Biography and Bibliography of Dr. Thomas Nelson Annandale (1876-1924)

ZOOGOGICAL SURVEY OF INDIA
BIOGRAPHY AND BIBLIOGRAPHY
OF
Dr. THOMAS NELSON ANNANDALE
(1876-1924)

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PREFACE

Nelson Annandale, more completely Thomas Nelson Annandale (1876–1924) for some strange reason does not feature in the academic curriculum of any Indian University teaching "Zoology" as a subject. The last of the English alphabet denoting the exciting area of Science inspired many brilliant minds over the centuries. But perhaps few can match the like of Nelson Annandale. Born in 15th June 1876, Nelson was the eldest son of Dr. Thomas Annandale, Professor of Clinical Surgery at the University of Edinburgh. His quest for knowledge was untiring in two major subject areas viz., Anthropology and Zoology. One can now relate the first and last letters of English alphabet, albeit logically–both dealing with life, past and present.

Nelson Annandale had his early education at Rugby where 'his only recorded success appears to have been winning of a prize for an essay on the natural history subject'. From Rugby to Balliol College, Oxford, the passage was smooth; studying Zoology under Ray Lankester, Nelson graduated with honors in 1898. But while an undergraduate, Nelson had his restless mind exploring unknown. He visited Iceland and Faeroes Island on anthropological mission and even published a book 'The Faeroes and Island: A study in Island Life' (Clarendon Press, 1908). Right after graduation, he joined Skeat Expedition in 1899 to Malay Peninsula and again travelled to the area between 1901 and 1903. Nelson was then a Research Fellow in Anthropology (1902–1904) and his work 'Fascicule Malayanees'–a series of papers finally earned him D. Sc., from the University of Edinburgh in 1905.

But eastern attraction was insurmountable. And Nelson joined Indian Museum, in the first ‘Capital City’ of British India, at Calcutta in 1904 as Deputy Superintendent; with retirement of Lt. Col. Alcock, Nelson Annandale succeeded him as Superintendent in 1907; with great energy and vision, he started two seminal series of publication ‘Record’ and ‘Memories’ of the Indian Museum.

But what is most unique is his liberal and humane outlook towards emerging Indian Science & Scientists. Not only did he recognise and applauded good works of Indian colleagues, but made it heard in the International scenario. Nelson strived to set up Zoological Survey of
India tirelessly between 1907 and 1915 and in 1916; the Zoological Survey of India was born. 'By this measure, Zoology was for the first time placed on a footing of equality with Geology and Botany and what had merely been the Zoological section of the Indian Media, become recognised as one of the great scientific research department of Imperial Government'

Annandale received many acelode during his rather life span of 48 years. He was President of Zoology & Entomology Section of Indian Science congress, Fellow of the Linnaean Society of London and in the year of his demise, his name featured in the list of recommended candidate to the Fellowship of the Royal Society. It's not his 'honors' and 'recognition' for which he should be remembered, but it's the work that he has left for the posterity, which need to be mentioned. Annandale’s seminal work on Lake Biology, Cave Fauna, Study of Marine Biota and Estuarine Eco-system of Hugli-Matla to name a few, can never be bypassed without being referred to by any researcher. Royal Society (1925), mentioned 'Annandale was first and foremost a field naturalist or more precisely a student of animal ecology'

'Annandale was of slight physique, with a high strung temperament and restless energy' He was forth right in criticism and caustic wit, outspoken in expression, but brilliant in analysis. He was unsparing of assistance and encouragement to his junior assistants. 'Except for the Asiatic Society of Bengal, which owes to his wise counsel and of which he was President in 1923, Annandale's interest during his twenty years services in India were almost wholly concentrated in the institution that he culminated'

During his rather short space of life, Annandale a bachelor, travelled to Palestine in 1912 and 1921, revisited Malaya besides China and Japan in 1916 and Morocco in 1921.

One can never complete any homage to Annandale without referring to his unique Presidential Address delivered in the Section of Zoology in the Ninth Indian Science congress in 1922. His address was on 'Ethics of Zoology' One can not prevent the temptation of quoting Annandale, however selectively. Some excerpts

In his Introduction to the eighty-third section of the Ain-i-Akbari Shaik Abulfazal wrote of Akbar.
“His majesty was taught men something new and practical and has made an excellent rule, which protects the animal, guards the stores, teaches equity, reveals the excellent and stimulates the lazy man.” (Blochmann’s Ain-i-Akbari, Vol. I, p. 217.)

“Let us constitute ourselves humble followers of Akbar and strive to find a rule that will at once protect the animal, guard and stores of zoological learning, maintain equity between zoologists and stimulate the excellent, if not the lazy man to sound zoological research.”

While discussing the genesis of zoological research in India, Annandale said

“Sir William Jones in his inaugural discourse to Asiatic Society, delivered in Calcutta in 1784, omitted zoology from the proposed agenda of the Society. Nine years later, in his tenth address he explained the reason. ‘Could the figure, instincts and qualities if birds, beasts, insects, reptiles and fishes,’ he said, ‘be ascertained, either on the plan of Buffon, or on that of Linnaeus, without giving pain to the objects of our examination, few studies would afford us more solid instruction or more exquisite delight’ ”

Annandale was critical of this decision of Sir William Jones, as he observed

“Elementary as was Sir William Jones’s concept of zoology, his opinion as a scholar and a poet cannot be dismissed lightly. There is, as the French say, nothing that kills like ridicule, but ridicule kills only when its object is really ridiculous. To laugh at what is true and solid is merely to exhibit lack of sympathy and sense.”

“The study of zoology in India has not, as a matter of practice, been much affected by the addicts of Asoka and the remarks of Sir William Jones on the supposed cruelty involved in zoology had no more than a temporary effect on the history of the Asiatic Society. Indeed, it seemed at times as if the stone the builder had rejected had become the headstone of the corner, for in the days of Blyth and again in those of Alcock, zoological papers were amongst the most important published in the Society’s Journal. Nevertheless, it is as well that in our zoological work we should keep in mind both Firdausi and Piyadasi.”

Annandale in his inimitable way laid the future path of Zoological Survey of India, as he said
"In the official document whereby the Zoological Survey of India was constituted in 1916, our relations with the technical departments are laid down as being those of 'co-ordination without subordination'. The thanks of all Indian zoologists are due to the man who discovered this formula – I do not know his name. The formula implies not only the recognition of pure zoology on the part of the Government of India, but also its independence of direct economic aims. I have nothing to say against applied science, provided that it is science at all, but the term is often 'applied' to something akin to the Holy Roman Empire, which has been described as neither holy, Roman, nor an empire."

He was forthright in criticizing the dogma of the western scientists towards the works of Indian Zoologists or the works carried out in India, when he mentioned

"In discussion on the value of zoological works there is nothing that makes me more indignant than the saying that this or that piece of Indian research is good work – for India. This usually means that it is of inferior quality, but must not be judged too hardly, because it has been done either by an Indian or by an Englishman working amidst Indian difficulties. We Indian zoologists, to judge by the work of our predecessors – Hodgson, Blyth, Stoliczka, Blanford, Alcock and many others – have no reason to claim indulgence. There can be nothing more fatal to Indian science than to aim at a low ideal and no greater insult can be paid to any branch of scientific effort than to judge it from a racial or a geographical stand-point. Zoology is often regarded in India as the Cinderella of the sciences and it is, therefore, necessary on occasion for zoologists to mingle the meekness of the dove with the subtlety of the serpent."

He continued his strong advocacy on the necessity of carrying out zoological research in India, as he said

"I had recently in London an opportunity of discussing the position of zoology in the country with one of the greatest of living zoologists. He maintained that zoology should not be encouraged in India, until India was in a position to do independent work. By independent work he meant research independent of official control. Apart from all personal considerations, I was unable to agree with him, for I see no way of fostering zoological research at present in India, but through the agency of government. It is quite true that no branch of science can be said to
be on a sound basis unless it is independent and that the flame of research must burn feebly so long as it is not fed by the spirit of individuality. Moreover, the age has not yet come in which the true value of the independence of science will be appreciated by the powers that be. Science and officialdom are as antagonistic as the mongoose and the snake, but officialdom in its dangerous form is a matter of the spirit: obiit in mores. To confound government with officialdom is unjust."

Annandale was aware of bureaucracy what he termed officialdom and its immense adverse effects in pursuing free and fair pathway of research. He said

"No government that consisted merely of officialdom could exist for a month. I prefer to regard red-tape as the excreta of government. It is unfair to judge any organism but its excreta, nor is it fair to confound the Imperial policy with the wriggling of some harassed secretary afflicted with dysentery of notes and minutes and trembling at the name of Finance Department. Zoology throughout the world owes a great debt to the government of India as the only Government that has founded a zoological survey on a basis of pure research. At the present time zoological posts sanctioned in previous years are kept vacant in Great Britain in the interests of so-called economy, while in India the Government is at any rate attempting to place zoological research on a sound financial basis. The constitution of the Indian Museum is now especially in the matter of zoology, much more liberal than that of the British Museum from which it was originally copied. We have, therefore, in India justification for the hope of a bright age. With faith in our calling and hope in its future we zoologists are in a very strong position."

"Science can afford to be magnanimous and the petty politics of the passing hour need not concern us. Truth is great and will prevail. Whatever may be our political views, whatever our race, or creed, or caste, Pope's words stand true in science":–

"For Forms of Government let fools contest;
What're is best administrated is best;
For Modes of Faith let graceless zealots fight;
He can't be wrong whose life is in the right;
In Faith and Hope the World will disagree;
But all Mankind's concern is Charity."

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Annandale breathed his last on 10th April, 1924, after only a few days of serious illness in this city of Calcutta (he was laid to rest in the South Park Street Cemetery, but later his last remains was removed to the Scottish Cemetery, in Ekka Lane, Park Circus, Kolkata).

Dr. S. Kemp, his distinguished colleague, wrote "To most of his acquaintances... Annandale was something of an enigma ... 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 the... 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..."

Annandale left a legacy behind. Not only his enormous publications covering 14 diverse areas of Zoological research besides Botany and Anthropology (including many in ‘Nature’ but also his foresight insisting the necessity of setting up ZSI. This survey continues to provide immense services to Agriculture, Fishery, Animal Husbandry, Public Health etc. over last 94 years. The Zoological Survey of India has survived test of time, grown from strength to strength, branching out from headquarters in Kolkata to 16 centres across India. But, hurdles and problems remain and perhaps only with resolute determination one can cope up with the hurdles.

It is not strange that ‘Annandale Memorial Medal’ was announced by the Council of Asiatic Society, in April 1924, to perpetrate the memory of Dr. Thomas Nelson Annandale, D. Sc., F.L.S., F.R.S., to be awarded triennially for ‘Anthropological Work in India’

Annandale remains what he was. A complete man with knowledge extending from A to Z.

Dr. A.K. Ghosh

Dr. A K Ghosh, Ph. D., served as the 13th Director of the Zoological Survey of India during 1992–1996. A Fulbright Scholar and recipient of several honors and Visitorship, Dr. Ghosh is currently the Director, Centre for Environment & Development, Kolkata and a visiting faculty to the University of Calcutta & Jadavpur University. He has published more than 330 research papers including 25 books from 10 countries around the world.
ESTABLISHMENT OF
ZOOGICAL SURVEY OF INDIA

Biodiversity underlies our existence and contributes to our physical and mental health and ensures that we remain in touch with the natural world. Equally true, no organism exists in isolation from other living organisms and individually each plant and animal has a role to play in the web of life around us. It is for this reason, that the global community expectations are reflected in understanding, and developing strategies, legislations and agreements at national and international level for best practices in all environmental matters.

Faunistic and floristic surveys provide information to address both biodiversity conservation and ecological function values of the country, based on qualitative and quantitative floristic and faunistic species composition, threatened species and the ecosystem that sustains, as well, identifying landscapes, biologically rich and valuable areas. It also serves to understand the intrinsic value of the species, not only based on the rarity and vulnerability in terms of geographic distribution, but also on the basis of the key functions. The survey also provides a basis and benchmark for ongoing species and habitat action plans to conserve and increase biodiversity.

The voucher specimens collected during various faunistic field surveys and explorations, preserved and deposited in natural history museums helps in recognizing multiple species in a complex of closely related species, variation in traits of populations that affect morphology, ecology, behaviour or physiology, errors or omissions in keys or guides used for identification. Accessible voucher specimens are critical for accurate identification and subsequent verification of species. Species are the raw material of biodiversity research, whether the focus is of research in taxonomic, evolutionary, ecological, genetic, behavioural or physiological aspects. Research projects in biodiversity require a significant investment of time, effort and money, but without adequate documentation in the form of vouchers there is great potential for that investment to be wasted. Indeed, a failure to protect the currency of science inevitably leads, just as in business, to bankruptcy.
In a time when the world knows little over 1.75 million species, a large number is yet to be described especially from tropical countries, and even after 250 years of Linnaeus, we still to know the entire species diversity living on this universe.

**Formative days (1700’s-1916)**

Serious exploration of the faunal diversity of India was started during the last quarter of 18th century. The Asiatic Society of Bengal, founded by Sir William Jones in 1784 was only organisation documenting culture and biological wealth of the east during that time. The society possessed a building in 1808 and established a museum in 1814. Sir William Jones was personally not in favour of collecting zoological specimens; however there was definitely a bias towards biological specimens from the very beginning in the museum.

**SIR WILLIAM JONES**

The phase of field studies was initiated by the British Government for the investigation of deep sea fauna, assigned to Surgeon Naturalists of the Marine Survey of India. The deep sea explorations started in 1822, with Royal Indian Marine Ship *Investigator*, laid a solid foundation for the systematic study of deep-sea fauna. Among the other earlier zoological explorer, the contributions made by Dr. John Anderson from his expeditions to Yunan (China) in 1868 and 1875, collections form Persian Boundary Commission (1870-1872), Second Yarkan Mission (1873-1874) and Dafla expedition (1874-1975) are significant in the history of the survey.

The Government of India passed The Indian Museum Act in 1866 and the museum of Asiatic Society was transferred in 1875 to the newly constructed building. By this time the zoological and anthropological collection had expanded, a number of descriptive catalogues were published and expeditions were taken out to different parts of the empire.

Sir Alfred Alcock, was working as superintendent of the museum. At the Indian Museum, Alcock worked on improving the public galleries of Reptiles, Fishes and Invertebrates. Sir George King who was the chairman of the Trustees supported him, however after his retirement, Alcock was given little support. Lord Curzon decided to exhibit the collections of the Indian Museum as a memorial to Queen Victoria in 1903 and Alcock was ordered to “to vacate the gallery of Fishes at a moment’s notice.”

SIR ALFRED ALCOCK

Alcock protested to the Trustees that “it would be disgraceful to dismantle a gallery of Invertebrates which included an exhibit of the recent mosquito-malaria discoveries, at a moment when those discoveries seemed at last to have driven into the thickest British skull the great truth that the study of zoology was of some use to mankind.” The gallery was spared but the library was to be cleared. These experiences caused Alcock to quit and he returned home in 1906 writing to the Government “telling him what an impossible post the superintendentship of the Museum was and begging him to get it improved for the sake of the Science of Zoology and of my successors.” In the letter Alcock wrote that Zoology was “a branch of pure science pregnant with human interest”, important to the state “in matters of education, in matters agricultural and veterinary, and in the vital matter of public health” He suggested the establishment of an Indian Zoological Survey with a museum and laboratory administered by zoologists along the lines of the Geological and
The main task of the Asiatic Society (1814-1875) and Indian Museum (1875-1916), was to identify and exhibit the zoological collections deposited by different explorers and naturalists of British India when organised field studies for fauna were limited. It was felt, that the role of survey was not purely of museum taxonomy and without having detailed field studies, any conclusion drawn regarding the habit and habitat of any species would be meaningless.

A representation made to the Government of India by the trustees of the Indian Museum accepted the advice and separated the Zoological and Anthropological section from the Indian Museum on 1st July, 1916 into a separate department, the Zoological Survey of India. The exploratory field studies gained considerable importance after the official creation of the Zoological Survey of India, as an independent organisation. The post of Surgeon Naturalists, Marine Survey of India was transferred to Zoological Survey of India in 1920 and Major R B Seymour Sewell became an additional member of the survey in the rank of Superintendent.

