WRITTEN ANSWERS TO QUESTIONS

[English]

Voyage to Antarctica

*457. SHRI SUDHIR GIRI: Will the PRIME MINISTER be pleased to state:

(a) the achievements of the voyage made by the Indian Scientists and Technocrats to the Antarctica in the year 1989;

(b) the financial provision made for the voyage and for the works undertaken in Antarctica in the year 1989-90; and

(c) whether any voyage would be undertaken in the year 1990-91 also; if so, the details thereof?

THE MINISTER OF STATE IN THE MINISTRY OF SCIENCE AND TECHNOLOGY AND MINISTER OF STATE IN THE DEPARTMENT OF EDUCATION IN THE MINISTRY OF HUMAN RESOURCES DEVELOPMENT (PROF. M.G.K. MENON): (a) The ninth Indian Expedition sent during the year 1989 to Antarctica successfully accomplished all scientific tasks designed for it in the field of Earth and Atmospheric Sciences, Astrophysics, Biology and Polar Medicine. These are briefly outlined in the statement give below. The ninth expedition summer team also carried out the task of converting the first Indian Antarctic Station at Dakshin Gangotri, which had outlived its warranty, into a supply base. They also erected a glass greenhouse at Maitri. A team of 22 members has stayed behind in Antarctica to continue the scientific and logistic work during the Antarctic winter. In addition to expanding the substance and quality of our research activities around the Maitri region this years a special exploratory expedition was sent to the Weddell Sea Region of Antarctica, as a part of a programme to develop first hand knowledge and understanding of the critical terrains of Antarctica, to guide us in selecting an appropriate site, if it is later decided to set up a second permanent station in Antarctica.

(b) The total sum spent for the Antarctic Programme during the years 1989-90 amounted to Rs. 12.99 crores.

(c) An expedition is proposed to be sent to Antarctica during 1990-91. Te objectives of this expedition and attendant tasks are being worked out.

STATEMENT

Achievements of the Summer Team of the 9th Indian Scientific Expedition to Antarctica (DG-Maitri Area)

I. *EARTH SCIENCES*

1. Geological mapping of a 1000 sq. km. area in the Humboldt mountains, nearly 100 km south of Maitri, was completed on a scale of 1 : 50000. Garnetiferous biotite gneiss was found to be the most abundant rock unit in this region, predominant minerals being, quartz, calcite, plagioclase and biotite. Finer chemical and mineralogical analysis will be carried out in the months to come.

2. A 10 sq. km area surveyed in the Schirmacher hills near Maitri revealed the presence of Sapherine bearing granulitic rocks.

3. A gravity survey was completed along five profiles covering nearly hundred gravity stations to resolve some enigmatic features seen in the aeromagnetic data which was gathered two years ago.

4. 150 rock samples from 140 stations were collected from Schirmacher hills

for fine structure geochemical analysis to model possible regimes of atomic mineral concentrations.

II *ATMOSPHERIC SCIENCES*

1. Synoptic Meteorological data was collected enroute and at Maitri. The temperature at Maitri ranged from-7.6° C to 7.8° C and surface pressure from 967 to 1009 mb. Wind velocity varied from 9.4 to 40 knots. The data collected were redioed to India Meteorological Department, New Delhi, once every six hours for climate modelling, of which Indian Monsoons constitute and important element.

2. Studies of the relationship between the ozone layer and trace gases in the Antarctic atmosphere, were continued alongwith observations of the ultraviolet radiations as a measure of ozone density.

3. Intensity of Radon, a noble gas produced in the decay chain of Uranium 238 was found to be decreasing from Goa to Antarctica and its concentration at Maitri was found to be below normal.

III *POLAR ASTROPHYSICS*

Studies of the structure and evolution of solar supergranulation were made using uninterrupted visibility of sun for several days at a stretch.

IV OCEANOGRAPHY

1. Studies of primary productivity were carried out to work out productivity of polynya and freshwater lakes. Results revealed that production levels varied mainly with light condition rather than the avialability of nutrients.

2. Lake studies indicated that the density of microfauna were abundant in semi-dry areas rather than in dry or freshly grown moss soil areas.

3. Bacteriological studies of Schirmacher lakes indicated the total absence of pathogenic *Vibrios*

V *POLAR MEDICINE*

Physiological and psychological studies were conducted on humans and rabbits to derive meaningful conclusion on the pattern and mechanism of adaptation to extreme conditions of climate and isolation.

Development of Hilly Areas of Uttar Pradesh

*458. SHRI C.M. NEGI: Will the PRIME MINISTER be pleased to refer to the reply given on 13 March, 1990 top Unstarred Question No. 231 regarding industrial backward districts in U.P. and states:

(a) the reasons for economic backwardness of Chamoli, Pauri Garhwal, Tehri Garhwal, Uttar Kashi, Almora and Dehra Dun;

(b) the action plan contemplated for removing this backwardness;

(c) the funds earmarked for the purpose in the Eighth Plan;

(d) whether specific strategy is being adopted for the development of hilly areas of U.P. keeping in view their topography, climate and inaccessibility; and

(e) if so, the details thereof?

THE PRIME MINISTER (SHRI VISHWANATH PRATAP SINGH): (a) and (b). The hill areas have some special problems