The government contribution in the current financial year will amount to £657,000 and will include for the first time a contribution towards the Naples Zoological Station. It had been agreed before devaluation that the Royal Society will be the vehicle for the British Government contribution of £28,000 a year (50 million lire) towards the station so as to qualify for a seat on the administrative council of the station. Presumably the cost will now be higher.

Among the new ventures undertaken by the fellows of the Royal Society in the year past is the setting up of a study group on modern population, chiefly as a result of a discussion held at the society on May 17 this year. The chairman of the study group is Dr H. A. Cole.

Big Biology

CONSIDERATION of the philosophical bases of the International Biological Programme (IBP) has so preoccupied scientific leadership in the United States that observers elsewhere have wondered when American biologists might actually get down to specific projects, and what these might be. A stream of stately essays has been the main output so far; yet Phase 2, or the operational part of the IBP, was supposed to start last July. At that time, however, the National Committee was in the midst of Congressional hearings on IBP and its funding.

It now seems that, having scrutinized the underlying concepts of IBP more thoroughly than any other community, the United States may now undertake work that is proportionately more significant. This is clear from the most recent report of the National Committee, Report No. 3, Part I, now published. Of the greatest interest are the major integrated research projects specially developed within IBP guidelines by the National Committee and directly sponsored by it. The radical sweep of some of these programmes makes most of the efforts of other countries look very small beer. None is expected to cost less than $2 million and several will cost a great deal more.

Six such integrated programmes have already been adopted by the US National Committee and were discussed in detail in the committee's report to the House of Representatives Subcommittee on Science, Research and Development. These are: (1) an aerobiology programme to study on a world-wide scale the dispersal of airborne bio-material such as pollen, spores, algae, pathogens, and insects, to make the prediction of crop diseases and other pests more reliable and control more effective (cost $16 m); (2) large ecosystems analysis of which six contrasted regions have been chosen including a polar environment and a South American tropical forest (cost $45 m); (3) a joint Canadian study of Eskimo populations based on at least three widely separated population centres in Alaska, Arctic Canada and Greenland whose communities all stem from the same origin but which have become differentially adapted (cost $2 m); (4) intensive work on the Hawaiian "evolutionary explosion" while it remains identifiable—this rich flora and fauna has all evolved from 700 immigrant ancestors in the few million years that the islands have been isolated, but the area has already lost more land species than the whole North American continent put together through the accelerated impact of man (cost $2 m): (5) phenology within the United States, or the impact of climate and seasons on animals and plants, is expected to lead to a series of maps of the country in terms of nest-building, fish-spawning, bud development, seed production, useful for biological prediction (cost $2 m); (6) ecology of migrant populations, primarily concerned with the effects of urbanization on rural peoples and particularly those migrating from rural southern states to large city receiving areas such as Chicago (cost $10 m). All these programmes now have a research director and some sort of headquarters, although none have yet secured funds. The committee shows confidence that they will be obtained, and hopes for House sympathy over requests.

In addition, nine other major research operations are under review and a whole series of high-level "workshop" meetings are taking place this month and next to bring these to a head. They cover the adaptation of peoples to high altitudes; experimental biogeography of the sea; control of insects by plants and plants by other plants; biological control of pests, insects and other organisms; (in conjunction with Japan) adaptive processes in hybrid human populations; adaptability of primitive peoples; convergent and divergent evolution, and the physiology of colonizing species; plant gene pools; nutrition and new foods.

Apart from these committee-sponsored moves in a grand strategy, the recent report lists over 100 individually proposed schemes relevant to the IBP, many of which are going on anyway and are already financially secure. The number has now risen to a total of about 170. This section of the report is quite a rag-bag, and the items very uneven in value and interest. This section much more resembles the national programmes of other countries such as Britain where the impression is left that the IBP has provided a new system for indexing research projects already in progress.

Some of the written answers to the Congressional Sub-committee's enquiries are revealing. Asked to consider what effect a lack of funds would have on the international programme as a whole and on American scientific prestige and US standing generally, the witnesses answered: "The IBP National Committee feels that this would not greatly affect the prestige of American science. At the same time, it points out that experience in the last 15 years has demonstrated that, if any international scientific programme is to be successful, the US must take a strong and vigorous role. It applies the analogy of 'critical mass'; with added fuel the programme will 'go'; with decreased fuel the programme will falter . . ." Summing up the committee evidence: "Inadequate US support would adversely affect this international research programme. Inadequate US support and participation would delay urgently needed world-wide ecosystem research."

Anniversary in Chicago

THE twenty-fifth anniversary of the first controlled release of nuclear energy rolls around this week. The University of Chicago is holding two days of ceremonies to celebrate the birth of the nuclear age in a squash court under its football stadium on December 2, 1942. The stands at Stagg Field have now been demolished, and five of the fifty who witnessed the scene are now

dead, including the team's leader Enrico Fermi, Arthur H. Compton and Leo Szilard. Among those to be honoured by the university this week will be Robert Duffield, director of the Argonne National Laboratory.

