ROBERT BERESFORD SEYMOUR SEWELL 1880-1964

AN APPRECIATION

By E. G. Silas

Lieut.-Col. R. B. S. Sewell, C.I.E., M.A., M.R.C.S., L.R.C.P., Sc.D. (Cantab.) I.M.S. (Retd.), F.Z.S., F.L.S., F.A.S., F.Z.S.I., F.N.I., F.R.S., died at Cambridge, England on February 11, 1964 at the age of 83. He belonged to a select band of Indian Medical Service Surgeon Naturalists which had on its roll such illustrious men as Lt.-Col. Sir George King, Lt.-Col. Sir David Prain, Lt.-Col. Francis Day, and Lt.-Col. A. Alcock.

Robert Beresford Seymour Sewell, the second son of Rev. Arthur Sewell was born at Leamington on March 5, 1880. He received his schooling at Weymouth where he evinced keen interest in the study of zoology which led him for a short while to the Zoology Department of the University College, London, from whence he moved to Christ College, Cambridge on a scholarship. He obtained his Degree in Zoology at Cambridge in 1902 with first class honours in both parts of natural science Tripos. He then entered St. Bartholomew's Hospital in London to study medicine and took the Conjoint Diploma in 1907. In 1908 he passed into the Indian Medical Service by competition and for the two-year period of compulsory military duty was attached to the 67th and 84th Punjab Regiments. After this, Sewell chose the post of Surgeon-Naturalist to the Marine Survey of India in preference to remaining in 'Military.' He served on the Royal Indian Marine Ship 'INVESTIGATOR II', working off the coast of Burma and in the Andaman Sea until 1914. During this period he was also Honorary Assistant Superintendent, Zoology Section, Indian Museum, Calcutta, and was also seconded for a short time in 1911 to Calcutta Medical College as Professor of Biology. He was recalled to active military duty during the First World War, and between 1914-'18 served in Aden and Palestine, being mentioned in despatches.

After the war, on reversion to civil employment, he was Officiating Superintendent, Zoological Survey of India (1919-'20), and also worked for a third term as Suregon-Naturalist on board R.I.M.S. 'INVESTIGATOR' until July 1925 when he took over as Director of the Zoological Survey of India. Here, Sewell's task was not an easy one, but he upheld the fine traditions of the Zoological Survey of India set by his predescessor Dr. Nelson Annandale, its Founder-Director. With hardly seven officers, which later swelled to nine (of which one was an Anthropologist), the Zoological Survey of India soon became one of the foremost Institutions of its kind in the world and a centre of active research of a high order. Col. Sewell was a good organizer, and in spite of the 'depression years' he strived for the expansion of the Survey and its activities to cover besides faunistic studies, investigations on fishery and oceanographic problems. However, some of his plans such as the opening of a marine biological station at Karachi as part of the expansion programme of the Survey in 1927 met the same fate—being shelved as Dr. Stanley Kemp's earlier proposal for the establishment of a permanent research station at Port Blair, Andamans. In any case, some of the projects undertaken at the time met with grand success, and one that comes foremost to mind is the shellfish fishery investi-

gations in the Andamans with special reference to *Trochus* and *Turbo*. Attention was drawn to the importance of this resource by extensive poaching by Japanese fishermen. The investigations based on recommendations made by Col. Sewell and carried out by Dr. Srinivasa Rao and his colleagues resulted in an outstanding piece of work not only on the shellfish fishery, but on several biological aspects as well.

At the 14th Indian Science Congress in 1927, Col. Sewell stressed the ' paramount importance in this country of the study of ecology and bionomics ' of animals in their own surroundings. At the same time he also suggested that one or two students from colleges or Universities should accompany Zoological Survey parties on field expeditions to get training in these disciplines. To date, I do not think that this generous offer has been taken advantage of. Col. Sewell was far-sighted in thinking of plans for the expansion of the Survey and its activities. It is gratifying to find that the recommendations that he made from time to time even after his retirement in 1933 are partly being implemented. In this connection, special mention should be made of the starting of the Marine Survey Division in the Zoological Survey of India.

