

# EDITORIAL NOTES AND NEWS

## SUNDER LAL HORA

The sudden death of Dr. Sunder Lal Hora, Director, Zoological Survey of India, Calcutta, on December 8, 1955, comes as a great shock to his many friends and colleagues throughout the world. A very brilliant star in the world of science has

been extinguished, and ichthyology in particular is rendered poorer by the loss of one of its most accomplished devotees. His death has also left a gap in the scene of Indian zoology which will be hard to fill.

Born in Hafizabad, Punjab, on May 2, 1896,



*Photograph by L. P. Schultz*

Dr. Sunder Lal Hora, Dec. 2, 1953, Calcutta

Hora studied at the Das-Anglo Sanskrit High School, Jullunder, and later attended the Government College, Lahore, of the Punjab University. On a visit to Lahore in 1919 Dr. Nelson Annandale, founder and then Director of the Zoological Survey of India, saw in Hora great promise and invited him to Calcutta to continue researches as an associate. The distinguished Indian Zoologist Dr. Bains Prasad was already working in Calcutta and after Hora's arrival, Drs. B. N. Chopra and H. S. Rao joined their ranks in the early twenties, to form a select band of Indian zoologists who received their training from Annandale. At the Survey, Hora was appointed Assistant Superintendent in 1921 in charge of ichthyology and herpetology and later became Superintendent and in 1947, when Prasad was called to advise the Government on matters of fisheries development in India, Hora became Director.

Hora's prolific output of research began with a faunistic study of "The Fish of Seistan," written in 1920 in collaboration with Annandale. In recent years, despite heavy administrative duties, frequent travels and other preoccupations he continued his interest in research with the same vigour and at the time of his death had published over four hundred scientific papers on a great variety of subjects, mainly dealing with various aspects of ichthyology. He had an abiding interest in the study of animal ecology, adaptation and evolution and later became concerned with zoogeographical and palaeogeographical problems.

Hora always recalled with love and gratitude the lasting influence Annandale had on his thought and early scientific development; for, from him he acquired an insatiable curiosity to delve into the habits and habitats of the animals that he came across. Annandale advocated a policy, whereby each member of his staff had the opportunity of spending a few months every year in the field and Hora himself availed of this from the very beginning and developed an uncanny knack for selecting problems in the field which were worthy of intensive laboratory study. To him animals were complex systems interacting always with the almost equally complex and ever-changing environment. Hence it is no wonder that his writings, whether they be in systematic ichthyology or in faunistic studies are all impregnated with much valuable data gained through field observations. This quality marked him as an outstanding field naturalist.

It was while engaged in a field survey of the Manipur Valley in the eastern Himalayas (Assam) with Annandale that Hora was first struck by the amazing adaptations of animals inhabiting the hill-streams. Subsequently, both studied the adaptive modifications of fishes and batrachians inhabiting the hill-streams. These researches were

among the foundations on which Hora's opinions on the broad zoological questions of adaptation and evolution later became resolved. His work on the torrential fauna culminated in a monograph on the "Ecology, Bionomics and Evolution of Torrential Fauna, with special reference to the organs of attachment" (Trans. Roy. Soc. London (B) 218: 171-282), which will remain a classic on account of its masterly exposition. He felt that the unit of evolution is not an individual, much less a chromosome, but that the entire population is affected by some external factors and hence that evolution may be defined as "an increase in the capacity of a group of individuals to respond to the changes in the environment in a way more suitable to the conditions of existence."

He was critical of the usage of the term "non-adaptive characters" and would rather have them labelled as "uninvestigated characters." He considered "preadaptation" as partly explaining how certain animals could colonize difficult situations, or "dynamic environmental conditions" such as a torrential environment, or the breaker zone close to the shore, where everything is subordinated to the environment. His views on convergent and divergent evolution are well expressed not only in his works on the hill-stream fauna, but also in his studies of the evolution of the air-breathing fishes and the adaptations of the gobioid fishes of the Gangetic estuary. He attributed the marked resemblance of the homalopterid and gastromyzonid fishes, to an extreme case of convergence and deduced the origin of the two groups which he later treated as phylogenetically separate families, the former evolved from the Cyprinidae and the latter from the Cobitidae.

Early in 1927 he contemplated a much-needed revision of Day's "Fishes" in the Fauna of British India series, but his various other activities interfered. However, his many faunistic studies and revisions of Oriental cyprinoid and silurid fishes will serve as a foundation for any future comprehensive work on Indian fishes.

