NEWS

EXPLORING THE INDIAN OCEAN

Oceans have fascinated mankind throughout history. They cover over 70% of the Earth's surface and have remained hidden, mysterious and full of secrets. Our ancients called them *Ratnakara* and *Jalanidhi* implying thereby that they are the repositories of untold wealth. These anticipations have come true with the discovery of mineral wealth in the form of sea bed nodules. A battle is presently raging between the developed and non-developed countries over rights for the exploitation of this hidden wealth.

It was more than hundred years ago when the ship *Challenger* (1872–1876) set out to explore the sea. During the four years of its voyage, it collected a wealth of data. Sir John Murray studied the samples collected by *Challenger* and established the science of submarine geology. Depth of the ocean floor came to be determined subsequently by echo sounding and it was realised for the first time (1925–1927) that the sea bed was not a featureless plain but one with well defined mountains, valleys, plateaus and canyons. World war II gave a further fillip to ocean exploration. Since 1968, a special drilling ship, *Glomar Challenger* started deep sea drilling ship and established a world wide network of deep drill sites. This ship was equipped to drill at depths of 6000 m and sample the ocean bottom. The Joint Oceanographic Institute for Deep Earth Sampling (JOIDES) greatly extended exploration of the sea bed. This exploration and the facts it disclosed led to the theory of sea-floor spreading and plate tectonics, concepts which have caused a revolution in Earth Sciences. These new concepts have given a fillip to oil exploration and the oil industry has shifted its attention from land to off-shore, to conti nental shelf and deep sea areas.

Exploration and exploitation of the wealth hidden in the sea is of recent origin. Advanced nations having fully explored the accessible parts of the earth have now turned their attention to the sea. Demand for minerals continue to rise at an alarming rate. The seemingly inexhaustible resources on land are showing signs of exhaustion, with the result that attention is being diverted to explore the sea,where metals in low concentration are known to be present. Oceans have come to be recognised as possible important resources of metals like copper, gold, nickel, lead, zinc, and silver. Heavy minerals like monazite, zircon, rutile, chromite and ilmenite are known to be concentrated along beaches and are expected to extend into the continental shelf. Phosphorite so badly needed for the fertiliser industry is known to be concentrated in the continental shelf regions. Sea water is also known to be an inexhaustible source of magnesium, sodium, potassium, bromine, sulphur, strontium, boron and uranium. Possibility of locating commercially exploitable concentrations of diamond,platinum and gold in the shelf regions are not ruled out. Deep sea at abyssal depths, especially along mid-ocean ridges is known to contain a rich crop of ferromanganese nodules with concentrations of nickel, copper and cobalt. Sodium,magnesium and bromine are already being recovered in a big way from sea water. Large scale desalination and recovery of fresh water from the sea has been attempted in several countries.

The exploitation of the above mentioned hidden resources in the sea require technological skills of a very high order as well as enormous amounts of money. Before one reaches this stage, it is necessary to explore and get to know what we have in the shelf regions bordering the Indian coast line extending for over 6000 km. The Peninsula of India is formed predominantly of Precambrian rocks which host a number of economically important minerals. This terrain has stood as a rigid land mass exposed to the ravages of weather for nearly 2000 million years. Over this immense period of time, layers after layers of rock have got weathered and the disintegrated material transported to the sea and deposited. It is logical to expect that the winnowing action of water would have concentrated heavy minerals and metals in favourable specific horizons. The continental shelves both along the east and west coast of India are therefore special targets of exploration.

The deeper parts of the Indian Ocean are known to contain rich accumulation of ferro manganese nodules. Advanced countries have staked their claims for exploitation of minerals in international waters, while the developing and underdeveloping countries are claiming these resources as the "common heritage of mankind". UN Law of the sea conference has formulated a new sea law treaty. An international sea bed authority is now envisaged. In view of the efforts and investments already made by the Indian Government, the new law has recognised India as a 'pioneer investor'. This position has to be kept up and improved upon through development of technological skills.

Against this background of modern developments in ocean exploration, it is heartening to note the launching of two new research ships, appropriately named *Samudra Manthan* and *Sagar Kanya*. The first of these commissioned on the 22nd of June 1983 will

be operated by the Geological Survey of India. The primary task of this research vessel will be to explore the territorial waters as well as the exclusive economic zone. It will also map the deeper parts of the Indian Ocean and gather data on the polymetallic nodules and metalliferous muds on the sea bed. *Sagar Kanya* is an oceanographic research vessel acquired by the National Institute of Oceanograpy based at Goa. This vessel will be mainly engaged in meteorological studies and in the exploration of marine biological resources. With the launching of the two research ships India takes a leap forward in joining the technological run for the exploitation of the resources of the sea bed. Off-shore oil has already set the pace for the economic recovery of this country. In a like manner the exploration and exploitation of off-shore mineral deposits can be expected to contribute in the coming years to the material prosperity of the country and the well-being of its people.

Geological Society of India, Bangalore. 560 053. B. P. RADHAKRISHNA

ANNOUNCEMENTS

SECOND NATIONAL WORKSHOP ON CATALYSIS IN PETROLEUM INDUSTRY

The Second National Workshop on Catalysis in Petroleum Industry will be held at the Department of Chemistry, Indian Institute of Technology, Madras 600 036, during 8th to 10th December, 1983.

The scope of the workshop is to present the recent advances in catalysis in petroleum industry, in general and also with specific reference to the problems and possible strategies for India. The programme will include invited lectures by experts in the field from all over the country. In addition contributed papers on the related areas are also welcome. These will be presented in the poster session. No review papers will be accepted. Some of the areas covered by the invited talks will be zeolite catalysts, hydro-desulphurisation, anchored catalysts, coal conversion, catalytic processing of by-products from petroleum refineries, problems in manufacturing specific catalysts, etc. The last date for submission of abstract (in duplicate) in about 400 words is 15 September, 1983, to the Convener.

Further information may be had from Dr R. P. Viswanath, Second National Workshop on Catalysis, Department of Chemistry, Indian Institute of Technology, Madras 600 036.

SIXTH INTERNATIONAL CONFERENCE ON FRACTURE

The Sixth International Conference on Fracture will be held at New Delhi, India, during 4–10 December 1983. Contributors are invited to submit full papers for presentation at the conference on the following themes: (1) Fracture-Merchants and Mechanisms; (2) Fatigue-Mechanics and Mechanisms; (3) Failure at High temperatures-Mechanics and Mechanisms; (4) Environmental effects on fracture; (5) Dynamic Fracture; (6) Fatigue and fracture of nonmetalic materials; (7) Fatigue and fracture of composites; (8) Engineering applications of Fracture mechanics; (9) Text techniques; and (10) Failure analysis. All papers should be in English language.

Further details can be had from K. N. Raju, Deputy Director, National Aeronautical Laboratory, Bangalore–560 017