NELSON ANNANDALE (1916-1924)

The Zoological Survey of India (ZSI) commenced its work with four scientific officers under the directorship of Dr. Thomas Nelson Annandale. The first survey was undertaken at the request of the medical authorities of India. During First World War, the government became anxious that the disease Schistosomiasis, hitherto unknown in India, might be introduced by soldiers returning from Middle East. A survey of Indian freshwater Mollusca and their possible role in acting as vectors of human Schistosomiasis was undertaken. Other significant contribution from Dr Nelson Annandale include expedition to Lake Galilee, Tiberias, Palestine, to the Tale Sap in Thailand and to Lake Biwa in Japan.
Biography

Dr. Thomas Nelson Annandale was born on 15th June 1876 at Edinburgh city of United Kingdom. He came to India in 1904 as Dy. Superintendent of the Natural History Section of the Indian Museum and in 1907 was appointed as Superintendent on the post vacated by Lieut-Col. Alcock. Under his strong and wise administrative ability, the Natural History Section of the Indian Museum flourished both with human and faunal resources. Two scientific journals viz., Records of the Indian Museum and Memoirs of the Indian Museum was initiated and inaugurated in the year 1907. Dr. Annandale was Honorary Secretary to the Board of Trustees of the Indian Museum for many years. In 1916 he achieved one of his principal aims in the foundation of the Zoological Survey of India, in which he was appointed as Director and performed his duty till his last breath.

He had published a series of scientific reports on zoology as well as on anthropology. In spite of his pre-occupied administrative work, he became an authority on many groups of animals like sponges, polychaeta, barnacles, molluscs etc., but his interest spread far beyond these limits and there is scarcely any group in the animal kingdom on which he did not make original contributions. Thus, Dr. Annandale became a legend in his life time.

He was an emphatic believer in the necessity of field work. He travelled all corners of the Indian Empire and acquired a personal knowledge of its fauna. Prior to beginning of his career in India, he had travelled widely, which includes Faroes and Iceland, Skeat Expedition to the Malay Peninsula in 1899 and subsequently revisited the country during 1901 to 1903 and the results were published in three volumes under the title Fasciculi Malayenses. In the years 1912 and 1921 he visited Palestine and in 1916 he undertook a comprehensive journey to the Malay States, China and Japan and in 1921 the Morocco. Before arrival in India, his chief interest was in Anthropology, but the same was overshadowed by his later activities in zoology, where he continued to make contributions throughout his life. His suggestion on the problem in anthropology to P.C. Mahalanobis led the latter discovery of a technique that developed into the multivariate statistical techniques of today.
Scientific Evaluation

It is almost an impossible task to evaluate the scientific work of Dr. Thomas Nelson Annandale, who had studied and published a lot almost on every group of zoology. Within a very short life span of only 48 years he produced an enormous number of publications in almost all groups of zoology and anthropology also. Altogether he published 538 scientific reports and findings including 72 articles on anthropology and only 1 on Botany. The anthropological articles are mostly based on the expedition in Malay Peninsula. In the beginning of the 20th century he published certain anthropological reports on Scotland and Iceland.

Dr. Annandale started his career as an anthropologist and for that he mainly concerned himself as a member of the Skeat Expedition, with Mr. H.C. Robinson. Later the result was published under the title Fasciculi Malayenses. He also wrote on pure ethnography, physical anthropology, folklore, religion including original anthropological observations. Though, later his main interest was in zoology yet he continued his interest in anthropology and published articles in the Memoirs and Journals of the Asiatic Society of Bengal. He engaged himself to obtain data from the Eurasian population of Kolkata for anthropometrical study. He edited a special centenary volume, entitled ‘The Indian Museum: 1814-1914’ and contributed a chapter in it.

He started working on the aquatic fauna of India, an untouched field of research and gave much of his attention to the fauna of freshwater and began a series of study on Hydra as well as freshwater sponges and Polyzoa, which he summarized in 1911 and published in ‘The Fauna of British India and Ceylon’ During the last eight years of his life he published an enormous volume of work on fresh and brackish water mollusca. His study on the faunas of the Asiatic Lakes is still an invaluable document. He personally investigated the fauna of nine lakes spread throughout the length of Asia, viz., Sea of Galilee, the Hamun-i-Helmand in Siestan, the Chilka Lake in Orissa, the Ennur backwater near Madras presently Chennai, the Loktak Lake in Manipur, The Inlé Lake in Mayanmar, the Talé Sap in the Siamese Malay States, the Tai-hu in China and Lake Biwa in Japan and published enormous scientific documents, however his intention to correlate all his observations had not come true due to his untimely death.
He extended his work on sponges to the marine family Clionidae and became an authority on the pedunculate Cirripedes. In 1911 he recorded the occurrence of *Limnocnida* in Indian waters, a freshwater medusa, and in 1912 described *Caridinicola*, a Temnocephalid parasite of Atyid prawn. In 1910-1911 he published an important revision on Sand-flies of the genus *Phlebotomus*. Before his death, he rented a bungalow in the Barkuda Island of Chilka Lake and at the time of his death, a series of papers on the fauna of the Barkuda Island was sent for publication. One of the most valuable contribution being a detailed account of the habits of termites.

From a close study of fossil mollusca he 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 similar phenomenon in the adaptations undergone by fish and tadpoles inhabiting mountain torrents. He worked out on the freshwater sponges of the United States National Museum collected by Prof. Max Weber from South Africa and reported to the Imperial Academy of St. Petersburg on the sponge-fauna of Lake Baikal. He examined the Cirripeds obtained during the Ceylon Pearl Oyster Investigation; the pedunculate forms obtained by the Danish 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 mollusca of the Percy Sladen Trust Expedition to Yunnan and on Polyzoa from the Volga Basin and the Colombo water works. He also contributed a paper on the marine element in the fauna of the River Ganges.
ANNOTATED BIBLIOGRAPHY

Publications on Zoology

   
   Attitude and habits of flower like Mantidae (Orthoptera) described.

   
   Notes on aquatic Blattidae (Orthoptera)

   
   Habits of Phasmid insects


   Galeopithecus volans (Dermoptera : Mammalia) in Malay. [Current Name : Cyanocephalus volans (Linnaeus)]


   Calotes versicolor Linnaeus – on its bipedal locomotion.


   The Horse : Equus sp.


*Megalophrys montana*, an Amphibia


*Porpita* (Hydromedusae) of Indian seas.


*Gonatodes andersonii* sp. nov.

*Ptychozoon homalocephalum* – notes on regeneration of tail.


Family COLUBRIDAE

*Stoliczkaia khasiensis* Jerd.

*Dipsadomorphus trigonatus* Schneider

*Contia angusticeps* Boulenger


Class CIRRIPEDIA

*Alepas gigas* sp. nov.
*Alepas Malaysians* sp. nov.
*Scalpellum inerme* sp. nov.
*Scallpelum sociable* sp. nov.


*Hydra vulgaris* from Calcutta, description with a note on its habits.


*Chaetogaster bengalensis* sp. nov. in ponds in Calcutta, description, figures, habits and symbiosis.


Following species of snakes are described:

Family TYPHLOPIDAE
*Typhlops braminus* (Daud.)

Family COLUBRIDAE
*Lycodon aulicus* (Linn.)
*Oligodon woodmasoni* (Scl.)
*Coluber melanurus* Schleg.
*Dendrophis pictus* (Gmel.)
*Tropidonotus piscator* (Schneider)
*Tropidonotus nicobarensis* Scl.
*Dipsadomorphus ceylonensis* Gthr.
*Distira andamanica* sp. nov.


Family TYPHLOPIDAE
*Typhlops mulleri*
*Typhlops kapaladua* sp. nov.
*Typhlops acutus*
Family GLAUCONIIDAE
Glauconia blanfordii

Family COLUBRIDAE
Calamaria leucocephalia
Dryocalamus tristrigatus
Tropidonotus khasiensis
Macropisthodon Himalayanus
Coluber radiatus
Ablabes gilgiticus
Ablabes baliodirus
Helicops indicus sp. nov.
Dipsadoides decipliens genus & sp. nov.
Bungarus sindanus Blgr.


SIRENIA
Halicore Dugong – morphology, habits and etc.


Following species are described and also a list of lizards of India, Burma and Ceylon is incorporated.

Family GECKONIDAE
Hemidactylus triedrus Dud.
Hemidactylus karenorum (Theob.)
Hemidactylus frenatus Gray
Hemidactylus platyurus (Schneider)
Ptychozoon homacephalum (Crev.)
Phyllodactylus burmanicus Annandal
Gonatodes andersonii Annandale
Gymnodactylus consobrinoides sp. nov.
Gymnodactylus oldhami Theob.
Gymnodactylus marmoratus Gray
Gymnodactylus feae Blgr.
Alsophylux pipiens (Pall.)
*Lepidodactylus ceylonensis* Blgr.
Family EUBLEPHARIDAE
*Eublepharis hardwickii* Gray
Family AGAMIDAE
*Calotes junnanensis* sp. nov.
*Calotes microlepis* Blgr.
*Calotes versicolor* (Daud.)
*Calotes rouxii* Dendy & Burton
*Japalura andersonia* sp. nov.
*Pyctolaemus gularis* Ptrs.
*Acanthosaura lamnidentata* Blgr.
*Solia horsfieldii* Gray
*Agama lirata* (Blanf.)
*Agama nupa* De Fil.
*Liolepis bellii* (Gray)
Family ANGUIDAE
*Ophisaurus apus* (Pall.)
*Ophisaurus gracilis* (Gray)
Family VARANIDAE
*Varanus dumerilii* (Mull.)


Following species are described and also a list of lizards of India, Burma and Ceylon is incorporated.

Family LACERTIDAE
*Tachydromus septentrionalis* Gthr.
*Lacerta viridis* (Laur.)
*Ophiops schleuteri* Boett.
Family SCINCIDAE
*Mabuia rugifera* (Stol.)
*Mabuia multifasciata* (Kuhl.)
*Mabuia tytleri* Blgr.
*Mabuia monticola* (Theob.)
Mabuia anakular nom. nov.
Lygosoma maculatum (Blyth)
Lygosoma mitanense sp. nov.
Lygosoma dussumerii var. concolor var. Nov.
Lygosoma olivaceum var. griseum (Gray)
Lygosoma cacharensis sp. nov.
Lygosoma pulchellum (Gray)
Lygosoma sikkimense (Blyth)
Lygosoma tragbulense Alc.
Lygosoma beddomii Blgr.
Lygosoma formosum (Blyth)
Lygosoma atrocostatum (Gray)
Lygosoma chinense (Gray)
Lygosoma lineolatum (Stol.)
Lygosoma comotii Alc.
Lygosoma anguinum (Theob.)
Eumeces scutatus (Theob.)
Eumeces taeniolatus (Blyth)
Scincus mitranus Anders.
Chalcides ocellatus (Forsk.)


Two tadpole larva of Rana from northern Cachan in Assam studied and described, which are of the same species and abnormal in the absence of hind limbs. These are present in the miscellaneous specimens present in the Indian Museum.


Detail description of the egg and early larval stage of the Heteroptera was given but species was not confirmed and written as “almost certainly Dalader acuticosta”

**Hemidactylus subtriedoides** sp. nov.

**Hemidactylus gamotii** Dendy & Burton

**Ptychozoon homacephalum ilonotum** var. nov.

**Phyllodactylus siamenses** Boulenger

**Phyllodactylus burmanicus** sp. Nov.

**Gonatodes marmoratus** Beddard

**Gonatodes affinis** Stol.

**Gymnodactylus fedtschenkoi** Strauch.


Stalked Barnacles from western Malaysia:

**Poecilasma amygdalum**

**Dichelaspis equina**

**Alepas indica**

**Alepas malaysiana** sp.nov.

**Alepas gigas** sp.nov.

**Scalpellum inerme**

**Scalpellum sociabile** sp.nov.

**Scalpellum inerme** sp.nov.

Stalked Barnacles from the Indian Seas:

**Scalpellum gruelii**

**Scalpellum gruelii** var. *quadratum*

**Scalpellum laccadivcum**

**Scalpellum laccadivcum** var. *investigatoris*

**Scalpellum alcockianum**

**Scalpellum squamuliferum**

**Scalpellum bengalense**

**Scalpellum acutum**

**Scalpellum velutinum**

**Scalpellum wood-masoni**

**Scalpellum tenue**

**Scalpellum novae-zelandiae**

**Scalpellum subflavum**

**Megalasma striatum**

**Megalasma carino-dentatum**
Poecilasma kempferi
Poecilasma amygdalum
Dichelaspis pellucida
Dichelaspis lepadiformis
Dichelaspis grayi
Dichelaspis warwicki
Dichelaspis equine
Conchoderma hunteri
Alepas xenophorae
Alepas indica
Lithotrya dorsalis var. maldivensis
Lithotrya dorsalis var. rugata
Lithotrya nicobarica


Described a new variety of freshwater sponge and included a list of freshwater sponges recorded from India.

Phylum PORIFERA

*Spongilla lacustris* var. *bengalensis* nov.


Described the polyzoa *Hislopia lacustris* from Calcutta 'Maidan' and compared with *Norodonia* of Carter.


*Testudo baluchiorum* sp. nov.


Aquatic habits of cockroaches of two species of genus *Epilampra*.

Hydra orientalis lives commensal life with freshwater sponges and polyzoa. Chironomid larvas are the enemies which feeds on Hydra orientalis.


Aquatic worm Chaetogaster spongillae sp. nov., Chironomid larva Tanypus sp. and Neuropterous larva Sysyra sp. occur in the substance of living specimens of Spongilla carteri in Calcutta, while several other animals seek shelter in the dead skeleton of the sponge.


New species of Gobid fish from Port Canning (lower Bengal).

Gobius alcociki sp. nov.


Described the following species and appended a list of the Indian Tortoise.

Family TRIONYCHIDAE

Trionyx gangeticus Cuvier

Emyda granosa (Schoepff)

Family TESTUDINIDAE

Testudo elegans (Schoepff)

Testudo horsfieldi Gray

Testudo baluchiorum Annandale

Nicoria trijuga (Schweigg.)

Bellia petersii Annandale


Compared three species

Conchoderma hunteri

Conchoderma virgatum (Spengler)

Conchoderma virgatum var. hunteri

   Family GECKONIDAE

   *Gymnodactylus himalayicus* sp. Nov.


   Notes on some Himalayan Tadpoles and their habits.

   *Bufo himalayanus* Gunther

   *Megalophrys montana* Kuhl

   *Rana liebigii* Gunther

   *Rana* sp.


   A prefatory note of the paper by C.A. Paiva


   This is an addendum of the note on *Labidura lividipes vicina* By Mr, Burr.


   The common Hydra of Bengal is *Hydra orientalis*, and the present communication deals with the peculiarities in the structure and life history of the Bengal form.


BATRACHIA
Rana cyanophlyctis
Rana greenii
Bufo melanostictus

REPTILIA
Testudo elegans
Nicoria trijuga var. thermalis
Hemidactylus frenatus
Hemidactylus brookii
Hemidactylus leschenaultii
Hemidactylus triedrus
Teratolepis scabriceps sp. nov.
Sitana ponticeriana
Calotes gigas
Mabuia bibronii
Lygosoma punctatum
Chamaeleon calcaratus
Typhlops braminus var. arenicola var. nov.
Typhlops limbrickii sp.nov.
Typhlops psammophillus
Eryx conicus
Eryx johnii
Lycodon striatus
Zamenis mucosus
Dendrophis pictus
Rtopidonotus piscator
Dryophis mycterizans

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Dryophis mycterizans var. anomalus nov.
Naia tripudians
Echis carinatus


Family SCINCIDAE
Lygosoma megalops sp. nov.
Theconyx gen. nov. for Euprepes halianus Nevill


Description, habit and habitat of aquatic Weevil (Family Curculionidae) of Indian Museum tank, Calcutta and its life history are described.


