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Panchanan Maheshwari, 1904-1966

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Prakeshwari

PANCHANAN MAHESHWARI

1904-1966

Elected F.R.S. 1965

ON 18 May 1966, after being afflicted with encephalitis, Panchanan Maheshwari, one of India's outstanding scientists and one of the world's leading botanists and students of plant morphology, died. He was 62, up to this point apparently in full physical and intellectual vigour, enjoying the respect of his colleagues and receiving the merited honours which were being bestowed upon him. In the spring of 1966 he was still confidently anticipating more years of productive work. On 14 April 1966 Maheshwari signed the Charter Book of the Royal Society to which he was elected in 1965. On his return to India he became indisposed on 10 May, on the eve of a projected visit to Japan and the U.S.A., and, despite all that medical care could do, he succumbed eight days later. Maheshwari's loss is not only to the science of botany, to which his whole life was devoted, but also to the cause of science and higher education in India, to which he was equally dedicated.

Maheshwari was born on 9 November 1904 in the City of Jaipur, India. Although his father was not a scientist, he nurtured the scientific training and advancement of his son. First destined for a medical career, he was sent to Allahabad where he joined the Ewing Christian College and came under the influence of an American missionary-teacher, Dr Winfield Dudgeon. Unable to pursue his medical studies—it is said because of weak eyesight—he pursued his studies in science at the University of Allahabad, taking successively the degree of Bachelor of Science (1925), Master of Science (1927), and Doctor of Science (1931). It was in this period, and under the general guidance of Dr Dudgeon, who was an able microtechnician trained under Professor C. J. Chamberlain of Chicago, that Maheshwari laid the foundations of his own skill as a microtechnician which, together with his avid interest in plants, was to motivate his career and distinguish his future influence upon his students and colleagues and upon the subject of his choice.

Maheshwari was married at the age of 13. Shanti, his wife, spoke no English and did not accompany him on his many subsequent travels, but nevertheless, despite the lack of formal scientific training, she acquired the skills of a microtechnician under her husband's direction and greatly assisted him in some of his work by preparing sections and slides. Of his six children, three sons and three daughters, three have entered the field of

science and two have studied botany in the U.S.A. One of these, his son Satish, has been appointed Professor in the Department of Botany in the University of Delhi. Those who were privileged to enjoy the hospitality of the Maheshwari home felt its quiet dignity and the atmosphere of scholarship which could flourish in the simplicity and warmth of the way of life to which Maheshwari and his wife were so obviously attached.

After completing the work for his D.Sc. degree, Maheshwari joined the Agra College, Agra, in 1930. It was in this period that he aroused the interest of many who were to become prominent botanists in India, including his life-long associate, B. M. Johri. While at Agra, Maheshwari's interests in embryology developed, as shown by his publication (in 1937) of a critical review of the types of embryo sacs to be found in angiosperms (*New Phytol.* **36**, 359-417). From Agra he moved in 1939 as Reader and Head of a new Department of Biology to Dacca, where he remained until 1949 to establish a flourishing school of botany. But it was in that year that he accepted the invitation of Sir Maurice Gwyer, Director of the Government of India, Delhi, to accept the Professorship of Botany, and it is in this context that he will be remembered. Maheshwari raised the Department of Botany in Delhi to a position of leadership in India, made it a centre of world-wide influence in plant morphology, known both for its graduates and the many foreign investigators attracted to Delhi by its fame. To Maheshwari's prestige and influence may be attributed the facilities that botany has enjoyed at Delhi, and until his death he was speaking about, and working for, the future developments that were to come.

