

Nelson Annandale

1876—1924.

By the death of Nelson Annandale on the 10th of April, 1924, at the early age of 48, science in India has lost its leading Zoologist and Anthropologist and the Zoological Survey of India its founder and first Director.

Thomas Nelson Annandale was born at Edinburgh on the 15th of June, 1876, and was the eldest son of Thomas Annandale, Professor of Clinical Surgery in the University of Edinburgh. He was educated at Rugby, where he rose to be head of the school and at Balliol College, Oxford, graduating in 1898. In 1899 he joined the Skeat Expedition to the Malay Archipelago, and between 1901 and 1903 revisited that country on more than one occasion in company with Mr. H. C. Robinson. From 1902 to 1904 he held a research fellowship in Anthropology in the University of Edinburgh, by whom in 1905 he was awarded the degree of D. Sc. He came to India in 1904, and throughout the remainder of his life was associated with the Indian Museum, first of all with the Natural History Section and latterly with its successor, the Zoological Survey of India. His twenty years of official work earned for him in 1923 the award of the C.I.E., and in 1924, in recognition of his distinguished service to science, his name was recommended by the Council for election to the Fellowship of the Royal Society. This honour he did not live to enjoy, for his death occurred before the formal election had taken place.

From his earliest days Annandale appears to have possessed the keenest enthusiasm for natural science, and at the beginning of his career, owing perhaps to the influence of E. B. Tylor, his interests centred chiefly in Anthropology. It was with Anthropology that he mainly concerned himself as a member of the Skeat Expedition, and it was to this subject that he devoted much of his attention on his subsequent expeditions with Mr. H. C. Robinson. In the results of the latter, published in three volumes under the title *Fasciculi Malayenses*, Annandale wrote on pure ethnography, on physical anthropology, on folklore and on religion and magic, showing in his anthropological observations the same breadth of outlook and absence of specialization that characterized his later work in Zoology.

Between 1896 and 1903 he paid several visits to the Faroes and Iceland, publishing in 1905 a book entitled *The Faroes and Iceland. Studies in Island Life*.

Throughout his life he maintained his interest in Anthropology. During official tours in India and travels in other parts of Asia, in which Zoology was his main objective, he still found time to make ethnographical observations and to publish them in the *Memoirs and Journal of the Asiatic Society of Bengal*, while for several years in Calcutta he devoted the best part of his Sundays to obtaining data for an anthropometrical study of the Eurasian population.

Annandale came to India in 1904 as Deputy Superintendent of the Indian Museum, and in 1907, on the retirement of Lieut.-Col. Alcock, was appointed Superintendent. At this time the Natural History Section had been suffering for a considerable period from official indifference to its needs. Alcock had endeavoured to institute reform, but not being one of the Board of Trustees was unable to make his voice heard and, at length, seeing no hope of effecting any improvement in the conditions under which he worked, felt compelled to submit his resignation. This step, though deplorable in that it deprived India of an officer of the highest scientific reputation, had immediate result. Annandale, on appointment, was given a seat on the Board of Trustees and quickly seized the opportunity for reform which his predecessor's drastic action had rendered possible. The *Records and Memoirs of the Indian Museum* were inaugurated, before long important additions were made to the superior staff and technical establishment, and the Natural History Section bade fair to take its place as the leading zoological institution in Asia.

With this successful outcome many would have rested content, but Annandale cherished further ambitions for his department. At length, in 1916, after many years of struggle, and with disappointments that would have daunted anyone with less tenacity of purpose, he achieved his aim in the transference of his department to Imperial control under the title of the Zoological Survey of India. To many the change must have seemed purposeless, for it brought no improvement in the conditions of service of the staff and no increase to their number; and it was absurd to suppose that any comprehensive survey of the fauna of so vast a territory as the Indian Empire could be effected by a department with only four scientific officers. But Annandale showed himself far-sighted in this, as in many less important administrative matters. He saw the advantages that would ensue if Zoology were given equal official recognition with her sister sciences, Geology and Botany; above all, that the change would sweep aside all possibility of restricting the activities of the department (at one time a very real danger) and would establish it firmly as an institution with research as its main object and the entire Empire as its field of work.

