

creates serious pollution problems and according to one survey 1000 MW thermal power station discharges about 40-80 metric tonnes of sulphur dioxide everyday? Apart from leading to acid rain, this is a serious health hazard. So I would like to know what effective steps Government are taking to keep such environmental pollution under control and whether NTPC or any other State Electricity Board has installed such type of equipment to prevent this type of pollution.

**SHRI SHIVRAJ V. PATIL :** Sir, I have answered this supplementary in the written statement itself. The steps that are being taken by the Government are enumerated there. There are three power plants. One is with NTPC. The other one is with Madhya Pradesh State Electricity Board and the third one is thermal power station with Madhya Pradesh State Electricity Board. As far as the two power plants are concerned they have the equipment the NTPC and super power plant.

**SHRI PRATAP BHANU SHARMA :** How are you going to control the excess quantity?

**SHRI SHIVRAJ V. PATIL :** As far as the third plant is concerned—those are old plants—there are three houses and in one of the houses there is a plant, that is, electro-static precipitators. The electro-static precipitators reduce the sulphur content and bring it down to an acceptable level. These instruments are available in the two power plants. In the third power plant also in one of the houses it is available but in the other two they are not available. We have asked the Government to put up those kind of instruments and devices there so that the content of the sulphur can be reduced.

**SHRI SURENDRA PAL SINGH :** May I know if it is a fact that BARC at Trombay has during the past one or two years carried out certain experiments in the application of radiation sources for the control of water and air pollution? If so, may I know the results of the experiments and whether it will be possible to use the new technology for the purpose in view?

**SHRI SHIVRAJ V. PATIL :** This question relates to pollution but as far as pollution by radiation is concerned BARC does carry on experiments at certain levels. We all know there is radiation in the atmosphere but whether that radiation is at acceptable level or it has gone upto the dangerous level that is the question. But this kind of experiments and examinations are carried on by BARC. In thermal power stations some sort of radiation is emitted but it does not cross the dangerous level.

#### Exploration of Ocean Remains

\*868. **SHRI SRIBALLAV PANIGRAHI† :**  
**SHRI CHINTAMANI JENA :**

Will the PRIME MINISTER be pleased to state :

(a) the progress made by India in the field of Ocean Science;

(b) the names of the Ocean Science Institutes in the country engaged in the field of exploration of Ocean remains; and

(c) their achievements in the field of exploration of ocean remains and ocean deposits till date?

THE MINISTER OF STATE IN THE MINISTRY OF SCIENCE AND TECHNOLOGY AND IN THE DEPARTMENTS OF OCEAN DEVELOPMENT, ATOMIC ENERGY, ELECTRONICS AND SPACE (**SHRI SHIVRAJ V. PATIL**) : (a) to (c). A statement is given below.

#### Statement

- (a) India has made significant progress in different branches of ocean science. Our country has a very advanced institutional base in marine science. It has a very well trained team of scientists and two highly sophisticated research vessels. In all there are 958 marine scientists in the country in about 25 research organisations engaged in marine scientific investigations.
- (b) The names of the key institutions engaged in marine scientific

research and exploration are given below :—

- (1) Central Salt and Marine Chemicals Institute, Bhavnagar.
  - (2) Central Marine Fishing Research Institute, Cochin.
  - (3) Central Institute of Fisheries Education, Bombay.
  - (4) Central Marine Fisheries Research Institute, Cochin.
  - (5) Central Institute of Fisheries Technology, Cochin.
  - (6) Geological Survey of India, Calcutta.
  - (7) Indian Institute of Technology, Madras.
  - (8) National Geophysical Research Institute, Hyderabad.
  - (9) National Institute of Oceanography, Goa.
- (c) About 16 lakh sq. km area of the exclusive economic zone has been surveyed for living resources and potentially rich areas of hitherto untapped resources have been located. For non-living resources the entire western continental shelf and one-third of the eastern continental shelf have already been surveyed. India has been conducting deep sea exploration since 1976 and so far about 4 million sq. km have been surveyed to identify two mine sites for polymetallic nodules in the Central Indian Ocean.

MR. SPEAKER : I have been conveyed that you have changed the answer.

