

preparation of a manual of proposed standard practices for surveys on R&D for the Frascati Conference on this subject in 1963. At the NIESR Freeman led research into the electronics, plastics and chemical process plant industries, and became a frequent consultant in Europe on questions concerning the economics of science. In 1965 he was invited by the University of Sussex to create the first British university centre in the science policy field.

Under Freeman's leadership and largely in response to requests from government and industry, the original group has grown in four years from two to over thirty research fellows, research students and staff. Its activities range from social and economic history of science to the relationship between science, industry and economic development, both in advanced and developing countries. Within the last two years fresh work has begun on the study of science in China and the Far East, on the economics of innovation and on safety in industry. Teaching duties of the unit's staff bring it into close contact with both science and arts schools of the university, while its research has made it a focus of international interest. Although the Phillips chair does not attempt to answer the unit's need for long term continuing support, it is a welcome witness to the increasing significances of science policy studies, which Christopher Freeman has helped to pioneer.

100 Years Ago



We referred last week to the "situation" at the Paris Observatory. The action of the French Government has been of the promptest and M. Le Verrier is no longer Director. This step indicates very clearly—too clearly we fear—the strength of the case put before the Minister of Public Instruction, in the memorial, of which a copy has been sent to us. This document, which is signed by all the *chefs de service*—Villarceau, Marié-Davy, Wolf, and Loewy—and the *astronomes adjoints* without exception, discusses all points connected with the administration of the Observatory, scientific and otherwise. It is to be sincerely hoped that M. Le Verrier may be able yet to do service to astronomy, in some other capacity, some position where his great talents alone will be called into play. His is a name that will never die, let us hope it is but momentarily eclipsed.

From Nature, 1, 387, February 10, 1870. The "situation" referred to was that the entire staff of the observatory had threatened to resign if Le Verrier were not dismissed, because of his uncompromising policies. He was reinstated at the observatory in 1872, but with reduced powers. Nature's comment on February 3 was that "the present régime at the Observatory of Paris has been rather more autocratic than could be patiently endured, even in a country subjected to eighteen years of personal government". Le Verrier predicted the existence of Neptune in 1846, without knowing that Adams had reached the same conclusion in England.

UNIVERSITY ENTRANCE

Continuing the Swing

by our Education Correspondent

MORE than 1,300 places in the science, engineering and technology faculties of British universities were unfilled last October. In May 1969 the universities estimated that 10,447 engineering and technology places and 16,828 science places would be available this year. But in the event, only 9,984 and 15,978 students were admitted to these faculties, representing a shortfall of 463 and 850 respectively. This reduction in numbers, given in the report of the Universities Central Council on Admissions for 1968-69, seems to have been caused by a lack of suitably qualified applicants. In the sciences, the number of applicants was only 1.5 times greater than the number of places available, while the ratio for the arts was 1.8 : 1 and for the social sciences it was 2.5 : 1.

Because of the lack of competition for places, science, engineering and technology faculties seem to be willing to accept students with significantly lower qualifications than those accepted by arts or social science faculties. During the clearing procedure in September, when unfilled places are filled by suitably qualified candidates who were unsuccessful in the first round of the lottery, 38.5 per cent of the engineering and technology candidates and 37.4 per cent of the science candidates were accepted, compared with 14.9 per cent of the social science and 21.0 per cent of the arts candidates. Moreover, if A-level grades are awarded points—five for an A grade down to one for an E—282 candidates out of 922 with scores of five or less were awarded places in mechanical, electrical and civil engineering in the clearing procedure, compared with thirteen out of 343 in English.

The total number of admissions, at 61,139, was 3.1 per cent up on the total for October 1968, however, but the report says that "if suitably qualified candidates had applied in sufficient numbers, the increase in admissions could have approximated to 4.5 per cent". The number of applicants for university places was 114,289, which suggests that there are almost twice as many candidates as there are places available. But Dr Geoffrey Templeman, chairman of UCCA, suggests that this is misleading. He says in the introduction to the report that about one in five applicants do not achieve the minimum university entrance qualification, and that about 15 per cent of those who apply in any given year can be expected to have applied for admission in a previous year. He suggests, therefore, that about three out of every four qualified candidates were awarded places last October.

GRADUATE EMPLOYMENT

Industry's Share Growing

GRADUATES who go straight into employment in Britain now outnumber those who continue to study. The University Grants Committee's latest volume of statistics (*First Employment of University Graduates, 1967-68*, HMSO, 10s) shows that out of a total for the year of 42,615 graduates with first degrees, 17,508 took up a job in Britain and 17,047 carried on with their education. In 1966-67 the figures were 14,775 and 15,190 respectively. Industry seems at last to have reversed its declining attractiveness to graduates,

Table 1. DISTRIBUTION OF FIRST DEGREE GRADUATES BETWEEN EMPLOYMENT AND FURTHER EDUCATION

Percentages in:	1965-66	1966-67	1967-68
Further education	41.7	41.6	40.0
UK industry	25.1	25.1	25.7
Other UK employment	14.9	15.3	15.4
Others (including emigrants)	18.3	18.0	18.9

for its share rose from 25.1 to 25.7 per cent of the year's output (see Table 1). More encouraging still is a continuing fall in the proportion of emigrants—the figure of 4.9 per cent compares with 5.2 per cent for 1966-67 and 6.1 per cent for 1965-66.