For many years Annandale was Honorary Secretary to the Trustees of the Indian Museum, taking an active part in the Museum administration and introducing numerous reforms in its management. Through his agency biennial courses of popular lectures were inaugurated and the success of the centenary celebrations in 1914 was largely due to his enthusiasm and enterprise. He edited a special centenary volume, entitled *The Indian Museum: 1814-1914*, which was published at this time and himself wrote a considerable part of it.

Notwithstanding administrative preoccupations Annandale accomplished a vast amount of zoological work. As will be seen from the list at the end of this notice, he leaves behind him a record of published work of which anyone with twice his length of service might be proud.

On arrival in India he seems first to have interested himself in the Reptilia, publishing a number of short papers on snakes and lizards, mostly in the *Journal of the Asiatic Society of Bengal*. Very soon, how-

ever, he turned his attention to the fauna of fresh water and began a series of studies on *Hydra* and on the freshwater sponges and Polyzoa which he summarized in 1911 in a volume published in *The Fauna of British India and Ceylon*. Prior to this he had extended his observations to brackish-water forms, in India almost an untouched field of research, and in 1915 he began to devote close attention to the fresh and brackish water Mollusca, publishing an immense amount of valuable work on this group during the last eight years of his life.

The beginning of his work on Mollusca may be traced to events connected with the war. Unable through ill-health to take a more active part, he offered to Government his own services and those of his entire staff as assistants in medical laboratories or any position in which a knowledge of biological technique might be of value. For long no answer came and Annandale, chafing at his inability to do more, equipped young Anglo-Indian officers at his private expense. To troops stationed in Calcutta he gave a series of short addresses on the museum exhibits, each followed by a sumptuous tea. At length the opening came. Many Indian troops serving in Egypt had been invalided to their native country suffering from schistosomiasis and the medical authorities, alarmed at the consequences if so serious a disease were to spread, summoned Annandale to their assistance. Schistosomiasis is caused by a parasite which passes its early stages in a freshwater mollusc and the problem to be solved was whether *Bullinus*, the snail which carries the infection in Egypt, might occur in some part of the Indian Empire, or—with greater probability—whether some other mollusc might not serve the parasite equally well as an intermediate host. Annandale pursued this quest with whole-hearted energy; tours were planned to likely parts of the Empire and repeated attempts were made to infect Indian molluscs with schistosome miracidia. The search carried him as far afield as Seistan in Eastern Persia and induced him to give close attention to the difficult problems presented by the taxonomy of freshwater Gastropods. After many months of assiduous work he was able to report that negative results had attended all his efforts—*Bullinus* was not represented in the Indian fauna and no other Gastropod seemed able to harbour the parasite. That this conclusion was correct may be inferred from the fact that no indigenous case of schistosomiasis is known to have occurred in India.

Thus Annandale added the Mollusca to the numerous groups of freshwater forms of which he had detailed systematic knowledge and formed the idea of making a comparative study of the faunas of Asiatic lakes. In spite of frail health he travelled far and wide in pursuit of this object, spending most of his leave in tours to distant countries. In all he personally investigated the faunas of some nine lakes spread throughout the length of Asia:—the sea of Galilee, the Hamun-i-Helmand in Seistan, the Chilka Lake in Orissa, the Ennur backwater near Madras, the Loktak Lake in Manipur, the Inlé Lake in Burma, the Talé Sap in the Siamese Malay States, the Tai-hu in China and Lake Biwa in Japan. From each large collections were made and before any general summary could be attempted or comparisons drawn a vast amount of detailed work was necessary, some of it involving the col-

laboration of specialists in Europe and elsewhere. This spade work, to which he applied himself most assiduously, was for the most part finished at the time of his death and he had published some summaries and papers of general interest on certain sections of the work. But the final reports in which it was his intention to correlate all his observations had not been written. The lack of these reports, in which views based on many years of patient work would have found expression, will be deplored by every zoologist.