In the early years Col. Sewell's contributions to science covered a wide range of subjects including Physical Anthropology, Ichthyology, Helminthology, Malacology, Copepodology and Physical and Biological Oceanography. Most of his work he did solo and he always had a critical approach to the problems he tackled, being meticulous and taking great pains to achieve accuracy. The resulting publications numbering about 75, thoughtfully written, to some extent accounted for the eminence in which he was held in scientific circles.

The pioneering and vigorous deep-sea biological investigations carried out by Dr. J. Wood-Mason of the Indian Museum, and the Surgeon-Naturalists, notably Lt. Col. A. Alcock, A. R. S. Anderson, and others associated with R.I.M.S. ' INVESTIGATOR I ' which operated from 1879-80 to 1908, earned for the Surgeon-Naturalist a honoured place in the field of marine sciences of the day. Col. Sewell, though a junior officer in the Indian Medical Service, having held the appointment of Surgeon-Naturalist for hardly two years, was appointed a Vice-President of Section V, Oceanography, at the Meeting of the International Congress of Zoology held at Monaco in 1913. He was virtually the last to hold the post of Surgeon-Naturalist, his only successor Major R. W. G. Hingston working as Naturalist for hardly a year. A gradual waning in interest in deep-sea biological work, combined with lesser and lesser opportunities and facilities for carrying out deep-sea trawling from ' INVESTIGATOR II ' enabled Col. Sewell from 1913 onwards to take up oceanographic investigations. Thus the first serious attempt was made to study the temperature and salinity in parts of the Indian Seas (Bay of Bengal, Andaman Sea, Gulf of Mannar, and Laccadive Sea up to depths of 1000 metres. His studies embodied in eight parts published in the Memoirs of the Asiatic Society of Bengal between 1925 and 1935 have thrown light on several problems including seasonal and daily variations in air temperature over the open sea in the areas worked ; the time of occurrence of diurnal maximum temperature ; wind force ; atmospheric humidity ; and amount of precipitation. From the very beginning he was highly appreciative of the need of intensive oceanographic investigations of comparatively smaller areas over a long period of time, than undertaking major expeditions spread far apart in space and in time which with each successive expedition added less and less to the sum total of our knowledge. Full credit goes to Col. Sewell for laying the foundations of oceanographic research in this region.

More than once Col. Sewell has stressed the fact that for an elucidation of many of our fishery problems, such as annual fluctuations in the fish populations, annual migrations, etc., the study of oceanographic conditions over a number of years is imperative to enable forecasting the results of our fisheries in any given year. To understand the fishery problems of the west coast of India, he felt that it was essential that we undertook a careful investigation of the waters of the Somali Current and a study of the annual changes in this Current ' as this may enable us to predict what will take place off the Indian Coast a month or two later.' In the formulation of plans for the establishment of the Government of India Research Stations for marine and inland fisheries research in India, his advice was sought and in this connection he visited India for the last time in 1946.

Few would realise that Col. Sewell had contributed a good deal in Physical Anthropological studies as well. His work (with Dr. B. C. Guha) on the prehistoric human remains from Nal, Mekran, and Mohenjo-Daru led them to conclude that the chief racial type of the Chalcolithic times in the Indus Valley was of the ' Mediterranean strain, a large-brained long-headed type of possible Proto-Nordic affinities.' As President of the Anthropological Section of the 16th Indian Science Congress at Madras in 1929, Col. Sewell spoke on the origin of man and the population of India in the past and future. It was here that he propounded the hypothesis that the causative factor for brachycephaly in man was his ' living in high altitudes in the formative period of man's life-history.'

