's avowed intention to create a system of democratic government well suited to the conditions of Pakistan. The fact that the second Plan is prepared to tackle the thorny problem of family planning by including a family planning programme of national propaganda, with clinics at all hospitals, dispensaries and maternity centres estimated to cost 3 crore rupees, is regarded as the most hopeful single pointer to the prospect of successful planning in Pakistan.

* *Planning*, Vol. 26, No. 446 (7th November, 1960): More Planning in Pakistan. Pp. 309-336. (London: Political and Economic Planning, 1960.) 3s. 6d.

RADIO RESEARCH DURING 1959

THE report of the Radio Research Board and of the Director of Radio Research for 1959 summarizes the wide range of work carried out at the Radio Research Station, Slough, and at the sub-station in Singapore*.

The report of the Board refers to the recent revision of the structure and terms of reference of its committees in order to ensure that they adequately cover present and future research activities in the radio-field. Considerable emphasis is laid on the importance of radio in space research, and it is planned that in the immediate future about 50 per cent of the effort at Slough shall be devoted to such research. Details of the research work at the Station during 1959 are given in the report of the Director.

* Department of Scientific and Industrial Research, 1959: The Report of the Radio Research Board and the Report of the Director of Radio Research. Pp. iv+34+4 plates. (London: H.M. Stationery Office, 1960.) 3s. net.

Some preliminary work on data obtained during the International Geophysical Year has been done, and this includes an analysis of data on the incidence, at high-latitude stations, of polar radio 'blackouts' and of polar sporadic-E ionization. The results show that these phenomena are produced by solar-particle streams incident on the upper atmosphere along arcs which are similar to the precipitation spirals predicted by Störmer fifty years ago.

A study has also been made of the International Geophysical Year data now available for Slough, Singapore and Ibadan on atmospheric radio-noise. The Slough observations provide detailed information on noise characteristics at four frequencies in the range 20 kc./s.-20 Mc./s. The differences between noise-levels at Slough and Singapore are such as would be expected from known differences in meteorological conditions.

logical conditions; but the noise-level at Singapore is not so intense as might be expected from its close proximity to one of the main thunderstorm areas of the world. Work on atmospherics from local storms is providing information on the power distribution with frequency in the lightning flash, and on the extent to which the wave-forms of the radiated disturbances can be explained in terms of the lightning mechanism.

The day-to-day variability in the electron densities of the various ionospheric layers is largely due to the corresponding variability in the wave and particle radiation from the Sun. The derivation of ionospheric indices of solar activity is of special importance for prediction purposes, and the report describes work which has been carried out on such indices for the *E* and *F2* layers. As part of the International Geophysical Year Calendar Record, *E*-layer solar ionizing radiation indices, *F2*-disturbance indices and polar blackout indices have been calculated for each day of the International Geophysical Year. These daily indices should be invaluable for studies in other International Geophysical Year disciplines.

A rapidly increasing proportion of the activities of the Station at Slough is being devoted to various aspects of space research, and considerable observations have already been made on the direction of arrival of signals from satellites and on the received signal characteristics (Doppler shift, Faraday rotation, telemetry). The station also provides some 100 establishments and observers with predictions, at weekly intervals, of the times and directions of transit of satellites passing within radio-range of observers in the British Isles. Similar work is also being carried out at the Singapore sub-station.

In the radio-measurements and standards field the research and development have been concentrated mainly at frequencies greater than a few hundred megacycles per second. The Station has acted as the co-ordinating centre for the international comparison of milliwatt power-measuring techniques at centimetre wave-lengths, and satisfactory agreement has been found between measurements made with instruments of different types used in the standard laboratories of the United States, Japan and the United Kingdom. Recognition of the possible harmful biological effects of high-intensity electromagnetic radiation at frequencies greater than about 50 Mc/s.

has called for the development of reliably calibrated instruments to measure the flux density near high-power transmitters, and the report refers to work being carried out to meet this need.

The study of long-distance ionospheric transmission characteristics, using a sweep-frequency pulse technique, has continued and been extended to a 6,700-km. path between Ascension Island and Slough. It is found that during the daytime the modes of transmission are always very complex because of reflexions from tropical sporadic-*E* ionization, and the sunset deterioration and fading of signals from stations in equatorial latitudes is associated with the break-up of this sporadic ionization at such times. Work on the lateral deviation of signals from Japanese short-wave stations shows that there are often periods when the signals depart significantly from the great-circle path and that propagation by way of auroral reflexion is probably a common feature of night-time propagation over these paths.

Tropospheric radio-wave work includes studies of scatter propagation, delay times on microwave links and the refractive properties of the lower atmosphere. Extensive signal-level, gain in height, fading and diversity measurements have been made over distances from 130 to 400 km.; but it would appear that no completely satisfactory explanation of troposphere scatter propagation is yet available. The bandwidths which can be used in short point-to-point microwave communication links are limited by multi-path propagation, and equipment is being developed at Slough to enable accurate detailed work on the signal-delay times to be measured. The refractive properties of the lower atmosphere are being investigated by means of airborne refractometer measurements, by radar sounding and also by using pressure, temperature and humidity data obtained from a balloon-borne wired-sonde.

Research at the Station on semiconductors has been mainly on transistors and their application. Microwave measurements on certain ferrite-aluminates in a resonant cavity and on transmission phenomena in wave-guides containing these materials has continued.

This 1959 report is of particular interest in that it is the last annual report of Dr. R. L. Smith-Rose, consequent on his retirement from the post in September 1960.

W. J. G. BEYNON

SAFEGUARDING HEALTH IN LONDON

THE annual report on the work of the Scientific Branch, Public Health Department, London County Council, has been prepared by Dr. S. G. Burgers, scientific adviser to the Council*. The Department has 64 members of whom 34 are graduates, and the work covered by them during 1959 varied from routine analysis of foodstuffs—still very necessary—to investigating the properties of cleansing materials used in kitchens and laundries. Much research of a fundamental nature is carried out and opens up many possibilities for economic exploitation. The Council is to be commended for the high quality of the investigations carried out by this section of its staff.

* London County Council. Public Health Department—Scientific Branch. Annual Report of the Scientific Adviser for the year 1959. Pp. 46. (London: London County Council, 1960.) 1s. 3d.

Particularly valuable research was connected with the treatment of sewage. How to produce sulphur from sulphate-enriched sludges was investigated by one team, and valuable information was obtained about the cost and practicability of the process, if conditions of national emergency should render its use necessary. Because of the long duration of these experiments, useful information was also accumulated about the effect of sulphide sludges on metal and other components of the experimental plant. Metals were found to be singularly free from corrosion—stainless steel was as bright after three years exposure as it was initially, mild steel and cast iron (partly protected by calcium carbonate scale) were scarcely affected and steel bolts immersed for eighteen months could be unscrewed with ease. Brass and lead,