of their proximity to the Kurudwadi region have possible territorial extension beneath the traps.

In addition to the above features, some other interesting features have also been brought in the Bouguer map. The combined feature of subsidence and uplift indicated near Nasik is a zone close to the areas known for intense discharge of magma through volcanic vents in the Narmada and Tapti valleys. The thickness of traps as indicated by the seismic surveys is of the order of 1400 meters pointing to repeated cycles of volcanic activity.

The broad closure of — 85 milligals in the Koyna-Karad area is suggestive of a synclinal sag which might have been formed due to the westward flow of a thick sequence of lava erupted through fissures near the coast.

The well-known Panvel flexure near the Bombay coast is well brought out by the positive gravity values with a very high westerly gradient for the contours and this feature actually appears to be a deep fault extending to the south up to Ratnagiri evidence for which has been published by the authors (Kailasam *et al.*, 1969). There is almost a virtual isolation of the positive anomaly values in the Bombay and Surat regions in the belt of dyke clusters adjoining the Arabian sea.

The arcuate swing of the band of contours eastward beyond latitude 20° 30′ N and longitude 74° E, with smaller gradients than are indicated in the Panvel region, bring out the relationship with the known parallel east-west fault scarps in the Godavari and Tapti valleys of the Satpuras whose dominant trend is the same.

The Airy-Heiskanen anomaly map faithfully reproduces the features brought out in the Bouguer map, reflecting the isostatic stability of the areas where the Bouguer anomalies are strongly negative in the ghat section and even more strongly positive in the coastal tracts. A crustal thickness of the order of 38 kilometers is indicated in the central parts with progressive thinning towards the sea.

The gravity data have brought out two major lineaments, one along the west coast and the other along the 21st, parallel; and no major fracture zones have been indicated barring the one along the west coast and the other along the Satpuras. The results further indicate that the repeated cycles of the Deccan activity have given rise to zones of subsidence with interior basins and uplifts in this negative platform of the Deccan 'syneclise', lending credence to epeirogenic movements presumed by geophysicists and geologists.

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PROFESSOR CHANDRASEKHARA VENKATA RAMAN (HIS LIFE AND WORK)
BY S. BHAGAVANTAM*

THIS is the biography of a scientist by a scientist, the portrayal of a master by a pupil.

It is not always an easy task to write the biography of a great man. Especially is this so if the subject is both a genius and an idealist. As a genius he has achievements to his credit, and as an idealist he has attitudes which are likely to be misunderstood. The biographer himself should have a certain greatness of understanding and outlook to appreciate these qualities and present them in their proper perspective. Dr. Bhagavantam is eminently suited for this, and the picture he presents of Professor C. V. Raman in this short sketch is as scintillating as the subject himself.

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Dr. Bhagavantam, one of the distinguished students of Professor Raman, is well known for his many research contributions in Raman Effect, magneto-optics, crystal physics, group theory, and ultrasonics. In his young years he joined as a research scholar under Professor Raman and worked both at the Indian Association for the Cultivation of Science, Calcutta, and at the Indian Institute of Science, Bangalore, of which, years later he became the Director. He was long connected with the Andhra and Osmania Universities where, amongst other disciplines of research, he founded the School of Ultrasonics, the Silver Jubilee of which was celebrated recently (p. 46).

Like Professor Raman, Dr. Bhagavantam held various high scientific positions in the country, both academic and administrative. For over nearly four decades he remained in close contact with Professor Raman and his scientific activities. He has been associated with the Indian Academy of Sciences from its inception, and also with the Raman Research Institute. Thus he can write with authority and intimate knowledge on Professor Raman, and the book reveals this on every page of it.

Professor Raman (1888–1970), the discoverer of the "Raman Effect", the Nobel Laureate, one of the outstanding physicists of the century, was admired by contemporary scientists, and held in honoured esteem during his lifetime. His name will continue to find an abiding place in the history of Indian Science, and in the history of physics of the present century. His razor-sharp mind remained active till the end and as he told the doctors who attended on him during the last days of his brief illness "I do not want to survive my illness if it means anything less than a hundred per cent active and productive life" (p. 85). He would only have "life added to his years, and not years to his life".

Those who had listened to the Gandhi Memorial Lectures (p. 85) which Professor Raman used to deliver every year on the 2nd October at the Raman Research Institute, would have been impressed by the sharpness of his intellect and the freshness of approach he brought to each topic of his talk. In these extempore lectures which were more or less "think alouds", Professor Raman shared his thoughts with his audience, and they often presented evidence of "his intuition getting ahead of mathematical logic" (p. 46). Some of these ideas which he propounded in these talks are yet to receive a wider publicity, but there is no doubt that when this is done, the rigorous mathematics underlying them will follow soon and form the basis of further extensive researches.

In ten short chapters of this biography, Dr. Bhagavantam presents to the reader a panoramic view of Professor Raman, his life, and his work: dealing successively with his parentage and early education, his researches in his college days, his service as a government officer, his choice "to surrender the preferments of office in favour of the pursuit of knowledge" (p. 17), the "golden era" (p. 20) of his activity at the Indian Association for the Cultivation of Science, Calcutta and the discovery of the Raman Effect, his creation and development of the Department of Physics at the Indian Institute of Science, Bangalore, his intensive studies on diamonds, the founding of the Indian Academy of Sciences, the establishment of the Raman Research Institute, and finally, his researches in the last few years of his life with special reference to floral colours, and the physiology of vision. There is also an appropriate reference to Smt. Lokasundari Raman, happily still with us, a highly talented lady interested in social welfare work, but who, in line with the best of Indian traditions, regarded her primary duty as one of self-effacing devotion to her husband. Her "principal interest in life has been only one and that was to enable Professor Raman carry on his scientific work with efficiency and in an uninterrupted manner (p. 90).

The book contains many interesting quotations and anecdotes. But the two long extracts in it deserve special mention: The article "The Diamonds of the Krishna Valley" (pp. 70–76), which Professor Raman wrote in 1968, just two years before his death, shows how in tackling any problem Professor Raman worked "with much concentration of mind and with deep personal involvement" (p. 76). The second extract on the Raman Research Institute (pp. 59–62) which indeed may be called his last testament, is a study of the conflict between "idealism" and "practicalism".

Dr. Bhagavantam in this brilliant study of his master has brought out a correct and balanced appreciation of Professor Raman, understanding him as he himself would have liked to be understood. The book will act as a source book of essential information for future biographers of this great Indian scientist.

A. S. GANESAN.