The First World War brought about an awareness as to how the services of professional zoologists could be utilised to tackle some of the medical problems, especially prevention of disease by sanitation and its control by quarantine measures. One major problem was the introduction of diseases, especially *Schistosomiasis*, hitherto unknown in India, by soldiers returning from infected areas in the Middle East. Part of the results of these investigations was Col. Sewell's treatise entitled ' Cercariae Indicae ', and on *Schistosoma*. The project also involved him in the study of the biology of some of the molluscs and a collaborative effort with Dr. Annandale on ' The Banded Pond-Snail of India (*Vivipara bengalensis*). Col. Sewell fully subscribed to Dr. Annadale's views on taxonomy as a dynamic composite subject of which description of pickled specimens was only a part. He was fully aware of the importance of ecology, general variability of species, information on life-history stages, biological details and biogeography in taxonomy. His studies on the pedunculate cirripede *Lithotrya nicobarica* show how critical he was of the use of highly variable characters for species differentiation. He demonstrated on the basis of a good series of material, the considerable range of changes which occurs in this species with size and age increase, indicating that some of the species of *Lithotrya* to which Darwin (1851 : A Monograph of Cirripedia, Vol. 1, Ray Society, London, p. 350) had indicated Class affinity, may in reality only represent different varieties or growth phases of a single species.

In the Pyrosomida he felt that the majority of the different forms may belong to a relatively few species and are mostly based on growth stages. The differences between zooids in the same colony and the similarities of zooids in the different colonies are attributable to changes in the relative growth and development of the different parts of the individual or of the colony caused by corresponding differences in the environment.

Col. Sewell's enduring passion was for the study of Copepoda which he diligently pursued for over half a century, his first contribution on the surface-living

Copepoda of the Bay of Bengal appearing in 1912. He was an authority on Copepoda and his advice and help was freely sought and received by many budding copepodologists in India and abroad. The Copepoda confronts the taxonomist with great complexities—the systematics being still unstable to the morpho-systematist, especially at infra-specific levels. To cite one instance, in the genus *Mesocyclops* Sars (Cyclopoida) with about 39 species (placed under the subgenera *Mesocyclops* s. str., and *Thermocyclops* Kiefer), the main criterion for the separation of the species is the relative length proportion of the two spines of the endopod of the fourth pair of swimming legs, the ranges for most of the species showing considerable overlap. Col. Sewell's work on the subgenus *Thermocyclops* published in 1960 demonstrates how difficult it is to correctly interpret infra-specific variations. In the vast group—Copepoda—Col. Sewell described several species, varieties and forms (forma) new to science in addition to redescribing numerous species and adding information on the life-history stages of several species, with illustrations. A lesser mind may find fault that he has on occasions described a new species or a variety on a single specimen or a few specimens of one sex. In a pioneering work this is inevitable, but to the credit of Col. Sewell it should be mentioned that whenever more material was available, in subsequent publications he made it a point to include additional information on these species. Besides, his familiarity with the Copepoda no doubt enabled him to evaluate the differences and make taxonomic pronouncements which a casual worker on the group would find difficult.

His work on Copepoda led him on to biogeographical studies, best exemplified in two publications, one in the 'Scientific Reports' Series of the John Murray Expedition dealing with the geographical distribution of the free swimming planktonic Copepoda, and the second, his Presidential address to the Linnean Society on 'The Continental Drift Theory and the distribution of Copepoda.' On the basis of the distribution of the present-day Copepoda he favoured the 'Continental Drift Theory' (also referred to as 'the Wegner Drift Theory') over the earlier theory of the 'Permanence of the Ocean Basins.'

His opportunities for conducting field investigations in India, and an early and long association with Dr. Annandale strongly influenced his outlook on the theory of evolution. In 1931 he discussed the problem of evolution from the point of view of experimental modifications of bodily structure and the trend of evolution under natural conditions. In 1958 he more or less summed up his views (as a taxonomer) on evolution, concluding that 'Throughout the whole course of evolution there has been a steady urge towards bodily complexity and simultaneously with this has been a drive towards biochemical complexity; and the full extent of this is only now beginning to be understood, (but it seems clear that the ultimate character upon which the final decision as to what is a "species" will be based may eventually prove to be bio-chemical.'

Col. Sewell's vast experience was taken advantage of in placing the John Murray Expedition to the Indian Ocean in 1933-34 under his leadership to extend oceanographical and biological investigations earlier carried out from R.I.M.S. 'INVESTIGATOR' westwards to the Laccadive-Maldive Archipelagoes, Persian Gulf, South Arabian Coast, and Somali Coast to Zanzibar. Retirement did not diminish his ardour for research, in fact, it only redoubled his efforts. During the thirty years of his retired life, most of which he lived at Cambridge, he was actively working in spite of ill-health towards the end, organising, getting together for publication and editing the results of the John Murray Expedition in the 'Scientific Reports' Series published by the British Museum (Natural History), at the same

time carrying on his extensive studies on Copepoda at the Department of Zoology, Cambridge University.

