a degree which would have seemed unlikely in the months immediately after the collapse of the Mohole project—one of the less successful of the foundation's projects. The proposed spending by IDOE is, of course, a comparatively small part of the foundation's interest in oceanography. In 1969, for example, it spent \$19 million on 280 grants for research in oceanography. One of the most spectacular of the recent successes has been the way in which the drilling ship *Glomar Challenger* has been able to return a series of cores from the deep oceans, chiefly the North and South Atlantic and the Pacific, which are yielding detailed and profound confirmation of doctrines such as that of sea floor spreading. The same vessel, operated by the National Science Foundation on behalf of the universities and other interests, has been able to demonstrate that the strange mounds found on the ocean bottom of the Gulf of Mexico are indeed domes of salt similar to those beneath which oil occurs on the continental shelves—in some, indeed, oil has actually been found. The foundation also supports to the tune of \$6 million a year what is called a sea grant programme intended to strengthen the teaching of oceanography and related subjects at various universities in the United States.

The National Science Foundation's interest in oceanography, even with the new office now established, is a small part of the \$1,000 million or so being spent on oceanography of all kinds by agencies as different as the Office of Naval Research and the petroleum companies. In this sense and others, the setting up of the International Decade of Ocean Exploration does not prejudice the more ambitious proposal for setting up an organization for oceanographic research along the lines advocated a year ago by the Stratton Commission. Most probably, this issue will be dealt with in the forthcoming report on government organizations due to be presented to President Nixon on April 16.

SATELLITES

Comsat faces Life

from a Special Correspondent

THE coming year will be a testing one for the Communications Satellite Corporation. It has reached a plateau, as its annual report for 1969 shows. It now must either begin to rise or decline. Comsat's revenues from American customers using its share of the Intelsat global satellite system increased sharply, by 54 per cent—\$47 million for 1969 compared with \$30.5 million for 1968. But its income from the temporary investments made with the nearly \$200 million invested in the corporation by the American public and by telecommunications companies declined; Comsat has had to pay out considerably in the past year for the Intelsat 3 satellites (there were launch failures) and for new Earth stations and its new laboratories. Also the outage of the Atlantic satellite last summer hurt its revenues. As a result, Comsat's net income per share was up only 3 per cent—71 cents per share.

Comsat has lost its best hope for a dramatic rise in business. The Federal Communications Commission has refused Comsat the monopoly it sought over a domestic satellite system. Instead, the FCC will entertain bids from all kinds of applicants, including

Comsat's biggest rival, the American Telephone and Telegraph Company. Comsat may still be first up with all-American satellites, but if its most likely customers, the American television networks, also put up their own, Comsat's profits may be lean. The corporation still retains the managership of Intelsat and will for at least another six years, but that is worth only about \$150,000 a year. However, even if it is hemmed in domestically and internationally, Comsat can expect a good increase in earnings when the next generation of satellites, the Intelsat 4, puts five or six thousand new circuits on the transatlantic market in 1972.

MACROMOLECULAR STRUCTURE

MIT sets up Co-op

A Regional Center for Macromolecular Structure has been set up at the Massachusetts Institute of Technology by Professor Alexander Rich and Professor F. Albert Cotton. The intention is to provide facilities by means of which biologists, chemists and medical scientists, but especially the last, can make use of well organized facilities for the X-ray analysis of molecular structures and nucleic acids more or less on a service basis. Professor Rich explained this week that the new centre would be comparable with that organized at Bristol in the United Kingdom in that it would help to provide X-ray analysis for research workers who do not usually count that among their skills. To begin with, he and Professor Cotton will integrate their own facilities for X-ray analysis, but the next step is to raise enough money to support on a continuing basis a sufficient body of expertise to provide the kind of help for which outsiders are likely to ask.

New Hierarchy for NSF

FOUR assistant directors for the National Science Foundation have been nominated by President Nixon and will take up their posts in the next few months, provided that they are approved, as they must be, by Congress. The position of deputy director has not yet been filled.

The nominations are as follows:

Research—Dr Edward C. Creutz, vice-president in charge of research and development at Gulf General Atomic, San Diego.

Education—Professor Lloyd G. Humphreys, a psychologist at the University of Illinois.

Institutional Programs—Dr Louis Levin, executive associate director at the NSF since 1968.

National and International Programs—Rear Admiral Thomas B. Owen, Chief of Naval Research since 1967 and previously director of the Naval Research Laboratory.

In present circumstances, the weight which these nominees carry may turn out to be something of an embarrassment. If the National Science Foundation had twice as much money to spend, there might be more room for them to do new things.