

require that there should be about 630,000 places by 1976 and 780,000 by 1980. Such an expansion would put a very severe strain both on finances and on manpower, and the talks this week centred on how a variety of possible measures in the university sector could alleviate the situation. Most of the measures canvassed "in very general terms" have been bandied about before, and have caused alarm in various quarters. Four-term years, student loans, regionalization of intake, staff-student ratios and the extension of part-time and correspondence courses seem to have been predominant in the discussions. In particular, student loans and regionalization of intake have been consistently attacked by the National Union of Students, and the fact that the talks have begun without any formal student representation will no doubt cause resentment in the student body.

Although the DES statement said that "no conclusions were sought at this meeting", it also indicated that decisions will have to be made on many of these issues next year. Parliament could therefore be faced with a higher education bill during the coming session or the measures canvassed are likely to find expression in the UGC recommendations for the 1971-76 quinquennium.

PARTY CONFERENCES

Conservative Science

THE Conservative Party Conference in Brighton next week will follow hard on the heels of the Labour Conference. Like the previous occupants of the Top Rank Centre, the Conservatives are unlikely directly to have much to say about science and technology—the only motions of much concern are those on education and on the Common Market. Although these are largely restatements of accepted party policy, education will probably be a highly charged issue at the conference. The second "Black Paper" on education, which is due to be published on the eve of the education debate, could cause some embarrassment to Sir Edward Boyle, whose views are generally considered to be more liberal than those of most of his colleagues and of the first so-called Black Paper. That publication, which sold more than 25,000 copies, was primarily designed to draw attention to an alleged decline in educational standards in Britain and argued for maintaining a system of selective secondary education. The second paper is obviously intended to influence the conference when it votes on the motion proposed by the Workington Divisional Association, condemning the Government for talking of making local authorities introduce comprehensive education. Conservatives will be urged next week to take "any necessary action to remedy this proposal" when they next take up office.

A motion proposed by Mr Eldon Griffiths, on behalf of the Bury St Edmunds Conservative Association, merely restates the Conservative policy accepting the need to join the Common Market. "A major contribution to the security and prosperity of Britain" and the enhanced ability "to discharge more effectively its responsibilities for the maintenance of peace and for the improvement of conditions in the developing countries" are the chief arguments for joining the Common Market put forward in the motion. There are, however,

enough hostile motions submitted to the conference to suggest that this motion will not have an easy passage through the conference.

SPACE

Busy Weeks Ahead

from our Astronomy Correspondent

EVEN without the launch of Apollo 12 on November 14 for a landing site in the Ocean of Storms, the weeks ahead are going to be busy in space. By now, ESRO's fourth satellite should be in orbit, and launches are being prepared for the first Skynet satellite for British defence communications, the first German satellite and the third in the Italian series of "San Marco" satellites.

At the same time, the space agencies are going through an introspective phase. In the United States, people are wondering what sort of programme NASA should carry out within the framework laid down by the task force under Vice-President Agnew which reported last month. And Europeans are considering how best to set up a space organization which would combine the functions of ELDO and ESRO and yet have escape clauses for countries such as Britain which are not enamoured by part of the programme as it stands.

If the number of successful satellites produced is a fair barometer of ESRO's health, then the organization must be glad to have its fourth satellite on the stocks. The launch comes at a time when the always meagre finances of ESRO are being threatened by a proposed reduction in the French contribution. But it is difficult to see how ESRO can gain much confidence from the latest satellite, which is nothing more than the spare flight model of the ESRO 1 satellite launched a year ago. Approval for the launching came at an ESRO council meeting in March where it was the most modest of the projects which received the go-ahead. After ESRO 1b, as it is called, the next European satellite will not be until 1971.

Like its predecessor which was launched almost exactly a year ago, on October 3, 1968, ESRO 1b is to be placed in a polar orbit to study ionospheric and auroral phenomena, in particular over the northern polar regions in winter. The eight experiments which it carries are of course the same as in ESRO 1, but with minor improvements. Five of the experiments—from the Radio and Space Research Station (Slough), Kiruna Geophysical Observatory (Sweden), the Danish Space Research Institute, the University of Bergen and the Norwegian Defence Research Establishment—are to count electrons and protons of different energies and in different directions. Two experiments from University College, London, are Langmuir probes to measure positive ion composition and temperature and also electron density and temperature. The eighth experiment is from the Norwegian Institute of Cosmic Physics and consists of photometers to measure auroral luminosity.

The Skynet satellite, which was to have been launched by a Delta rocket early in October for the British Ministry of Defence, has been postponed until November, and an investigation of the series of Delta failures continues. Since September last year, four satellites have been lost because of Delta failures, including

two Intelsat 3 satellites. Skynet was built by the Philco Ford Corporation and is to be placed in a geostationary orbit over the Indian Ocean, where it is to relay messages through ground stations in Britain, Cyprus, Singapore, Bahrein and Gan. There are also two portable stations which can be airlifted, and stations on HMS Intrepid and Fearless.

