

dence towards and in the sub-tropical anticyclones—is an essential link, but that farther northwards the momentum transport (as the moisture transport) is mainly the effect of the unsteady motions, with mean meridional motions playing a minor and perhaps negligible part.

The study of mechanisms, and especially of the relative importance of steady mean circulations and irregular motions, is important if the basic problem is to be formulated in a manner suitable for mathematical attack. It is now thoroughly established that the mean state of the atmosphere cannot be maintained by the mean motions and that the two together do not provide the solution to any real problem. Thus the nature of the turbulence, which is physically different in different zones, must be introduced into the theory at a very early stage: it is not a mere embroidery on a general circulation existing in its own right. It seems probable that the wave-length or scale of unstable synoptic systems

which theory shows must develop in the baroclinic atmosphere sets a scale to the zonal mean organization.

The time now seems to be ripe for an attack on the basic problem, and experience with electronic computing for dynamical forecasting in middle latitudes has given to the mere complications of calculating a less formidable appearance. Much progress is almost certain to come during the next decade, and it is urgently required. When one compares the two summers of 1954 and 1955, as experienced in Europe, one is forcibly struck with the fact that the general circulation averaged over a matter of months may run quite differently from one year to the next and so far with no explanation whatever. It seems unlikely that such differences will be understood unless we have a basic theory of the planetary circulation on which to build, and the physical nature of the problem of seasonal weather prediction must for the present remain a mystery.

## POPULATION OF BRITISH UNIVERSITIES IN THE 1960's

### THE AGE-GROUP BULGE

AT the final session, on the afternoon of December 17, of the 1955 Conference of the Universities of Great Britain and Northern Ireland, the problem of "The Age-group Bulge and its Possible Effect on University Policy" was discussed, with Dr. D. W. Logan (principal, University of London) in the chair. In the opening address, Dr. G. E. F. Chilver (Queen's College, Oxford) defined the problem: at the peak of the bulge (1964-67) there will be at least 7,500 more applicants for university places each year; afterwards there will be a plateau, when the number of applicants will be at least 2,500 more than at present. This is calculated simply on the basis of the extra births in the years from 1944. In addition, there has been a trend towards more pupils aged seventeen years and more remaining at school, the increase since 1951 being 30 per cent in England and Wales and 15 per cent in Scotland. If this trend continues, then the numbers of applicants will be larger than the figures given. However, there are good reasons for believing that the trend is unlikely to operate during the peak of the bulge, though it may well be resumed in the later years.

The more important and tractable problem is that of the plateau. The universities should plan for an expansion of the order of 10-15 per cent in the 1960's, concentrated largely in science and technology. The Ministry of Education has provided places in secondary grammar schools to accommodate the extra children during the bulge, and there are signs that enough specialist teachers are coming forward for sixth-form work. The provision of additional university teachers is not so easily envisaged, since they must be found before the extra graduates are forthcoming; this is particularly so in science faculties, where the teachers will need to be withdrawn from other jobs. Capital development, to be in time to make the expansion possible, must take place earlier; it must be provided in the next quinquennium (1957-62). As regards the peak of the bulge, it may be unprofitable to speculate now, provided that planning proceeds for dealing adequately with the level of the plateau.

Exceptional difficulties are to be expected at Oxford and Cambridge, where it is unlikely that the expansion can be large, whatever may be desirable. This is a matter of fact, based on current views in the older universities, and is not a personal opinion. A major factor here is the existing system of college (as opposed to university) finance, the colleges not being directly in receipt of grants from the University Grants Committee. In any event, expansion in a city like Oxford is difficult, population growth being limited and college sites being too small for much further building. It is generally felt that, in view of their structure, colleges are reaching their maximum size. At the peak of the bulge, it is unlikely that Oxford and Cambridge will dilute their tutorial system to the extent tolerated after the Second World War; they are almost bound to raise their entrance standards.

In the second address, Prof. R. G. D. Allen (London School of Economics and Political Science) supported the contention that the problems of the plateau are more important than those of the peak of the bulge. He thought that 2,500 is a low estimate of the extra numbers the universities must soon absorb each year. Certainly a smaller figure would only arise if universities were to impose higher entrance standards or the economic climate in Great Britain deteriorate. The appropriate employment of 2,500 or so extra graduates a year raises special problems, but there can be no doubts about a ready market for scientists and technologists; for arts graduates also, even those with pass or general degrees, there are clear signs that there is an expanding market for their services, for example, in the Civil Service and local government, in banks and insurance offices. The likely recurrent cost of the expansion is not great—£3 million added to grants by the University Grants Committee and £2 million to maintenance awards—but the cost in capital grants is likely to be high and needs to be incurred early, particularly since much of the expansion must be in science and technology.