SHRI SHIVRAJ V. PATIL : That was the original answer. We wanted to give a detailed answer. Now I am laying a statement on the Table of the House. I am told by the office that copies have been given.

MR. SPEAKER : That is all right.

SHRI SRIBALLAV PANIGRAHI : We have not received the revised statement. Anyway I am putting my supplementary. We have a many-pronged programme for the utilisation of the wealth of the Indian ocean. It includes deep sea mining, harnessing of wave energy and desalination of the brackish water and survey of living and non-living and also marine sources. But, Sir, the statement supplied does not indicate any programme much less the performance relating to wave energy and desalination of brackish water. These are our two national problems. We are in dark, facing terrible shortage of energy and acute drinking water in many places. Whereas the Indian ocean provides fresh water and also there is a lot of scope of harnessing energy from the Sea. What is our programme with regard to these areas? What has been the achievement in this field so far?

SHRI SHIVRAJ V. PATIL : Sir, it has not been possible for me to give all the details in the reply about the wave energy and drinking water programme which has been submitted to this House. If I want to give that, it will run into many pages. But I can send the details about the programme to the Member. However, in short, I would like to keep this House and the hon. Member informed that as an experimental measure, we have carried out some programme. We have developed a wave energy producing technology in one of our laboratories and we want to upscale it and use it on a commercial scale. But the technology for using the wave energy in India as well as in many other countries is also not fully developed. It is in the process of development. It will take some time to perfect it and after it is perfected, we will be able to use all the wave energy that is available. As far as drinking water is concerned, in many laboratories, the technologies have been developed. In one of the laboratories—one of the CSIR laboratories and also in Geological Survey of India and one of the BARC laboratories also—the technology for providing drinking water from saline water, turning saline water into potable water, has been developed and they have been used also. We have one plant in Madras and that plant is being used now. Another plant is being set up. As far as Scientific Department are concerned, they are responsible for the development of the technologies. Once the

technology is developed, it is handed over to the agencies which use the technology and produce the machines and equipments which can be used on a large scale. The developed technologies have been transferred to BHEL and the BHEL is producing the plants which will be used. We have transferred these technologies to the State Governments also and if the State Governments want, they can use it. We have also reverse osmosis technology. We have two or three other technologies also which are being used now.

**SHRI SRIBALLAV PANIGRAHI :** My second supplementary is this. As you know, science is advancing rapidly and the time has come when the scientists in different countries are working on a concept to provide accommodation to the people in the sea. Not in distant future, people might be living in the water, of course, in the water in two or three kilometre long tunnel and the major thrust of one Science congress probably held three years ago at Tirupati, was that Ocean development should provide accommodation to the people in the Sea. Work is being done in India, in this direction also and we have made a lot of stride in ocean development. We have the Antarctica programme I would like to know what the main features of the Antarctica programme are and what the major thrust is and whether any time schedule programme is there. The answer given by the Minister reveals that we have only two Research vessels and also 958 marine scientists. Now, keeping this challenging task in view, that is ahead of us, I would like to know whether these two vessels and less than 600 scientists are adequate and sufficient and, if not, what you are doing to increase the number and also to give proper training to these people. What concrete steps are you taking in this direction ?

**SHRI SHIVRAJ V. PATIL :** The subject relating to ocean development and using the resources in the ocean was discussed in the Science Congress at Tirupati in 1983 at a very great length. It is now clearly realised that the ocean is full of resource and those resources can be used for economic development of countries. What has now to be done is to see that the technologies for using those resources are developed and once those technologies are developed, they would be used. Under the

international organization, it is stated that the ocean is the common heritage of mankind and for the development of technology international organizations are taking steps. The Sea Bed Authority is trying to develop the technologies; different countries are also trying to develop the technologies; there are multi-national corporations which are trying to develop the technologies but the level of development of technology in this area is not really very satisfactory and it is going to take some time, may be 15 to 20 years to develop commercially usable technologies.