Throughout his career Maheshwari travelled widely; he was equally at home in the U.S.A., on the continent of Europe, and had visited the U.S.S.R. on more than one occasion. Nevertheless he was never tempted to leave his native land, for he was dedicated to its well-being and scientific advancement. In 1936-1937 he did post-doctoral work in the laboratory of Professor G. Tischler in Kiel (Germany) and also in Vienna (Austria); and during 1945-1947 he worked at Harvard University on his book *An introduction to the embryology of angiosperms*, which was published in 1950. Maheshwari made, it seems, a deliberate choice to develop experimental embryology at Delhi; partly because this was a comparatively neglected field and partly because it was one in which much could be accomplished by careful observation, but without the heavy demands for elaborate scientific equipment which it was then difficult to satisfy in India. While at Harvard, Maheshwari was in contact with Professor R. A. Wetmore and also with the late Professor Blakeslee, then at Smith College. It is said that Maheshwari's own enthusiasm for angiosperm embryology was strengthened by his discussions with these men.

Subsequently, at the invitation of UNESCO, Maheshwari visited Indonesia in 1952 and Egypt in 1954. In 1958 he was a member of the Indian Government's delegation to the U.S.S.R. Successive International Botanical Congresses found him in attendance and, at the one held in Montreal in

1959, he (in company with two other distinguished morphologists, Professors Wardlaw and Manton) was granted the degree of Doctor of Sciences *honoris causa* by McGill University, Montreal, Canada. In 1959 he was Visiting Professor at the University of Illinois, U.S.A. In 1961 he visited botanical institutions in West Germany, and in 1963 lectured at Nijmegen, Holland; and in 1964 undertook a four months' lecture tour of universities in the U.S.A. and Europe, followed (in 1965) by a tour of the U.S.S.R., Poland and Australia under the auspices of Academies of Science in these countries.

Maheshwari's honours as a scientific citizen of the world are too many to be fully documented, Academies of Science made him their honoured fellow or member: the Indian Academy of Science (1934—and he was its President in 1964); Kaiserliche Deutsche Akademie der Naturforscher, Leopoldina (1959); The American Academy of Arts and Sciences (1947); and, of course, The Royal Society of London (1965). Botanical societies numbered him among their foreign or corresponding members, namely the Botanical Society of America (1947); Deutsche Botanische Gesellschaft (1961); the Royal Dutch Botanical Society (1963). Offices which Maheshwari has filled in India and the symposia and congresses which he has either organized, or in which he participated, represent a contribution to Indian Science that should not be overlooked, even though the full list is not itemized. But botanists will regard the founding of the International Society of Plant Morphologists with its journal, *Phytomorphology*, as a major contribution to international botanical science. This society and its journal owed at the outset everything to Maheshwari's persistence and determination. In his native land, Maheshwari was honoured by the Birbal Sahni Medal of the Indian Botanical Society (1959) and by the Sunderlal Hora Memorial Medal of the National Institute of Sciences of India.

But it is as a teacher and author that Maheshwari will be known and remembered. His *Introduction to the embryology of the angiosperms* (1950) is still a standard work. This book filled, in the English language, a long-standing gap since the publication many years earlier (1903) of the work by Chamberlain on the *Morphology of angiosperms*. However, Maheshwari also embarked on studies of the gymnosperms. A significant contribution was a monograph on *Gnetum*, an unusual genus of gymnosperms, which was prepared in collaboration with his pupil, Vima Vasil, and published in 1961. The previous book which contained substantial information on the morphology of *Gnetum* was H. H. W. Pearson's *Gnetales* (1929). The original contributions to the development of the reproductive structures of *Gnetum*, which were illustrated with high quality photographs and line drawings, illustrate Maheshwari's thoroughness and his success in enlisting in collaboration the aid and interest of his younger colleagues. At his death Maheshwari was engaged on a major work on the gymnosperms; this was destined to appear in 1967. This work was so near completion that, happily, his colleagues expect to fulfil his original plan.

The active school of botany at Delhi, which Maheshwari inspired, awarded 62 doctorates of philosophy between 1949 and 1966, published six books and some 300 original papers. Among these publications were volumes that summarized symposia that Maheshwari organized, as for example, *Plant tissue and organ culture—A symposium* (1963) and *Recent advances in the embryology of angiosperms* (1963) which he edited. But Maheshwari's botanical, scientific, and educational interests were wide and his writings prolific. Articles on such topics as the history of botany; economic botany; hormones in reproduction; botany and the world's food problems; plants, history and politics; agriculture and economic development in India; plants that India gave to the world; plants and human history; botany and the food problems of India; show the broad scope of his interests.