The enthusiasts for commercial exploitation of the nuclear reaction have, in the United States at least, further cause for celebration. This year marks the tenth anniversary of the first sale of electricity generated by a nuclear power station. (The Schippingport reactor in Pennsylvania, with a new core, is still serving Pittsburgh today.) The boom in orders for new power plants is continuing; twenty-six were made known in the first three-quarters of this year compared with twenty-three in the corresponding period last year. And the contract has just been signed for southern California's combined nuclear power and desalination plant, expected to be not only the world's biggest, but one of the cheapest in terms of the delivered cost of its desalted water.

Moreover, next week should see the first nuclear explosion sponsored jointly by the Atomic Energy Commission and private industry to test the peaceful (that is, commercial) possibilities of such explosives. Project Gasbuggy, as someone has thought fit to label it, will consist of a 26 kiloton explosion 4,000 ft. down in the sandstone formations near Farmington, New Mexico. The AEC and the El Paso Natural Gas Company want to see whether the blast can release the gas locked up in an otherwise unprofitable gas field. The AEC has at least six other commercial experiments scheduled—one to get at oil, another at copper. Conceivably some day the commission could be in such heavy demand as a blaster that it might have to contract out the business of setting off nuclear explosions to a private company.

Discovery of X-rays

On November 8, 1895, W. C. Röntgen, professor of physics at Wurtzburg University, observed a phenomenon which led to his discovery of X-rays. Almost immediately after the discovery, applications blossomed at a remarkable rate, and some fell even within the ambit of the original discovery itself. Even today, when the importance of the rapid application of new ideas is widely appreciated, this rate of application is rarely if ever equalled. Dr D. Chilton of the Science Museum discussed the reasons for the rapid application of Röntgen's discovery in a paper to the history of science discussion group at the Royal Institution on November 15.

One reason for Röntgen's success seems to have been the remarkable speed at which he worked. Dr Chilton quoted from a speech by Professor Ewald—"Röntgen was a character who hated to part with an unfinished experiment by publishing it. He made the chance observation on November 8 and, working feverishly in the next six weeks, found nearly all the properties of X-rays which were to be known within the next ten years . . . Physicists and medicals alike tried to find out more about the properties of these rays than Röntgen had indicated in his ten-page pamphlet which he sent out to his friends as a New Year's gift." The reaction was certainly remarkable; Dr Chilton said that by the end of April 1896, there had been sixty-one references to X-rays in the pages of *Nature*, an average of three to four each week. By February 1, the *Lancet* was reporting that the invention was so far advanced that in Belgium it was being brought into practical use in the hospitals. This was just one month and three days after the first announcement of the discovery.

Other applications were also quickly realized, Dr Chilton said. Röntgen himself noted the way in which X-rays showed up lack of homogeneity in a metal structure, now the basis for industrial testing of metals. S. P. Thompson showed that gem stones and their glass imitations differ in their absorption of X-rays. All this, Dr Chilton said, was derived almost directly from Röntgen's first paper.

Röntgen's "chance observation" came when he was working on electric discharges within an evacuated glass tube. Working in a darkened room with the tube enclosed in black paper, he noticed that a film of barium platinocyanide, a well-known fluorescent material, showed a bright fluorescence whenever the tube was operating nearby. But if the discovery was a piece of luck, from then on Röntgen left nothing to chance.

New Building at Teddington

Mr Robert Mellish, Minister of Public Building and Works, cut the traditional sod on November 28 to mark the site of a new laboratory building at the Ministry of Technology's National Physical Laboratory at Teddington.

The laboratory, which will be known as Petavel Building after Sir Joseph Petavel, a former director of the NPL, should cost about £650,000. The NPL is already the third largest research establishment in Britain and the new three storey building will provide an extra 34,000 sq. ft. of laboratory space and 21,000 sq. ft. for offices. The main building will consist of a central reinforced concrete core containing the main staircase, lift and common services. Surrounding this will be the laboratories which, on each floor, will be divided into seven zones, each sub-divided into areas by low partitions. Although the laboratories will be without windows, thereby permitting an economical design for the engineering services, the artificial lighting and air conditioning will, however, provide a stable environment for research. The offices will be located on the perimeter of the building and will have natural light and ventilation.

Petavel Building, which should be completed by September 1969, is a departure from the normal type of research building. It has been essentially designed to meet the changing needs in research; as Mr Mellish put it, "Petavel Building is, we believe, a good answer to the request for a general purpose laboratory which would provide the conditions required for a wide range of the National Physical Laboratory's work and which would also be capable of modification to provide other conditions with a minimum of expense". The contractors began work on November 29, and it looks as if the ministry is determined to have the building finished on time.

Protein from Petroleum

Interesting results have been obtained from experiments in which yeast cells have been used to produce