Hora's researches of hill-stream fishes led him on to zoogeographical and palaeogeographical studies and in 1937 he propounded the "Satpura hypothesis" to explain the occurrence in Peninsular India of fishes closely allied to those of the Malaya Peninsula. His attack on this problem became a collaborative synthesis of biological, meteorological, geological and geographical data which led to a meaningful interpretation of a considerable amount of faunistic and taxonomic data. Although opinions may slightly differ as to the different time of migration indicated by Hora, the major part of his thesis remains irrefutable.

Hora became interested in fisheries while doing the "Fish and Fisheries of Manipur . . ." in 1920.

Between 1942 and 1947, as Director of Fisheries, Bengal, he was able to further his interests in this field and before long was recognized as a leading exponent of pond culture of freshwater fishes and, at the time of his death had completed an extensive treatise on the subject. Many in America will remember his last visit to this country, when under the auspices of the United Nations, he opened a discussion on "Pond Culture of Warm Water Fishes" at Lake Success in 1949. His advice on fishery matters was always sought by the Government of India, by the different State Fishery officials in India, and by fisheries biologists from other countries. He represented India in many international fisheries conferences.

A born naturalist, Hora's interest in wildlife conservation can be well understood. As Honorary General Secretary of the Indian Board for Wildlife Conservation, he helped a great deal in the formulation of plans for more judicious methods of wildlife conservation, for the formation of National Parks, etc.

Hora became deeply interested in assessing the knowledge of ancient Hindus concerning the fishes and fisheries of India, with the idea of tackling fishery problems in India today against the background of the wealth of traditional knowledge that had hitherto remained buried in Pali and Sanskrit literature. His many contributions on this theme were published by the Asiatic Society of Bengal.

Hora's pre-eminence in the field of biology in Asia was well recognized and he was honoured by various scientific bodies both in India and abroad. He recalled with pleasure his election as an Honorary Foreign Member of the American Society of Ichthyologists and Herpetologists. The highest honour that his country and fellow scientists could bestow on him was accorded him in 1954, when he was elected General President of the Indian Science Congress Association for that year.

As a man, Hora was well above medium height and of heavy build. During college days he distinguished himself in the athletic field. He was quite unassuming and possessed a rare blend of humility and kindness. He was an excellent speaker and writer, a good conversationalist and had a capacious mind. As an administrator, he was mildly firm but no dictator. He was always ready to praise the scientific success of his colleagues, and gave every encouragement to members of his staff and pupils who will always remember him as a wise and friendly counselor and a revered master. In keeping with the tradition handed down to him by his distinguished predecessors, he kept the Zoological Survey of India in the forefront of institutions of its kind in the world, and as a center for zoological research in India.

Early in 1953 he suffered a heart attack, but

recovered. Not being one to be downed by circumstances, he soon resumed the full swing of activity. His tireless activity after illness was astounding. Nothing could diminish his ardor for work. For such a soul, nothing is more befitting than to face the end while in the line of duty. On December 6, while addressing a meeting in the Asiatic Society of Bengal, he had a second stroke and passed away two days later. It is unfortunate that time ran so short that he could not fulfill some of his major projects.

Only those who knew the Horas well can say how much he and science owed to his wife's sympathetic understanding and her devoted care of him during and after his period of illness in 1953. He is survived by her and by one son and two daughters.

In this brief notice, I am able to give only a glimpse of the many sided activities of a versatile genius and a great teacher—one who has been a great asset to his country and to science in general.—E. G. Silas, *Scripps Institution of Oceanography, University of California, La Jolla, California*, and, *Trivandrum, Travancore-Cochin, India*.

#### Daniel Giraud Elliot Medal

**A**WARD of the Daniel Giraud Elliot Medal of the National Academy of Sciences to DR. ARCHIE CARR of the University of Florida in recognition of his "Handbook of Turtles" was announced February 2 by the President of the Academy, DR. DETLEV W. BRONK.

The Elliot Medal has been awarded by the Academy annually since 1917 under a provision of the will of DANIEL GIRAUD ELLIOT expressing his wish to provide a medal and honorarium to the author of any paper, essay, or other work published each year in zoology or paleontology and judged by the Academy to be of outstanding merit.

#### Senckenberg Museum, Frankfurt am Main, Germany

**A** COMPREHENSIVE account of the amphibians and reptiles of Southwestern Africa by DR. ROBERT MERTENS, has been published in "Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft" (No. 490, 1955). The extensive material collected by DR. MERTENS during the winter of 1954-55 in Brazil, Peru, and Venezuela has arrived in Frankfurt. The investigations on the difficult Peruvian *Tropidurus* are already terminated and in press. The herpetological collection, brought from the Galapagos Islands by DR. EIBL-EIBESFELDT with the "Xarifa" Expedition, has been received. DR. EIBL has described a remarkable new form of *Amblyrhynchus cristatus*. Another important acquisition is the herpetological collections of the Museum