The total number of first degree graduates includes 30,151 men and 12,464 women, and compares with the previous year's total of 36,528. Apart from the reversal of the trend away from industry, however, there has been little change in graduate career patterns. Teaching, for example, is still losing its popularity—the proportion that entered directly fell from 13.9 to 13.3 per cent of those taking up employment. The proportion that went into teacher training was unchanged.

A further 9,135 people graduated with higher degrees, comprising 8,150 men and 985 women and topping the numbers for 1966-67 by 1,758. Here, too, more have been looking to industry for a career—12.7 per cent in comparison with 11.8 per cent for 1966-67. The fall in the proportion of PhDs among the higher degrees awarded—from 61.4 per cent in 1963-64 to 47.4 per cent in 1966-67—has, however, been checked. In spite of the Swann report's recommendation that shorter periods of postgraduate study should be encouraged, the 1967-68 figure for PhDs was reduced only to 45.7 per cent.

With a little further analysis, the UGC's statistics reveal that between 1965 and 1968 the brain drain among newly graduated people was, in relative terms, significantly reduced, even though the numbers of emigrants continue to increase. Table 2 shows that 1.2 per cent of first degree graduates and 6.2 per cent of higher degree graduates went abroad "permanently" (the UGC's term for an indefinite length of time) in 1967-68. Two years earlier, the respective figures were 1.6 and 6.7 per cent. The fall for the total of emigrants is more marked. Although the extra graduates that the totals include intended to return to Britain after a period of overseas work or study, the experience of their predecessors suggests that they may not be able to find jobs when they want to come back (see *Nature*, 225, 213). The net loss is thus likely to be somewhere between the two extremes that are given in Table 2.

Two features here call for further comment. First, perhaps surprisingly, relatively few pure scientists with first degrees go abroad—a total of 3.8 per cent in 1967-68, compared with 4.9 per cent as the proportion of all graduates. Against this, however, should be set the fact that 25.5 per cent of pure scientists continued academic study or went into research, compared with 18.6 per cent of all graduates. Second, applied scientists are more likely to go abroad permanently than pure scientists. While 18 per cent of pure scientists with higher degrees emigrated, only 6.5 per cent intended to stay abroad; among applied scientists, 9.8 per cent emigrated but the departure was permanent for 6.8 per cent.

Mr Enoch Powell has given widespread publicity to a survey by the Cambridge University Management Group, which reported that 27 per cent of an undergraduate sample were considering permanent emigra-

Table 2. EMIGRATION OF GRADUATES

First degrees	1965-66 (per cent)	1966-67 (per cent)	1967-68 (per cent)
Total emigrants	6.1	5.2	4.9
Pure scientists	4.3	3.7	3.8
Applied scientists	6.1	5.7	5.1
Permanent emigrants	1.6	1.4	1.2
Pure scientists	1.3	1.0	0.9
Applied scientists	3.4	3.1	2.6

Higher degrees	1965-66 (per cent)	1966-67 (per cent)	1967-68 (per cent)
Total emigrants	14.2	13.8	13.3
Pure scientists	19.5	19.1	18.0
Applied scientists	10.9	11.8	9.8
Permanent emigrants	6.7	6.9	6.2
Pure scientists	6.7	7.0	6.5
Applied scientists	8.6	9.5	6.8

"Total emigrants" and "permanent emigrants" are shown as percentage of the total number of graduates (42,615 for first degrees; 9,135 for higher degrees). "Pure scientists" as percentage of pure science graduates (12,993 for first degrees; 3,931 for higher degrees). "Applied scientists" as percentage of applied science graduates (8,198 for first degrees; 2,280 for higher degrees). Permanent emigrants are "those who may reasonably be assumed to be lost to the British market at least for some years".

tion. Even allowing for subsequent emigration by some of those who start work in Britain, the UGC's figures suggest that many of the interviewees will have had second thoughts by the time they graduate.

TELEVISION BROADCASTING

Cable Talk

It is one thing to show, as Rediffusion's laboratories have in Britain, how cables can bring many more television channels into the home than can aerials on the roof. It is something else again to work out how cable television is to co-exist with conventional television broadcasting. In the United States, the broadcasting industry regards cable television as the dog in the manger. It steals programmes out of the air without paying for them, and transmits them to subscribers for a fee. And it threatens to grow into a national network, local cable companies joining up and perhaps receiving their signals from satellites, bypassing the conventional broadcasting networks altogether.

A report released last week by the Rand Corporation suggests how cable television might be encouraged to grow without running wild. Cable operators should be allowed to carry whatever programmes from whatever distance they choose (the Federal Communications Commission now places severe restrictions on their freedom to import signals), but they should pay for what they take. They should be allowed to originate programmes themselves (the first real hope that something like local television will ever come to pass) and they should be allowed to sell advertising—at least to pay for the programmes that they prepare themselves—and they should be allowed to interconnect into regional and national cable networks.

There is a threat in all this, in spite of the diversity implicit in the provision of 40 or 100 television channels to every television set, instead of two or three. The entire flow of information into the home would then be in the hands of a single operator. The best way round this, the Rand study suggests, is for certain channels to be given the status of "common carriers"—television service to be for sale to the public, just as telephone service is. The American Civil Liberties Union, incidentally, has also put its weight behind this idea.