

## HISTORICAL SKETCH OF INDIAN OCEAN MALACOLOGY\*

RALPH W. DEXTER

*Department of Biological Sciences, Kent State University, Kent, Ohio, U.S.A.*

### ABSTRACT

Early studies on Indian Ocean molluscs were promoted by the organisation of the Asiatic Society of Bengal (1784) and its serial publications of proceedings and a journal. Later, its zoological museum served as a centre for such researches. The Journal of the Bombay Natural History Society (1886) also served as a focal point for promoting research. A total of 41 expeditions (1817-1961) which included the Indian Ocean has been summarized by Yentsch (1962). This also includes 789 references on molluscs, and two supplements to this bibliography have been issued by Alagarswami, Lal Mohan, James, and Appukuttan (1968 ; 1969), with an additional 606 references. The Indian Museum (1914) has been a major centre for work on Indian Ocean molluscs, and problems of economic malacology have spurred considerable research. The principal scientific periodicals including works on Indian Ocean molluscs are listed, and current students of Indian Ocean malacology are annotated.

### EARLY BEGINNINGS

THE Asiatic Society of Bengal, organized in 1784 by Sir William Jones, gave Indian malacologists their first opportunity to report the results of their researches. The monthly Proceedings of the Asiatic Society of Bengal and the Journal of the Asiatic Society of Bengal, edited by the secretaries, included studies on marine molluscs of the Indian Ocean and adjacent seas. The Journal was first published in 1832 and later the Journal and Proceedings were combined into a single publication. After a zoological museum was established, the Curator of the Zoology Department submitted periodic reports on acquisitions.

The Journal of the Bombay Natural History Society was established in 1886, giving another outlet for Indian malacologists. At the Symposium on Mollusca sponsored by the Marine Biological Association of India held at Ernakulam, Cochin in January of 1968, Sharad M. Ketkar submitted a paper on 'History of Indian Malacology and Conchology'. A brief abstract has already been published (Ketkar, 1968) and the full paper is in the Proceedings of the Symposium.

### EXPEDITIONS

Yentsch (1962) compiled, 'A Partial Bibliography of the Indian Ocean'. She included an excellent summary of expeditions which were conducted in the

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Indian Ocean prior to the International Indian Ocean Expedition. Altogether there were 41 expeditions (1817-1961) which included biological collections sponsored by the following 12 nations : Austria, France, Italy, Great Britain, Monaco, Denmark, Egypt, Germany, Netherlands, Sweden, U.S.S.R. and the U.S.A., and one international expedition. The cruise tracks of 14 major expeditions conducted by seven nations are mapped. Not listed, however, was the U. S. Exploring Expedition, commonly referred to as the Wilkes Expedition (1838-1842), under the direction of Commander Charles Wilkes, which circled the globe. While work in the Indian Ocean was relatively minor, some collection was done on this first U. S. expedition. The vessels crossed the Indian Ocean from the Strait of Sunda to the Cape of Good Hope and a special volume was published on the molluscs. Haskell (1942) has given an account of this expedition and its publications.

The most important early contribution to the study of Indian Ocean Malacology was the work of the Royal Indian Marine Survey Ship *Investigator*. The Marine Biological Survey of India began in 1871 and the *Investigator* was launched in 1881. Annual reports were issued beginning that year entitled 'Administration Reports of the Marine Survey of India'. In addition, an unofficial series of publications titled 'Natural History Notes from H.M. Indian Marine Survey Ship *Investigator*' was published beginning in 1885. At first these were issued chiefly in the *Journal of the Asiatic Society of Bengal*, but since 1889 appeared in the *Annals and Magazine of Natural History*. The series was begun by Dr. G. M. J. Giles, who was the surgeon-naturalist to the Marine Survey 1884-88. Beginning in 1892 a series of 'Illustrations of the Zoology of the Royal Indian Marine Survey Ship *Investigator*' was published. Sections on Mollusca were published from 1898-1909 (23 supplements). Alcock (1902) published an account of his service as naturalist on the *Investigator*, 1888-1892. The collections of the *Investigator* are deposited in the Indian Museum at Calcutta.

The International Indian Ocean Expedition (1962-1965) involving some 40 vessels has been the most important one in that region in recent years. Already six volumes of collected reprints have been issued with more to come in the future (UNESCO, 1969).