As far as India is concerned, the development of ocean is taking place in the Department of Ocean Development, in the Geological Survey of India, in the CSIR laboratories, Fisheries Department and the Agricultural Department. We have recently acquired two very sophisticated vessels. They are like floating laboratories; one is Sagar Kanya and the other is Sagar Sampada. Sagar Kanya is used for finding out non-living resources and Sagar Sampada is used for finding out the living resources. Apart from that, the Geological Survey of India has acquired three more vessels and they are using them for this purpose. One vessel, called Gaveshini, is also available. We have about six vessels and we are using them for the development.

*(Interruptions)*

I am expected to reply to all the questions which are raised. If you had asked a question and I had not replied to any part thereof, you would have taken objection to that. But if you do not want, I can give this reply in writing... *(Interruptions)*

**MR. SPEAKER :** Let me first ascertain the wishes of the House whether they want to listen to the answer or not. Why is this whispering going on ? I would like to have calmness in the House.

**SHRI SHIVRAJ V. PATIL :** As far as Antarctica is concerned, we have sent five expeditions and all the five expeditions have come back. We have established a permanent station over there and about 14 or 15 scientists are left there for wintering and carrying on experiments in different fields. We have made a plan for studying the Antarctic conditions and the conditions which are surrounding Antarctica also.

While going and coming also, they study the conditions in the ocean. At this stage what has actually to be done is to understand and collect the knowledge relating to the ocean as such, different levels of ocean, sea water, sea bed, under the sea etc. After the knowledge is collected, after the survey is done and after the technologies are developed, within the next 15-20 years times, we would be able to use the ocean in a manner which will be really very useful to the mankind.

**SHRI CHINTAMANI JENA :** I am grateful to the hon. Minister and his Ministry. I am also grateful especially to our hon. Prime Minister who is taking keen interest in exploiting the reserves which are available in our seas. In view of the importance of ocean science, may I know from the hon. Minister whether the Government have any programme to exploit the two mining sites covering about 3 lakh Sq Km with rich deposits of poly-metallic nodules which are identified in the Indian Ocean? If so, I would like to know the details thereof.

*(Interruptions)*

**MR. SPEAKER :** Order please !

**SHRI CHINTAMANI JENA :** I am suffering from cold and I cannot speak loudly...*(Interruptions)*

**MR. SPEAKER :** You have already taken too long a time.

*(Interruptions)*

**SHRI CHINTAMANI JENA :** I cannot hear you. I would like to know whether the Government has any programme to have one separate technical board or a corporate body to tap the the sea-bed mineral reserves and also for harnessing of wave energy, survey of living and non-living marine products...*(Interruptions)*

I cannot shout because I am suffering from cold.

**MR. SPEAKER :** Is your voice also drowned in the ocean ?

**SHRI CHINTAMANI JENA :** I want to know whether the Government has any programme to set up a technical board or a corporate body...

**MR. SPEAKER :** Are you reading a statement ?

**SHRI CHINTAMANI JENA :** To tap the sea-bed mineral wealth and for harnessing wave energy...

**MR. SPEAKER :** I told you the other day that reading a statement while putting a supplementary question is not allowed. I will overrule that thing.

**SHRI CHINTAMANI JENA :** What to do ? *(Interruptions)*

**MR. SPEAKER :** It is not the proper way. How can I allow such a long question ?

**SHRI CHINTAMANI JENA :** I cannot hear you Sir. I have already put my supplementary.

**MR. SPEAKER :** Then, what are you doing ?

**SHRI CHINTAMANI JENA :** If you kindly allow me, I will repeat it. I want to know whether two mining sites covering about 3 lakh Sq. KM of mineral wealth are identified in the Indian Ocean and if so, what is the action taken to exploit it. I also want to know whether the Government have any programme to set up any corporate body...

**MR. SPEAKER :** There is a limit to every thing. Dr. D.N. Reddy. Next question.

#### “Control Parameters for Air and Water Pollution”

\*869. **SHRI D.N. REDDY :** Will the PRIME MINISTER be pleased to state :

(a) whether the anti-pollution efforts have been correspondingly increased with the pace of increase in imports of pesticides;

(b) if so, the details of control parameters used for air, water and food etc.;

(c) whether the imports are commensurate with gains in agricultural production, control of diseases and air and water pollution caused; and