

THE INDIAN ACADEMY OF SCIENCES : XXXIV ANNUAL MEETING

THE Thirty-fourth Annual Meeting of the Indian Academy of Sciences was held on the 22nd, 23rd and 24th December, 1968 in Ahmedabad at the invitation of the Physical Research Laboratory, Ahmedabad. The inaugural function was held on the 22nd evening at the Tagore Hall before a large gathering of Fellows, scientists and distinguished public. Dr. Vikram A. Sarabhai, Chairman, Atomic Energy Commission and Secretary, Department of Atomic Energy, Government of India delivered the Welcome Address. After introduction of the Fellows of the Academy present at the session, the President Sir C. V. Raman, Nobel Laureate, delivered the Presidential Address on "Floral Colours and their Origins".

Dr. Raman said that a very wide range of floral colours arises from the presence of a set of discrete and well-defined bands in the absorption spectra of the flower petals. Thus all flowers exhibiting colours ranging from the palest blue to the deepest violet, show three distinct absorption bands respectively in the red, yellow and green regions of the spectrum. Likewise, flowers exhibiting colours ranging from a reddish-purple to crimson red exhibit three well-separated bands respectively in the yellow, green and greenish-blue regions of the spectrum. He has named the pigments present in the flower petals having these properties as Florachrome-A and Florachrome-B respectively. In many cases these pigments can be readily extracted from the flower petals by simple immersion in acetone. The extracts exhibit the same absorption spectra as the flowers and retain their colours for fairly long periods without fading away.

According to present ideas floral pigments are identified with one or another of the class of substances known as anthocyanins. The extraction and purification of these anthocyanins involve the treatment of the flower petals with acids, and their absorption spectra as reported bear no resemblance to the observed spectra of Florachrome-A or Florachrome-B. It is difficult in the circumstances, said Dr. Raman, to accept anthocyanins with the structures assigned to them, as being truly the pigments responsible for the observed colours of the flowers.

The joint scientific meetings under Sections A and B were held on the 23rd and 24th in the lecture theatre of the Physical

Research Laboratory. The forenoon session on the 23rd was presided over by Prof. T. S. Sadasivan, Director, University Botany Department, Madras, who addressed the gathering on "Osmoregulation in Pathogenesis". This was followed by an illustrated lecture by Dr. M. S. Swaminathan, Director, Indian Agricultural Research Institute, New Delhi, on "The Genetic Betterment of Yield and Quality in Food Crops". Then two papers were presented, the first on "Effect of Pressure on Optical Rotatory Power" by Dr. S. Ramaseshan, Head of the Material Sciences Division, National Aeronautical Laboratory, Bangalore, and the second on "Meteorites as Probes for Studying the Archaeology of Cosmic Rays" by Prof. D. Lal of the Tata Institute of Fundamental Research, Bombay.

The afternoon session under the Chairmanship of Prof. T. R. Seshadri of Delhi University, started with his address on "A Line of Development in the Chemistry of Natural Products". This was followed by a talk on "Meteorological Instrumentation for Atmospheric Studies" by Miss Anna Mani, Director (Instruments), Meteorological Department, Poona. Dr. C. Ramaswamy, Retired Director-General of Observatories, spoke on "The basic causes of large-scale deficiency in the South-west Monsoon Rainfall over India in 1965 and 1966". Dr. N. A. Narasimham, Head of the Spectroscopic Division, Bhabha Atomic Research Centre, Bombay, gave an account of some recent developments on Electronic Spectra of Simple Molecules".

In the evening public lecture held in the Senate Hall of the Gujarat University, Prof. G. N. Ramachandran, Centre of Advanced Study in Biophysics, University of Madras, spoke on "Molecular Biology". Prof. Ramachandran discussed the relationship between structure and function of biological macromolecules in the light of the data that have come to be known within the last decade or so. In these large molecules the primary structure alone is not sufficient to define the nature of the factor responsible for biological activity. Secondary and tertiary structures, based on the folding of the chains play a vital part. Studies on physical chemistry and molecular physics have thrown much light on the nature of mechanism of this folding. X-ray crystallographic studies have also revealed much information on the types of folding that take

place. Prof. Ramachandran also explained the nature of the fold in proteins, in nucleic acids and in polysaccharides in relation to their biological function.