#### MUSEUMS

According to Alcock (1902), Edward Blyth was the 'real father of the Zoological Section of what is now the Indian Museum'. He was appointed Curator of Collections in 1841. William Blanford began a volume on the molluscs of British India. Other workers included his brother, Henry Blanford, William Theobald and Ferdinand Stoliczka from Vienna. Geoffrey Nevill was assistant secretary and librarian who contributed much to the collection of molluscs. Alcock (*Ibid.*) wrote, 'It is to him that the excellence of our collection of shells is still in great part due.' Lt. Col. H. H. Godwin-Austen completed the work of William Blanford.

The Indian Museum in Calcutta was organized in 1814. In 1878 Geoffrey Nevill published the first part of his 'Hand List of Mollusca in the Indian Museum'. Beginning in 1881 an Annual Report and List of Accessions was published, which was renamed the Annual Report of the Zoological Survey in 1916. On the 100th anniversary of the Indian Museum a memorial volume was issued (The Indian Museum, 1814-1914) which includes a summary of the zoological collections and a bibliography of publications based on the work of the *Investigator*. A brief history of the zoological collections and the Marine Survey of India is given.

The first Curator was Dr. John Anderson, appointed in 1866. James Wood-Mason, after serving as Assistant Curator beginning in 1869, succeeded Dr. Anderson as Superintendent of the Museum in 1886. The Museum building was first occupied in 1875, and a section of the Museum was devoted to natural history. Surgeon-Captain A. W. Alcock became Superintendent in 1893. Mookerjee (1914) published 'The History of the Indian Museum' at the time of its centenary.

Beginning in 1889 the Museum trustees issued a series of 'Indian Museum Notes', which ran for six volumes. Starting in 1907 'Records of the Indian Museum (A Journal of Indian Zoology)' was published by the Director of the Zoological Survey of India, and edited by the Superintendent of the Indian Museum (Natural History Section). That same year the 'Memoirs of the Indian Museum' were initiated. Ten years later the First Annual Report on the Zoological Survey of India began. This listed the annual additions to the collections.

In 1889 Theobald published the first part of 'Index of The Genera and Species of Mollusca in the Hand List of the Indian Museum, Calcutta' and 'A Guide to the Zoological Collection Exhibited in the Invertebrate Gallery of the Indian Museum,' including the molluscan collection, was published by Alcock in 1894. The Central Marine Fisheries Research Institute published in 1969 Part I of a catalogue of molluscs, etc. in the reference collections of that Institution. The cephalopods were listed by R. Sarvesan and other molluscs by K. S. Sundaram.

#### ECONOMIC MALACOLOGY

In addition to the pure science of malacology, students of Indian marine molluscs have given considerable attention to those species of economic importance. Thurston (1890) wrote on the pearl and chank fisheries in the Gulf of Mannar. This work was reprinted in 1894 by the Madras Government Museum. Southwell and Kerkham (1909) and Southwell (1910) published a series of papers on the Ceylon pearl banks, which were under Government control. Legge (1912) and Pearson (1912) also published reports on the Ceylon pearl oyster fisheries. Hornell (1913, 1914, 1916, 1917) published a series of papers on the chank bangle industry and on edible molluscs. Interest has continued to the present day. In 1968 the Central Marine Fisheries Research Institute held a symposium on the marine living resources of the seas around India, including a special section on molluscs of economic importance.

#### PUBLICATIONS

Yentsch (1962) compiled a bibliography on Mollusca (789 references on pp. 181-230) in her volume, 'A Partial Bibliography of the Indian Ocean'. Since then two supplements have been issued by Alagarwami, Lal Mohan, James, and Appukuttan (1968) and Lal Mohan, James, and Appukuttan (1969). The first supplement contains 313 references to Indian marine molluscs published 1900-1930. The second supplement containing 293 references to molluscs covers the period 1931-1961. These three bibliographies probably contain the vast majority of publications on marine molluscs of the Indian Ocean. The references listed involve most frequently the following 32 publications :

Nautilus  
Indo-Pacific Mollusca  
Journal Bombay Nat. Hist. Soc.  
Proceed. Mala. Soc. London

Bull. Madras Govt. Mus.  
Jour. Madras Univ.  
Madras Fisheries Bull.  
Jour. Roy. Soc. West Australia

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|---|---------------------------------|
| Proceed. Zool. Soc. London                    | South Australian Nat.           |
| Trans. Zool. Soc. London                      | Records of the Australian Mus.  |
| Trans. Linnean Soc. London                    | Trans. So. African Philo. Soc.  |
| Records of the Indian Museum                  | Trans. Roy. Soc. So. Africa     |
| Memoirs of the Indian Museum                  | Annals of the So. African Mus.  |
| Bull. Insti. Oceanog. Monaco                  | Archiv für Molluskenkunde       |
| Annals and Mag. Nat. Hist.                    | Ceylon Jour. Sci.               |
| Jour. Conchology                              | Nachrichtsblatt der Deutschen   |
| Jour. de Conchyliologie                       | Malakozoologischen Gesellschaft |
| Jour. and proceed. Asiatic Soc. Bengal        | Jour. Malacology                |
| Bull. U. S. Nat. Museum                       | Proceed. Indian Acad. Sci.      |
| Bull. du Muséum National d'Histoire Naturelle | Jour. Zool. Soc. India          |
|   | Annals of the Natal Mus.        |

