

and a layout plan of the Nuwara Eliya Hatchery. The author is to be congratulated on the production of a treatise which should not only be of great interest to all those

interested in Trout Culture in tropical waters, but also serve as a work of reference in all Trout Hatcheries.

GULAM MUSTAFA MALIK.

Larvicidal Fishes and Their Identification

MALARIA is one of the major scourges of India and its prevention and cure have engaged the attention of the Medical and Public Health authorities in India for well over quarter of a century. The problem of the prevention of Malaria is many-sided, but from the time of the discovery by Sir Ronald Ross that the Anopheline mosquito was the carrier of the malarial parasites, it has been the aim of the authorities to control the incidence of Malaria by controlling the breeding of the carrier-mosquitoes in various ways. It has been known for many years now that some species of Indian freshwater fishes have a special preference for mosquito larvæ as food, and that their introduction into tanks, ponds and wells would go a long way to control the mosquito population in the neighbourhood of human dwellings. Medical men naturally turned their attention to the fishes of the aquatic areas in which mosquitoes bred, but found themselves in difficulties in the identification of the fishes. The only standard works on the Fishes of India were none too easy to refer to, burdened as they were with a mass of technical details, and the result was that fishes were often wrongly identified, sometimes not at all. The medical man, who is a field-worker interested in the control of Malaria by the use of larvicidal fishes, would appreciate a simple guide to the identification of freshwater fishes in India. In respect to this, *Health Bulletin* No. 12, *Malaria Bureau* No. 4 (Second Edition, Revised and Enlarged), pp. 1-47, pls. i-vii (1938), by Dr. S. L. Hora and the late Mr. D. D. Mukerji, of the Zoological Survey of India, seems amply to fulfil the needs of medical men in the field. The *Bulletin* bears the title "Table for the Identification of Indian Freshwater Fishes, with descriptions of certain families and observations on the relative utility of the probable Larvivorous Fishes of India"—a sufficiently self-explanatory title which renders a review somewhat superfluous. Nevertheless, the value of a neat and useful compendium of information on Indian Freshwater Fishes, like the present *Bulletin*, will hardly suffer by emphasis on its merits.

To the medical man in the field with the best will in the world, a reference to a well-arranged identification table of Indian Fishes would be of little help if he has not only to face terms like "procumbent predorsal spine" or "pro-current caudo-dorsal", but also to find the structures referred to in the fish under examination. The few pages devoted to the explanation of the principal terms and of the modes of measurements used in the description of a fish are, therefore, a very useful prelude to the Table of Identification which, with the eleven clear sketches of the external morphology of fishes (text-figures 1-11), renders the task of identification easy. The Table deals with 59 families of fishes, of which 11 are known to be larvivorous. The generic identification of the larvivorous families of fishes is facilitated by the inclusion of keys in footnotes, but a separate generic key of the Cyprinidæ is given as this family includes several genera of potential utility in anti-malarial work. The three appendices which follow are at least as valuable as the Table of Identification. Appendix I contains descriptions of exotic and Indian families of probable larvivorous fishes with information of value to those interested in mosquito-control work, printed in italics or in thick type. Appendix II contains notes on the relative importance of the various exotic and indigenous species of fish as destroyers of mosquito larvæ, and deplores the fact that no serious attempt has been made in this country to elucidate the value of exotic and Indian species of fish as destroyers of mosquito larvæ under Indian field conditions. A useful list of references on Malaria and mosquito control and on larvicidal fish follows. In Appendix III it is pointed out that the rough identification of the fish in the field should, in many cases, be followed by expert identification which is possible only in institutions with large reference collections of fish and literature such as are available in the Indian Museum. The collection and preservation of fish, simple as they appear, need a little expert guidance, and the authors give in this appendix a few simple directions as to how fish may be

observed in their natural haunts, how they may be collected and preserved if wanted for museums, or how they may be transported alive when required for anti-malarial work. The seven plates at the end with clear dot and line drawings of Indian freshwater fishes which enhance the value of this little *Bulletin*, should help not only medical men, but also students of fishes, to familiarise themselves with the features of

some of the principal Indian larvivorous fishes.

The *Bulletin*, which is priced at 7 annas or 8d. a copy, is published in Delhi by the Manager of Publications, and may be obtained from the Agents to the Government of India Publications in India and from private book-sellers, a list of which is given on the page opposite to the Prefatory Note.

H. S. R.

OBITUARY

Dayaram Sahni, M.A., C.I.E.

RAI BAHADUR DAYARAM SAHNI, M.A., C.I.E., late Director-General of Archaeology, died suddenly on the 7th March 1939 of heart failure at Jaipur, where he was employed as Director of Archaeological Researches since 1935. Rai Bahadur was the first Indian to be trained in the modern methods of archaeological excavations, and by his death India loses a most experienced archaeologist.

Rai Bahadur belonged to a respectable family of Khatri from Bhera in Shahpur District, Punjab. He was born on 16th December 1879. After passing his M.A. from the Oriental College at Lahore, with Sanskrit as his main language, he was selected for the archaeological scholarship instituted by the late Lord Curzon's Government, with a view to preparing suitable Indian scholars for archaeological work. Sir John Marshall, who was then organising the first systematic campaign of excavations in India, found in Rai Bahadur a willing and capable assistant. He worked at the excavations conducted by the Department at Sarnath near Benares, Kasia, the scene of the Great Buddha's decease. Sahet Meheth, the ancient Sravasti, Rajgir in Bihar, Mandar near Jodhpur, and Rampurva in Champaran. At Sarnath, Mr. Sahni studied the finds and prepared a comprehensive catalogue and a guide to the ruins. After a year, at the Lucknow Museum, where he worked as Curator, Mr. Sahni's services were lent to the Kashmir State, in December 1912. During the next four years, Mr. Sahni studied the architectural remains in Kashmir, and excavated at several places, among which may be mentioned Avantipur, the city of Avantivarman, Parihaspur, Hushkur, and Martand, the well-known site of a temple in classical style. In 1917, Mr. Sahni returned for work, to Lahore, where he took over the Hindu and Buddhist monuments in the

United Provinces and Punjab to his charge. After carrying out important archaeological work at Deogarh, Sarnath and other places in the United Provinces, Rai Bahadur Sahni then commenced a series of excavations at Harappa, which was shortly afterwards recognised as the foundation of our knowledge of one of the earliest cities of the Indus Valley culture. Since 1925, Rai Bahadur Dayaram Sahni was engaged at the Headquarters of the Government of India, first as a Deputy Director-General, and finally in July 1931, when he became Director-General. Unfortunately, his advent coincided with an era of unprecedented curtailment of activities owing to the need of retrenchment and his three years' tenure as Director-General was consequently very much handicapped and the lowest watermark of funds allotted to this cultural activity was reached. However, he carried the Department through this period and on retirement found fresh scope for his capacities in the almost untapped and rich archaeological field in the State of Jaipur. His excavations at Birat, where he unearthed one of the earliest Buddhist stupas in Rajputana, were highly successful. He carried out one or two seasons' work at the ancient city site of Naliasar-Sambhar near the well-known salt lake and at the time of his death was engaged in another important excavation at Rairh where he had hit upon another rich site of the early period.

Rai Bahadur Sahni was awarded the title of C.I.E. after his retirement in 1935.

Besides the two publications on Sarnath, Rai Bahadur contributed numerous other articles to scientific journals, particularly on Epigraphical subjects, bringing to light and interpreting many records of the past, particularly from the United Provinces and Northern India.