Annandale described the following species from a pond at Port Canning:
Phylum PROTOZOA
Carchesium polypinum
Folliculina ampulla

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Phylum PORIFERA
*Spongilla lacustris* var. *bengalensis*
*Spongilla cerebellata*
*Spongilla alba, Carter*
*Spongilla lacustris*
*Spongilla carteri*

Phylum CNIDARIA
*Metridium schillerianum*
*Irene ceylonensis*
*Bimeria vestita*
*Hydra sp.*
*Syncoryne sp.* (new species)

Phylum MOLLUSCA
*Hydrobia (Belgrandia) miliacea*
*Valvata microscopica*
*Blythinia sp.* (new species)
*Martesia sp.* (new species)
*Teredo sp.* (new species)
*Pharella sp.* (new species)
*Theora, sp.* (new species)
*Stenothyra blanfordiana*
*Corbula spp.* (five new species)
*Bithinella sp.* (new species)
*Ampullaria sp.*
*Onchidium sp.*

Phylum NEMATODA
*Oncholaimus* sp.

Phylum GASTROTRICHA
*Chaetonotus schulizei*

Phylum POLYZOA
*Victorella pavida*
*Membranipora bengalensis*
*Bowerbankia caudata* (Hincks)

Phylum ARTHROPODA
Class CRUSTACEA
*Varuna sp.*
Ceriodaphnia rigaudi
Cyclops leuckartii
Balanus Amphitrite var. communis
Balanus patellaris
Chthamalus stellatus
Class INSECTA
Anopheles rossi
Ischnura senegalensis
Gerris sp.
Hydrometra sp.
Microvelis sp.
Mesovelia sp.
Laccotrephes sp.
Nectocoris sp.
Anisops sp.
Plea sp.
Sphaerodema sp.
Cybister convexus
Nymphula sp.
Phylum CHORDATA
Class PISCES
Symbranchus bengalensis
Amblypharyngodon microlepis
Macrones gulio
Barbus chola
Barbus stigma
Nuria danrica
Haplochilus melanostigma
Haplochilus panchax
Gobius acutipennis
Gobius guiris
Gobius alcockii
Apocryptes lanceolatus
Ophiocephalus punctatus
Anabas scandens
Trichogastwer fasciatus
Periophthalmus koelreuteri
Boleophth viridis
Barbus chola
Haplochilus pacchax
Haplochilus melanostigma

Class AMPHIBIA
Rana cyanophlyctis
Rana tigrina
Bufo melanostictus

Class REPTILIA
Tropidonotus piscator


Metridium schillerianum var. exul. var. nov.


Described the appendicular skeleton of the Dugong Halicore dugong from the Gulf of Mannar and compare it with that of Australian race.


Described varying tendency towards melanism of the fish Barbus ticto.


Two species of Barnacles Poecilasma gracile Hoek and Poecilasma eburneum Hinds recorded for the first time from Indian Seas.


The mosquitoes species Anopheles lindesayi (Giles), Toxorhynchites immisericors (walker), Stegomyia scutellaris (Walker)and Culex albopictus, Skuse were first recorded from Vim Tal (4500 ft.)

Observed the earthworm *Perionyx excavatus* in the hollows of trees which had become filled with dead leaves and rain-water.


Described 3 species of Hydrozoa from brakish ponds at Canning.

*Irene ceylonensis*

*Syncoryne filamentata* sp. nov.

*Bimeria vestita* Wright


Described *Lophopus lendenfeldi* var. *himalayanus* n.var. and comparative chart of 10 species of Polyzoon

*Plumatella princeps* Kraepelin

*Plumatella polymorpha* Kraepelin

*Plumatella philippinensis* Kraepelin

*Plumatella javanica* Kraepelin

*Plumatella punctata* Hancock

*Lophopus crystallinus* (Pallas)

*Lophopus lendenfeldi* Ridley

*Lophopus lendenfeldi* var. *indica* var. nov

*Lophopus carteri* (Hyatt)

*Lophopus jheringi* Meissner


Nine species of Lacertilia from Nepal and Western Himalayas are described.

*Hemidactylus nepalensis* sp. nov.

*Acanthosaura major* ((Jerd.)

*Acanthosaura kumaonensis* sp. nov.

*Acanthosaura tricarinata* (Blyth)
Calotes versicolor (Daud.)
Agama tuberculata Gray
Mabuia maoularia (Blyth.)
Lygosoma himalayanum (Gunth)
Lygosoma sikkimense Blyth


New record of Kachuga sylhetensis from Rajshahi


Annandale used in his earlier paper used a preoccupied name, viz., Macrothrix tenuicornis. Kurz used it many years ago for M. rosea. The Macrothrix odiosa should stand as a correction.


Enemy of three species of pearl oysters namely
Avicula macroptera, Meleagrina vulgaris and Meleagrina margaritifera


Statoblast of the polyzoa Plumatella emarginata


Describe the following fauna of a brackish water pond at Port Canning:
HYDROZOA
Irene ceylonensis
SIPUNCULA
Physcosoma

ACTINIAN
Metridium schillerianum var. exul

POLYZOA
Victorella pavida
Bowerbankia caudate
Membranipora bengalensis


Phylum PORIFERA
Trochospongilla phillottiana


Phylum PORIFERA
Ephydatia blembingia.


Phylum PORIFERA
Spongilla proliferens
Spongilla crassissima


Phylum PORIFERA
Ephydatia meyeni
Ephydatia indica
Ephydatia fluviatilis var. meyeni


Amphibia, Urodele : Tylototriton verrucosus

*Isopoda: Tachaea spongillicola*


*ISOPODA*

*Bathynomus giganteus*

*BARNACLES*

*Dichelaspis bathynomi*


Water current of the sponges *Spongilla crassissima* and *Spongilla proliferens* stops in the midday


*Phylum PORIFERA*

*Spongilla reticulata* sp. nov.

*Spongilla alba*

*Spongilla crassior* sp. nov.

*Spongilla crassissima*


*REPTILES*

*Emyda vittata* Peters

*Hemidactylus frenatus*

*Hemidactylus brookii* Gray

*Calotes versicolor*

*Varanus nebulosus* (Gray)

*AMPHIBIA*

*Typhlops acutus*
Cerberus rhynchops
Racophorus maculates (Gray)


Sponges described from Calcutta:
- *Spongilla proliferens* sp. nov.
- *Spongilla crassissima* sp. nov.
- *Spongilla crassissima* var. *bigemmulata* var. Nov.
- *Ephydatia indica* sp. nov.
- *Trochospongilla latouchiana* sp. nov.
- *Trochospongilla philottiana* sp. nov.

With these a list of freshwater sponges recorded from India is also given.


Description of *Felis tristis* Milne-Edwards present in the Indian Museum, purchased from China.


Description of a medusae *Irene ceylonensis* Brown collected in brackish pool at Port Canning.

Described some Polyzoa occurring in Indian fresh and brackish pools.

**CHEILOSTOMATA**

*Membranipora bengalensis* Stoliczka — Gangetic delta (brackish water)

**CTENOSTOMATA**

*Victorella pavida* Kent — Gangetic delta (brackish water)

**PHYLACTOLAEMATA**

*Plumatella repens* (Linn.) — Bombay and Calcutta

*Plumatella emarginata* Allman — Bombay and Calcutta

*Plumatella allmani* Hancock — Bhim Tal, Kumaon (4500ft.)

*Plumatella punctata* Hancock — Calcutta

*Lophopus lendenfeldi* Ridley — Bhim Tal, Kumaon

*Lophopus sp.* — Madras

*Pectinella carterii* Hyatt — Bombay


A small biography of Lieutenant colonel A. W. Alcock, Superintendent of Indian Museum from May 1893 to December 1896 and a list of 65 Scientific papers on Indian Zoology Published by Alcock, 1890-1907 were incorporated.

Phylum ECTOPROCTA

*Victorella bengalensis* sp. nov.
*Bowerbankia caudata*

Phylum ENTOPROCTA

*Loxosomatoides* gen. nov.
*Loxosomatoides colonialis* sp. nov.


Recorded the following species from Western India:

*Spongilla lacustris*
*Spongilla cineria*
*Spongilla carteri*
*Spongilla bombayensis*
*Ephydatia indica*

Described two new species:

*Spongilla indica* sp. nov
*Spongilla lapidosa* sp. nov


Described a new species of lizard

Class REPTILIA

*Salea austeni*ana* sp. nov.


Described a new species of Diptera

*Phlebotomus argentipes* Annandale and Brunetti sp. nov.


A sub-fossil Polyzoa

*Lepralia occlusa*


*Lophopus lendenfeldi* var. *himalayanus* is corrected as *Pectinatella carteri*

*Plumatella repens* Linne of Calcutta is corrected as *Plumatella fruticosa* Allman


Five species sponges recorded first time and description of a new species from Maymmer:

*Spongilla proliferens* Mihi
*Spongilla carteri* Bowerbank
*Spongilla loricata* var. *burmanica* Kirkpatrick
*Ephydatia indica* Mihi
*Trochospongilla latouchiana* Mihi
*Plumatella vesparioides* sp. nov.


Described three species of phylactolaemata, two of them are new species:

*Plumatella bombayensis* sp. nov
*Lophopus carteri* (Hyatt)
*Pectinatella burmanica* sp. nov.


Recorded the following species of Batrachia:

*Rana vicina* Stoliczka
*Rana doriae* Boulenger
*Rana laticeps* Boulenger
*Rana limborgi* Sclater
*Rana limnocharis* Wiegmann
*Rana nigrovittata* Blyth
Ixalus cinerascens Stoliczka  
Ixalus annandalei Boulenger  
Bulo stomaticus Lutken  
Megalophrys parva Boulenger

100. Annandale, N. 1908. Breeding habits of Tylototriton verrucosus.  
Rec. Indian Mus., 2 305-306.

Note on Sponge Ephydatia meyeni (Carter).


Hydra fusca Linnaeus  
Several specimens from among weeds in the Rham-Tso Lake at an altitude of about 15,000 ft; taken in August, 1907 by Capt. F.H. Stewart. During a visit to Burma (March, 1908) Annandale found a Hydra, apparently identical with specimens from Calcutta, common in a pond at Mandalay; while in a small pool near Moulmein, in Lower Burma, he took a single polyp, which was of an 'oil-green' colour and had eight tentacles. None of these specimens showed any sign of sexual activity, but several of the Mandalay examples bore buds. The nematocysts of all agreed with those of H. orientalis, to which he therefore assigned even the Moulmein specimen, in spite of its eight tentacles. Such identifications, however, no gonads being present, can only be provisional.

Turkestan & Siberia: Hydra fusca  
Tibet: Hydra fusca  
India: Hydra orientalis, Hydra fusca, Hydra spp.  
Ceylon: Hydra orientalis,  
Malay: Hydra orientalis  
Tonquin: Hydra fusca

Description of the Tadpole of *Rana pleskii* Gunther with notes on *Rana vicina* Stoliczka and *Rana liebigii* Annandale


Class **PISCES**

*Trigon microps* sp. nov.


*Diplonema superstes* sp. nov.


As Captain Powell's valuable account of the Bombay Spiny Lobster in a recent number of *J. Bombay Nat. Hist. Soc.* (vol. XVIII, No. 2, p.360) suffers from the fact that the species he describes has not been identified. Rev. T R. R. Stebbing says in his History of Crustacea (London, 1893) 'Palinurus Fabricius, 1797. is restricted by Spence Bate to those species which have a small central rostriform tooth or tubercle that overhangs but does not cover or enclose the ocular segment, which to the first antennal, and in which the segment that carries those antennalis anteriorly produced and laterally compressed in front. Such species appears to be confined in the northern hemisphere (p.195). *Palinurus* White, 1847, contains the numerous eastern and one or two western species, in which there is no central rostriform tooth, which have the ocular segment exposed and membranous, the flagella of the first antennal long and slender, and their segment produced considerably in advance of the frontal margin, that being generally armed with strong teeth. The most abundant species of *Palinurus* in Indian seas is *Palinurus fasciatus* Fabricius, which is probably that with which Captain Powell deals; but other occur, notably the deep-sea form *Palinurus angulatus*, Spence Bate, which is not uncommon at depths from 143 to 710 fathoms in the Arabian Sea.


Annandale received two photographs of unknown Lemur from the Lusai Hills, Assam. He compared it with all the other genera of Lemur but was not able to identify up to genus level.


List of the Batoidei recorded from Indian Seas described with the keys up to the species, figures and plates

Family PRISTIDAE

*Pristis cuspidatus*

*Pristis perottetii*

*Pristis pectinatus*

*Pristis pectinatus* var. *annandalei*

*Pristis zysron*

Family RHINOBATIDAE

*Rhamphobatis ancylostomus*

*Rhinobatis djeddensis*

*Rhinobatis halavit*

*Rhinobatis granulatus*

*Rhinobatis thoiiini*

*Rhinobatis columnse*

*Rhinobatis schlegelli*

Family RAJIDAE

*Raja mamillidens*

*Raja johannis-davisi*
Raja reversa
Raja sp. nov
Raja powellii
Raja philipii (?) (= R. powellii)
Platyrhia schonleinii.

Family TRYGONIDAE
Trygon microps
Trygon uarnak
Trygon gerrardii
Trygon favus sp. nov.
Trygon bleekeri
Trygon alcockii sp. nov.
Trygon jenkinsii sp. nov.
Trygon marginatus
Trygon bennettii.
Trygon imbricata
Trygon zugei
Trygon kuhlii
Hypolophus sephen
Taeniura melanospilos
Urogymnus asperrimus
Urogymnus laevior sp. nov.
Pteroplatea micrura
Pteroplatea zonura
Pteroplatea tentaculata

Family TORPEDINIDAE
Torpedo marmorata
Narcine timlei
Narcine brunnea sp. nov.
Narcine mollis
Benthobatis moresbyi
Astrapte dipterygia
Bengalichthys impennis gen. et sp., nov.

Family MYLIOBATIDAE
Rhinoptera javanica
Rhinoptera adspersa
Myliobatis nieuhofii
Myliobatis nieuhofii var. comifera
Myliobatis maculata
Aetobatis guttata
Aetobatis flagellum

Family CERATOPTERIDAE
Dicerobatis eregoodoo
Dicerobatis thurstoni
Dicerobatis kuhlii
Ceratoptera orissa


Family TRYGONIDAE
Trygon uarnak (Forskel)
Trygon gerrardi Gray
Trygon fluviatilis (Ham. Buch.)
Trygon fluviatilis (Ham. Buch.)

Family MYLIOBATIDAE
Aetobatis narinari (Euphrasen).


Spongilla travancorica sp. nov.
Tuhclla pcnnsylvaiiica Potts.
Pectispongilla aurea sp. nov.


Anactinia pelagica sp. nov.

Described the following species of lizards:

- *Gonatodes ornatus*
- *Gonatodes kandianus*
- *Hemidactylus brookii*
- *Hemidactylus leschenaultii*
- *Draco dussumieri*
- *Otocryptis heddomii*
- *Calotes versicolor*
- *Calotes ophiomachus*
- *Charasia hlanfordiana*
- *Mahuia carinata*
- *Lygosoma dussumieri*
- *Lygosoma dawsonii*, sp. nov.
- *Lygosoma albopunctatuni*
- *Ristella guentheri.*
- *Ristella beddomji*


*Scalpellum (Smillum) kampeni* sp. nov.


*Spongilla hemephydatla* sp. nov.


*Stolella Indica* sp. nov.


Synonymised four species of *Dipsadomorphus* (Reptilia) as *D. ceylonensis* by comparing their wall structure.


Described 16 species of Amphibians

*Rana vicina* Stoliczka.
Btifo stoniatic'us Lutken
Rana hexadaciyla
Rana cyanophlyctis
Rana verrucosa
Rana tigrina
Rana limnocharis
Rana beddo'nii
Rana leptodactyla
Rana temporalis
Rhacophorus maculates
Micrixalus fusciis
Ixalus nasulus
Micrioliyla rubra
Bujo inelanostictus
Ichthyophis gluiinosa


Described 3 insects
Myrmecophila quadrispina
Tetigoniella ferruginea Fabr.
Podalirius pulcherrims.


Described 2 species of King Crab
Limulus moluccanus
Limulus (Carcinoscorpius) rotundicauda


Observation on growth in two crustaceans
Lepas anserifera
Conchoderma virgaluni var. hunteri


Described a new species of Hymenoptera
Alaptus magnanimous sp. nov.

*Fredericella indica* sp. nov.


*Spongilla hetretica* sp. nov.


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Spongilla philippinensis sp. nov.
Spongilla clementis sp. nov.