In his early career, Maheshwari developed the subject of the comparative embryology of flowering plants and, particularly, the construction of the embryo-sac. He continued this programme with his research students and drilled into them the necessity for first-rate technique and accuracy of observation, description, and illustration. Several of his research students have become professors and have built up their own schools of embryological research at other Indian Universities. Thus, India has become the main centre for this botanical work and, through Maheshwari's drive, the intricate subject has yielded so much new and critical information that it must be incorporated in the classification of flowering plants. In the course of his travels Maheshwari always gathered fixed material for this research and formed in Delhi a great collection of material from critical genera and families. He has also left to his University the most comprehensive collection of reprints on the embryology of seed-plants.

Even those who never had the privilege of attending one of Maheshwari's classes could sense his role as a teacher; partly from the esteem in which he was held by his colleagues and students, partly by his generous praise of, and appreciation for, any lectures delivered in Delhi or elsewhere that, in his view, helped or inspired students. Maheshwari was also well known for the careful and critical attention he gave to the manuscripts of his students and colleagues. He also encouraged—even insisted—that his graduate students learn to copy-edit a manuscript or a printer's proof; a wise requirement that might well be more widely adopted.

The personal qualities which contributed to Maheshwari's leadership and accomplishment were his boundless energy and capacity for hard work and his ability to enlist the interest of others and to organize team-work. He set high standards for himself and accepted nothing that was, in his opinion, second rate. But he made it a point never to ask of others what he was not prepared to do himself. Throughout his life he was indefatigable in amassing for use in teaching botanical material in the form of prepared slides, and botanical literature in the form of books and reprints. He left a rich legacy to Delhi in this way.

Maheshwari's place as a scholar and man of science is therefore assured.

But what was his role on the contemporary scene? Professor Maheshwari's deep concern for the improvement of botanical teaching and research was not limited to his own subject or department. Under his chairmanship, a detailed report on 'Botany in Indian Universities' was prepared for the University Grants Commission (1963). To improve the teaching of biology in schools, he undertook the major task of editing, jointly with his colleague Dr Manohar Lal, a textbook on biology for Higher Secondary Schools. Even though this was the first of its kind in India, the book promises to fill the great need for a well-illustrated and inspiring introductory text on the life sciences for use in that country.

Trained in the classical discipline of morphological biology, especially steeped in embryology, Maheshwari nevertheless saw that these respected and still very necessary branches of knowledge must avail themselves of experimental methods and also profit by the current surge of knowledge being made available through cell physiology and biochemistry. To this end he turned to, and encouraged in Delhi, the investigation of fertilization under experimental conditions, and the study of growth and development by organ, tissue, and later by cell culture methods. His own skill, fastidiousness as a manipulator, and enthusiasm was transmitted to his colleagues and students. In his influence upon experimental morphology in India—profiting by his critical, classical background of knowledge but responsive also to the mood of his day—Maheshwari may well have made his most important and lasting contribution.

While Maheshwari may have, and did, deplore India's economic inability to furnish his, or other, Indian laboratories with instrumentation and facilities on the western scale, nevertheless and despite these limitations he preserved and developed other values. He encouraged the powers of observation, the manipulative skills born of an understanding of, and respect for, botanical organization; and he thus helped to bridge the gap between the classical descriptive period in morphology and the modern experimental and biochemical one in ways which do justice to both without violence to either.

In these days when 'molecular biology' is in the ascendancy, and when we are often more adept in tearing the living system apart than in interpreting how it grows, develops and works as an integrated whole, Maheshwari's balanced biological view is one that should be, and perhaps in India will be, preserved.

A list of Maheshwari's principal published works follows.

It goes without saying that I have gratefully used the materials so willingly furnished by members of the Department of Botany of the University of Delhi in response to my request.

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