

APPADVEDULA LAKSHMI NARAYAN

(1887-1973)

Foundation Fellow

BIRTH, PARENTAGE AND CHILDHOOD

APPADVEDULA LAKSHMI NARAYAN was born in 1887 in an orthodox brahmin family to Appadvedula Vyasulu and to Mahalakshmi in the village Mukkamala in Konaseema of East Godavari District of Andhra Pradesh (then Presidency of Madras). His parents were pious Hindus, well versed in Vedic culture and customs.

Departing from his family tradition of studying Vedas and Sastras, Dr Narayan took to English education from his childhood. He studied upto matriculation in the higher secondary school at Kothapeta, a taluk centre very near his place of birth. From the very beginning of his educational career, he developed keen interest in the study of science in preference to humanities and continued his studies in the Government Arts College, Rajahmundry and passed the B.A. degree with physics as his main subject, from the University of Madras, which was then the only University for the whole of South India.

Not satisfied with a pass degree, Narayan studied privately for the M.A. degree in physics, of the Madras University and passed the same in 1914. He then joined as Lecturer in Physics in Maharaja's College of Vizianagaram, one of the few degree colleges in Madras Presidency at that time. He was the first M.A. in Physics among the few from Andhra who took that degree from the University of Madras.

When Narayan joined as Lecturer in Physics in Maharaja's College, Vizianagaram, Physics was taught only upto the Intermediate level but at his initiative and with his efforts, he was able to obtain affiliation for the degree course in physics of the University of Madras in 1918 in that college.

With only four students (for which number affiliation was granted by the University of Madras) for coaching upto the B.A. degree (there was no B.Sc. degree course at that time in the University) and with the meagre equipment available in the college, he trained the first batch of students for the degree examination of 1920. In this batch was the late Dr K. Rangadhama Rao who later became a pioneer in India in spectroscopic research. The writer of this memoir was in the third batch of students.

RESEARCH CAREER AT VIZIANAGARAM

Since the start of his teaching career in 1914, Dr Narayan took keen interest in scientific developments in Great Britain and the United States. With the meagre





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grants for library he was getting, he could save something for purchase of journals like *Nature*, *Science Abstracts*, *Proceedings of the Royal Society of London*, *Philosophical Magazine*, *Proceedings of the Physical Society of London* and popular scientific journals like *Scientific American* etc. These journals helped to create in him an aptitude for research in physics.

At the same time, Dr Narayan got his inspiration from eminent physicists of the University of Calcutta, the late Professor Sir C.V. Raman and Professor M.N. Saha. Being in the Post-Graduate College of Science and Technology of that University, both these scientists had enough facilities for research provided by the then Vice-Chancellor of the University, the late Sri Asutosh Mookerjee. But Dr Narayan being in a degree college, was handicapped for want of equipment for research. But as he was tenacious and anxious to start with the meagre resources available, he researched in the field of Spectroscopy. From the grants of the laboratories for the graduate course, he could save enough to purchase two instruments for research *viz.*, one small and one medium quartz spectrographs and with these he began his work on line spectra and their analyses both in the emission and absorption types.

Dr Narayan rigged up a small workshop in which he could make his own tools and equipment necessary for his research. He did his own glass-blowing work for making discharge tubes for gases. He purchased a single-stage vacuum pump and a mercury diffusion pump for high vacuum necessary in several cases. For exciting arc-spectra, he used a dynamo coupled with a set of batteries necessary for D.C. For spark spectra requiring high voltages of the order of 15,000 volts he made use of an induction coil available in the laboratory.

What was remarkable in Dr Narayan was his resourcefulness. He could develop single-handed a research laboratory, which ranked among the best in India and enabled him to produce original work. All this he did in addition to teaching work for the degree classes which demanded much of his time. His hunger for research consumed all his evenings till late in the night.

Starting in 1921 with some general topics like coupled vibrations of a double-pendulum, mechanical oscillations of magnetically coupled oscillating circuits, modified form of double slit spectrophotometer, surface tension of soap solutions at different concentrations, sounds of splashes etc., Dr Narayan began concentrating on spectroscopy in which he specialised during the period 1923–30.

With the original papers published by him during 1922–24, he submitted his thesis for the degree of Doctor of Science of the University of Madras. He was the first D.Sc. in physics of that University. His work was much appreciated by C. V. Raman and M. N. Saha who were, at that time, foremost in the field of Physics in India and both of them gave him a lot of encouragement in his advanced studies in the field of spectroscopy.