Described list of the plectognathi of indian seas with key up to the species

SCLERODERMI
Fam. TRIACANTHIDAE
Triacanthus brevirostris
Triacanthus oxycephalus
Triacanthus strigilifer
Triacanthus weberi
Triacanthodes ethiops
Halimochirurgus centriscoides
Fam. TRIODONTIDAE
Triodon bursarius
Fam. BAUSTIDAE
Balistes stellaris
Balistes maculatus
Balistes vetula
Balistes niger
Balistes mitis
Balistes conspicillum
Balistes viridescens
Balistes fuscus
Balistes flavimarginatus
Balistes ellioti
Balistes aculeatus
Balistes rectangulus
Balistes undulatus

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Balistes buniva.
Bahstes erythrodon
Monacanthus oculatus
Monacanthus nematophorus
Monacanthus setifer
Monacanthus choerocephalus
Monacanthus tomentosus
Aluteres monoceros
Aluteres scriptus
Aluteres nasicomis
Anacanthus barbatus
Fam. OSTRACIONTIDAE.
Ostracion gibbosus
Ostracion cubicus
Ostracion punctatus
Ostracion nasus
Ostracion comutus
Ostracion fornasini
GYMNODONTES
Fam. TETRODONTIDAE
Tetrodon lunaris
Tetrodon inermis
Tetrodon sceleratus
Tetrodon hypselogenion
Tetrodon oblongus
Tetrodon spinosissimus
Tetrodon patoca
Tetrodon cutcutia
Tetrodon immaculatus
Tetrodon nigropunctatus
Tetrodon stellatus
Tetrodon reticularis
Tetrodon hispidus
Tetrodon leopardus
Tetrodon viridipunctatus
Tetrodon fluviatilis
Tropidichthys investigatoris sp. nov.
Tropidichthys valentini
Tropidichthys bennetti
Tropidichthys margaritatus

Family Diodontidae
Diodon hystrix
Diodon maculates
Diodon orbicularis

Family Molidae
Orthagoriscus sp.


Spongilla microsclerifera sp. nov.


Three species of sand flies (Phlebotomus) are described from Peradeniya with their keys.

Phlebotomus argentips Annandale and Brunetti
Phlebotomus babu Annandale
Phlebotomus marginatus sp. nov.

List of known species of *Phlebotomus* with the description and key to the species and of papers in which they are described are incorporated.

*Phlebotomus papatasi* Scopoli
*Phlebotomus minutus* Rondani
*Phlebotomus mascittii* Grassi
*Phlebotomus tipuliformis* Meunier
*Phlebotomus vexator* Coquillett
*Phlebotomus cruciatus* Coquillett
*Phlebotomus duboscqui* Neveu-Lemaire
*Phlebotomus papatasi* Scopoli
*Phlebotomus himalayensis* sp. nov.
*Phlebotomus malabaricus* sp. nov.
*Phlebotomus perturbans* Meijere
*Phlebotomus babu* sp. nov.
*Phlebotomus major* sp. nov.
*Phlebotomus argentipes* Annandale and Brunetti


Following species of Indian Phlebotomi were described
*Phlebotomus argentipes* Annandale and Brunetti.
*Phlebotomus argentipes* var. *marginatus* Annandale.
*Phlebotomus major* Annandale.
*Phlebotomus major* var. *grisea* nov.
*Phlebotomus babu* Annandale.
*Phlebotomus babu* var. *niger* nov.
*Phlebotomus papatasi* (Scopoli)


Introduction of the fauna of Chilka Lake is incorporated.

Described a new species of freshwater sponge from Cape Comorin
*Spongilla ultima*, sp. nov.


Revised Phylactolaematous Polyzoa of India and described the following species with keys
*Fredericella indica* Annandale
*Plumatella repcns* Allman (? Linne)
*Plumatella fruticosa* Allman
*Plumatella emarginata* Allman
*Plumatella allmani* Hancock
Var. A. (*P. allmani* Hancock.)
Var. B. (*P. dumortieri* Allman.)
Var. C. (*P. diffusa* Leidy.)
*Plumatella javanica* Kraepelin
*Plumatella Philippinensis*
*Plumatella bombayensis* Annandale
*Plumatella punctata* Hancock
*Stolella indica* Annandale
*Lophopodella carteri* (Hyatt).
*Pcctinatella burmanica* Annandale


Described a new species of *Rana* from Burma
*Rana burkilli* sp. nov.


Described an albino Owl received at the Indian Museum
*Athene brama*


Described a new species of barnacle
*Scalpellum lambda* sp. nov.

Described a new genus of Psychodid Diptera
*Brunettia* gen. nov.
*Brunettia travancorica* sp. nov.
*Brunettia superstes* (Annandale)


Describe species of barnacle of sub-genus *Smilium* of the genus *Scalpellum* with the key
*Scalpellum* (*Smilium*) *squamuliferum* Weltner.
*Scalpellum* (*Smilium*) *hengalense* Annandale.
*Scalpellum* (*Smilium*) *acutum* Hoek.


Described a new species of frog
*Rana travancorica* sp. nov.


Described sponges and polyzoa of Yunnan
SPONGES
*Spongilla* (*Euspongilla*) *proliferens* Annandale.
*Spongilla* (? *Euspongilla*) *yunnanensis* sp. nov.
*Spongilla* (? *Stratospongilla*) *coggini* sp. nov.

POLYZOA
*Plumatella javanica* Kraepelin.


Notes on a lizard of Darjiling
*Lygosoma sikkimense*


Described a behaviour of cockroach: *Periplaneta americana*

Two species of barnacles new record to India

*Dichelaspis orthogonia* Darwin

*Dichelaspis nierstraszi* Hoek.


Note on Slugs from Kurseong, in the Darjiling district

*Austenia sikkimense* var. *mainwaringi*, G.A.

*Austenia annandalei* G.A.

*Cryptaustenia succinea* (Rve.).


*Spongilla microscierifera* sp. nov.


With reference to the Imperial Entomologist's list (J. Bombay Nat. Hist. Soc., vol. XX, pg. 203) of the volumes sanctioned by the Secretary of State for publication in the *Fauna of British India and Ceylon*, may I inform your readers that the two additional volumes have recently been sanctioned and are now in the course of preparation in the Indian Museum, Calcutta. They are to deal with (1) the Nemocera other than mosquitoes and Chisonomidae (crane-flies or daddy-long-legs, fungus-midges, moth-flies etc.) by Mr. E. Brunetti and (2) the sponges, coelenterates and polyyza of stagnant water by myself. Most Indian Zoologists will agree as to the importance of rendering the official 'Fauna of India' as complete as possible, and I have, therefore, no hesitation in appealing for assistance to the members of the Society. At last it is found possible to sanction the preparation of part of the 'Fauna' in the country with the animals of which it deals.


Described the habitat of Rhizocephalons crustacean from freshwater as well as sea.


Described Some sponges associated with gregarious molluscs.

*Racodiscula sceptrellifera* (Carter).

*Racodiscula sceptrellifera* Var. *sproiglyphi* nov.

*Racodiscula sceptrellifera* Var. *siliquariae* nov.

*Spongisoritics topsenti* Dendy

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Redescription of 3 species of aquatic *rhynchota*
*Euratia formidabilis* Distant
*Fabatus servus* Distant
*Perittopus rufus* Distant


Described some Ctenostomatous Polyzoa of freshwater.
*Paludicella ehrenbergi*, van Beneden
*Pottsiella erecta* (Potts)
*Victorella mulieri* (Kraepelin)
*Victorella pavida*, Kent.
*Victoreella bengalensis* Annandale
*Victorella symbiotica* Rousselet
*Arachnoidea ray-lancesteri* Moore
*Hislopa lacustris* Carter


Described some Batrachia and Reptiles of Yunnan.

**BATRACHIA**
*Tylootriton verrucosus* Anderson
*Megalophrys carinensis* (Boulenger)
*Megalophrys major* Boulenger
*Bufo melanostictus* Schneider
*Hyla chinensis* Gunther

**REPTILES**
*Japalura yunnanensis* Anderson
*Acanthosaura dymondi* Boulenger
*Ablabes porphyraceus* (Cantor)
*Zoocys nigromarginatus* (Blyth)
*Coluber taeniurus* Cope
*Coluber prasinus* Blyth
*Helicops schistosus* subsp. *yunnanensis* (Anderson)
Tropidonotus stolatus (Linn.)
Tropidonotus nuchalis Boulenger
Bungarus fasciatus (Schneider)


Described freshwater sponges collected from the Poona district.
Spongilla (Euspongilla) cinerea Carter
Spongilla (Stratospongilla) bombayensis Carter
Corvospongilla burmanica subsp. bombayensis nov.


Described the distribution of the genus Ibla (Crustacea, Cirripedia, Pedunculata)
Ibla quadrivalvis (Cuvier)
Ibla cummingi Darwin
Ibla sipogae


Spongilla (Stratospongilla) sinensis sp. nov.


Heteromeyenia gen. nov.
Heteromeyenia radiospiculata sp. nov.


**FRESHWATER SPONGES**
- *Spongilla proliferens*
- *Spongilla carteri*

**POLYZOA**
- *Plumatella princeps* Kraeplin
- *Plectinatella burmanica*

187. Annandale, N. 1911. Correction as regards the Ceylon species of *Phlebotomus* *Spolia Zeylanica*, 7 159.

- *Phlebotomus marginatus*
- *Phlebotomus argentipes*
- *Phlebotomus zeylanicus*
- *Phlebotomus babu*


**Ramica** gen. nov.
- *Ramica inepta* sp. nov.


- *Phlebotomus marginatus* is synonymised as *Phlebotomus argentipes* var. *marginatus*
- *Phlebotomus argentipes*
- *Phlebotomus zeylanicus*
- *Phlebotomus babu*
- *Phlebotomus papatasi*
- *Phlebotomus major*


**Rhynchomicropterion** Gen. nov
- *Rhynchomicropterion puliciforme* sp. nov.

It is well known that both Acorn Barnacles (Operculata) and the stalked species Pedunculata are hatched from eggs as minute free swimming larvae of the 'Nauplius' type. After a short period of active life, their form changes and they settle down on some solid object, to which they finally fix themselves, in this position they attain the adult form. As regards pedunculates from Indian seas, I only know of one precise statement (Rec. Ind. Mus. Pg. 295), which was based on an observation made by Dr. J. Travis Jenkins. A clean Buoy was moored off the Madras Coast on 23rd February, 1910 and was lifted on March 3rd of the same year. On it were found numerous specimens of Lepas anserifera and Conchoderma virgatum var. hunteri. The largest of the former measured 8 mm caputular length and of the later 15 mm. The species of Conchoderma found on the buoy is confined to the Indian Ocean and probably does not attain the same dimension as the typical form of the species. The observations on barnacles are scattered and incomplete as they give some idea of the rapid growth of barnacles on ships' bottoms and in similar situations, but valuable observations of a more precise nature might be made without much difficulty in a sea-port provided like Bombay with an extensive harbor.


Scalpellum vulgerr Leach
Scalpellum (Smillum) kempl sp. nov.


Described Freshwater sponges, hydroids & polyzoa of British India including Ceylon and Burma.

FRESHWATER SPONGES
Phylum PORIFERA
Class DEMOSPONGIAE
Order HAPLOSCLERIDA
Family SPONGILLIDAE
Genus 1. Spongilla Lamarck
Subgenus Euspongilla Vejdovsky
Spongilla lacustris Auctorum
Spongilla lacustris Subsp. Reticulata Annandale
Spongilla proliferens Annandale
Spongilla alba Carter
Spongilla alba var. cerebellata Bowerbank
Spongilla alba var. bengalensis Annandale
Spongilla cinerea Carter
Spongilla travancorica Annandale
Spongilla hemephydatia Annandale
Spongilla crateriformis (Potts)
Subgenus Eunapius Gray
Spongilla carteri Carter
Spongilla carteri var. mollis nov.
Spongilla carteri var. cava nov
Spongilla fragilis Leidy
Spongilla fragilis subsp. Calcuttana nov.
Spongilla fragilis subsp. Decipiens Weber
Spongilla gemina sp. nov.
Spongilla crassissima Annandale
Spongilla crassissima var. crassior Annandale
Subgenus Stratospongilla Annandale
Spongilla indica Annandale
Spongilla bombayensis Carter
Spongilla bombayensis var. pneumatica nov.
Spongilla ultima Annandale
Genus 2. Pectispongilla Annandale
Pectispongilla aurea Annandale
Pectispongilla aurea var. subspinosa nov.
Genus 3. Ephydatia Lamouroux
Ephydatia meyenii (Carter)
Ephydatia fluviatilis Lamouroux
Genus 4. Dosilia Gray
Dosilia plumose (Carter)
Genus 5. Trochospongilla Vejdovsky
Trochospongilla latouchiana Annandale
Trochospongilla philottiana Annandale
Trochospongilla pennsylvanica (Potts)
Genus 6. Tubella Carter
Tubella vesparioides Annandale
Genus 7. *Corvospongilla* nov.

*Corvospongilla burmanica* (Kirkpatrick)
*Corvospongilla lapidosa* (Annandale)

*Corvospongilla caunteri* sp. nov.

FRESHWATER POLYPS (HYDRIDA)
Phylum COELENTERATA
Class HYDROZOA
Order ELEUTHEROBLASTEA
Family HYDRIDAE
*Hydra oligactis* Pallas
*Hydra vulgaris* Pallas
*Syncoryne filamentata* Annandale
*Bimeria vestita* Wright
*Irene ceylonensis* Browne

Class ACTINIARIA
*Sagartia schilleriana* Stoliczka
*Sagartia schilleriana* subsp. *Exul* Annandale

FRESHWATER POLYZOA
Class POLYZOA
Subclass ENTOPROCTA
*Loxosomatoides colonialis* Annandale
Subclass ECTOPROCTA
*Membranipora lacroixii* Audouin
*Membranipora bengalensis* Stoliczka
*Bowerbankia caudate* subsp. *bengalensis* Annandale
*Paludicella* sp.
*Victorella bengalensis* Annandale
*Hisloplia lacustris* Carter

*Hisloplia lacustris* subsp. *Moniliformis* nov.
*Fredericella indica* Annandale
*Plumatella fruticosa* Allman
*Plumatella diffusa* Leidy
*Plumatella allmani* Hancock
*Plumatella emarginata* Allman
*Plumatella javanica* Kroepelin
*Plumatella tanganyikae* Rousselet
Plumatella punctata Hancock
Stolella indica Annandale
Stolella himalayana sp. nov.
Lophopodella carteri (Hyatt)
Lophopodella carteri var. himalayana Annandale
Pectinatella burmanica Annandale


This is an extract from a letter received from Mr. S.W. Kemp, zoologist with the Abor Expedition. *Peripatus* was found under large stones in comparatively dry earth at the height of 3800 ft. at the down slope of Dihang River


A volume was written entirely in India first, with a comment that 'biological research on Indian animals can only be under taken in India'


The collection exhibited forms a very interesting addition to our knowledge of the fauna of the Himalayas, illustrating a district (the eastern extremely of the great range) hither to almost unknown. Specimens of at least 20 species of frogs, mostly arboreal in habits, were obtained, and of these more than third are new to science. Notably species of the two peculiar Burmese genera *Chirixa/us* and *Phrynoderma* are of considerable interest.


Dr. J. R. Ashworth and Dr. Annandale's observation on an individual of *Sagartia troglodytes* for a long time shown that the species was in excellent health even after eight years.


Fauna of Paresnath Hill described in detail.

MOLLUSCS
Family ZONITIDAE

*Arlophanta interruppta* (Bs.) subsp. *sacra* nov.
Macrochlamys sacrata G.A.
Macrochlamys perplana, G.A. (Nevill MS.)
Microcyrtina cryptomphalus G.A.
Kaliella barrakporensis (Pfr.)

Family HEUCIDAE
Glessula praelustris (Bs.)

Family CYRENIDAE
Pisidium prox. atkinsomanum Theob.

EARTHWORMS
Glyphidrilus annandalei
Gordiodrilus sp.
Perionyx excavatus

CRUSTACEA
Family POTAMONIDAE
Paratelphusa (Barytelphusa) jaquemontii, Rthbn.

Family PALAEMONIDAE
Palaemon (Brachycarpus) sp.