It might be thought that this intensive work on freshwater faunas would have absorbed all the time and energy that he was able to spare from his administrative duties as head of a scientific department. But among modern zoologists Annandale was unique in the number of groups that he mastered; his interests embraced the whole animal kingdom and there is scarcely a section on which he did not publish original observations. He extended his work on sponges to the marine family Clionidae and became an acknowledged authority on the pedunculate Cirripedes. In 1911 he recorded the occurrence in Indian waters of *Limnocyclus*, a freshwater medusa, and in 1912 described *Caridinicola*, a Temnocephalid parasite of Atyid Crustacea.

From the time that he joined the Skeat Expedition he had been interested in Insects and throughout his life he continued to make observations on this group, publishing in 1910-11 an important revision of the sand-flies of the genus *Phlebotomus*. During the last few years of his life, finding the hot weather in Calcutta very trying to his health, he rented a bungalow on a small island, named Barkuda, in the Chilka Lake. To this he paid frequent visits and at the time of his death, a series of papers on the fauna of the island was in course of publication. He made numerous contributions to this series, one of the most valuable being a detailed account of the habits of termites, a paper which well illustrates his genius as a field naturalist.

To fossil Mollusca he gave close study and from this was able to formulate a theory of parallelism or convergence in the evolution of the shell-sculpture of the Viviparidae. He also drew attention to a somewhat similar phenomenon in the adaptations undergone by fish and tadpoles inhabiting mountain torrents. In such an environment both kinds of animals develop an adhesive apparatus, by which they can cling to the rocks and save themselves from being swept downstream. Annandale studied these structures in detail and found that their varying degree of complexity in different species is correlated with the rapidity of the current in which the species lives.

Because of his close acquaintance with so many different groups of animals Annandale's help was widely sought by institutions in other parts of the world. He described the freshwater sponges of the United States National Museum and those collected in South Africa by Prof. Max Weber and reported to the Imperial Academy of St. Petersburg on the sponge-fauna of Lake Baikal. He examined the Cirripedes obtained during the Ceylon Pearl Oyster Investigations, the pedunculate forms obtained by the Dalish Expedition to the Gulf of Siam and made a valuable contribution to our knowledge of this group in his account of a collection obtained from telegraph cables in the Malay Archipelago.

In the *American Journal of Hygiene* he wrote on the Molluscan hosts of the human blood-fluke in China and Japan ; he reported on the Mollusca of the Percy Sladen Trust Expedition to Yunnan and on Polyzoa from the Volga Basin and the Colombo water-works. To the 'Feestschrift' volume to Prof. Max Weber he contributed a paper on the marine element in the fauna of the River Ganges.

From this brief survey and from the list of titles (p. 7 *et seq.*) it will be possible to form some idea of the vast extent of Annandale's contributions to scientific literature and it will be realised that so much could never have been accomplished without unceasing energy and the capacity for using every moment of time to best advantage. Both these qualities he possessed in an unusual degree and, when in health, he was never idle. He worked with remarkable speed and seemed endowed with a special instinct for taxonomic differences, recognising species almost at a glance, while his fluency in descriptive writing enabled him to contrast closely related forms with exceptional lucidity. All his work was illuminated by continual observation in the field. The description of structural detail left him unsatisfied unless he could interpret its significance from an evolutionary stand-point or its meaning as an adaptation to environment.

Systematic work in its narrowest sense he esteemed but little, regarding it rather as a means to an end than as an end in itself, and in spite of the large number of his papers which, so far as their mere form goes, are systematic, it is doubtful whether his real interests lay in this branch of zoological investigation. It was his ambition to grapple with larger problems, to deal collectively with adaptations to particular environments, to compare whole faunas, seeking to explain their origin and to understand the reasons for their difference—only to be checked by the discovery that this Polyzoan or that Gastropod must first be accurately defined.

