THE INDIAN ACADEMY OF SCIENCES : XXXII ANNUAL MEETING

THE Thirty-Second Annual Meeting of the Indian Academy of Sciences was held on the 20th, 21st and 22nd December 1966, at Madurai under the auspices of the Madurai University. The session was inaugurated by Sardar Ujjal Singh, Governor of Madras and Chancellor of the University. Prof. T. P. Meenakshisundaram, Vice-Chancellor of the University, welcomed the large gathering of Fellows, Delegates and the public. Sir C. V. Raman, President of the Academy, delivered the presidential address on "The Eye and Vision" in which he explained some of the significant results that have emerged from his most recent studies on human vision.

Dr. Raman said that one of the most remarkable features of the faculty of vision was that it served one over an enormous range of strength of illumination, but quite differently in bright light and in dim light respectively. It had hitherto been believed that there were two distinct types of vision known as *photopic* and *scotopic*. Functioning at these two different levels of brightness, photopic vision enabled one to perceive both light and colour, and scotopic vision only light but no colour ; while acuity of vision was high in photopic vision and very low in scotopic.

Dr. Raman's investigations have established that in reality there is only one type of vision. It has been proved by him that the fading away of colour and of visual acuity in dim light are both consequences of the corpuscular nature of radiation. It is also found that the spectrum of white light progressively alters in its features with diminishing brightness of luminosity. In bright light the yellow region of the spectrum is dominant. But in dim light both the red and the yellow sensations weaken and ultimately disappear. The blue end of the spectrum is but weakly observable in dim light and, at the lowest levels of brightness, it also disappears. Only the green region of the spectrum then persists. This is beautifully demonstrated by observing the sky on a clear moonless night through various colour filters. Through a green filter all the features of the night sky are clearly visible. But through red and blue filters the sky appears very dark, and only a few of the brightest stars can be glimpsed. These facts of observation lead one to conclude that the so-called visual purple present in the human retina, far from playing an active role in the perception of light, is to be regarded only as a physiological exudate which serves to keep the retina with its nervous structures in a state of health.

In the scientific meeting in Section A, on the forenoon of the 21st there was a symposium on "Active Solar Regions" under the Chairmanship of Dr. K. R. Ramanathan. Dr. M. K. Vainu Bappu, Director of the Kodaikanal Solar Observatory, spoke on "Chromospheric Active Regions". This was followed by a talk by Dr. Vikram A. Sarabhai, Chairman of Indian Atomic Energy Commission, on "Active Regions and the Interplanetary Medium". Dr. U. R. Rao, Physical Research Laboratory, Ahmedabad, reviewed the "Recent Advances in Our Knowledge of Interplanetary Space". Dr. K. R. Sivaraman of the Astrophysical Observatory, Kodaikanal, spoke on "The Development of Active Regions on the Sun". Dr. J. C. Bhattacharya and Dr. A. Bhatnagar, also of the Kodaikanal Observatory, presented papers respectively on "Solar Magnetic Fields" and on "Sunspot Velocity Fields".

In the afternoon session of the 21st the following papers were presented and discussed : "High Resolution Studies of Active Solar Regions at Microwave Frequencies" by Dr. Govind Swarup of the Tata Institute of Fundamental Research, Bombay, "Radio Burst Characteristics" by Dr. M. R. Kundu (TIFR). "Composition and Propagation of Solar Cosmic Rays" by Dr. S. Biswas (TIFR) and "Solar Cosmic Rays" by Dr. R. R. Daniel (TIFR). Dr. A. P. Mitra of the National Physical Laboratory, New Dtlhi, spoke on "Ionospheric Effects of Solar Flares".

Mr. C. Ramaswamy, Director-General of Observatories, Retd., gave a talk on "Monsoons of the World and the General Circulation of the Atmosphere".