MYRIAPODA and ARACHNIDA
Family SCOLOPENDRIDAE
Cormocephalus dentipes, Poc.

Family GALEODIDAE
Galeodes orientalis, Stoliczka

INSECTA
ORTHOPTERA
Mecopoda elongata (Linn.)

HYMENOPTERA
Family SCOLIIDAE
Myzine petiolata Smith

Family POMPIIDAE
Pseudogenia tincta (Smith)
Pseudogenia alaris (Sauss.)
Salius madraspatanus.

Family SPHEGIDAE
Sceliphron violaceum (Fabr.)
Sphex umbrosus Christ.
Sphex aurulentus var. ferrugineus Lepel
Cerceris unifasciata Smith.
Family BUMENIDAE
Eumenes flavopicta, Blanch
Rhynchium brunneum (Fabr.)
Rhynchium metallicum Sauss
Odynerus bipustulatus Sauss
Family VESPIDAE
Icaria ferruginea (Fabr.)
Family COLLETIDAE
Prosopis mixta Smith
Prosopis strenua Cam.
Family APIDAE
Normia westwoodi Grib.
Anthophora zonata Linn.
Xylocopa amethystina Fabr.
Apis dorsata, Fabr.
Family CHRYSIDIDAE
Stilbus cyanurum Forst.
Chrysis oculata Fabr.
DIPTERA
Family PSYCHODIDAE
Phlebotomus major Annandale
Family TIPULIDAE
Geranomyia semistriata Brunetti
Family LEPTIDAE
Atherix intermedia Brunetti.
Family BOMBYLIDAE
Exoprosopa niveiventris Brunetti
Argyroserpa distigma (Wied.)
Acalypterata, subfamily Sepsinae
Sepsis cynipsea (Linn.).
COELEOPTERA
Thysia wallichii Hope
Clintesia klugii (Hopè)
Clintesia hearsiana Westw.
RHYNCHOTA
Haphsa nicomache (Walk.)

LEPIDOPTERA
Two species of Microlepidoptera
Oligophlebia amalleuta
Acrocercops convoluta
List of butterflies caught on Paresnath Hill by Capt. G. H.I. Graham and a native catcher, during the months of April and October, 1908-09

NYMPHALIDAE
Subfamily I.
Danais plexippus
Danais chrysippus
Danais limniace
Euploea core
Euploea mulciber
Subfamily II.
Mycalesis perseus
Mycalesis mineus
Mycalesis visala
Orsotrioena meda
Lethe europa
Lethe nilgiriensis
Ypthima baldus
Ypthima inica
Melanitis ismene
Subfamily IV.
Charaxes imna
Charaxes marmax
Charaxes fabius
Eulepis athamas
Euthalia lubentina
Euthalia garuda
Euthalia nais
Moduza procris
Athyma perius
Neptis eurynome
Neptis columella
Junonia iphita
Junonia lemonias
Junonia orithya
Junonia atlites
Junonia hierta
Junonia almana
Vanessa cardui
Hypolimnas bolina
Hypolimnas misippus
Kallima inachus
Atella phalantha
Argynnis hyperbius
Ergolis ariadne
Subfamily V.
Telchinia violae
Nemeobidae
Abisara echerius
Papilionidae
Papilio aristolochiae
Papilio demoleus
Papilio polymnestor
Papilio polytes
Papilio clytia
Papilio dissimilis
Papilio nomius
Pieridae
Leptosia xiphia
Delias eucharis
Huphina nerissa
Ixias pyrene
Catopsillia crocale
Catopsillia pyranthe
Catopsillia florella
Terias libythea
Terias hecabe
FISH
Glyptostemum saisii
Nemachilus savona
Discognathus lamta
Danio dangila
Ophiocchopus gachua.

REPTILES and BATRACHIA

FROG
Rana limnocharis, Wiegm

LIZARDS
Hemidactylus brookii, Gray
Calotes versicolor (Daud.)
Charasia blanfordiana, Stoliczka
Mabuia carinata (Schneid.)
Lygosoma sikkimense (Blyth)


Distribution of 3 species of Lizards in the Indian Empire,
Lizards
Loolepis belliana Gray
Mahuia bibronii (Gray)
Gymnodactylus peguensis Blgr.


Spongilla ultima was synonimised with Corvospongilla ultima


Symbiotic Polyzoa attached to Indo-Pacific Stomatopods
Platypolyzoon gen. nov
Platypolyzoon investigatoris sp. nov.
Triticella koreni, G. O. Sars.

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Described the general discussion of Invertebrate Fauna of the Kumaon Lakes, with special reference to the sponges and Polyzoa

**POLYZOA**

*Lophopodella carteri*

*Fredericella indica*

*Plumatella diffusa*

*Plumatella emarginata*

*Plumatella allmani*

*Plumatella tanganyikae*

*Stolella. himalayana* sp. nov.

**PORIFERA**

*Spongilla bombayensis*

*Spongilla carteri*

*Spongilla cinerea*

*Spongilla lacustris subsp. reticulata*

*Ephydaiia fiuviatilis*

*Stratospongilla bombayensis* var. *pneumatica*

**CRUSTACEA**

*Potamon atkinsonianum*

*Pristicephalus priscus*

**PERIDINIID**

*Ceratium kumaonense* Carter

*Ceratium longicorn* Ehrenburg,


Described the systematic and geographical notes on the Sponges and Polyzoa of the Kumaon Lakes.

**PORIFERA**

1. *Spongilla (Euspongiivla) lacustris* subsp. *reticulate*
Spongilla (Euspongilla) cinerea, Carter.
Spongilla (Eunapius) carteri, Carter.
Spongilla (Stratospongilla) bombayensis, Carter

Ephydatia fluviatils subsp, himalayensis, nov.

POLYZOA

Fredericella indica, Annandale
Peumatella emarginata Allman
Plumatella diffusa Leidy
Plumatella allmani Hancock

Afrindella subgen nov.

Plumatella (Afrindella) tanganyikae Rousselet
Stolella himalayana Annandale

Lophopodella carteri (Hyatt)


Described the Polyzoa associated with certain Gangetic Tortoises.

Hislopi a lacustris Carter.
Plumatella (Afrindella) testudincola sp. nov.


List of the Indian Trionychidae

Dogania subplana (Geoffr.)
Trionyx gangeticus Cuvier
Trionyx leithii Gray
Trionyx hurum Gray
Trionyx nigricans, Anderson
Trionyx formosus Gray.
Trionyx phayrei Theobald
Trionyx cartilaginous (Boddaert)
Pelochelys cantoris (Gray).
Chitra indica (Gray).
Emyda granosa (Schoepff)

Emyda granosa intermedia nov
Emyda granosa vittata Peters. S
Emyda granosa ceylonensis Gray
Emyda granosa scutata Peters.


The occurrence of Entoprocta in Indian waters
Barentsia gracilis
Barentsia discreta
Loxosomatoides colonialis


Described the flat worm of Class Tempocephaloidea with a new family, new genus and a new species found attached to antennae of prawns of the genus Caridina taken at Cuttack.

Fam. SCUTARIELLIDAE, nov.
Caridincola gen. nov.
Caridincola indica sp. nov.


A freshwater medusa discovered from the Yenna and Koyna valleys in the Satara district of the Bombay Presidency.

Limnocausta indica sp. nov.


Trionyx gangeticus mahanaddicus subsp. nov.
Trionyx leithii (Gray)
Emyda granosa intermedia Annandale

Family Testudinidae The following four tortoises actually known to live in the Mahanadi are described in detail.

Family Trionychidae
Kachuga tectum intermedia (Blanford)


The freshwater sponges of the Malabar Zone were described in detail. The collections of S. P. Agharkar of the Elphinstone College,
Bombay, F. H. Gravely of the Indian Museum, R. Shunkara Narayana Pillay of the Trivandrum Museum, and N. Annandale in the Nasik, Poona, Satara and Ratnagiri districts of Bombay and in the Native State of Travancore were studied and described.

List of the Freshwater Sponges of the Malabar Zone.

Genus *Spongilla* Lamarck
Subgenus *Euspongilla* Vejdovsky
*Spongilla* lacustris subsp. *reticulata*, Annandale
*Spongilla* proliferens Annandale
*Spongilla* alba Carter
*Spongilla* cinerea Carter
*Spongilla* travancorica Annandale
*Spongilla* crateriformis (Potts)
Subgenus *Eunapius* Gray
*Spongilla* carteri Carter
*Spongilla* carteri subsp. *lobosa* Annandale
Subgenus *Stratospongilla* Annandale
*Spongilla* *gravelyi* nov.
*Spongilla* *indica* Annandale
*Spongilla* bombayensis Carter
Genus *Pectispongilla* Annandale
*Pectispongilla* *aurea* Annandale
*Pectispongilla* *aurea* var. *subspinosa* Annandale
Genus *Ephydatia* Lamouroux
*Ephydatia* meyeni (Carter)
Genus *Dosilia* Gray
*Dosilia* *plumosa* (Carter)
Genus *Trochospongilla* Vejdovsky.
*Trochospongilla* pennsylvanica (Potts)
Genus *Corvospongilla* Annandale
*Corvospongilla* *caunteri* Annandale
*Corvospongilla* *ultima* Annandale
*Corvospongilla* *ultima* var. *spinosa* nov.
*Corvospongilla* *burmanica* subsp. *bombayensis* Annandale
*Corvospongilla* *lapidosa* Annandale

Kemp's collection of Batrachia from the Abor country and the frontiers of Assam comprises 57 specimens of frogs and toads of the Expedition of 1911-1912. With those included two interesting specimens taken by Mr. Kemp on a visit to the frontier of eastern Bhutan. In all 25 species are represented of which eight were new species.

List of species represented in Mr. Kemp's collection:

- Rana cyanophlydis Schneider
- Rana liebigii Günther
- Rana tigrina Daud.
- Rana limnocharis Wiegm.
- Rana alticola Bougl.
- Rana granulose (Anderson)
- Rana afghana (Günther)
- Rana gerbillus sp. nov.
- Micrrixalus borealis sp. nov.
- Rhacophorus maximus Günther
- Rhacophorus bimaculatus Bougl.
- Rhacophorus naso sp. nov.
- Rhacophorus microdiscus sp. nov.
- Rhacophorus maculatus (Günther)
- Rhacophorus maculatus himalayensis subsp. nov.
- Rhacophorus maculatus leucomystax (Gravenhagen)
- Rhacophorus tuberculatus Anderson
- Ixalus asper Bougl.
- Ixalus annandalei Bougl.
- Ixalus argus sp. nov.
- Ixalus tuberculatus Anderson
- Chirixalus doriae Bougl.
- Phrynoderma moloch sp. nov.
- Bufo melanostictus Schneider
- Bufo himalayanus Günther
- Megalophrys (?) major
- Megalophrys kemptli sp. nov.


The freshwater sponges of the Malabar Zones

- Hemidactylus brookii Gray
- Hemidactylus platyurus (Schneider)
- Draco maculatus Gray
Ptytolaemus gularis Boulenger
Acanthosaura minor (Gray)
Calotes versicolor (Daud.)
Calotes jerdonii Gunth.
Ophisaurus gracilis (Gray)
Varanus bengalensis (Daud.)
Tachydromus sexlineatus Daud.
Mabuia macularia (Blyth)
Lygosoma indicum (Gray)
Lygosoma courcyanum, sp. nov.

OPHIDIA
Typhlops diardi Schleg
Typhlops tephrosoma Wall
Typhlops diversiceps sp. nov.
Trachischium monticola (Cantor)
Blythia reticulate (Blyth)
Aproaspidops antecursorum gen. nov., sp. nov.
Polydontophis collaris (Gray)
Ablabes porphyraceus (Cantor)
Ablabes pavo sp. nov.
Ablabes frenatus (Gunth.)
Simotes albocinctus (Cantor)
Oligodon erythrorhachis Wall
Zamenis mucosus (Linn.)
Coluber taeniurus (Cope)
Dendrophis gorei Wall
Pseudoxenodon macrops (Blyth)
Tropidonotus platyceps Blyth
Tropidonotus khasiensis Boulenger
Tropidonotus piscator (Schneid.)
Dipsadomorphus gokool (Gray)
Psammodynastes pulverulentus (Boie)
Dryophis prasinus Boie
Calophis maclellandii (Reinh.)
Amblycephalus monticola (Cantor)
Lachesis monticola (Gunth.)
Lachesis gramineus (Shaw)

The collection of the Abor Expedition, 1911-1912 contains only two species of sponges which are described here.

*Spongilla* (*Euspongilla*) *proliferens* Annandale

*Spongilla* (*Eunapius*) *crassissima* var. *crassior* Annandale


A guide on Madras aquarium was published by Dr. J.R.Henderson, the Honorary Director. It is to be mentioned that a number of interesting observations on the habits of fish and marine reptiles that are liable to escape notice unless attention is called to them. On particular red bands of *Lutianus seboe* became faded after being sometime in the aquarium; *Notopterus kapirat* turn black after a few weeks.


Interesting note on the hatching of *Calotes jerdoni* and mine on *Calotes nigrilabris*, so far as the external appearance of the egg just before the young lizard emerges is concerned, my observations agree closely with *Calotes jerdoni* but no trace of egg tooth in *Calotes nigrilabris*.


The name of the eye less prawn of Galilee is *Typhlocaris galilea*. It was found in asmall pool near the town of Tiberias communicating with the lake and fed by a mineral spring. There was no trace of colour on the living prawn, except that the internal organs of the thoracic region produced a dusky blotch externally. The whole body was otherwise of a semi-opaque white like that of paffin wax.

The paper is the first in a series based on the visit to Palestine made in October, 1912. With the object of discovering whether the peculiar fauna characteristic of fresh water in tropical Africa and Asia, especially as regard the lower invertebrates extends northwards up the Jordan valley. Considered as a whole the sponge fauna of the lake provides evidence (1) that a peculiar fauna of closely related species is being evolved their in; (2) that in this lake, as in others, there is a tendency for the Spongillidae to lose there characteristic gemmules; and (3) that as the gemmules disappear the skeleton of the sponges becomes harder and more compact.


The Chelonia, and more particularly the terrestrial tortoises of Chota Nagpur, have considerable interest of a geographical kind, for they appear to differ from those of the Ganges valley and to resemble those of northern Assam. The collection of Indian Chelonia in the Indian Museum, brought together largely by the exertions of Blyth, Theobald and John Anderson, is very much more nearly complete than any collection elsewhere. Six species and three races of Tortoises of Chota Nagpur are described here.

Family TESTUDINIDAE.
Genus *Geoemyda* Gray
*Geoemyda trijuga* (Schweigg.)
Form *typica*
Race *thermalis* (Lesson).
Race *coronata* (Anderson).
Race *edeniana* (Theobald)
*Geoemyda trijuga madraspatana* (Anderson)
*Geoemyda indopeninsularis* sp. nov.
*Geoemyda tricarinata* Blyth
Genus *Testudo* lyinn.
*Testudo parallelus* sp. nov.
Family TRIONYCHIDAE.
*Emyda granosa intermedia* Annandale.

Capt. R. E. Lloyd, I. M.S., while Surgeon-Naturalist to the Indian Marine Survey, obtained a single specimen of an undescribed Eryx has been described.

**Eryx tadiens sp. nov.**


To the sub-genus *Scalpellum* 12 Indian species are described here and their description and key to the species are incorporated here.

*Scalpellum alcockianum* Annandale
*Scalpellum velutinum* Hoek
*Scalpellum trapezoideum* Hoek
*Scalpellum pacificum* Pilsbry
*Scalpellum novae-zelandiae* Hoek
*Scalpellum woodmasoni* Annandale
*Scalpellum albatrossianum* Pilsbry
*Scalpellum gruvelii* Annandale
*Scalpellum curiosum* Hoek
*Scalpellum lambda* Annandale
*Scalpellum longius sp. nov*
*Scalpellum. laccadivicum* Annandale


Sponges from shells of the genus *Aetheria* (Freshwater Oysters).

*Spongilla (Eunapius) aetheriae* sp. nov.
*Corvospongilla scabrispiculis* sp. nov.


Adaptation in the habits of a Tabanid Fly *Haematopota litoralis* is described here.