## MODERN JOURNALS AND MONOGRAPHS

Within the past 40 years a number of periodicals available to students of marine molluscs of the Indian Ocean have been originated. They include the following: Proceedings of The National Academy of Sciences, India (Section B)—(Annual number founded 1930; yearbook founded 1956); The Indian Zoological Memoirs on Indian Animal Types (1936); The Indian Ecologist (for the Indian Ecological Society) (1946); Proceedings of the Zoological Society of Bengal (1948) (in 1954 renamed Proceedings of the Zoological Society); Journal of the Zoological Society of India (1949); Journal of the Marine Biological Association of India (1959); Indo-Pacific Mollusca (1959); Indian Journal of Zoology (1960); Malacologia (1962); Bulletin of the Central Marine Fisheries Research Institute (1968).

In recent years the popular source materials for Indian marine molluscs have been the works of Hornell (1922; 1951). One of the most thorough recent works has been the two volume monograph on 'The Mollusca of Kursadai Island (in the Gulf of Mannar)' by Satyamurti (1952; 1956).

## MODERN WORKERS ON INDIAN OCEAN MALACOLOGY

The Pacific Scientific Information Center (1968) compiled a directory to 'Indo-Pacific Invertebrate Zoologists (other than Entomologists)—1968.' The following 66 names are listed with pertinent information for those malacologists with a special interest in the marine molluscs of the Indian Ocean.

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|-----------------------|-----------------------|------------------------|
| Abbot, R. Tucker      | Grau, Gilbert         | Ponder, Winston Frank  |
| Aboul-Ela, I. A.      | Habe, Tadashige       | Rajagopal, A. S.       |
| Adam, William         | Heppell, David        | Rancurel, P. G.        |
| Allen, John A.        | Hodgkin, Ernest P.    | Ranson, Gilbert        |
| Angot, Michel         | Horikoshi, Masuoki    | Rao, M. V. Lakshmana   |
| Arakawa, Kohman Y.    | Ino, Takashi          | Ray, Harish Chandra    |
| Beeman, Robert D.     | Kenk, Vida C.         | Robertson, Robert      |
| Berry, S. Stillman    | Khan, David           | Roper, Clyde F. E.     |
| Boss, Kenneth J.      | Knudsen, Jorgen       | Rosewater, Joseph      |
| Cate, Crawford N.     | Kohn, Alan J.         | Roy Choudhuri, Parimal |
| Cate, Jean M.         | Korringa, P.          | Salvini-Plawen, L. von |
| Chen, Chin            | Kosuge, Sadao         | Schilder, Franz A.     |
| Dance, S. Peter       | Krishna, Y. Radha     | Soliman, G. N.         |
| D'Attilio, Anthony    | Lecloup, E.           | Srinivasan, V. V.      |
| deBruin, George H. P. | Lemche, Henning       | Stasek, Charles R.     |
| Demond, Joan          | McMichael, Donald F.  | Taki, Iwao             |
| Desai, B. N.          | Maes, Virginia O.     | Taylor, John D.        |
| Dinamani, Parameswara | Menon, K. R.          | Turner, Ruth D.        |
| Djajasmrita, M.       | Mosclev, Lev          | van der Spoel, S.      |
| Fischer, P. H.        | Murti, N. N.          | Voss, Gilbert L.       |
| Fischer-Piette, E.    | Nair, N. Balakrishnan | Wilson, Barry R.       |
| Gohar, Hamed A. F.    | Old, William E., Jr.  | Zilch, Adolf           |

In addition, the following 55 malacologists are also current students of Indian Ocean marine molluscs.