RESEARCH COUNCILS

New Faces Again

AFTER serving the statutory four years, Professors J. L. Gowans, W. Melville Arnott and D. G. Evans retired from membership of the Medical Research Council at the beginning of October. Under the MRC's new charter, granted three years ago, scientific members of the council are not eligible for reappointment until at least a year has elapsed, but retired members must usually wait much longer than that before being invited back. The three new members appointed by Mr E. Short, Secretary of State for Education and Science, are Professors A. S. V. Burgen, the Cambridge pharmacologist, Professor W. S. Peart, professor of medicine at St Mary's Hospital, London, and Professor R. E. O. Williams, professor of bacteriology at St Mary's and also dean of the medical school.

Mr Short has also announced the appointment of a new lay member of the council. Although it is no longer a statutory requirement that the council shall include a peer and a member of the House of Commons, tradition persists. Mr Laurence Pavitt, MP for Willesden West, who has had considerable experience of medical matters and who was National Organizer for the Medical Practitioners' Union from 1956 to 1959 and a member of the North West Metropolitan Regional Hospital Board from 1965 to 1969, succeeds Mr David Marquand. Lay members, unlike scientific members, can be immediately reappointed after up to a four year stint on the council, but Mr Marquand, acting as a stopgap, served for only a year.

SHIPPING

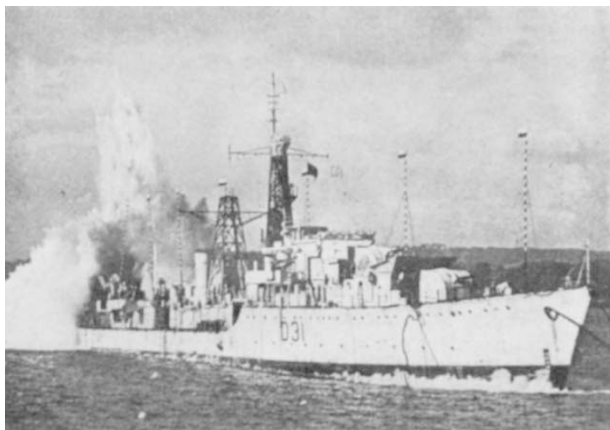
Towards a Plastic Navy

from our Special Correspondent

BRITISH defence research laboratories have recently been opening some of their doors to the public, and the Naval Construction Research Establishment in Fife last week held its first ever open days. NCRE has its headquarters at Dunfermline, but the heavy work goes on at Rosyth naval dockyard, to the west of the northern landfall of the Forth Road Bridge. On a spit of reclaimed land, NCRE tests the effects of pressure and explosions on ship structures to its heart's content. Part of its equipment is a Heath Robinson barge which can be towed into the River Forth to see what effect explosive shocks have on naval machinery, and the establishment has before now blown up obsolete destroyers and submarines on their way to the breakers' yard.

Something like 10 per cent of NCRE work is civil, according to the superintendent, Mr K. G. Evans, and the establishment could probably do more, but it would have to be at the expense of defence research. What the establishment has to sell just now is the

results that can be obtained from an apparatus which tests almost full-scale models of hull sections. So far, the test frame has been used on a seven-eighths model of a frigate section and on two three-quarter scale sections of minesweepers, but the next tests early next year will be on a one-eighth model of a centre tank and associated wing tanks of a 250,000 ton super-tanker. The aim is to check a computer program which started life as an aid to warship design but which has been adapted by NCRE to the three-dimensional structural analysis of supertankers. NCRE is particularly proud of the program because it is quick, and therefore cheap, to run compared with earlier programs—£35 instead of £20,000 were the figures given last week. Once the tests are over next June, the program will be available to the shipbuilding industry through the British Ship Research Association. The next step in this Ministry of Technology sponsored research is to be the structural analysis of design studies for 400,000 and 1,000,000 ton tankers.



HMS Broadsword being blown up. The stern was broken off and severe whipping, which can be seen here, broke the ship's back.

The Mechanical Properties Division also believes it has knowledge valuable to the oil industry, especially now that a neoteric Manhattan project has shown that tankers can sail the north-west passage to the Alaskan oilfields. This is because the division makes a speciality of the study of brittle fracturing in steels, which tends to happen at temperatures from 0° to -10° C. Brittle fracturing became a problem in the first all-welded vessels—the American Liberty ships—because the cracks can propagate across welds, and the temperature at which it occurs goes up with thickness. For a six-inch-thick plate, brittle fracturing is apparently difficult to avoid even at +30° C. NCRE has a 1,200 ton machine which can test plates up to six feet square and helps to predict the temperatures and stresses at which fracturing starts, and the establishment claims that because of this research brittle fracturing is unknown in the Navy.

On the military side, the potentialities of glass-reinforced-plastic hulls are being investigated. Plastic ships have a number of advantages including high strength for low weight, transparency to radar, magnetic and acoustic detectors, and little tendency to corrosion, and a 140 foot long mine hunter is to be built out of glass-reinforced-plastic for the Navy.