Indian Blood-Sucking Midges of the subfamily Culicoidinae or Ceratopogoninae of the family Chironomidae or Tendipedidae, the number of blood-sucking midges for which the habit has been authenticated in India belong to the genus Culicoides.

*Culicoides molestus*
Culicoides oxystoma
Culicoides himalayae
Culicoides peregrinus


The species described or commented on in this paper are represented by specimens presented to the Indian Museum or collected by members of its staff.

BATRACHIA
Fam. CAECILIIDAE
Uraeotyphlus menon sp. nov.
Uraeotyphlus oxyurus D. & B
Herpele fulleri Alcock
Fam. BUFONIDAE
Bufo stomaticus Lutken
Fam. RANIDAE.
Ixalus leucorhinus Martens
Ixalus variabilis Gunther
Ixalus signatus Boulenger
Ixalus cincrasgens Stoliczka
Ixalus chalazodes Gunther
Ixalus glandulosus Jerdon
Ixalus annandalei Boulenger
Ixalus semiruber sp. nov.

LACERTILIA
Fam. GECKONIDAE
Alsophylax himalayensis sp. nov.
Gehyra beebel sp. nov.


Twenty three species of the Indian Geckos of the genus Gymnodactylus so far recorded are described.

Gymnodactylus montium- salsorum sp. nov.
Gymnodactylus scaber (Ruppel)
Gymnodactylus brevipes Blanford
Gymnodactylus kachhensis Stoliczka
Gymnodactylus stoliczkai Steindachner
Gymnodactylus lawderanus Stoliczka
Gymnodactylus gubernatoris sp. nov.
Gymnodactylus rubidus (Blyth)
Gymnodactylus himalayicus Annandale
Gymnodactylus khasiensis (Jerdon)
Gymnodactylus oldhamii Theobald
Gymnodactylus triedrus Guinther
Gymnodactylus jeyporensis Beddome
Gymnodactylus nebulosus Beddome
Gymnodactylus deccanensis Guinther
Gymnodactylus albofasciatus Boulenger
Gymnodactylus peguensis Boulenger
Gymnodactylus consobrinoides Annandale
Gymnodactylus fasicolatus (Blyth)
Gymnodactylus frenatus Gunther
Gymnodactylus pulchellus (Gray)
Gymnodactylus variegatus (Blyth)
Gymnodactylus feae Boulenger


Sponges of Lake Baikal, their systematic and geographical distribution of marine as well as freshwater forms.

Family HAPLOSCLERIDAE

Subfamily CHALININKZ

Genus Lubomirskia Dybowski

*Lubomirskia baicalensis* (Pallas)

*Lubomirskia abietina* (Swartschevski)

Subfamily RENIERINAE.

**Baikalospongia, gen. nov.**

Type-species: *Lubomirskia bacillifera* Dybowski

The following species from Lake Baikal are assigned to the genus *Baikalospongia*

*Lubomirskia bacillifera*

*Lubomirskia papyracea*

*Lubomirskia intermedia*, Dybowski,

*Lubomirskia tscherskii*
Lubomirskia fusifera
Lubomirskia baikalensis var. e, Soukatschoff
Lubomirskia irregularis Swartschevski

All these sponges are so far as is known, found only in Lake Baikal.


The sponges described in this paper all occur commonly on living shells of Ostrea and Mytilus either in the harbour of Madras or in lagoons of brackish water on the east coast of India.

The list of the encrusting sponges found on the mussel-shells is as follows:

Family DESMACIODONIDAE
- *Mycale aegagropila* (Johnston) var. *militaris* nov.
- *Mycale mytilorum* sp. nov.
- *Mycale madraspatana* sp. nov.
- *Lissodendoryx balanophilus* sp. nov.
- *Suberites aquae-dulcioris* sp. nov.


Annandale described or noticed together with a species of which specimens have been obtained by Mr. J. Hornell off the coast of Baluchistan during the expedition of “Investigator”

Family SCALPELLIDAE
- *Scalpellum (Smilium) kampeni* Annandale
- *Scalpellum (Smilium) rostratum* Darwin
- *Scalpellum (Smilium) sinense* Annandale
- *Lithotrya (Conchotrya) valentiana* (Gray)

Family LEPADIDAE
Subfamily OXYNASPIDINAE
- *Oxynaspis indica* Annandale
Subfamily LEPADINAE
- *Alepas investigatoris* sp. nov.
- *Heteralepas (Paralepas) reticulata* sp. nov.

Three rare lizards from the western Himalayas deposited to the Indian Museum described are.

*Alsophylax himalayensis* Annandale

*Gymnodactylus lauderanus* Stoliczka

*Acanthosaura major* (Jerdon)


In a small collection of lizards and snakes made in the Abor Expedition, 1911-1912 after the conclusion of the main expedition by Capt. Sir George Duff-Sutherland-Dunbar, and presented by him to the Indian Museum the following species are represented which are described here.

LIZARDS

*Japalura andersoniana* Annandale

*Ophisaurus gracilis* (Gray)

SNAKES

*Trachischium monticola* (Cant.)

*Callophis macclellandii* (Reinh.)


List of aquatic fauna of the Tiberian Basin

PORIFERA

*Ephydatia fluviatilis syriaca*

*Nudospongilla reversa*

*Nudospongilla mappa*

*Nudospongilla aster*

COELENTERATA

*Hydra viridis*
TURBELLARIA
Planaria tiberiensis
Planaria salina
Planaria barroisi

ROTATORIA
Branchionus patulus
Branchionus capsuliflorus
Asplanchnopus syrinx
Synchaeta oblonga
Keratella quadrata
Keratella cochlearis
Conochiloides dossuarius

HIRUDINEA
Placobdella catenigera
Herpobdella (Dina) lineate concolor

OLIGOCHAETA
Criodrilus lacuum
Helodrilus (Dendrobaena) lacustris
Helodrilus (Dendrobaena) byblicus

POLYZOA
Fredericella sultana jordanica
Plumatella auricomis

HYDRACHNIDA
Atax crassipex
Hygrobates longipalpis

OSTRACODA
Limnicythere tiberiadis

COPEPODA
Cyclops leuckarti
Cyclops serrulatus
Cyclops macrurus
Cyclopsvaricans
Ectinosoma barroisi
Laophonte mahammed
Canthocamptus hibemicus var. incertus
Diaptomus salinus

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CLADOCERA
Daphanosoma brachyurum
Daphnia lumholtzi
Daphnia magna
Monia Brachiata
Ceriodaphnia rigaudi
Ceriodaphnia reticulate
Bosmina longirostris
Bosmina longirostris var. comuta
Macrothrix laticornis
Alona cambouei
Alona affinis
Chydorus sphaericus
CONCHOSTRACA
Caenestheriella educta
AMPHIPODA
Gammarus pungens
Gammarus syriacus
Orchestia platensis
ISOPODA
Asellus coxalis
Philoscia couchii
DECAPODA
Atyaephyra desmarestii
Typhlocaris galilea
Potamon potamios
MOLLUSCA
GASTROPODA
Lymnaea auricularia
Lymnaea virginea
Physa tiberiadensis
Melania tuberculata
Melania tuberculata var. elongate
Melanopsis costata
Melanopsis costata var. jordanica
Melanopsis costata var. degenerate
Melanopsis buccinoidea
Melanopsis praerosa
Pyrgula barroisi
Bithinia badiella
Bithinia gennesaretenisis
Bithinia semakhensis
Bithinella contempt
Bithinellaannandelei
Bithinella syngenes
Bithinella galilaeae
Bithinellavexillum
Valvata saulcyi
Theodoxis jordani
Theodoxis bellardi
Theodoxis bellardi var. michoni

LAMELLIBRANCHIATA
Unio requieni
Unio pietri
Unio tiberianensis
Unio tristrami
Unio terminalis
Unio jordanicus
Unio zabulonicus
Unio prosacrus
Unio littoralis
Unio ellipsoideus
Unio genezarethanus
Unio rothi
Unio simonies
Unio galilaei
Unio raymondi
Unio lorteti
Unio chinnerethensis
Corbicula fluminalis
Corbicula cor
Corbicula crassula
Corbicula syriaca
Corbicula filiciani

PISCES
Blennius varus
Blennius lupulus
Discognathus lamta rufus
Varicorhinus damascinus
Varicorhinus syriacus
Varicorhinus socialis
Varicorhinussauvagei
Barbus canis
Barbus beddomei
Barbus longiceps
Leuciscus zaregi
Alburnus sellal
Nemichilus galilaeus
Nemichilus leontinae
Clarias macracanthus
Cyprinodon ricchardsoni
Cyprinodon sophiae
Cyprinodon mento
Paratilapia sacra
Tilapia magdalenae
Tilapia zilli
Tilapia nilotica
Tilapia galilaea
Tilapia simonies
Tilapia flavi-josephi

BATRACHIA
Rana esculenta ridibunda
Bufo viridis
Hyla arborea savignyi

REPTILIA
Clemmys caspica rivulata
Emys orbicularis

Delt with the sponges found in excavations in shells and corals by far the best known are those of the family Clionidae, the species that occur in Indian seas.

Genus *Cliona* Grant
*Cliona celata* Grant
*Cliona vastifica* Hancock
*Cliona carpenteri* Hancock
*Cliona margaritiferae* Dendy

**Cliona annulifera sp. nov.**
*Cliona mucronata* Sollas
*Cliona ensifera* Sollas
*Cliona viridis* (Schmidt)
*Cliona orientalis* Thiele

**Cliona acustella sp. nov.**
*Cliona patera* (Hardwicke)

Genus *Thoosa* Hancock

**Thoosa investigatoris sp. nov**
*Thoosa armata* Topsent
*Thoosa hancocci* Topsent

**Thoosa laevlaster sp. nov**


Described the genus *Australella* in 1910' in a footnote to a paper on Indian Phylactolaemata, but here the type-species as well as other species of the genus *Australella* are described. With this some sponges and Hydrozoa are also described.

Genus *Australella* Annandale

**Australella indica sp. nov.**
*Australella lendenfeldi* (Ridley)
*Australella jheringhi* (Meissner)

Genus *Plumatella* Lamarck

*Plumatella punctata* Hancock

**Plumatella punctata var. longigemmis nov.**
Genus *Stolella* Annandale
*Stolella himalayana* Annandale
*Stolella indica* Annandale
SPONGES

*Spongilla carteri* Carter (Bowerbank)
*Spongilla lacustris* subsp. *reticulata* Annandale

HYDROZOA

*Hydra oligactis* Pallas


The genus *Pectispongilla* was described in 1909 (*Rec. Ind. Mus. III*, p. 103). But the genus redefined here with the description of type species as well as other species of the genus.

*Pectispongilla aurea* Annandale
*Pectispongilla stellifera* sp. nov.
*Pectispongilla subspinosa* Annandale


The majority of the specimens mentioned in these notes have been sent by Dr J.R. Henderson of the Madras Museum to the Indian Museum with specimens from the Madras Presidency.

Family TRIONYCHIDAE

*Trionyx leithii* Gray
*Trionyx hurum* Gray

Family TESTUDINIDAE

*Testudo travancorica* Boulenger
*Geoemyda trijuga* (Schweigg)
*Geoemyda trijuga* Subsp. *plumbea* nov.
*Geoemyda trijuga* Subsp. *coronata* (Anderson)
*Geoemyda trijuga* Subsp. *thermalis* (Lesson)
*Geoemyda tricarinata* Blyth
*Geoemyda silvatica* Henderson
*Bellia crassicollis* (Gray)


Following species of Amphibians and reptiles are described in details.

*Trionyx sulcifrons* sp. nov.
*Trionyx leithii* Gray
**Gonatodes bireticulatus** sp. nov.

**Tropidonotus sanci-johannis** Boulenger

**Chirixalus sinus** sp. nov.

**Ichthyophis glutinosus** var. **tricolor** Annandale

**Ichthyophis monochrous** (Bleeker)

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In this paper "On the Clionidae of Indian seas" (*Rec. Ind. Mus.* XI, pp. 1-24) Annandale referred incidentally to other sponges parasitic in their burrows. Here he proposed to give an account of those sponges adding some additional notes on the Indian Clionidae. The systematic position of the different species are considered first, in taxonomic order, detail descriptions of all the species in Part- I and then their biological relationships in Part-II.

Part I. SYSTEMATIC

The following is a list of the species; all belong to the order Tetraxonida:

Grade TETRAXONELLIDA

Family **PACHASTRELLIDAE**

*Stoeba plicata* var. **simplex** (Carter)

Family **STELLETIDAE**

*Stelletta vestigium* Dendy

Grade MONAXONELLIDA

Family **EPIPOLASIDAE**

*Coppatias penetrans* (Carter)

*Coppatias investigalrix** sp. nov.

Family CLIONIDAE

*Cliona carpenteri* Hancock

*Cliona mucronata* Sollas

*Cliona quadrata* Hancock

*Cliona kempi** sp. nov.

*Thoosa hancocci* Topsent

Family DESMACIODONIDAE

Subfamily **ECTYONINAE**

*Rhahdevemia prolifera** sp. nov.
Family AXINELUDEAE
Amorphinopsis excavans Carter
Amorphinopsis excavans var. digitifera nov

Family CHONDROSIIDAE
Chondriella nucula Schmidt
Chondriella mixta Schulze
Chondriella distincta Schulze

Part II. BIOLOGY

   Spongilla alba Carter
   Spongilla nana sp. nov.
   Cliona vastifica Hancock
   Suberites sericeus Thiele
   Laxosuberites aqua-dulcioris Annandale
   Laxosuberites lacustris sp. nov.
   Tetllla dactyloloea var. lingua nov.


*Pleurobrachia globosa Race bengalensis nov.*


POLYZOA
ECTOPROCTA
CHEILOSTOMATA
*Membranipora bengalensis* Stoliczka
*Membranipora hippopus* Levinsen,
CTENOSTOMATA
*Victorella bengalensis* Annandale (Endemic)
*Bowerbankia caudata* Hincks
*Alcyonidium mytili* Dalyell
ENTROPOCTA
*Loxosomatoides colonialis* Annandale (Endemic)
*Loxosomatoides laevis*
*Barentsia discrete* Busk
CIRRIPEDIA
PEDUNCULATA
*Dichelaspis cor* Aurivillius
OPERCULATA
_Balanus Amphitrite_ Dawdin

OLIGOCHAETA
ENCHYTRAEIDAE
_Enchytraeus barkudensis_ sp. nov.

MEGASCOLECIDAЕ
_Pontrodilus bermudensis_ Bedd., forma _ephippiger_ (Rosa)

GLOSSOSCOLECIDAЕ
_Criodrilus lacuum_ Hoffmstr.

MYCIDACEA
_Rhopalophilalmus egregious_ Hansen
_Gastrosaccus muticus_ sp. nov.
_Gastrosaccus simulans_ sp. nov.
_Macropsis orientalis_ Tattersall
_Potamomysis assimilis_ Tattersall

MAMMALS, REPTILES AND BATRACHIANS

MAMMALS
_Lutra macrodus_ Gray
_Orcaella brevirostris_ (Owen)

Reptiles and Batrachians
_Cherisydrus granulates_ (Schneider)
_Cerberus rynchops_ (Schneider)
_Hydrophis obscurus_ Daudin
_Crocodilus palustris_ Lesson
_Gavialis gangeticus_ (Gmelin)
_Chelone imbricata_ (Linnaeus)
_Chelone mydus_ (Linnaeus)
_Emyda granosa intermedia_ Annandale
_Rana cyanophlyctis_ Schneider

CRUSTACEA
STOMATOPODA
_Squilla scorpio_
_Squilla scorpio var immaculate_
_Squilla interrupta_
DECAPODA

Matuta victor (Fabricius)

Ebalia malefactrix sp. nov.

Philyra alcocki sp. nov.

BRACHYGNATHA

Elamena (Trigonoplax) clmex sp. nov.

Ocypoda macrocera Milne-Edwards

Ocypoda platytarsis Milne-Edwards

Gelasimus annulipes Latreille

Dortilla pertinax sp. nov.

Dortilla clepsyrodactylus Alcock

Dortilla myctioides Milne-Edwards

Macrophthalmus gastrodes sp. nov.

Pachygrapsus propinquus de Man

Varuna litterata (Fabricius)

Camptandrium serdentatum Stimpson

Sesarma tetragonum (Fabricius)

Sesarma batavicum Moreira

Plagusia depressa sub sp. tuberculata Lamarck

Cardiosoma camifex (Herbst.)