In the forenoon session on the 22nd in Section B, Chairman Dr. N. K. Panikkar, Director, National Institute of Oceanography, gave an address on "New Perspective in Brackish-water Biology". This was followed by a talk on brackish-water characteristics by Dr. Qasim (Biological Oceanography Division, NIO, Ernakulam). B. N. Desai and M. Krishnankutty (also of BOD, NIO, Ernakulam) presented a paper on "Studies on the Benthic Fauna of Cochin Backwater".

Prof. S. Krishnaswami (Madurai University) presented some interesting results of work being done by the group in the Zoology Department

of the University with special reference to ionic regulation mechanisms in some brackish-water fauna.

In the Symposium on "Molecular Biology" Dr. L. K. Ramachandran (Osmania University) gave a talk on "Primary Structure of Proteins". This was followed by two papers on "Conformation" by the group working at the Centre of Advanced Study in Biophysics, University of Madras. Dr. V. Sasisekaran spoke on "Conformation of Nucleotides and Nucleic Acids", while Dr. V. S. R. Rao spoke on "Conformation of Polysaccharides".

In the afternoon session on the last day under Section B, Chairman Professor T. S. Sadasivan, Director, U.G.C. Centre for Advanced Studies in Mycology and Plant Pathology, Madras University, gave an address on "Physiology of Plants under Stress". Dr. A. Sreenivasan (Biochemical and Food Technology Division, Atomic Energy Establishment, Trombay, Bombay) gave a talk on "Regulating Mechanisms in the Living Cell". Dr. T. N. Khoshoo, Assistant Director, National Botanic Garden, Lucknow, gave an illustrated talk on "Experimental Manipulation of Chromosomes".

Dr. (Mrs.) V. C. Anguli (Stanley Medical College, Madras) read a paper on "Emigration of Filarial Embryos from the Habitat of the Parent Worms to the Blood Streams".

There were two public lectures during the session: the first by Dr. S. Bhagavantam (Scientific Adviser to the Minister of Defence) on "The Atomic Nucleus" on the evening of the 21st, and the second on the 22nd evening by Dr. Jacob Chandy (Medical College and Hospital, Vellore) on "The Human Brain".

ABSTRACTS OF PAPERS PRESENTED AT THE 32ND ANNUAL MEETING OF THE INDIAN ACADEMY OF SCIENCES

Active Regions on the Sun and the Interplanetary Medium

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Cosmic rays from the galaxy provide unique probes to study the magnetic fields stretched out from the sun by the continually expanding corona which forms a solar wind with a radial velocity of 300 to 500 km. per second, filling up all interplanetary space. Evidence of the wind can be seen in comet tails which always point away from the sun. The earth in the solar wind is like a stationary object in a stream of water. We have the formation of a bow wave and a wake.

There are three aspects of solar activity which are of great significance to interplanetary conditions. Firstly, the activity on the sun occurs in localised regions; secondly, this activity is concentrated in regions of latitude which migrate towards the solar equator as the 11-year sun-spot cycle advances; and thirdly, the northern and southern hemispheres of the sun are not equally active and in consequence there is marked north-south asymmetry at most times. These features have been taken into account in a new model of the topology of interplanetary conditions proposed by me in 1963. In essence, it postulates that interplanetary space has a sector structure which rotates with the sun as it spins on its axis. The sector structure reveals itself through 27-day recurrences of many cosmic ray and geomagnetic effects. The sector structure due to quasi-stationary active regions on the sun has also been demonstrated in recent space experiments.

It was shown for the first time in analysis made by us two years ago that cosmic rays from the galaxy have often a deficiency in the direction of the interplanetary magnetic field. The new experimental observation emphasised the importance of magnetic field conditions in influencing the diffusion of cosmic rays into the solar system. A model recently suggested by me in collaboration with Dr. G. Subramaniam involves diffusion of cosmic rays that does not occur symmetrically at all latitudes of the sun. The mechanism appears to present a way of understanding the semi-diurnal component of cosmic rays and the associated changes of intensity which can be observed in cosmic rays measured on the earth.

One may hope that with the use of high-counting rate cosmic ray instruments it would be possible to study the interplanetary conditions in regions away from the solar equatorial plane, about which so far we know very little.