It was at this time in 1924 that the late Dr K. Rangadhama Rao who later gained the distinction of being one of the foremost spectroscopists of India, joined Dr Narayan as a research scholar. Both of them worked tenaciously to build up a first rate spectroscopic laboratory second to none in the country.

They had then with them a constant deviation spectrograph, a small quartz spectrograph and a medium quartz spectrograph. All these were of low dispersion



and low resolving power. At this stage of their work, they required an instrument of high dispersion and high resolving power, which they could not afford. So, Ranghadhama Rao was sent to Calcutta, where a ten-foot concave grating was available in the Indian Association for the Cultivation of Science of which C.V. Raman was Director and with the facilities provided there, they could further extend their work on analysis of spectra in the visible and ultraviolet regions.

But the analysis could not be complete without extending the study of the far ultraviolet and vacuum regions. No vacuum grating spectrograph was available in India at that time. Dr Narayan purchased a grating for the vacuum region and constructed a spectrograph of his own design. The next problem was procurement of the special Schumann photographic plates suitable for this instrument. They were not easily available anywhere in the world and even when available, they were so delicate that they were liable to damage during transit. But Narayan was so resourceful and so determined to overcome all handicaps that he developed the technique of manufacturing these special plates and succeeded in using the instrument to extend his investigations to the vacuum region of spectra.

The series in line spectra which Dr Narayan analysed, had to be confirmed by study of the fine structure of these lines. So he purchased interference spectroscopes like the Lummer-Gerhcke plate and Fabrey-Perot-interferometer and in conjunction with the constant-deviation spectrograph, he could photograph the fine structure of these lines and thus confirm the analysis of the series in line spectra of several elements. In this work he had the assistance of K. Rangadhama Rao.

No work in spectroscopy is complete without covering the entire range of the spectrum comprising the visible, ultraviolet and infrared regions. So Dr Narayan began to equip his research laboratories with the components necessary for work in the infrared. This, however, had to be left incomplete because he was called to occupy the post of Assistant Director at the Solar Physics Observatory at Kodaikanal, in 1929.

NARAYAN'S WORK AT KODAIKANAL OBSERVATORY

At Kodaikanal, Dr Narayan had much better facilities in respect of scientific equipment and resources. So he started more extensive and intensive work with a view to make the institution a centre of spectroscopic research. The observatory had already become famous for observations on solar and stellar physics through the work of the great Astronomer John Evershed F.R.S., who was its Director for many years. Dr Narayan began recruiting research scholars and scientists both from India and abroad and made it a vigorous centre.

In recognition of his contributions Dr Narayan was promoted as Director of the Observatory. He was the first Indian to occupy the post.

During his regime, the library was enlarged by the acquisition of a large number of books and periodicals on astronomy, mathematics, physics, geophysics, statistics and allied sciences. He also expanded the workshop and spent considerable time in improving its working. The observatory acquired its own generator for supply of electrical energy to the laboratories, the library, the offices and to the rest of the campus.



During the Second World War, particularly after the threat to India of aggression from the Japanese, some of the senior members of his staff were shifted for meteorological work in connection with the war effort. There was interruption of research work to some extent, but Narayan could not rest contented, and carried on his research work with the meagre staff remaining with him.

After the War, the Government of India appointed a Committee for the post-war development of astronomy and astrophysics in the country, with particular reference to the expansion of the activities of the Kodaikanal Observatory, with the later Professor M. N. Saha as Chairman. Dr Narayan was an active member of the Committee and was instrumental in launching the scheme of expansion of the Observatory.

He retired from the post of Director in 1947 at the age of 60.

Narayan, a Man of Social Importance

At Kodaikanal, he had taken keen interest in the Civic life of the Hill Station. He was an active member of the Boat Club, the Kodaikanal Fellowship and the Indian Club and took part in all social activities of the small township, which was the summer resort for the elite of South India, next only to Ooty. Ooty, which was the summer capital of the Government of Madras was crowded and busy and hence, people preferred Kodaikanal at an elevation of 7000 feet above sea level. Most of them visited the Observatory which was 1000 feet higher up the town. Dr Narayan thus came in contact with eminent lawyers, businessmen, industrialists, professors and politicians. He thus became a popular figure among them.

He also encouraged his staff to actively participate in the civic activities of the town, as a change from the isolation of their place of daily work, which was far away from the township. He took keen interest in gardening and maintained a beautiful garden both in the Observatory campus as well as in his bungalow nearby. He was a strict disciplinarian in office as well as at home and very hardworking. At the same time, he was generous and sympathetic and treated his young assistants as members of his family.