Heteropanope indica de Man

Leipocten sordidulum gen. et Sp. nov.

Scylla serrata (Forskal)

Neptunus pelagicus (Linnaeus)

Thalamita crenata (Latreille)

PAGURIDEA

Clibanarius padavensis de Mann

Clibanarius longitarsis de Mann

Clibanarius olivaceus Henderson

Diogenes avarus Heller

Coenobita rugosus Milne-Edwards

Coenobita cavipes Stimpson

THALASSINIDEA

Callianassa (Callichirus) maxima Milne-Edwards

Upogebia (Upogebia) heterocheir sp. nov.
CARIDEA

_Pontophilus hendersoni_ sp. nov.
_Paleomon lamarrei_ Milne-Edwards
_Paleomon malcolmsoni_ Milne-Edwards
_Paleomon rudis_ Heller
_Paleomon scabriculus_ Heller
_Leander styliferus_ (Milne-Edwards)
_Urocaris indica_ sp. nov.
_Periclimes demani_ sp. nov.
_Ogyrides striaticauda_ sp. nov.
_Athanus polymorphus_ sp. nov.
_Alpheus crassimanus_ Heller
_Alpheus malabaricus_ Fabricius
_Alpheus paludicola_ sp. nov.
_Caridina nilotica_ var. _bengalensis_ de Mann
_Caridina propinqua_ de mann
_Leptochela aculeocaudata_ Paulson

PENAEIDEA

_Penaeus carinatus_ Dana
_Penaeus indicus_ Milne-Edwards
_Penaeopsis monoceros_ (Fabricius)
_Penaeopsis affinis_ (Milne-Edwards)
_Penaeopsis dobsoni_ (Miers)
_Lucifer hansenii_ Nobili


MOLLUSCA : GASTROPODA

Family TROCHIDAE
_Umbonium vestiarium vestiarium_ (Linnaeus)
Family Cyclostrepetidae
_Tubiola microscopic_ (Nevill)
_Tinostoma variegatum_ Preston
Family NERITIDAE
_Smaragdia mamilla_ sp. nov.
Family RISSOIDAE
Stenothyra (Gangetica) miliacea (Nev.)
Stenothyra minima (Sowerby)
Fenella virgata (Philippi)
Family CERITHIDAE
Telescopium telescopium (Linnaeus)
Potamides (Tympanotonos) cingulatus (Gmelin)
Family PYRAMIDELLIDAE
Turbonilla rambhaensis (Preston)
Pyrgulina humilis (Preston)
Family NASSIDAE
Pygmaeonassa orissaensis (Preston)
Pygmaeonassa denegabilis (Preston)
Nassa (Eione) labecula Adams
Family MURICIDAE
Cuma disjuncta Annandale
Family TORNATINIDAE (= RATUSIDAE)
Didontoglossa striata (Preston)
Family BULLIDAE
Haminea crocata Pease


Introduced Shells:
GASTROPODA
NASSIDAE
Bullina vittata
STROMBIDAE
Strombus isabella LK
VIVIPARIDAE
Vivipara bengalensis LK
AMPULLARIDAE
Ampullaria globosa Swains
NATICIDAE
Natica macrochiensis Gmel
Natica maculosa Lam.

LAMELLIBRANCHIATA

VENERIDAE

Meretrix morphone LK

Meroe scripta Gray

Meroe chilkaenensis Preston

Meroe satparaensis Preston

DONACIDAE

Donax pulchella Hanley

TELLINIDAE

Tellina barhampurensis Preston

Other than introduced shells 73 species of which 31 of gastropods and 42 of Lamellibranchs. The gastropods are distributed among 14 families 19 genera and lamellibranchs among 20 families 25 genera. No less than 28 species, with one genus (Chilkaia) - that is to say, about 38% of the total number - appear at present to be endemic in the lake system.

GASTROPODA

TORNATINIDAE

Tornatina estriata

BULLIDAE

Bulla (Haminea) crocata

NASSIDAE

Nassa sistroidea

Nassa labecula

Nassa marrattii

Nassa denegabilis

Nassa orissaensis

MURICIDAE

Thais carinifera

CERITHIDAE

Potamides (Tympanotonos) fluviatilis

Potamides (Telescopium) fuscum

TURRITELLIDAE

Vanesia rambhaçnsis

FOSSARIDAE

Chilkaia imitatrix
LITIOPIDAE
Litiopa (Alaba) kempi
Litiopa (Alaba) copiosa

HYDROBIDAE
Hydrobia (Belgrandia) myliacea
Stenothyra blanfordiana
Stenothyra minima
Stenothyra chilkaensis
Stenothyra orissaensis
Stenothyra trigona
Stenothyra obesula

SCALARIIDAE
Epitonium hamatulae

PYRAMIDELLIDAE
Pyrgulina humilis
Chrysalilla (mormula) ecclesia
Chrysalilla (mormula) nadiensis
Odostomia chilkaensis

NERITIDAE
Neritina (Theodoxus) souverbiana

CYCLOSTREMATIDAE
Cyclostrema (Tubiola) innocens
Tinostoma variegatum

TROCHIDAE
Umbonium vestiarium
Solarica satparaensis

LAMELLIBRANCHIATA

OSTREIDAE
Ostrea virginiana
Ostrea cucullata
Ostrea lentiginosa

MYTILIDAE
Mytilus smaragdinus
Modiola undulata
Modula striata
ARCIDAE
Arca (Anadara) granosa
Arca (Fossularca) lactea
ERYCINIDAE
Kel/ya chilkaensis
Kel/ya mahosaensis
GALEOMMIDAE
Scintilla chilkaensis
CARDIIDAE
Cardium (Fulvia) rugatum
VENERIDAE
Meretrix meretrix
Meretrix casta
Meretrix ovum
Tivela dillwymi
Tapes pinguis
Tapes ceylonensis
Clementia annandalei
PETRICOLIDAE
Petricola esculpturata
UNGULINIDAE
Diplodonta satparaensis
Diplodonta barhampurensis
Diplodonta (Felania) annandalei
Diplodonta (Felina) ovalis
Diplodonta (Felina) chilkaensis
PSAMMOBIIDAE
Psammobia mahasaensis
SOLENIDAE
Solen? Fonesi
Solen annandalei
Solen kempi
MACTRIDAE
Standella annandalei
MYIDAE
Corbula chilkaensis


The medusa of the species was described by Browne in 1905 under the name *Irene ceylonensis*, while the hydroid was discovered by Annandale in 1906. Here Annandale described the species as *Campanulina ceylonensis* (Browne).


The paper delt with the fauna of Barkuda Island in the Chilka Lake, Orissa with a description of a new genus and species of lizard

*Family SCINCIDAE

Genus Barkudla nov.

*Barkudla Insularis* sp. nov.


Described the frog *Rana pleskii* Gunther, from Kashmir.


   This chapter of the Fauna of Inle Lake Contains the Geography of the lake, structure of the surrounding country and origin and history of the lake.


   This chapter of the Fauna of Inle Lake Contains Fish and fisheries which includes Introduction, physical and other conditions, geographical relations of the fish of the Inle basin, Intha names of
fish, Systematic description of the collection, fisheries of the lake, licences, fishing boats, fish-traps and baskets, nest, fishing enclosures, hooks and lines, fish-spearing and chief edible fish of the lake.

List of species of fish described:

Family CHAUDHURIIDAE nov.
*Chaudhuria caudata* gen. et sp. nov.

Family SYMBRANCHIDAE
*Amphipnous cuchia* (Ham. Buch.)
*Monopterus albus* (Zuiew)

Family CLARIIDAE
*Clarias batrachus* (Linn.)

Family CYPRINIDAE
*Lepidocephalus berdmorei* (Blyth)
*Nemachilus brevis* Boulenger
*Nemachilus brunneanus* sp. nov.
*Discognathus lamta* (Ham. Buch.)
*Cirrhina latia* (Ham, Buch.)
*Barbus sarana caudimarginatus* Blyth
*Barbus schanicus* Boulenger
*Barbus stedmanensis* Boulenger
*Cyprinus carpio intha* subsp. nov.
*Sawbwa resplendens* gen. et sp. nov.
*Microrasbora rubescens* gen. et sp. nov.
*Microrasbora erythromicron* sp. nov.
*Barbilius auropurpureus* sp, nov.

Family NOTOPTERIDAE
*Notopterus notopterus* (Pallas)

ACANTHOPTERIGII
Family MASTACEMBELIDAE
*Mastacembelus oatesii* Boulenger
*Mastacembelus caudiocellatus* Boulenger

Family OPHIOCEPHALIDAE
*Ophiocephalus striatus* Bloch
*Ophiocephalus harcourt-butleri* sp. nov.
In addition to these twenty-two species and races the following fish are known to inhabit the Inle basin.

*Nemackilus botia* (Ham. Buch.)
*Barbus dukai* Day
*Barbus tor* (Ham. Buch.)
*Barbus nigrovittatus* Boulenger
*Barbus stoliczkanus* Day
*Barilius ornatus* Sauvage
*Danio aequipinnatus* (McCl.)
*Ophiocephalus gachua* Ham. Buch.
*Ophiocephalus siamensis* Gunther


The fishermen of the Inle Lake recognized two species of Chelonia, those were not not seen by Annandale. He described one new subspecies of Chelonia and four species of Batrachia.

**CHELONIA**

*Cyclemys dhor shanensis* subsp. nov.

**BATRACHIA**

*Rana kuhlii* D. and B.
*Rana limnocharis* Wiegm
*Buto melanostictus* Schneid
*Megalophrys montana* Kuhl


The Porifera, Hydrozoa and Polyzoa of the Inle Lake are described here.

**PORIFERA**

*Spongilla lacustris* var. *proliferens* Annandale
*Spongilla fragilis* var. *calcuttana* Annandale
*Ephydatia fluviatilis* var. *intha* var. nov.

**HYDROZOA**

*Hydra vulgaris* Pallas

**POLYZOA**

*Hislophia lacustris* Carter
*Hislophia malayensis* Annandale

The paper is based on the collection of Mollusca made in the Inle Lake and the surrounding district by Dr. F. H. Gravely and Annandale in February and March, 1917, which includes Introduction, Systematic, Palaeontological, Geographical and Plasticity and evolutionary aspects.

Part I. SYSTEMATIC
GASTROPODA
Order PULMONATA
Family SUCCINEIDAE
*Succinea indica* Pfeiffer

Family LIMNAEIDAE
*Limnaea andersoniana* Nevill
*Limnaea bowelli* Preston
*Limnaea shanensis* sp. nov.
*Limnaea mimetica* sp. nov.
*Limnaea ? prox. ovalis* Gray
*Planorbis exustus* Desh
*Planorbis saigonensis* (?), Crosse & Fischer
*Planorbis velifer* sp. nov.
*Planorbis velifer* var. *ciliata*, nov.
*Planorbis trochoideus* Benson
*Planorbis calathus* Benson
*Planorbis caenosus* Benson

Order PECTINIBRANCHIATA
Suborder TAENIOGLOSSA
Family MELANIIDAE
*Melania tuherculata* (Miiller)
*Melania terebra* Benson
*Melania baccata* (Gould)
*Melania baccata* subsp. *elongata* nov
*Paludomus omata* Benson

Family HYDROBIIDAE
Hydrobioides turrita (Blanford)
*Hydrobioides nassa* (Theobald)
Hydrobioides nassa forma typica
Hydrobioides nassa subspecies lacustris nov.
Hydrobioides nassa subspecies distoma nov
Hydrobioides avarix, sp. nov
Hydrobioides nana sp. nov.
Hydrobioides physcus sp. nov.
Amnicola alticola sp. nov.

Family VIVIPARIDAE
Vivipara lecythis (Benson)
Genus Taia, gen. nov.
Taia theobaldi (Kobelt)
Taia naticoides (Theobald)
Taia intermedia sp. nov.
Taia obesa sp. nov.
Taia shanensis (Kobelt)
Taia cylindrica sp. nov.
Taia lacustris sp. nov.
Taia analoga sp. nov.
Taia conica sp. nov.
Taia eltorallis sp. nov.
Taia intha sp. nov.

Family AMPULLARIIDAE
Ampuaria winkleyi Pilsbry
Pelecypoda

Order TETRABRANCHIA
Family UNIONIDAE
Physunio micropteroides sp. nov.
Physunio ferrugineus sp. nov.

Suborder Conchacea
Family CYRENIDAE
Corbicula noetlingi v. Martens
Pisidium casertanum (Poli)

The remains from cave deposits represent the following species.
Mammalia – Cervus cldi
Mollusca – Mekinia variabilis
Taia obesa
Taia cylindrica
Taia conica

The shells found in lake deposit were:

Limnaea sp. nov.
Planorbis trochoideus
Limnaea shanensis
Hydrobioides nassa distoma
Taia lacusiris

The superficial deposits of the He-Ho basin were:

Succinea indica
Hydrobioiodts nuiSa distoma
Livinaea shanensis
Amnicola alticola
Planorbis saiqonensis
Taia theobaldi
Taia intermedia
Taia lacustris
Mdania baccata clongata
Hydrobinides turrita
Corbicula noetlingi

The following species and subspecies of Fossil and Subfossil Mollusca occur:

Limnaea ? sp. nov.
Limnaea shanensis
Planorbis trochoideus
Melania variabilis
Hydrobioides nassa distoma
Taia theobaldi
Taia obesa
Taia conica
Taia cylindrica
Taia lacusiris

The subfossil shells were taken in superficial deposits on the He-Ho plain. The following is a list of the species and subspecies:

Succinea indica
Limnaea shanensis
Planorbis exustus

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Planorbis saigonensis
Planorbis trochoideus
Melania tuberculata
Melania haccata elongata
Hydrobioides territa
Hydrobioides nassa distoma
Amnicoli alticola
Taia intermedia
Taia theobaldi
Taia analoga
Corbicula noetlingi


The object of this paper is to summarise what has been said in previous papers in this volume on the biology, the geographical relations and the origin of the fauna of the Inle Lake. General discussion of the Inle Lake is given here.


With one exception the tadpoles here described were found in the hills of Cochin, in most cases with young frogs of their species, by Dr. F.H. Gravely and Mr. B. Sundara Raj in September, 1914.

List of tadpoles described in this paper :

*Rana verrucosa* Gunther
*Rana beddomei* (Gunther)
*Rana leptodactyla* Boulenger
*Rana semipalmata* Boulenger
*Nyctibatrachus pygmaeus* (Gunther)


The following tadpoles of the family Ranidae from South India were described :

Family RANIDAE
*Oxyglossus lima* Gravenh
Rana brevipalmata Peters
Rana cyanophlyctis Schneider
Rana hexadactyla Lesson
Rana breviceps Schneider
Rana limnocharis Weigm
Rana tytleri (Theobald)
Rana tigrina Daudin
Rana crassa Jerdon
Rana stemosignata Murray
Rhacophorus maculatus (Gray)
Rhacophorus macnalatiis (Gunther)
Rhacophorus malabaricus Jerdon
Family BUFONIDAE
Bufo melanostictus Schneider
Bulo fergusoni Boulenger
Bufo microtympanum Boulenger.
Bufo stomaticus Lutken
Bufo viridis Laur


Following species of Rana were discussed:
Rana tigrina Daudin
Rana crassa Jerdon
Rana rugulosa Wiegmann
Rana cancrivora Gravenhorst


The shells discussed in this paper were found for the most part in what may be called a subfossil condition.

