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ARTHUR STANLEY EDDINGTON

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President of the Royal Astronomical Society of Canada
(With Plate I)

TO the memory of a great and good man, Sir Arthur Stanley Eddington, O.M., F.R.S., and in recognition of his contributions to physical science and to philosophy, the Royal Astronomical Society of Canada pays its tribute.

Had Sir Arthur lived until the Annual Meeting of this society in January 1945, he would have been one of the first two Honorary Members of the R.A.S.C. to be elected under its new Constitution. The committee charged with the selection of Honorary Members placed his name before General Council in the following terms:

We nominate for honorary membership—

Sir Arthur Stanley Eddington, O.M., M.A., D.Sc., LL.D., F.R.S.
Plumian Professor of Astronomy in the University of Cambridge.

Sir Arthur Eddington has been contributing to the progress of astronomy and cosmology for about forty years in fields as diverse as stellar movements, internal constitution of the stars, (radiation pressure, pulsating stars, stellar diameters and densities, white dwarfs, central temperatures), mathematical theory of relativity, cosmological and physical constants, combination of relativity and quantum theories. His papers before the Royal Society, The Royal Astronomical Society and other national and international scientific bodies have placed him in the very forefront of the world's scientists. His expositions in *The Nature of the Physical World*, *New Pathways of Science*, *The Philosophy of Physical Science*, have been stimulating to scientists, philosophers, metaphysicians and thinking laymen in many countries. His insight and powerful thinking have placed his work at the foundations and within the superstructures of many investigations still in progress. We are proposing an honour to our R.A.S.C. in suggesting that Sir Arthur Eddington be asked to accept honorary membership.

PLATE I



SIR ARTHUR STANLEY EDDINGTON
(1882-1944)

*(Photograph by Lafayette, Ltd.,
supplied by courtesy of Harvard Observatory.)*

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In 1882 Eddington was born in Kendal, Westmorland. From Owens College, Manchester, he went to Cambridge where he became Senior Wrangler and Smith's Prizeman, Fellow of Trinity, F.R.S., Plumian Professor and Director of Cambridge Observatory, before he was thirty-two. During seven of these years he was Chief Assistant at Greenwich and concentrated on investigation of stellar movements, star streaming, and the structure of the galaxy, devising an effective way of projecting proper motions in different regions of the celestial sphere so that general trends would emerge.

From 1913 until his death on November 21, 1944, he resided in Cambridge, though meetings of the International Astronomical Union and the British Association, or special lectures and visits took him across three continents.

Eddington has been the prime interpreter of relativity theory in the English language. His powerful mathematical ability and insight made it possible for him to grasp the significance of Einstein's work against the background of Minkowski and the pioneers. DeSitter, Weyl, Eddington and later Lemaître, provided the early criticisms and developments of the theory. Eddington published a *Report on the Relativity Theory of Gravitation and Space Time and Gravitation* in 1920, followed soon after by *The Mathematical Theory of Relativity*, and in 1938 *Relativity Theory of Protons and Electrons*. He has consistently upheld the theory of an expanding universe since 1930 and from this cosmological basis combined with quantum theory he has developed his most daring work—the synthesis of a world structure relating all the fundamental physical constants. From three measured constants—the velocity of light and the Rydberg and Faraday constants for hydrogen—his theory enables him to calculate with no further dependence upon observation thirteen constants including the charge on an electron and its mass, the mass of a proton and a hydrogen atom; Planck's constant, gravitation constant; mass of the universe, number of particles in the universe and speed of recession of the spirals. The agreement of ten of these quantities with the values determined in laboratory or observatory is so remarkable that his theory deserves the closest scrutiny by those with the mathematical ability to do so critically. Max Born, like Herbert Dingle, dislikes the Aristotelianism of this work, and attributes its success to

Eddington's "personal genius and insight." These and other qualities enabled him to "spin the gossamers as well as forge the anchors of the mind" and who shall say what of his work future assessors will regard as his profoundest contributions?

The name of Eddington will always be associated in the minds of astronomers with some of the great peaks in the advance of this science in the last three decades: the first verification of the Einstein deflection of light from Eddington's eclipse photographs at Principe Island and Crommelin's at Sobral in May 1919; his recognition of the importance of radiation pressure as a prime factor in stellar stability; the theoretical calculation of stellar diameters and of the density of Sirius B; the Mass-Luminosity law; the central temperatures of stars; interstellar gases; the age of the universe. His books in these fields are *The Internal Constitution of the Stars* and the non-mathematical smaller books *Stars and Atoms* and *The Expanding Universe* and his Bakerian and Halley lectures.

Eddington's three books dealing with philosophy and physical science are already mentioned. Add to them his Swarthmore lecture *Science and the Unseen World*, and we have a body of literature, rightly so called, for it has great literary merit as well as being a source of penetrating honest thought and brilliant exposition. With rich metaphor and striking analogy, sometimes with subtle humour and sparkling wit, the symbolism of mathematics is translated into words as he unfolds the significance of relativity and quantum theories, wave mechanics, indeterminacy, theory of groups, probability, and speculations in cosmology.

In compiling his philosophy, Eddington recognizes that the problem of experience has dual aspects—experience resulting in sense data in the realm of physical science which embraces all that is measurable, and a different but complimentary kind of experience which is an awareness of values and of the significance of things immeasurable and unseen save by the eye of the soul. No philosophy is complete which does not include both types of experience. His philosophy of science dealing with the symbolic world of physics is best described as Selective subjectivism and Structuralism, to use his own terms. But the same urge from within man's spirit which drives him to seek truth and evaluate experience in the

physical world, drives him with equally logical reasonableness to seek truth through spiritual apprehension, and to evaluate experience of beauty in nature, in art, in human personality, and in "the sense of a divine presence irradiating the soul." Faith, he insists, is fundamental to both approaches to the problem of experience. "In an age of reason, faith yet remains supreme, for reason is an article of faith."

The modern world owes much to the Society of Friends which has produced many men of great and good influence. This debt is immeasurably increased when we remember that Sir Arthur Eddington was of that company of devout seekers after truth. *Cum illo sint animae nostrae.*

Queen's University,
Kingston, Ontario,
1944, December 5.