During his tenure of office at Kodaikanal, he was in constant touch with centres of learning in South India. He was a member of the Syndicate, Senate, Academic Council and Boards of Studies in Physics of Madras and Andhra Universities and evinced keen interest in their academic advances, particularly in the sciences. Indeed, he played an important role in the foundation of the Andhra University in 1926 and later in the development of University courses in Arts and Sciences there. He was continually active in the several administrative and academic bodies of the Andhra University and later became its Vice-Chancellor.

NARAYAN : AN EMINENT ADMINISTRATOR

Having retired as Director of the Solar Physics Observatory at Kodaikanal, he wanted to settle down in Madras and lead a peaceful life there. But that was not to be. The Rajah Saheb of Vizianagaram, who got acquainted with Dr Narayan during his frequent visits to Kodaikanal, offered him the post of the Principal of Maharajas College, Vizianagaram which was founded by his forefathers as early as the eighties



of the last century and of which he was the Chairman of the Board of Trustees. This was the same college, where Narayan had started his teaching career in 1914 and had done most of his early research for fourteen years. He accepted the offer and thus began his administrative activity in the field of education. His administration was marked by progressive thinking, punctuality and discipline and he made the College a model for the Andhra University area.

As ex-officio member of the Senate of the Andhra University, from which body he was elected to the Syndicate, he made distinctive contribution to the advancement of learning in the University, particularly in the sciences. He retired as Principal of Maharajas College, Vizianagaram after a distinguished service for nearly a decade. During this period, he was responsible for starting two additional colleges, one for Teachers' Training and the other for Girls both of which were located in Vizianagaram.

NARAYAN AS VICE-CHANCELLOR

Dr Narayan settled down at Visakhapatnam hoping to spend the rest of his life in peace and quiet. But soon he was called upon to take up the responsible position of the Vice-Chancellorship of the Andhra University, rendered vacant by the late Dr V. S. Krishna who was appointed as Chairman of the University Grants Commission.

At 74 years, Dr Narayan was still very active. He attended to his duties regularly and his work was systematic and thorough. His door was always open to all categories of staff and students. At the same time, he was a strict disciplinarian, and did not hesitate to enforce necessary discipline where and when required. This caused a certain amount of displeasure among some sections of the staff and students, but he never deviated from the path of discipline to gain their goodwill, though at heart he was kind and helpful to all. In the matter of recruitment of staff for the various faculties of the University he was strictly constitutional and he remained unswayed by any pressure, much to the chagrin of the powers that be.

Dr Narayan proved to be a worthy successor to his eminent predecessors C. R. Reddy and S. Radhakrishnan, who made the Andhra University as one among some of the best universities in India.

In the matter of advanced research in both Arts and sciences, he encouraged talented young men to take up doctoral and post-doctoral researches in their respective branches of learning under the guidance of eminent professors. Being himself a devotee of scientific research during the major part of his life, he fully understood the importance of research in the academic functions of a University. He was instrumental in establishing a large number of research scholarships from grants procured from the University Grants Commission, the Council of Scientific and Industrial Research and similar All India institutions.

Dr Narayan could thus consolidate the functioning of the University in the academic and administrative aspects. He finally retired as Vice-Chancellor in 1966, with full satisfaction of serving the University for five years, and for a continuous period of forty years in various capacities.



He finally retired from active life and settled down at Visakhapatnam at the ripe old age of 79. He died on March 7, 1973 at Madras, in the house of his second son A. L. Rama Rao. He is survived by his wife, two sons and four daughters.

FAMILY AND PRIVATE LIFE

Dr Narayan was head of quite a big family. At an early age he had married Srimathi Seshamma. They had three sons and four daughters. He had two major calamities during his life time. The first was the death of his eldest daughter's husband, Dr A. Subba Rao who was working as Soil Physicist of the Government of Madras at a very early age, in 1954. This was followed by the demise of his eldest son, Dr A. L. Sundara Rao, who was working as Special Officer to the Central Leather Research Institute at Madras.

Dr Narayan bore these calamities with courage and fortitude. He continued his life's mission of scientific work and administrative service to the Nation without interruption.

HONOURS AND DISTINCTIONS

Dr Narayan was Fellow of the Institute of Physics, London, Fellow of the National Institute of Sciences, India (presently, Indian National Science Academy) and President of the Physics Section of the Indian Science Congress at Benares. As a member of the Andhra Pradesh Planning Commission, he contributed considerably to Scientific education in the Andhra area. He was the recipient of the 'Maharaja of Travancore Curzon Memorial Prize' in recognition of his researches in Science.

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I. RAMAKRISHNA RAO

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