AAPT PHYSICS EDUCATION | AMERICAN JOURNAL of PHYSICS

Kariamanikkam Srinivasa Krishnan: His Life and Work.

D. C. V. Malik, S. Chatterjee, and V. Narayanamurti

Citation: Am. J. Phys. **80**, 1035 (2012); doi: 10.1119/1.4740481
View online: http://dx.doi.org/10.1119/1.4740481
View Table of Contents: http://ajp.aapt.org/resource/1/AJPIAS/v80/i11
Published by the American Association of Physics Teachers

Related Articles

MicroReviews by the Book Review Editor: Beyond the Black Box: The Forensics of Airplane Crashes: George Bibel
Phys. Teach. 50, 511 (2012)

MicroReviews by the Book Review Editor: Particle or Wave: The Evolution of the Concept of Matter in Modern Physics: Charis Anastopoulos
Phys. Teach. 50, 511 (2012)

MicroReviews by the Book Review Editor: The Rise of Nuclear Fear: Spencer R. Weart
Phys. Teach. 50, 511 (2012)

Everyday Engineering: Putting the E in STEM Teaching and Learning: Richard H. Moyer and Susan A. Everett
Phys. Teach. 50, 511 (2012)

MicroReviews by the Book Review Editor: The Little Brown Book
Phys. Teach. 50, 511 (2012)

Additional information on Am. J. Phys.

Journal Homepage: http://ajp.aapt.org/
Journal Information: http://ajp.aapt.org/about/about_the_journal
Top downloads: http://ajp.aapt.org/most_downloaded
Information for Authors: http://ajp.dickinson.edu/Contributors/contGenInfo.html

ADVERTISEMENT

BOOK REVIEW

The downloaded PDF for any Review in this section contains all the Reviews in this section.

Craig F. Bohren, *Editor*
Pennsylvania State University, University Park, Pennsylvania 16802; mailing address: P.O. Box 887, Boalsburg, PA 16827; bohren@meteo.psu.edu

Kariamanikkam Srinivasa Krishnan: His Life and Work. D. C. V. Malik and S. Chatterjee. 516 pp. University Press India (Private) Limited, 2012. Price: UK£30.00 (hardcover) ISBN 978-81-7371-748-2. (V. Narayanamurti, Reviewer.)

This is an eminently readable account of not only the life and scientific contributions of Sir K. S. Krishnan FRS but also in many ways, the history of the genesis of modern physics in India from the 1920s to the early 1960s. Written by two scientists at the Indian Institute of Astrophysics with a strong interest in the history and popularization of science in India, it relies heavily on the private papers in the possession of Krishnan's family as well as interviews of many of his students and colleagues.

The book has a total of 21 chapters spanning the time from his birth in December 1898 to his untimely death in June 1961. Born in a village of what was then the Madras Presidency (and now Tamil Nadu), Krishnan early on displayed a strong mathematical ability as well as an aptitude for experimental physics. The early chapters trace the roots of Indian science and the establishment of colleges and universities following colonization by the British. Calcutta, the first capital of what was then British India, was the seat of the earliest university established in 1857 and also of the Indian Institute for the cultivation of science. During the early 1920s, Calcutta was the home of C. V. Raman (light scattering), S. N. Bose (Bose Einstein statistics), and M. N. Saha (astrophysics) among other luminaries. According to the science writer William Blanpied, they made "Calcutta for a few years one of the most intense sites of scientific activity outside of Europe." After graduating from Madras Christian College, Krishnan was drawn to this milieu and to work on his M.Sc. with Sir C. V. Raman.

In two engrossing chapters, the book describes in detail the studies on light scattering being done in Raman's laboratory and the meticulous experiments by Krishnan. It is remarkable that some of the early experiments were done with filtered sunlight, where the first "feeble fluorescence" was observed that only later, with the use of the more powerful mercury arc, could be identified as scattering with energy lost to molecular excitations. The first paper announcing the discovery was published in 1928 in *Nature*. During the period from February 1928 to January 1929, Krishnan and Raman wrote a total of 14 papers on what soon became known as the Raman Effect, and for which the Nobel Prize (1930) was given to Raman alone. S. Chandrasekhar (later to win a Nobel Prize for his work in astrophysics), who was associated with the developments in Calcutta in 1928–1929, is quoted as follows: "*My own view is that, in a genuine sense, the discovery of the Raman Effect was possible because two absolutely original scientists worked together. It was not so much a sharing of the discovery between the two, as giving the whole credit to each.*"

