MARINE FISHERIES INFORMATION SERVICE

TECHNICAL AND
EXTENSION SERIES

No.24
October 1980

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
COCHIN, INDIA

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

UNDER WATER EXPLORATION*

Introduction

The sea-bed is considered as a major source of energy, minerals and food. One of the greatest attractions to the scientist in the sea, is the life in it. Invertebrates, fish, mammals and plants of many kinds and sizes fill the waters. Whether a person chooses to hunt them with spears or photograph them with cameras, collect them by other means or spend the time in animal watching they offer the most fascinating experience. The prehistoric man groping his hard way through existence exploited the resources of the sea even before he knew the way to use the soil. He depended for food as much on fishes as on the beasts of the forests. But there was something which prevented him from getting into the water and swim like fishes and breathe. No wonder history is replete with stories of trials and errors made by him in overcoming the barrier of water using reeds, tubes, cauldrons, swimbells etc. The post-World War II period ushered in a new era of underwater exploration. By this time considerable data and materials had been collected from the sea bottom by the various world famous expeditions with the help of mechanical contrivances, submarine vehicles, photography, echo-sounding etc., which were in the infant stage of development and perfection. Over the 35 years that followed World War II, progress in underwater technology,engineering, biomedicines, saturation-diving and automation had developed tremendously. William Beebe, Otis Barton,

* Prepared by S. Mahadevan and K. Nagappan Nair, Tuticorin Research Centre of CMFRI.

Auguste Piccard, Max Cosyns, Houot and Willm have become legendary figures by their descents in 'Operation deep' with various gadgets like Bathysphere, Bentho-scope, Bathyscaph and submersibles like *Trieste, Archi-mede* and *FNRS* 3. With the coming of 70's nations everywhere have reawakened to the importance and potential the world's oceans hold for them. Scientists are not only experimenting to probe deep into the abyssal depths of the ocean but also trying to live on the sea floor for extensive periods of time. The interest in the underwater science is growing to rival the in-terest in interplanetary excursions. Publication media

Fig. 1. Scientist exploring the sea bottom.

like 'Hydrospace', 'Underwater Science and Technology Journal', and 'Underwater Association Reports', only to mention a few, are all doing great service to the cause of developing the underwater exploration by the valuable information they give. Sea city plans, offshore living space, experimental sea bottom habitats etc., have caught the imagination of scientists as a result of automation, developments in saturation diving and hyperbaric environmental living for extensive periods while completing protracted tasks on the sea bed.

While thinking of the underwater exploration now-a-days, the first thing that strikes our mind is the picture of submersibles and other advanced equipments that are used in western countries like the U.S.A., France, U.S.S.R., Italy, U.K. and Germany. This is the image projected by films and television. The truth is that the bulk of the scientific, military and commercial exploratory diving has to be carried out in places in which conditions are difficult and necessarily different types of equipments have to be used. In practice there are many tasks that are best performed with instruments, wires, dredgers, televisions, cameras, echosounders and the like and other tasks that are best done by man only. In this connection diving skill by man becomes a vital factor in the armoury of tech-niques which are being used to explore and exploit the sea. A scientist diver can intelligently search for the specific details of features, take photographs, take measurements and write down notes on the spot of what he sees, based on hand to eye co-ordination. Man's presence is needed badly because of the benefits like decision making, ability, dexterity, compactness, mano-euvrability, agility and flexibility. The fact that these advantages constitute the real assets in our explo-rations and developments of the oceans, accounts, in part, for the increased activities of man's diving with aqualung. There is a lot to be done in the shallow limits of the ocean base with the help of the aqualung and the very nature of the cheap cost of possessing and operating the aqualung makes it all the more easy for the developing country to introduce this system of diving in the sea bottom explorations off its coast.

Fig. 2. Pearl oyster collection in progress.

Underwater work in India

Today in India only skin diving is practised in commercial fishing in some parts of the country, es-pecially in the south east coast where a section of the fishermen dive for chanks at depths up to 18 m. In almost all the major harbours the port authorities maintain a team of divers who are trained in diving with helmet and suits essentially for carrying out re-pairs and maintenance work alongside the harbour piers at shallow depths. The Indian Navy maintains its own team of 'Frogmen' solely for military reasons. Diving work as a means of doing exploratory scientific investigations was unknown till the beginning of 1958.