When a scientific worker dies in the full tide of his career much valuable information, of which he alone was possessed, is frequently lost with him. Of Annandale this is less true than of most, for while we have to deplore the unfinished condition of his study of Asiatic lake-faunas, by far the greater part of his work has appeared in printed form. It was his habit, as soon as any particular investigation was completed, immediately to write up and publish the results. This method, for which we now have reason to be grateful, was not without its disadvantages, for further work frequently indicated that some of the data had escaped notice and that the results required modification. But no one was ever more ready than Annandale to admit an error and to most corrections he himself was the first to draw attention.

As a writer he possessed unusual fluency ; he could carry in his mind, marshalled in orderly sequence, a prodigious number of details and could dictate either a closely reasoned official memorandum or a description of some complex anatomical structure with singular ease, without further reference to documents or specimens and with scarcely any subsequent revision. In a well-turned phrase or apt analogy he took keen delight, while from wide reading he had developed an unusual facility

in quotation and anecdote. Much of his writing was done before breakfast and, at night, especially in the hot weather, he would pace the roof of the museum, thinking out problems and projecting fresh schemes for the future.

During his twenty years in India Annandale was almost completely wrapped up in his work, devoting every moment, as it now seems, to scientific investigation and to the care of the institution that he founded. Of a reserved disposition, he made few intimate friends, yet in congenial company he was a brilliant conversationalist. He inaugurated series of lectures in the museum and those which he himself delivered were especially well attended. As a lecturer he proved himself eloquent and he always contrived to introduce those touches of humour which add so agreeably to a popular presentation of scientific facts. On committees, and especially when some contentious item was under discussion, he was at his best, frequently bringing others to his own view by his readiness in debate and quick appreciation of the vital points at issue. In official correspondence he showed striking originality. Impetuous by nature, he chafed at all delay and his irritation at any lack of appreciation of a scientific point of view sometimes led him to the use of a caustic wit which seemed ill-adapted to achieve the end he had in view. But the Government of India must have realized his genius and that his unusual methods were the outcome of an intense zeal for the promotion of zoological research, for he was singularly successful in introducing administrative reform.

Outside the museum and his own work his interests were few, but to the Asiatic Society of Bengal, of which he was President in 1923, he gave unstinted help, influencing all its activities by the breadth of his intellectual outlook and contributing much of his original work to its publications. He was a staunch supporter of the Indian Science Congress; twice he was Chairman of the Zoological Section and in 1924 was its President.

To most of his acquaintances, though they may have recognised his scientific abilities, Annandale was something of an enigma. His retiring disposition, close concentration on his work and almost complete lack of outside interests gave him little in common with his fellow men; only those who knew him intimately were aware of his kindly consideration for others and the readiness with which he gave assistance to all who needed it. By these qualities he endeared himself to his staff, inspiring them with enthusiasm by his interest and encouragement in their studies. He saw that each obtained full credit for all he did and was always ready to champion the cause of any member of his department when he thought his work had not received due recognition. His name will endure as an inspiration to his successors, who will feel that the memorial he would most have desired is the steady progress of the institution which he served with such devotion.

Annandale was never strong and during the past two years of his life was afflicted with continual ill-health. Only a few months before his death it was found that he had at one time suffered from a gastric ulcer. This appeared to have healed and he was thought to be on the road to complete recovery when he was seized with an acute form of

quartan malaria, which reduced his vitality and caused a fresh outbreak of the old malady. Against this double attack he was unable to make headway and he died on the 10th of April, 1924, after only a few days serious illness.

[S. K.]

The following list of Dr. Annandale's papers has been prepared by Dr. Bains Prasad, Dr. S. L. Hora, Dr. B. N. Chopra, and Mr. H. S. Rao. It is believed to be complete so far as zoology is concerned but there are possibly a few omissions among the earlier anthropological publications.