By 1931 much had changed. Krishnan was now making his own mark and was recruited to Dacca (today the capital of Bangladesh) by S. N. Bose (who had moved to Dacca from Calcutta) to join the faculty. He no longer worked on the Raman effect, but turned his attention to physics of both dia- and para-magnetism. The itinerant Krishnan moved back to Calcutta a few years later (Raman was soon named Director of the Indian Institute of Science, Bangalore) and established a thriving group in the field. Krishnan's work on paramagnetism in salts and diamagnetism in graphite brought him many international connections, notably with David Shoenberg at the Cavendish lab and van Vleck at Harvard. He received many honors and was elected Fellow of the Royal Society in 1940. He moved on to the physics chair at the University of Allahabad to succeed Meghnad Saha, who had established a thriving physics department there.

The honors and the move to Allahabad brought him to the attention of Pandit Jawaharlal Nehru, a native of the city. Nehru had a deep understanding of the need for establishing a strong base of scientific and industrial research in India. He appointed Krishnan as the founding Director of the National Physical Laboratory and also a founding member of the prestigious Atomic Energy Commission, which had Homi Bhabha at its helm and reported directly to the Prime Minister.

The book provides an interesting and nuanced view of this broader stage and the debates among the elites of India on how science should evolve. By the early thirties, the importance of research and science was firmly established and the need for national scientific bodies was being recognized. Unfortunately, due to differences between Saha and Raman, independent Science Academies were established in Bangalore and Allahabad and a third Indian National Science Academy was established in Delhi. In addition, Saha, who was elected to Parliament but had different political views from Nehru, expressed strong misgivings about creating an Atomic Energy Establishment independent of the University system. Bhabha, who had a different point of view and was a close confidant of Nehru, prevailed. The creation of large national laboratories without strengthening of the university system in India is only now being corrected!

As someone who started his research career with Krishnan in 1960 and then went to Cornell, I found the very careful attention to detail on the many facets of his life both in science and science policy most fascinating and recommend the book to those interested in the early history of modern science in India.

Venkatesh Narayanamurti is the Benjamin Peirce Professor of Technology and Public Policy and Professor of physics at Harvard University. He has done research in many different areas of condensed matter and materials physics and is increasingly engaged in science, technology, and innovation policy at the national and international levels.

BOOKS RECEIVED

Higgs: The Invention and Discovery of the "God Particle." Jim Baggott. 298 pp. Oxford U.P., Oxford, UK, 2012. Price: $24.95 (hardcover) ISBN 978-0-19-960349-7.

Something Incredibly Wonderful Happens: Frank Oppenheimer and His Astonishing Exploratorium. K. C. Cole. 410 pp. The University of Chicago Press, Chicago, IL, 2012. Price: $19 (paper) ISBN 978-0-226-11347-0.

Ballparking: Practical Math for Impractical Sports Questions. Aaron Santos. 220 pp. Running Press, Philadelphia, PA, 2012. Price: $15 (paper) ISBN 978-0-7624-4345-1.

About Time: Cosmology and Culture at the Twilight of the Big Bang. Adam Frank. 429 pp. Free Press, New York, 2012. Price: $16 (paper) ISBN 978-1-4391-6959-9.

Neils Bohr and the Quantum Atom: The Bohr Model of Atomic Structure 1913-1925. Helge Kragh. 416 pp. Oxford U.P., Oxford, UK, 2012. Price: $62.99 (hardcover) ISBN 978-9-19-965498-7.

An Introduction to Statistical Mechanics and Thermodynamics. Robert H. Swendsen. 421 pp. Oxford U.P., Oxford, UK, 2012. Price: $81 (hardcover) ISBN 978-0-19-964694-4.

Quantum Gravity, 3rd ed. Claus Kiefer. 403 pp. Oxford U.P., Oxford, UK, 2012. Price: $117 (hardcover) ISBN 978-0-19-958520-5.

INDEX TO ADVERTISERS