As regards the peak of the bulge (1964-67), the university population may well rise to more than

105,000, as compared with 50,000 before the Second World War and 80,000 now. The universities cannot easily absorb the peak numbers if they are concentrated heavily in science and technology, nor place them in employment unless they are so concentrated. But elaborate plans are not needed to meet the brief and passing phase of the peak. What is essential is that careful but generous plans should be laid during 1957-62 to provide for a university population at least 10-15 per cent higher than now, rising slowly and steadily during the late 1960's and 1970's as the trend towards more seventeen-year-olds at school operates. Prof. Allen also stressed the importance of maintaining the proportion of women (now about one-quarter) in the university population, and in this he was supported by Dr. C. M. Rigby (University College, London). The risk is that any strain in the universities, and the inevitable concentration on science and technology, will result in smaller numbers of women students.

Lord Simon of Wythenshawe, Prof. J. F. Allen (St. Andrews) and others stressed the extreme urgency of problems created by shortages of scientists and technologists in industry. Large numbers are reported as being trained in the U.S.S.R., and there is a growing scarcity in the United States, where British technologists are already being used. It is essential that in Britain we should not fall behind in the provision of technologists. Lord Simon noted that the universities have been able to achieve a large expansion since the Second World War, and he said that another increase, particularly of university-trained technologists, is now required.

Prof. A. V. Judges (King's College, London) asked the conference not to overlook the human side of the problem. The extra children of the post-war generation have already had a raw deal, through shortages of facilities, equipment and teachers, and they must not be barred from university education. They constitute an asset the country can ill afford to waste. Dr. G. B. Jeffery (director, Institute of Education, University of London) asked whether we are not failing to make best use of our population of university students. Jobs in industry are increasingly requiring a higher level of ability, and we are not turning out enough scientists and technologists even for teaching.

Two vice-chancellors, Sir James Mountford (Liverpool) and Sir Philip Morris (Bristol), expressed very strongly the view that the estimate of an expansion of 10-15 per cent is far too low. They would compound the effect of the higher birth-rate after 1944 with that of the recent trend towards larger sixth-forms in schools, the argument of the opening speakers providing the line from which to deviate—in an upward direction. Unless the estimate is raised, the plans of the universities will be too small, and too slow, to meet the real situation. The urgent need is for a large and immediate increase in capital grants to universities, and in this the Governments of the past decade have failed to provide what had been necessary, and indeed promised, for the expansion since the Second World War. Not only must the deficiency be made up, but there must also be full provision in capital grants for the expansion to come.

R. G. D. ALLEN

## NEWS and VIEWS

### Sir Edward B. Poulton, F.R.S. (1856-1943)

THE son of an architect, Edward Bagnall Poulton was born at Reading a century ago on January 27, 1856. After taking first-class honours in natural science at Oxford in 1876, he became demonstrator of zoology under George Rolleston. Rolleston's successor, H. N. Moseley, supplied him with material from the *Challenger* Expedition, and in 1883 Poulton published three papers on the tongues of Australian mammals; five years later he discovered that *Ornithorhynchus* possesses true teeth which cut through the gums, but are replaced by horny plates. His real scientific interest lay in living insects, and he showed "a lifelong delight" in the coloration of animals and in mimicry. During 1884-88 he wrote several papers on the colours of larvæ and pupæ and on the factors influencing their survival value, and these studies led to his election to the Royal Society in 1889; in 1890 he published his classic book, "The Colours of Animals", which placed him in the front rank of protagonists of natural selection. Poulton's early interest in heredity is shown by an article in *Nature* (29, 20; 1883) on the inheritance of abnormal toes in cats. In 1893 he succeeded the first Hope professor of zoology, J. O. Westwood, and he occupied this Oxford chair of entomology for forty years. Recipient of many honours, he was vice-president of the Royal Society (1909-10) and Darwin Medallist (1914), president of the Linnean Society (1912-16) and Linnean Medallist (1922), and president of the second International Entomological Congress (1912). He was knighted in 1935. Poulton was a big man with penetrating blue eyes and a vigorous, friendly

personality, and his fondness for making the title of a communication summarize all the contents sorely tried the patience of bibliographers. He died on November 20, 1943, at the age of eighty-seven.

### Vice-chancellorship of Hull: Prof. Brynmor Jones

PROF. BRYNMOR JONES has been elected to be vice-chancellor of the University of Hull as from October next, in succession to Dr. J. H. Nicholson who is retiring. Prof. Brynmor Jones has held the G. F. Grant chair of chemistry in the University College (now University) of Hull since 1947. He has also acted as pro-vice-chancellor of the University since 1954 and prior to that was vice-principal of the College. Prof. Brynmor Jones was at the University College of North Wales prior to proceeding to St. John's College, Cambridge, in 1929. He was thereafter on the staff of the Chemistry Department of the University of Sheffield during 1931-46.

### Theoretical Physics in the Australian National University: Prof. K. J. LeCouteur

THE development of research in physics in Australia has been greatly strengthened by the appointment of Dr. K. J. LeCouteur to the chair of theoretical physics at the Australian National University, Canberra. Dr. LeCouteur, who at present holds a readership in theoretical physics in the University of Liverpool, has made important contributions to a variety of subjects. In recent years he has developed the theory of the emission of particles from excited nuclei to such an extent that it has become possible