General.

Zoological names and theories of the Malays. *Proc. Roy. Phys. Soc. Edinburgh* XIV, pp. 446-461 (1901-2).

Contributions to the terrestrial Zoology of the Faroes. Part I. *Proc. Roy. Phys. Soc. Edinburgh* XV, pp. 153-160 (1902-4).

The Bird-cliffs of the Westmann Isles. *Field Naturalist's Quarterly, Edinburgh* (1904).

The Faeroës and Iceland. Studies in Island Life, with an appendix on the Celtic pony by F. H. A. Marshall, pp. viii + 238, with plate. Oxford (Clarendon Press): 1905.

Notes on the freshwater Fauna of India. No. V.—Some Animals found associated with *Spongilla carteri* in Calcutta. *Journ. As. Soc. Bengal* (n.s.) II, pp. 187-196, pl. i (1906).

Fasciculi Malayenses, Zoology, Part 3. (Liverpool: 1906). (*In collaboration with H. C. Robinson.*)

The Fauna of brackish Ponds at Port Canning, Lower Bengal. Part I.—Introduction and Preliminary Account of the Fauna. *Rec. Ind. Mus.* I, pp. 35-43 (1907).

The retirement of Lieutenant-Colonel Alcock, with a list of his papers etc., on Indian Zoology. *Rec. Ind. Mus.* II, pp. 1-9 (1908).

New volumes of the "Fauna." *Journ. Bombay Nat. Hist. Soc.* XX, p. 533 (1910).

The Madras Aquarium. *Journ. Bombay Nat. Hist. Soc.* XXI, pp. 693-694 (1912).

Notes on the Fauna of Paresnath Hill, Western Bengal. *Rec. Ind. Mus.* VII, pp. 33-49 (1912).

Observations on the Invertebrate Fauna of the Kumaon Lakes, with special reference to the Sponges and Polyzoa. General. *Rec. Ind. Mus.* VII, pp. 129-137 (1907). (*In collaboration with S. Kemp.*)

Some recent advances in our knowledge of the freshwater Fauna of India (a lecture delivered before the Asiatic Society of Bengal on the evening of March 27th, 1912). *Journ. As. Soc. Bengal* (n.s.) VIII, pp. 39-53, pls. i-iii (1912).

Stray Notes on Ceylon Animals. *Spolia Zeylanica* VIII, pp. 133-136 (1912).

Introduction to a Report on the Biology of the Lake of Tiberias. *Journ. As. Soc. Bengal* (n.s.) IX, pp. 17-23, pl. i (1913).

The African element in the freshwater Fauna of British India, IXe *Congr. Intern. Zool. Monaco* (*Publ. Rennes*), pp. 579-589 (1914).

