OCEANOLOGY

Technological Jamboree

A VISIT to the Oceanology International 72 Exhibition in Brighton left a bewildering impression of an array of technological advances and techniques which made it difficult to keep in mind how these pieces fit together and relate to the worldwide problems of how to make the best use of our environment. Of course, there was a parallel conference with the theme of "Ocean Management", and that provided a better opportunity to understand the impetus behind Oceanology 72 and the reason why so many technological trees are flourishing in this particular wood.

But just as it is difficult to believe that international motor shows are instrumental in selling cars, so it is difficult to believe that exhibitors came away from Brighton with order books stuffed full of requests for echo sounders or desalination plant.

There were, however, several items exhibited which are of particular interest to anyone who has worked in the ivory towers of university research. Perhaps the shining example of a piece of research which is beginning to find a niche in the technological world is that of the laser. No longer is this a solution searching for a problem, and indeed many of the problems which can be solved by laser applications are related to the oceans. Survey lasers which can replace theodolites have already been used successfully for tunnelling.

There is an obvious need for similar systems for marine use—in particular, any technique which can improve the efficiency of dredging operations, by providing an accurate line to steer by, would be a welcome addition to the repertoire of inshore operators. In this case, the immediate problem to be solved has been that the laser is, in a sense, too accurate. Once a dredging vessel strays out of the beam it requires some skill on the part of the crew to find it again. Now, Decca has found what appears to be the solution, and in its new marine channel lights it makes use of two HeNe lasers with spread overlapping beams. One of these lasers is on for 0.5 s and off for 1.5 s, while the other flashes intermittently for 1.5 s at a time with pauses 0.5 s long. In this way, a continuous beam is seen only in the required line of sight; as the vessel begins to stray this changes to a flashing light, and the spacing of the flashes immediately indicates the direction of the error. Such a system also has immediate application to navigation (of aircraft as well as ships).

If the laser is an example of pure research becoming applicable to technology, there are also examples of technological developments which aid research almost accidentally. One example of this which was on view in Brighton is a bottom sounder, developed by Raytheon Ocean Systems Center, which is so sensitive that it detects individual fish in the sea above the ocean bottom. To the oceanographic surveyor this is an irritation to be regarded as noise, as is the scattering layer (the nature of which is not yet clear) often recorded on these sounding charts a little way below the ocean surface. But one man's noise could be music to other ears, and the ingenious minds behind the fish trap shown in Fig. 1 might well be among those interested in an improved technique for recording the movements of fish.

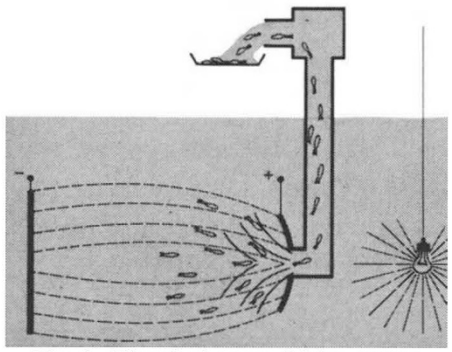

Fig. 1 Electrical ocean fishing system being developed by ACB de Bretagne. Fish are lured towards the suction nozzle of a pump by a bright light and a pulsating electrical current.

ECONOMY

More Machine Tools

MR JOHN DAVIES, Secretary of State for Trade and Industry, announced in the House of Commons last week that in order to assist the machine tool industry the DTI was granting £4-£5 million to polytechnics and colleges of education. The Department of Education and Science would also inject £1 million into universities — through the University Grants Committee—for the same purpose.

Mr Davies's statement in the Commons did not make clear to what precise use the money was to be put. A spokesman for the Department of Education and Science expressed complete ignorance of the existence of the grant and so he was unable to say whether it was to be used for research or for the purchase of capital equipment. Similarly the Department of Trade and Industry was unable to throw any light on the question.

The fate of the £1 million allocated by the DES finally came to light when a spokesman for the UGC—after much searching—announced that it was to be used for the purchase of machine tools within universities. Presumably the £4-£5 million that will go to the polytechnics and colleges of education will be used for the same purpose.

ENGINEERING MATHEMATICS

Growth Encouraged

SOME British engineering graduates are falling behind their European and North American colleagues in mathematical ability, according to a report from the Science Research Council's Engineering Mathematics Panel (Science Research Council, 1972). The panel says that this situation could be improved if mathematical engineering were encouraged as a discipline, and if there were more interchange both between the universities and industry and between mathematics departments and applied science departments within universities themselves.

Since the Engineering Mathematics Panel was set up in 1969 under the chairmanship of Professor A. Jeffrey of the University of Newcastle, it has been discussing the problem of how to encourage research and training in engineering mathematics with each of the SRC's seven engineering committees and panels. The panel particularly recommends the organization of more joint university/industry study groups along the lines of those run in Oxford by Dr A. B. Tayler. Dr Tayler's groups each consist of up to twenty people, about half from the Oxford mathematics department and half from industry; during a study meeting (usually lasting a week or two) the industrial participants raise some of the mathematical problems which have arisen in their own companies and these are then investigated by the whole group. The report says that these group meetings have thrown up problems ranging from those which make useful undergraduate exercises to those suitable as PhD topics or, sometimes, as longer term research projects.

The panel is also impressed with the way in which the engineering mathematics studentship scheme is developing. Under this scheme mathematics departments can apply for special studentships which enable graduate mathematicians to move into applied science departments. The panel thinks that the scheme should be expanded and given further publicity. Mathematics and engineering departments are encouraged by the panel to make joint applications for SRC research grants when appropriate, and engineering departments, the panel says, should carefully consider the inclusion of mathematicians in research teams—especially those teams involved in the study of transportation systems, for example.

Intensive short courses in universities to acquaint industrial mathematicians and engineers with new mathematical techniques are also recommended.