Oceanography

Excitement on the seabed

THE US oceanographic and geological community has been "set alight" by a quarter-million-square-mile survey of the Pacific Ocean floor off the west coast of the United States — a survey, completed three weeks ago with the British side-scanning sonar system GLORIA, of the 200-mile exclusive economic zone (EEZ) declared by President Reagan last year under the international Law of the Sea. The survey, says Dr Jim Gardner of the US Geological Survey (USGS) at Menlo Park, has for the first time provided a "road map" of the whole area stretching from the Mexican border in the south to the Canadian in the north, and outwards into the Pacific from the edge of the narrow continental shelf. This map reveals some 200 previously unknown volcanic sea-mounts, "spectacular canyons" 300–500 km long — apparently carrying meandering rivers of sediment along the ocean floor — and almost every kind of plate tectonic boundary.

Economically, the sea-mounts may offer sources of strategic minerals, and the canyons and ocean-floor fans will interest the oil industry both as models of older sources of oil, and as possible drilling sites. There are no indications of sea-floor manganese nodules, but these were not expected so far north.

The survey, says Gardner, who headed the American side of the US-British team that did the work, will lead to half-a-dozen priority research projects for more detailed investigation, and already \$60 million is inscribed in the USGS budget for fiscal year 1986 (yet to be approved) to pay for the work (over five years). This will be done jointly with universities, Gardner says.

In Britain, the excitement matches Gardner's, with the extra twist that the mission's success offers a real opportunity for British enterprise. GLORIA was developed at the Institute of Oceanographic Sciences (IOS) at Wormley, Surrey, and has a uniquely long range, which makes it extremely cost-effective for the survey of the 200-mile EEZs which almost every nation has declared since the 'Law of the Sea' agreement. According to Neil Kenyon of IOS, who with another British oceanographer Douglas Masson took charge of the British side of the recent GLORIA mission, GLORIA can perform an area survey 10 times faster than any competing system. It can survey an area half the size of Wales every day at a cost of \$5 per square mile, IOS claims.

As a result there is now likely to be a flood of interest in using the torpedo-like instrument to survey EEZs around the world. Already USGS is negotiating for a further five years' work with GLORIA, says Gardner, starting next year in the Gulf of Mexico, and later covering Alaska and Hawaii; and, says Dr Tony Laughton, the

director of IOS, to judge by reaction from the recent second international hydrographic technical conference in Plymouth, there are already indications of real interest in many other countries.

But that leaves IOS with an interesting problem. There is only one GLORIA. The USGS programme, if agreed, would occupy it nearly full-time. Apart from the interest of other nations, IOS scientists must have their own time with the instrument. And IOS funds, provided through

GLORIA — geological long-range inclined ASDIC — is an acronym of an acronym. Dating from the second world war, ASDIC stood for "anti-submarine detection investigation committee". The acronym came to be used to describe the acoustic echo system developed in Britain to detect German U-boats. The achievements of GLORIA represent a 40-year development of ASDIC. The photograph shows GLORIA being launched from the Farnella research vessel — a converted trawler.

the Natural Environment Research Council (NERC), are so short it would seem impossible to find the financial and human resources to build a second instrument, costing around £1 million. "If we were a commercial company, we would borrow money to build a new GLORIA on the prospect of making a profit", said Lawton. And, says IOS administrator Dr Tony Rees, "with ten GLORIAS we could cover the world in ten years".

Treasury rules, under which NERC (and hence IOS) operate, make borrowing difficult. But since the present government is in favour of enterprise, Dr Lawton is hopeful something might be arranged. Other possibilities he is considering are to establish a private company to exploit GLORIA or to license the technology to an existing company. However, too much has been published about the instrument for it to be patentable, he thinks. The potential profits are large. But IOS will have to strike the right balance between commerce and science, says Lawton. "It clearly poses some big problems in terms of our role."

Robert Walgate

European solar energy

Off to sunny Sicily

Brussels

HELPED by the European Commission, a consortium of European companies will next month launch an experiment, in Sicily, to test four types of photovoltaic cells "in the field" for the first time. According to Commission officials, the data collected could play an important role in developing cheaper and more efficient solar cells.

The project will compare fixed and sun-tracking systems of monocrystalline and polycrystalline silicon modules, and two alternative modules: flat-plate amorphous silicon cells and concentrator gallium arsenide cells. The electricity produced by the 5 kW systems will be used in small local applications. The companies involved in the design and manufacture of the components are the Italian companies

BA gets under way

THE 146th annual meeting of the British Association for the Advancement of Science (BA) opened at the University of East Anglia in Norwich on Monday, with over 3,000 visitors expected — 700 more than last year's conference in Brighton. In recent years the BA has been seeking a new identity; it may have found it at Norwich in a mix of science popularization, science politics (whither Britain?), due concern for the place of science in the developing world, and increasing efforts to link science and industry in the minds of its visitors.

To paraphrase the outgoing president Sir Alastair Pilkington (the glassmaker) the BA represents an effort to put science to work in Britain: it has a utilitarian, constructive goal. According to the incoming president, biochemist Sir Hans Kornberg — a man closer to the cuts that British science has suffered recently — next year's BA meeting at the University of Strathclyde will see a greater emphasis on basic science (and perhaps a little more polemic on its behalf) than at Norwich.

But BA officers are very pleased with the £450,000 that Norwich has raised locally to support the meeting (covering more than half its costs) and with the buoyancy of the BA young scientists scheme (BAYS), with its 130 local branches (ever increasing) which hold local meetings throughout the year. And this year there is a new departure: the BA is launching a glossy new magazine, *Link-up*, edited by John Stansell, which will aim to link university science with industrial problems.