Through a programme initiated by the Government of India in 1958 the services of an Italian underwater diving expert, Dr. Salvadori, who is also a biologist, was obtained with the help of the F.A.O. for training Indian biologists in aqualung diving. He visited India thrice between 1958 and 1960 during the course

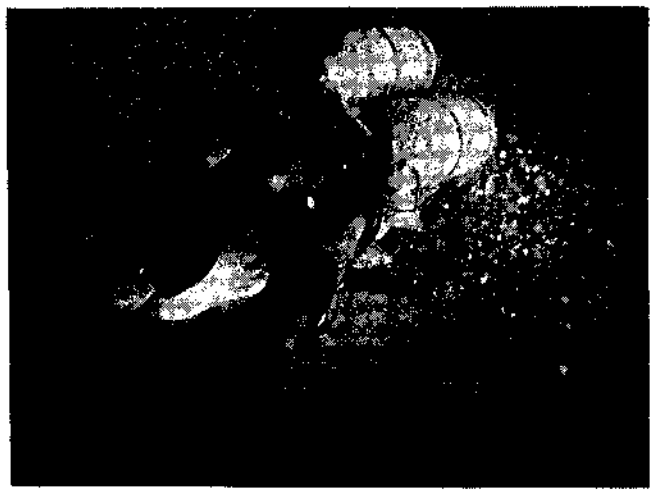

Fig. 3. Return to the launch after diving.

of which he not only trained a batch of 4 members, 2 scientists from the Central Marine Fisheries Research Institute and two technical staff of the Tamil Nadu Fisheries Department, but also conducted an initial survey of the sea bed off Tuticorin with the help of the trained scientist. This pioneering survey work was started in 1961 and completed in 1964. Many interesting scientific observations were made and published as a result of this survey. The pearl oyster and chank fishing grounds off Tuticorin were properly charted and demarcated. Till to-day these remain as the only publication in underwater research in the country.

In our country there is vast scope for the development of the diving activities with aqualung. India has the advantage of a very long coast line, extending over 6000 km with excellent locations all along the coast for exploratory diving work. Underwater study of the inshore areas will throw new light on the faunal and floral richness. Explorations of the coral reefs surrounding the innumerable islands of Andaman, Nicobar, Lakshadweep and the Gulf of Mannar by the SCUBA diving scientists of CMFRI have brought to light interesting information on the commercial possibilities in the exploitation of the many marine animals and seaweeds. The waters all around will offer enough scope for exploration and sport fishing, archaeological research, photography, fish watching, prospecting for minerals and salvage of sunken treasures and objects. Fun and pleasure can be combined with serious work.

Although development in this field involving advanced types of underwater equipments like the bathyscaph may not be possible immediately, a phased programme could be implemented. The first step would be to popularise the diving activities amongst people by introducing the aqualung system of diving. There is a mistaken impression that only people with robust health, physique and dare devil attitude can do diving work. In almost all foreign countries even whole families consisting of children, men and women between the age of 6 to 60 are attracted to this work and do diving as a hobby. So the development of this branch of work has to be viewed in its proper perspective so that diving becomes popular in India at least during the 80's.

Training in aqualung diving

People should be trained to become conversant with the use of masks, snorkels, fins and swimming at the surface at shallow depths in lagoons, swimming pools or tanks where water is clear. Side by side with this the basic principles governing the aqualung diving

Fig. 4. Group of trained technicians of the Institute ready for diving.

will have to be imparted to them. This should be followed by taking the trainees periodically for aqualung diving at shallow depths so that practical training can be imparted to them to give confidence in the use of these equipments. Once this initial period is over in a period of six to eight weeks, depending on the

ability of the individuals they can be taken to deeper areas for further experience in diving. By this time they would have gained considerable knowledge in overcoming minor and major defects which are likely to arise while diving. Organising diving clubs in several places in our country is another important aspect. These clubs will not only impart training to the aspirants but also cater information to them on all matters connected with the progress of diving activities.

The next stage in the development of the underwater activities is the manufacture of diving equipments in India itself. Abundant talent is available in our country and the necessary resources also. Enterprising firms who come forward to manufacture them should be encouraged by giving them all help. To start with it may become necessary to import equipments, but this dependence can be minimised once the interest in our country increases and the manufacturers get the confidence that their investments will bring good returns. Based on the measures of popularity of this branch during the first five years further schemes for expansion can be planned.

One of the sure ways of catching the eyes of the younger generation is by audio visual publicity, showing the interest evinced by other countries in diving activities. An educative documentary can be prepared with Indian bias to inform the people of the potentialities of underwater exploration and to popularise the aqualung diving method.

The Central Marine Fisheries Research Institute has in its regular programme a project for training scientists and technical personnel in aqualung diving. Under this project, training is given for a period of 8 weeks in the different systems and techniques of diving. Scientists, technicians and commercial diving fishermen (with some educational background) are eligible to be trained. Medical fitness of the individuals have to be checked before the commencement of the training. It is also recommended that those undergoing the training should get their lives insured by sponsoring agencies or by the associations deputing them. Tuticorin is chosen as the venue and the period of training starts during the fair weather of November extending up to the middle of April next year. It is hoped that University departments and Fisheries agencies of the various States will make the best use of this opportunity.