

planning to carry out a survey among universities of the extent to which the new budget would make it necessary to curtail the scale of operations. He said that similar surveys were carried out among physics departments after the budget cuts of the past two years, and that the results had been found to be of some value to agencies of the federal government in their battles with Congress.

The extent to which physics typifies other scientific disciplines is not at this stage clear—given that its involvement in the new environmental programmes is less direct than that of, say, biology, it would be no surprise if physics turned out to be a particular hard luck story. Some of the features of the labour market in physics have, however, been documented in a report for the American Institute of Physics by Susanne D. Ellis (*Work Complex Study*, to be had from the American Institute of Physics, New York). On the basis of interviews with industrial physicists, employers and employees, the report points to a sharp change in the balance between industrial laboratories on the one hand, and universities and government laboratories on the other; since 1967, when the growth of university research was first halted, industrial laboratories have apparently found it easier to recruit people. At the same time, the employers interviewed seem to have been convinced that “physics education has become too specialized and graduate training, especially, is strong but narrow”. A part of the problem in industrial laboratories seems to be the need to fit physicists into disciplinary teams within which communication should be easy. Mrs Ellis, in her survey, found that universities were inclined to reply with “if the universities do not train specialists, where else can one find a research atmosphere conducive to the pursuit of a narrow topic in great detail?” The industrial employers seem also to complain, however, that those seeking jobs as physicists in research laboratories without PhD degrees tended to be too inexperienced, and that physicists were less practically minded than engineers when engaged on similar work. Mrs Ellis concludes that universities should make more effort to produce broadly trained physicists but that many potential employers were not aware of the changes in curriculum which there have been in the past few years.

Some of these issues will no doubt be raised in the study of physics that is now being carried out by the National Research Council of the National Academy of Sciences under Professor D. Allan Bromley of Yale University. The intention is to extend the work of an earlier committee under Professor George E. Pake which argued the case for continued support for university physics in a report published in 1966. On this occasion, the intention is that the committee will “necessarily consider a broader range of topics”, including the relationship between physics and other branches of science in “the current national and social context”. A statement by the National Research Council says that the new committee will try to discuss the criteria which should guide financial support for physics rather than attempt to suggest precisely what programmes should be followed. The committee says that it will welcome constructive advice on the task which it has undertaken. The chances are that it will find itself having to pay close attention to the character of physics education at universities.

HIGH ENERGY PHYSICS

Robbing Peter to Pay Paul

THE Joint Committee on Atomic Energy seems reluctantly to be presiding over the shrinking of high energy physics. In his evidence to the committee on Tuesday this week, Mr Paul McDaniel of the Atomic Energy Commission explained some of the consequences of closing down the Princeton-Pennsylvania accelerator, and of restricting work at the Cambridge electron accelerator to that concerned with electron beams. Between now and June 1971, he estimates, there would be a reduction of ten in the manpower involved in high energy physics in the United States. The most spectacular decrease would be associated with the Princeton-Pennsylvania accelerator where the work force consists at present of 180 scientists, but more than sixty people would also leave the Cambridge operation. At the same time, he said, there has been a reduction in all the contracts let to the operators of the accelerators which will continue working.

One of the ironies of the situation that has developed is that nobody is quite clear what will now happen to the Princeton-Pennsylvania accelerator, the facilities at which are worth \$39 million. By all accounts, the fixed equipment now belongs to the universities collaborating in the venture, and Professor D. H. White, director of the laboratory, told the Joint Committee that he is hoping to raise enough money to keep the machine in operation either from the National Science Foundation, private foundations or even the universities themselves. Dr White said afterwards that the position of many research students engaged on work at the accelerator is very much in doubt, and that many of them will no doubt be “ruined”. He reckons that as little as a million dollars a year might be enough to keep the machine in being for two or three years, in the hope that by then the climate will have improved a little. Dr McDaniel agreed that “with the Princeton-Pennsylvania accelerator, we’ve cut too deeply—one can’t turn on and off scientific activities like these”. The new 200 GeV machine in Illinois is by contrast pushing ahead, although it seems now to be clear that the machine that eventually delivers the first beam of protons in 1972 will be as spartan as any machine could be. This year, the AEC was apparently hoping to persuade the Administration to let it spend \$112 million on the machine, but it was given authority for only \$65 million. The result is that equipment for using the beam is being deferred.

If high energy physics has taken the brunt of the Administration’s economies in the Atomic Energy Commission’s parish, however, two parts of the research programme will prosper. First, the Los Alamos meson production facility seems to have raised everybody’s hopes that the negative pi meson will be exceedingly useful in radiotherapy. At the same time, the control thermonuclear research teams have been so heartened by the progress of the Russian Tokamak device that they are proposing to spend \$5.5 million, roughly half as much again as in the present year, on new experimental devices which are frankly intended “to go into this field in a big way”. Plainly the Joint Committee, one of the most avuncular in congress, will still have plenty to be avuncular about even if there was only the thinnest logic in one member’s suggestion that gravitational waves should also be within its purview.