- The Limestone Caves of Burma and the Malay Peninsula. Part II. The Fauna of the Caves. *Journ. As. Soc. Bengal* (n.s.) IX, pp. 402-424, pls. xviii-xxii (1913). (*In collaboration with F. H. Gravely.*)
- The Distribution and Origin of the Fauna of the Jordan system with special reference to that of the Lake of Tiberias. *Journ. As. Soc. Bengal* (n.s.) XI, pp. 437-476 (1915).
- A Naturalist's view of the Chilka Lake. *Calcutta Review*, pp. 1-15 (1915).
- Fauna of the Chilka Lake. Introduction. *Mem. Ind. Mus.* V, pp. 1-20, pls. i, ii (1915). (*In collaboration with S. Kemp.*)
- Zoological Results of a Tour in the Far East. Introduction. *Mem. As. Soc. Bengal* VI, pp. 1-12 (1916).
- Preliminary report on the Fauna of the Talé Sap or Inland Sea of Singora. *Journ. Nat. Hist. Soc. Siam* II, pp. 90-102 (1916).
- Introductory Account of the Inlé Lake. *Rec. Ind. Mus.* XIV, pp. 1-7, with 1 map (1918).
- The Fauna of the Inlé Lake. Summary of Results. *Rec. Ind. Mus.* XIV, pp. 195-212, pl. xxvi (1918).
- The Fauna of certain small Streams in the Bombay Presidency. *Rec. Ind. Mus.* XVI, pp. 109-138, pls. i, ii and iii, figs. 1-5 (1919).
- Report on the Aquatic Fauna of Seistan with subsidiary studies. Geographical Introduction. *Rec. Ind. Mus.* XVIII, pp. 3-16, pls. i, ii (1919).
- The Fauna of Asiatic Lakes. *Proc. Seventh Indian Science Congress*, pp. ixxxix-lxxxiii (1921).
- The British Association. *Nature* CVI, pp. 373, 374 (1920-1921).
- The Fauna of the Loktak Lake in Manipur. *Proc. As. Soc. Bengal* (n.s.) XVII, p. cxlvii (1921). (*In collaboration with S. L. Hora.*)
- The Aquatic Fauna of Seistan. A Summary. *Rec. Ind. Mus.* XVIII, pp. 235-253 (1921).
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- The Fauna of Scottish Lochs. *Nature* CVII, p. 778 (1921).
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- Fauna of the Chilka Lake. The Hydrography and Invertebrate Fauna of Rambha Bay in an Abnormal Year. *Mem. Ind. Mus.* V, pp. 677-710, pls. xxxii-xliii (1922). (*In collaboration with R. B. Seymour Sewell.*)
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- Museums and Taxonomic Zoology. *Museums Journ.* XXI, pp. 141-146 (1922).
- The Macroscopic Fauna of Lake Biwa. *Annotationes Zoologicae Japonenses* X, pp. 127-153 (1922).
- The Marine Element in the Fauna of the Ganges. *Bijdr. Dierkunde Amsterdam* XXII (Max Weber Feest-nummer), pp. 143-154 (1922).

- Ethics of Zoology. *Calcutta Review*, pp. 1-16 (March, 1922); also *Proc. As. Soc. Bengal* (n.s.) XVIII, pp. 79-91 (1923).
- Advances in our knowledge of the Fauna of the Fresh and Brackish waters of India, with a Bibliography for the years 1912-1922. (Bibliography compiled by Cedric Dover.) *Journ. As. Soc. Bengal* (n.s.) XVIII, pp. 527-554 (1923).
- Animal Life of the Ganges. *Journ. Bombay Nat. Hist. Soc.* XXIX, pp. 633-642 (1923).
- Evolution Convergent and Divergent. Presidential Address, Eleventh Indian Science Congress, pp. 1-26 (Bangalore : 1924).
- Divergent Evolution. *Proc. Eleventh Ind. Sci. Congress.* p. 109 (1924).

Porifera.

- Notes on the Freshwater fauna of India, No. 1. A variety of *Spongilla lacustris* from brackish water in Bengal. *Journ. As. Soc. Bengal* (n.s.) II, pp. 55-58 (1906).
- Notes on freshwater Sponges, Nos. I-V *Rec. Ind. Mus.* I, pp. 267-273 (1907).
- The hosts of *Tachaea spongillicola*, Stebbing. *Rec. Ind. Mus.* I, p. 279 (1907).
- Notes on freshwater Sponges, Nos. VI-VII. *Rec. Ind. Mus.* I, pp. 387-392, pl. xiv (1907).
- Notes on the freshwater Fauna of India, No. IX. Description of new freshwater Sponges from Calcutta, with a record of two known species from the Himalayas and a list of the Indian forms. *Journ. As. Soc. Bengal* (n.s.) III, pp. 15-26 (1907).
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- Report on a collection of freshwater Sponges from Japan. *Annotationes Zoologicae Japonenses* VII, pp. 105-112, pl. ii (1909).
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