- Alagarwami, K. Central Marine Fisheries Research Institute, Cochin, India.  
 Aravindakshan, P. N. A. Indian Ocean Biol. Centre, Cochin, India.  
 Atapattu, D. H. Dept. of Zoology, Univ. of Ceylon, Colombo, Ceylon.  
 Balasubramanyan, R. Central Institute Fisheries Technology, Cochin, India.  
 Burgess, Mrs. L. A. Honolulu, Hawaii.  
 Burn, Robert. National Museum of Victoria, Melbourne, Australia.  
 Canagaratnam, P. Dept. of Fisheries, Colombo, Ceylon.  
 Cernohorsky, W. O. New Zealand.  
 Cherian, P. V. Dept. of Marine Sciences, Univ. of Cochin, Ernakulam, India.  
 Choudhuri, P. R. Zoological Survey of India, Calcutta, India.  
 Damodaran, R. Dept. of Marine Sciences, Univ. of Cochin, Ernakulam, India.  
 Emerson, W. K. American Museum of Natural History, New York, U. S. A.  
 Fong, Lin Chuan. Dept. of Zoology, Univ. of Singapore.  
 Ganapathi, P. N. Andhra Univ., Waltair, India.  
 Hridayanathan, C. Central Institute of Fisheries Technology, Cochin, India.  
 Jonklass, Rodney Ceylon.  
 Karande, A. A. Naval Chemical and Metallurgical Lab., Naval Dockyard, Bombay, India.  
 Ketkar, S. M. Maharashtra, India.  
 Kirtisinghe, P. Colombo, Ceylon.  
 Kuriakose, P. S. Central Marine Fisheries Research Institute, Cochin, India.  
 Kurian, C. V. Dept. of Marine Sciences, Cochin Univ., Ernakulam, India.  
 Macnae, W. Dept. of Zoology, Univ. of Witwaters and, Johannesburg, Union of South Africa.  
 Macpherson, J. H. National Museum of Victoria, Melbourne, Australia.  
 Mahadevan, S. Central Marine Fisheries Research Institute, Cochin, India.  
 McGowan, J. Scripps Institution of Oceanog., La Jolla, Calif., U.S.A.  
 Nair, Balkrishnan. Dept. of Aquatic Sciences, Kerala Univ., Trivandrum, India.  
 Mukundan, C. Central Marine Fisheries Research Institute, Cochin, India.  
 Nagabhushanam, R. Dept. of Zoology, Marathwada Univ., Aurangabad, India.  
 Narayanan, K. R. Fisheries Research Station, Jamnagar, India.  
 Natarajan, R. Centre for Advanced Studies in Marine Biology, Porto Novo, India.  
 Nayar, K. Nagappan. Central Marine Fisheries Research Sub-station, Tuticorin, India.  
 Okutani, T. Tokai Regional Fisheries Research Lab., Tokyo, Japan.  
 Oommen, V. P. Dept. of Marine Sciences, Univ. of Cochin, Cochin, India.

- Patel, B. Bhaba Atomic Research Centre, Bombay, India.
- Philip, K. P. Dept. of Marine Sciences, Univ. of Cochin, Cochin, India.
- Pickford, G. E. Yale Univ., New Haven, Conn., U. S. A.
- Powell, A. W. B. New Zealand.
- Raffael, Y. Dept. of Fisheries, Colombo, Ceylon.
- Ramamoorthi, K. Centre for Advanced Studies in Marine Biology, Porto Novo, India.
- Rao, K. Prabhakara. Central Marine Fisheries Research Institute, Cochin, India.
- Rao, K. Satyanarayana. Central Marine Fisheries Research Institute, Cochin, India.
- Rao, K. V. Central Marine Fisheries Research Sub-station, Bombay, India.
- Rao, N. V. Subba. Zoological Survey of India, Calcutta, India.
- Ray, H. Zoological Survey of India, Calcutta, India.
- Rehder, H. A. U. S. National Museum, Wash., D. C., U. S. A.
- Sakthivel, M. Indian Ocean Biol. Centre, Cochin, India.
- Santhakumar, Shri. Central Institute of Fisheries Education, Bombay, India.
- Saraswathi, M. National Institute of Oceanography, Cochin, India.
- Sarvesan, R. Central Marine Fisheries Research Institute, Cochin, India.
- Silas, E. G. Central Marine Fisheries Research Institute, Cochin, India.
- Starmühlner, Ferdinand. First Zoological Institute, Univ. of Vienna, Austria.
- Sundaram, K. S. Central Marine Fisheries Research Institute, Cochin, India.
- Tikedar, Zoological Survey of India, Calcutta, India.
- Van Benbhan Jutting, W. S. S. Domburg, Netherlands.

## INTERNATIONAL SYMPOSIUM ON MOLLUSCS

In January of 1968 the Marine Biological Association of India sponsored an international symposium on Mollusca. This was held at Ernakulam (Cochin) in South India, and included many modern studies on the molluscs of the Indian Ocean and adjacent seas. Proceedings have already been published by the Marine Biological Association of India. These volumes have become an important reference source for the current Symposium on The Indian Ocean and Adjacent Seas.

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