Robert Walgate

ENEL and Pragma, and MAN and Siemens of West Germany. Only a dozen or so European companies have been seriously developing solar energy components, including photovoltaic cells. In 1981, Europe had only a 12 per cent share of the world photovoltaics markets which then totalled 6 MWP (megawatts at peak). According to Commission estimates, the world market is expected to reach 400 MWP by 1990, and Commission officials believe that Europe could corner up to 40 per cent of that market. But Europe's main competitors, the United States and Japan, have a head start because of the extensive governmental support given to work on solar energy in those countries.

The solar energy industry is well-established in the United States. The photovoltaics market is worth an annual turnover of \$55 million to the fifteen companies involved in component and systems production. The US research and development programme is extensive, while Japanese companies are forging ahead with the development of large-area low-cost amorphous silicon cells, encouraged by a MITI subsidiary, the New Energy Development Organization (NEDO).

National non-nuclear energy budgets in Europe are less generous to research in this field. Tax incentives to encourage the production of electricity using solar energy are becoming more and more frequent in the United States, but in Europe such stimulants have so far only been introduced in Denmark.

The European Community's non-nuclear energy research and development programme has contributed to bringing the cost of silicon cells down to one-fifth of their 1973 cost. According to those working in the field, the cost could be down to one dollar per watt by the year 2000.

However, the community's second pluri-annual programme came to an end in June 1983, while the ambitious budget of 379 million European Currency Units (2 ECU = £1) which the European Commission proposed for the third programme — a tripling of the previous budget — has been held up by the Community's unresolved budgetary wrangles.

In the meantime the delay continues to take its toll of research operations. Far-seeing officials earmarked funds from the 1979-83 budget to keep certain projects ticking over. But lack of funds in other projects will mean that research teams may be moved to other fields. Calls for tenders have also been delayed, so that it may be another year before work on new contracts can get under way.

In addition, extra investments allocated to the Community's advanced information technology programme (Esprit), launched this year, mean that cuts have to be made in other areas in 1984 and 1985. Solar energy research is no exception. The three largest EEC member states, West

Germany, France and the United Kingdom, have opposed the draft budget proposed by the Commission at successive research councils. The proposal is not likely to fare any better when the ten's research ministers take their next look at it in mid-October.

The potential of photovoltaics is reflected in the funds earmarked for it under the third non-nuclear energy research and development programme proposed by the Commission — half of the solar energy sub-programme (80 million ECU) which also includes developing solar architecture, passive solar heating and cooling systems, and instruments for analysis, testing solar energy systems and looking at the problems of storage and performance.

As far as photovoltaics are concerned, the Commission wants to lower the costs of cells and develop competitive large-area power supply systems during the next four years. The second area of priority is biomass. It is estimated that the conversion of biomass could eventually provide 5 per cent of the Community's energy requirement, and half a million extra jobs. The Community has a 38 per cent energy deficit at the moment. Eight of the ten member countries have to import between 48 per cent (Greece) and 81 per cent (Italy) of their energy requirement from abroad — the two energy exporters are the United Kingdom and the Netherlands.

The third area on which research is to be concentrated is geothermal energy. The Commission has proposed spending 39 million ECU to develop low temperature source applications, and look at the problems of reservoir management, fluid extraction, energy conversion and develop the feasibility of the hot dry rocks process.

The final area of research and development is wind energy. In addition to monitoring the performance of some 200 wind generators, which are scattered throughout the ten member states, Community research would be centred on the development of multiwatt machines, the improvement of blade design and engineering, improving the technology of small and medium sized machines, solving the problems of site aerodynamics, sub-system concepts and integration into the overall electrical supply system.

Anna Lubinska

Science in India

In the special issue on science in India (*Nature* 308, 581-600; 1984), in an article dealing with the administration of research (pp.591 *et seq.*), there is a reference to an academic's complaint that he had to negotiate with his university to spend Rs100. The same paragraph mentioned the Madurai Kamaraj University, and the vice-chancellor, Dr J. Ramachandran, asks us to point out that the reference was not to his university. □

Mongolia

New man backs science

THE new general secretary of the Central Committee of the Mongolian People's Revolutionary Party, Dr Jambyn Batmonh, is something of a rarity among communist leaders. The usual route to political power involves rising through the ranks of the party or military apparatus. But Dr Jambyn is a former academic with good links with the scientific community.

Educated at the Mongolian State University and at the Academy of Social Sciences of the Central Committee of the Communist Party of the Soviet Union, Dr Batmonh worked for more than twenty years in Mongolia's higher education system. In 1967 he became pro-rector, and subsequently rector, of the Mongolian State University.

In 1973, he transferred to party work as head of the central committee's Department of Science and Education. In 1974, he became chairman of the Council of Mini-

Dr Batmonh — academic makes good.

sters of the Mongolian People's Republic. Given his background, it is not surprising that his inaugural speech as general secretary stressed the importance of science and technology in raising the efficiency of Mongolian agriculture and the need to improve education and health facilities.

The son of north-Mongolian cattleherders, Dr Batmonh's *curriculum vitae* illustrates the rapid development of education in Mongolia which (apart from lamasery schools) began only five years before his birth with the foundation of a 40-pupil elementary school in Urga (now Ulan Bator). The Mongolian State University was founded only in 1942 and the Mongolian Academy of Sciences in 1941. As a result of the lack of opportunity at home, a strong tradition has developed that Mongolian scholars do at least a part of their postgraduate studies in the Soviet Union, and in many fields of research, including the application of radioisotopes, the development of the Mongolian chemical industry and the geophysical survey, Soviet scientists continue to play an important role.

Vera Rich