On the 24th the forenoon session was held under the Chairmanship of Prof. G. N. Ramachandran. The opening lecture was by Dr. M. G. K. Menon, Director, Tata Institute of Fundamental Research, Bombay, who spoke on "Recent Work in Muon and Neutrino Physics". This was followed by an interesting talk on "High Pressure Phenomena in Solids" by Dr. A. Jayaraman of the Bell Telephone Laboratories, New Jersey. Prof. C. N. R. Rao, Indian Institute of Technology, Kanpur, spoke on "Charge-Transfer Spectra and Organic Semiconductors". Prof. S. Chandrasekhar of Mysore University gave an account of a recently developed theory on "Optical Properties of Cholesteric Liquid Crystals". Dr. Satya Prakash of the Physical Research Laboratory discussed a paper on "Study on Plasma Noise in the Lower Ionosphere using Rocket-borne Langmuir Probe and Plasma Noise Probe".

In the afternoon session of the 24th, Chairman Dr. N. K. Panikkar, Director, National Institute of Oceanography, spoke on "Crustacean Physiology in relation to Prawn Culture". The following three papers were presented and discussed: "Chief Factors which control Activity of the Southwest Monsoon over the Indian Sub-continent" by Dr. B. N. Desai; "Adaptation of Gene Erosion in Some Crop Plants" by Dr. B. R. Murthy; and "X-Ray Flux from Celestial Sources" by Dr. U. R. Rao. There was an evening public lecture on "Recent Studies on Some Nutritional Disorders" by Dr. C. Gopalan, Director, Nutrition Research Laboratories, Hyderabad.

As this year of the Academy's Annual Meeting marked the 80th Birthday of its President Sir C. V. Raman, a special banquet was held on the 23rd at which felicitations were offered to him. A tastefully got-up Souvenir Album containing the signatures of the Fellows of the Academy was presented to Sir C. V. Raman to mark the occasion.

ABSTRACTS OF PAPERS PRESENTED AT THE 34TH ANNUAL MEETING OF THE INDIAN ACADEMY OF SCIENCES AT AHMEDABAD

Osmoregulation in Pathogenesis

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One of the very early events in pathogenesis of bacterial, fungal and viral diseases of plants is a disturbance in osmoregulation. This is a consequence of the establishment of nutritive relationship by parasite with the host tissues. In obligate parasite-susceptible host combinations, the parasite, whether a rust or a virus, puts a heavy stress on nitrogen at cellular or sub-cellular level. An interesting case has been reported recently of a rust of bean recalling nitrogen compounds from the root in large quantities in a susceptible variety. In the case of facultative parasites there are even more adverse consequences.

Extracellular toxins/enzymes of pathogens diffuse out from infected areas and alter permeability. Pectic enzymes of bacterial or fungal origin attack the structural integrity of host tissues, whereas toxins act in a more subtle manner. Permeability is increased by non-specific toxins like lycomarasin, fusaric acid, alternaric acid, picolinic acid, etc. Lycomarasin and fusaric acid also interfere with iron distribution in plant tissues by their

chelating ability. Specific toxins like victorin not only bring about changes in permeability in the susceptible oat variety but also increase host tissue respiration. This increased tissue respiration does not seem to be brought about by victorin itself. It has been suggested that salts or other materials leaking from the vacuole and coming in contact with mitochondria might increase respiration, particularly as victorin has no direct effect on the mitochondria. Victorin added to isolated mitochondria does not affect the release of electrolytes or oxidative phosphorylation. Thus, the toxin produces indirect effects on mitochondrial activity but the relation of these effects to tissue respiration remains to be determined.

In soil-borne pathogenic wilt of cotton, ionic imbalance results in an accumulation of divalent cations like Ca and Mg and a marked diminution of K and Fe in leaves. It is difficult to visualize how pectic enzymes alone can act as protoplasmic poison; indeed, it may make plant cells more susceptible to toxins and toxic metabolites.

Hyperauxiny and the appearance of substances like gibberellins and kinins have been demonstrated in diseased tissues. These sub-