

## NEWS

## UNDERSTANDING THE EARTH - DEEP CRUSTAL EXPLORATION

While significant advances have been made in the exploration of outer space, surprisingly there has been no concerted effort at delving deep and understanding the nature of the Earth beneath our feet. Only about 10 km of the Earth below surface is accessible. The Kolar gold mine in Karnataka which is reckoned as one of the world's deepest mines has reached a depth of a little over 3 km only. Information on deeper zones in the lithosphere is mainly inferred through geophysical measurements and require to be verified and confirmed. Years ago (1957) the IUGG (International Union of Geodesy and Geophysics) adopted a resolution urging the nations of the world and especially those experienced in deep drilling to study the feasibility and cost of an attempt to drill to the Mohorovicic discontinuity at a place where it approaches the surface. Obviously, while accepting this resolution, members considered the nature of the composition of the Earth's mantle below the Mohorovicic discontinuity as one of the most important unsolved problems of geology. We are not aware of the further action taken on this resolution. There were, we understand objections saying "You won't prove anything! You should'nt do it. You can't do it!—What good will it do to get a single sample of the mantle?. The material beneath the Moho is not homogeneous and one sample cannot be expected to be representative. It might throw us off the track for years; ten or even hundred holes may be needed before we will know what the mantle is made of." To such questions, Harry Hess, that great exponent of Earth Science from Princeton University, seems to have answered "Perhaps it is true that we won't find out as much about the Earth's interior from one hole as we hope. To those who raise that objection I say, if there is not a first hole, there cannot be a second or a tenth or a hundredth hole. We must make a beginning."

We are not aware of what the Americans did further on this proposal. Russians, on the other hand, seem to have proceeded more actively on this suggestion. A recent report (Episodes 1982, p.9) has presented interim results and prospects of the Kola Super Deep Project. The Kola deep hole, it is stated, now holds the record of being the world's deepest hole having reached a depth of just over 11,500 m as on August 1982. The target is indicated to be 15000 m. Results so far achieved appear significant. Before drilling started

it was expected, based on geophysical measurements, that Proterozoic sedimentary cover (2000 m.y. age) would give place to a granitic layer at a depth of about 4700 m and basaltic layer at a depth of about 7000 m. Actual results indicated that the sedimentary cover persisted to a depth of about 6800 m, after which it gave place to granitic layer. It is still running in granitic—migmatitic complex estimated to be 2700 m.y. old and has not given place to basalt even at a depth of 11.5 km. Expected increase in rock densities does not seem to have been recorded nor any other change in the physical properties of the rocks detected. Large inflow of gases and mineralised waters are reported to have been encountered frequently at deformed zones, even at depths as high as 11.5 km where pressures are very high and normally there should be no open spaces. Solutions from these ultra depths are stated to contain bromine, iodine and higher than normal amounts of heavy metals. Among the gases detected are carbon dioxide, helium, hydrogen, nitrogen, methane and other hydrocarbons. The bore hole is also reported to have intersected sulphide ores with commercial amounts of copper and nickel at depths of 1600–1800 m and zones of crushed rock and hydrothermal mineralisation at depths of 4500–4600 and 6000–6500 m, pointing out that conditions at such increased depths are favourable for mineralisation.

Another important result relates to the knowledge about the temperature gradient. Upto 3000 m, the gradient was as expected, at 1° C for 100 m depth. Beyond this depth, however, gradient increased to 2.5° C per 100 m and at 10000 m, the temperature was 180° C instead of the expected 100° C. This unexpected increase is believed to have been caused by strong heat flow in the mantle. This may open up possibilities of harnessing Earth's endogenic heat as a source of badly needed energy.

It is understood that drilling of super deep holes is also being undertaken in oil and gas provinces of the Soviet Union in order to investigate the capacity of rocks at depth to transmit and store fluids and to determine the composition of hydrocarbons at depths of over 5 to 7 km.

These are interesting developments. We look forward to knowing more about the deep hole project

and how the difficulties attendant on drilling such deep holes have been overcome. Results of deep drilling in to the Earth can be as exciting as discoveries in space sciences. What is more important, exploration of

deeper sections of the Earth is likely to bring greater and lasting benefits to mankind than exploration of outer space.

B. P. RADHAKRISHNA.

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## ANNOUNCEMENTS

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### ASSOCIATION OF MICROBIOLOGISTS OF INDIA, C.F.T.R.I. MYSORE, WORKSHOP ON FOOD HYGIENE AND SANITATION

In the light of emerging food borne diseases leading to possible food poisoning outbreaks, the need has arisen to create awareness on sanitary methods of handling and distribution of foods. It is proposed to hold a two-week Workshop to impart knowledge and training with regard to different aspects of food hygiene and sanitation. The Secretary, Association

of Microbiologists of India, Mysore Unit, CFTRI, Mysore 570 013, Karnataka, will be able to provide further information to those interested in the subject from food processing and catering institutions. The course being organised from 16th to 27th August 1983, at CFTRI, will be a residential one involving both theoretical and practical orientation.

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### III ORIENTAL ENTOMOLOGY SYMPOSIUM (International Meet of Entomologists from the Oriental Region)

The Third Oriental Entomology Symposium is being organised by the Association for Advancement of Entomology in collaboration with the Department of Zoology, University of Kerala and the Department of Entomology, Kerala Agricultural University, during February 21-24, 1984 in Trivandrum, with a view to bringing together workers who are interested in the study of *insects*, *terrestrial arachnids* and *myriapods*

of the Oriental Region. Broad fields of the Symposium are Biosystematics & Zoogeography, Ecology & Behaviour, Physiology, Agricultural & Forest Entomology, Cytology & Cytogenetics and Medical & Veterinary Entomology.

Those interested can contact Dr N. R. PRABHOO, Convener, Department of Zoology, University of Kerala, Kariavattom, Trivandrum-695 581, India.

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