Col. Sewell was awarded the Degree of Sc.D by the Cambridge University in 1929 and was elected a Fellow of the Royal Society in 1934. Soon after his retirement from the Indian Medical Service in 1935, he was appointed Companion of the Indian Empire (C.I.E.). During his tenure in India he worked in different capacities on several scientific bodies. He was Sectional President (Zoology) of the Indian Science Congress at its 14th Session held at Lahore in 1927 ; Sectional President (Anthropology) of the 16th Session held at Madras in 1929 ; and the General President of the 18th Indian Science Congress held at Nagpur in 1931. He was also President of the Royal Asiatic Society of Bengal from 1931-1933. As Director of the Zoological Survey of India between 1925 and 1933, he was also Editor of the *Records*, and *Memoirs of the Indian Museum*. From 1933 to 1963 he was Editor of the *Fauna of British India* (presently known as *Fauna of India*) Series.

During his retired life he took an active interest in the affairs of the Linnean Society, as a Member of the Council of the Society from 1935-39, 1944-48, and 1950-56 ; as Vice-President from 1936-37, 1945-46, and 1955-56 ; and as President of the Linnean Society from 1952-1955. He was also President of the Ray Society from 1950 to 1953. Later, for a short while he also worked as Secretary, International Commission on Oceanography.

As a fitting tribute to his preeminence in the field of marine sciences of this region, he was elected the first Honorary Member of the Marine Biological Association of India in 1959.

In September 1956, I had the good fortune to meet him at his home at 18 Barrow Road, Cambridge, and though he was not in the best of health, he was in excellent spirit. He was rather apprehensive and perturbed that the development of marine researches in India was not progressing satisfactorily. In fact, he expressed that things appeared to be in the 'doldrums' when most countries were 'investing' in diverse marine research projects near and afar off. Later I heard that he expressed profound satisfaction on hearing about the formation of the Marine Biological Association of India to foster the growth of marine sciences of this region, as a ray of light on a dark horizon. Things have rapidly changed since. It would have been no mean satisfaction to him to see the sudden spurt of intense activity in the Indian Ocean at the International level for an understanding of several of the problems connected with this least known of all oceans. Unfortunately, he did not live long enough to see his *magnum opus* 'The Copepoda' published in the Fauna of India Series.

OBITUARY

DR. YOGESH M. BHATT

DR. YOGESH M. BHATT was born in January 1932. He was educated at Ruia College and in the Institute of Science, Bombay, obtaining his Doctorate in Zoology in 1959. After a brief stay of 2 years at Jamnagar unit of the Central Marine Fisheries Research Institute, he joined the Bhabha Atomic Research Centre in 1960.

Dr. Bhatt was one of the few ecologists in recent times who studied in detail the fauna and flora of the intertidal regimes of Bombay shores. In the course of his studies, he reported a number of new species of marine organisms. This is evident from his recent publication on the Polychaetous Annelids of Bombay, wherein he has described two varieties new to Science along with 4 new records for India. As one of the pioneer members of the Aquatic Radioactivity Laboratory of the Health Physics Division, he participated extensively in site selection studies for Atomic Power stations at Rajasthan and Madras. His contributions to the Project Marina—a collaboration project between the International Atomic Energy Agency, Vienna and Bhabha Atomic Research Centre, wherein the field of radioecology of aquatic environments, and in the successful search of indicator organisms for radioactivity. During 1963-64 he also participated in the International Indian Ocean Expedition cruises. There are 15 scientific publications to his credit. He was a life member of the Marine Biological Associations of both India and U.K.

His colleagues in the field of marine biology will feel for a long time to come, the void created by his untimely demise on February 14, 1967, while on his way to the laboratory at Trombay.

Dr. Bhatt is survived by his wife Bharti who is also an accomplished botanist in BARC and a six year old son.

B. PATEL

DR. YOGESH M. BHATT (1932-1967)