GASTROPODA
Order PECTINIBRANCHIATA
Family NERITIDAE
Neritina jordani Sowerby
Family HYDROBIIDAE
Bithynia badiella Parreyss
Bithinella palmyrae Dautzenberg
Family MELANIIDAE
Melania tuberculata (Muller)
Melanopsis nodosa Ferassac
Melanopsis subtingitana Nevill, Ms.
Family CERITHIIDAE
Potamides flaviatilis
Order PLUMONATA
Family LIMNARIDAE
Limnaea tenera (Parreyss)
Limnaea peregriformis Locard
Limnaea subpersica Locard
Family PLANOEBIDAE
Planorbs convexiusculus Hatton
Bullinus contortus (Mich.)
PELECYPODA
Family CYRENIDAE
Corbicula fluminalis (Muller)
Corbicula cor Lk.
Family UNIONIDAE
Unio calliopsis (Bourg.)
Unio tigrdis Bourguignat
Unio dignatus var. semiramidis Kobelt
Unio ciconius (Bourg.)
Gabillotia euphratica (Bourguignat)
Family CORBULIDAE
Corbula (Erodona) mesopotamica sp. nov


   The paper dealt with:
   *Limnea hordeum*
   *Limnea truncatul*
   *Limnea persica*
   *Limnea bactriana*
   *Limnea iranica*
   *Limnea gedrosian,
   *Limnea gedrosiana* var. *rectilabru,*
   *Limnea peregra canalifera*
   *Limnea cor* sp. Nov.
   *Limnea tenera euphratica.*


   In "Records of the Indian Museum "(Vol. XV, p. 21, pi. i, figs. 5, 5a) Annandale described and figured a tadpole as *Nyctibatrachus pygmaetis* which is corrected here as larvae of *Ixalus variabilis.*

Described a freshwater sponges of China

*Trochospongilla latouchiana* subsp. *sinensis* nov.


The series of papers based mainly on the collections made by Mr. S. W. Kemp and Annandale in Seistan and Baluchistan in November, December and January, 1918-19. The main object of the tour was to enquire into the etiology of the disease Bilharziasis or Schistosomiasis, and particularly to discover whether the parasite occurred in Seistan, or whether any known intermediate molluscan host was found to be in that country. So far as it was concerned the results were entirely negative; but that was the opportunity to make as large and complete a collection of the aquatic fauna of seistan.


Geographical Introduction:

The paper dealt with Seistan and Helmand River. A summary was provided about the Helmand River System and climate of Seistan and Hamun –i-Helmand as a lake and of an aquatic fauna includes Mayfly larvae *Palingenia*, small fishes etc. The Hamun is ordinarily divided into several distinct basins, of which two may be recognized as of most important and distinct named as Hamun-i-Sabari and the Hamun –i-Koh- Khwaja. The clay of the lakes contain empty shells of *Lamellidens* and *Corbicula*. It deals with the origin of Hamun-i-Helmand, water quality of Seistan.


Described the species of the genus *Discognathus* from India and Persia with their keys.

*Discognathus adiscus* sp. nov.
*Discognathus wanae* Regan
*Discognathus phryne* sp. nov.
Discognathus imberbis
Discognathus lamta Day
Discognathus gotyla (Gray and Hardwicke)
Discognathus persicus (Berg.)
Discognathus jerdoni (Day)
Discognathus jerdoni Subsp. kangrae Prashad
Discognathus stenorhynchus (Jerdon)
Discognathus bicornutus
Discognathus elegans sp. nov.
Discognathus gravely
Discognathus platycephalus
Discognathus nasutus
Discognathus macrochir


Specimens of ten species of the groups discussed in this paper were collected in Seistan - five sponges, one Hydrozoan, and four Polyzoa.

PORIFERA
Spongilla alba Carter
Spongilla alba var. rhadinacea nov.
Spongilla lacustris var. ineptorum nov.
Spongilla (Eunapius) carteri Carter
Ephydatia fluviatilis auct.

Hydrozoa.
Hydra vulgaris Pallas

POLYZOA
Fredricella sultana subsp. jordanica Annandale
Plumatella (Afrindella) persica sp. nov.
Plumatella (Hyalinella) bigemmis sp. nov.
Lophopodella carteri (Hyatt)


Residential area of Municipal Calcutta is free from house-flies (*Musca* spp.) and blue bottle flies. A few miles away from Calcutta the blue bottles (*Pycnonoma* and *Lucilia dux*) are responsible for enteric epidemiiasis. These flies are always seen in the dead bodies of *Achatina fulica*, a land snail. The snail was enormously abundant and in fact, it is worth putting on record as illustrating the delicate balance of nature and the danger of introducing apparently harmless or even seemingly beneficial animals into a new country.


In the report the freshwater Gastropod molluscs of the delta of the Tigris and Euphrates and of the lower reaches of the two rivers are described.

*Lymnea gedrosiana* Annandale and Prashad
*Lymnea bactriana* Hutton
*Lymnea peregra race canalifera* Mousson
*Lymnea cor* sp. nov.
*Lymnea tenera race euphratica* Mousson
*Lymnea hordeum* Mousson


This paper is based primarily on collection made in the course of tour in the Satara at Poona districts in February and March, 1918. The following chapters are dealt with in this paper.

INTRODUCTION
I. The Limnocnida pool in the Yenna river at Medha
Fauna recorded from this pool:
PORIFERA
*Corvospoiligilla ultima* var. *spinosa*
*Spongilla perviridis*
*Spongilla sumairensis* var. *rivularis*
POLYZOA
Plmnatella javanica
Plmnatella emarginata
CNIDARIA
Limnocoenda indica
PRAWNS
Caridina
Palaemon
CRAB
Paratelphusa (Barytelphusa) jacquemonti
MOLLUSCA
Parreyssia corrugata
Parreyssia cylindrica sp. nov.
FISH
Barilius bendelesis
Discognathus lamta
Gobius bombayensis
II. The Fauna of Mountain Streamlets at Khandalla
Fauna delt with:
INSECTS
Rhagovelia nigricans
Helocoris elongatus
Ptilomera laticaudata
Naucoris sordidus
Metrocoris stali
Erithares templetoni.
MOLLUSCS
Ampullaria nux
FISH
Nemachilus etezardi
Discognaihus nasutus
Psilorhynchus tentaculatus
BATRACHIA
Rana limnocharis syhadrensis
Ixalus bombayensis
Rana cyanophlyctis

III. The Fauna of Damp Rocks at the Edge of Waterfalls at Khandalla

INSECTA
Pirates arcuatus
Hebrus bombayensis
Onychotrechus rhexenor
Gerris sp.

MOLLUSCA
Cremnoconchus syhadrensis
Lithotis sp.

BATRACHIA
Ixalus bombayensis
Rana limnocharis syhadrensis

IV. Some Frogs from Streams in the Bombay Presidency
Rana cyanophlyctis Schneider
Rana limnocharis subsp. syhadrensis nov.
Ixalus bombayensis sp. nov.

V. Notes on Freshwater fish mostly from the Satara and Poona Districts.

Fish of the following species were collected in the Yenna at Medha:
Euglyptosternum saisii (Jenkins)
Lepidocephalus thermalis (C. & V.)
Nemachilus evezardi Day
Nemachilus botia (Ham. Buch.).
Nemachilus savona (Ham. Buch.).
Nemachilus anguilla sp. nov.
Psilorhynchus tentaculatus sp. nov.
Discognathus lamta (Ham Buch.)
Discognathus jerdoni Day
Discognathus nasutus (McClelland)
Discognathus gravelyi sp. nov.
Cirrhina reba (Ham. Buch.)
Barbus tor (Ham. Buch.)
Barbus mussullah Sykes
**Barbus putitora** (Ham Buch.)

**Barbus jerdoni** Day

**Barbus malabaricus** Jerdon

**Barbus kolus** Sykes

**Barbus ticto** Day

**Rasbora daniconius** (Ham. Buch.)

**Barilius bendelisis** (Ham Buch)

**Danio aequipinnatus** (McCle.)

**Chela boopis** Day

**Mastacembelus armatus** (Lacep)

**Ophiocephalus gachua** Ham. Buch.

**Goblius bombayensis** sp. nov.

VI. Some Freshwater Molluscs from the Bombay Presidency

Fauna described:

**Limnaea acuminata** Lamarck

**Limnaea acuminata** var. *nana* nov.

**Limnaea chlamys** Benson

**Limnaea pinguis** Dornh

**Planorbis cxustus** Desh

**Planorbis labiatus** Benson

**Melania tuberculata** (Müller)

**Melania scabra** (Miiller)

**Paludomus obesa** (Phillipi)

**Cremnoconchus syhadrensis** (Blanford)

**Ampullaria nux** Reeve

**Parreyssia cylindrica** sp. nov.

**Parreyssia corrugata** (Muller)

**Lamellidens marginalis** var. *cylindrica* (H.& T.)

VII. Aquatic and semiaquatic Rhychota from the Satara and Poona districts

The following species are described:

Family **HEBRIDAE**

**Hebrus bombayensis** sp. nov.

Family **HYDROMETRIDAE**

**Hydrometra vittata** Stal

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Rhagovelia nigricans (Burm.)
Onychotrechus rhexenor Kirk.
Ptilomera laticaudata (Hardw.)
Metrocoris stali (Dohrn)
Family REDUVIIDAE
Pirates arcuatus (Stal)
Family PELOGONIDAE
Pelogonus marginatus (Latr.)
Family Nepidae
Laccotrephes ruber (Linn.)
Laccotrephes griscus (Guer.)
Family NAUCORIDAE
Heleocoris elongatus Montand.
Heleocoris obliquatus Montand.
Naucoris sordidus Dist.
Family NOTONECTIDAE
Enithares lactea sp. nov.
Enithares templetoni (Kirby)
Family CORIXIDAE
Corixa hieroglyphica Duf.

VIII. Sponges from the Satara and Poona Districts and from Chota (Chutia) Nagpur
Sponges described in this paper :
Spongilla lacustris var. proliferens Annandale
Spongilla (Euspongilla) cinerea Carter
Spongilla (Euspongilla) perviridis sp. nov.
Spongilla crateriformis Potts
Spongilla sumatrana Weber
Spongilla sumatrana var. rivularis nov.
Spongilla sumatrana var. centralis nov.
Spongilla carteri Carter
Corvospongilla ultima var. spinosa Annandale.


The molluscs described or discussed in this paper live in the waterways of the Gangetic Delta or lead an amphibious existence on their shores. The present paper deals with only those Gastropods about which something new to say from a strictly taxonomic point of view. Fauna described as followes:

Family NERITIDAE
*Dostia comucopia* (Benson)
*Dostia depressa* (Benson)
*Dostia platyconcha* sp. nov.

Family LITTORINIDAE
*Littorina melanostoma* Gray
*Littorina subintermedia* Nevill
*Littorina delicatula* Nevill

Family HYDROBIIDAE
*Stenothyra echinata* sp. nov.
*Stenothyra solute* sp. nov.
*Bithinella milacea* (Nevill)

Family ASSIMINEIDAE
*Assiminea brevicula* (Pfr.)
*Assiminea beddomiana* Nevill
*Assiminea (Cyclotrophis) francesiae* (Gray)

Family MELANIIDAE
*Melania (Mainwaringia) paludomidea* Nevill

Family NASSIDAE
*Nassa ennurensis* Preston
*Nassa ennurensis* var. *depauperata* nov.

Family RINGICULIDAE
*Rlingeula caeca* sp. nov.

Family AURICULIDAE
*Auricula translucens* sp. nov.

Collection of molluscs made by Mr. J. Coggin Brown of the Geological Survey of India in Yunnan, numerous specimens of two species find a place among the Pleuroceratidae more conveniently than elsewhere. The two species are described here.

*Fenouilia kreitneri* (Neumayr)

*Paraprosothenia (Parapyrgula) coggini* sp. nov.


In studying the aquatic Mollusca of Seistan they found it necessary to study also those of Baluchistan, from certain parts of which abundant material was available. The following is a list of the species and varieties arranged according to the classification set forth by Pelseneer in Lankester's Treatise on Zoology, Vol. V (1906).

Systematic Account of the Fauna described.

Class GASTROPODA
Fam. HYDROBIIDAE
Genus *Amnicola* Gould and Haldeman
Subgenus *Alocinma* nov.

*Amnicola (Alocinma) siistanica* sp. nov.

*Amnicola parvula* (Hutton)

Family VIVIPARIDAE
Genus *Vivipara*, Montfort.

*Vivipara hilmandensis* Kobelt

Family MELANIIDAE

*Melanoides* Olivier

*Melanoides tuberculata* (Muller)

*Melanoides pyramis* (Hutton)

*Melanoides pyramis* var. *leopardina* nov.

*Melanoides pyramis* var. *putelicola* nov.

*Melanoides pyramis* var. *flavida* (Nevill)

*Melanoides pyramis* var. *luteomarginata* (Nevill)

*Melanoides tigrina* (Hutton)

*Melanoides scabra* (Muller) var. *elegans* (Hutton)

Genus *Melanopsis* Ferussac

*Melanopsis deserticola* sp. nov.
Family LIMNAEIDAE
Genus Limnaea Lamarck
  Limnaea persica Issel
  Limnaea iranica sp. nov.
  Limnaea bactriana Hutton
  Limnaea gedrosiana sp. nov.
  Limnaea gedrosiana var. rectilabrum nov.
  Limnaea truncatula Gray
  Limnaea hordeum Mousson

Family PLANORBIDAE
Genus Gyraulus Agassiz
  Gyraulus convexiusculus (Hutton)
  Gyraulus euphraticus Mousson
Genus Segmentina Fleming
  Segmentina calathus (Benson)

Class LAMELLIBRANCHIA
Family CYRENIDAE
Genus Corbicula Megerb
  Corbicula fluminalis (Muller)

Family UNIONIDAE
Genus Lamellidens Simpson
  Lamellidens marginalis Subsp. rhadinaeus nov.


Four species of this family from lower Mesopotamia, three belonging to the genus Gyraulus, one to Bullinus are described.

Family PLANORBIDAE
Subfamily PLANORBINAE
Genus *Gyraulus* Agassiz

*Gyraulus euphraticus* (Mousson)
*Gyraulus convexiusculus* (Hutton)
*Gyraulus intermixtus* (Mousson)

Subfamily BULLININAE

Genus *Bullinus* Adanson

*Bullinus contortus* (Michaud)


All the fish in the fauna of Seistan belong to the suborder Cyprinoidea and to the families Cyprinidae and Cobitidae.

Family CYPRINIDAE

Subfamily CYPRININAE

*Scaphiodon macmahoni* Regan

*Discognathus adiscus* Annandale

*Discognathus phryne* Annandale

Subfamily SCHIZORHORACINAE

*Schizothorax zarudnyi* (Nikolsky)

*Schizopygopsis stoliczkae* Steind

*Schizocypris brucei* Regan

Family COBITIDAE

*Nemachilus stoliczkae* (Steindachner)

*Adiposia macmahoni* (Chaudhuri)

*Adiposia rhadinaea* (Regan)


This paper dealt with the fisheries, fishing crafts and gears, fishing nets and etc. used in India and Seistan.


In Mr. H. B, Preston's volume on the Freshwater Molluscs in the Fauna of British India series, eighteen species are assigned to the genus Bithynia, Leach and several allied forms have since been described from Burma and Assam. All of these (22 species)
Annandale examined, placed them in five distinct genera assign
them to their proper genera and sub-genera, and described a new
genus and a new subgenus.

Subfamily BITHYNIINAE
Genus *Amnicola* Gould and Haldeman (1841)
Subgenus *Alocinma* Annand, and Prashad (1919)
Genus *Bithynia* lycach (1818)
Genus *Hydrobioides* Blanford (1869)
Subgenus *Hydrobiaides*
Subgenus *Paranerita* nov.
Genus *Sataria* nov.

Subfamily MYSORELLINAE nov.
Genus *Mysorea* Godwin-Austen (1919)

334. Annandale, N. 1920. Materials for a generic revision of the
freshwater Gastropod Molluscs of the Indian Empire, No. I. The

Genera described with key:
Genus *Melanoides* Olivier
Genus *Acrostoma* Brot.
Genus *Melania* Lamarck

335. Annandale, N. 1920. Materials for a generic revision of the
freshwater Gastropod Molluscs of the Indian Empire, No. II.

Genera described with key:
Genus *Vivipara* Montfort
Genus *Lecythaconcha* nov.
Genus *Taia* Annandale
*Temnotaia* Annandale (1919)

336. Annandale, N. & Prasad, B. 1920. Further notes on the genus
(n.s.), 16 : 27-33.

*Camptoceras hirasei*
*Camptoceras subspinosis* sp. nov.
Key to the species of *Camptoceras* (4 species)

*Camptoceras austeni*, *Camptoceras hirasei*, *Camptoceras terebra*, *Camptoceras lineatum*, *Camptoceras subspinosum*


In the genus *Ennea* H. and A. Adams, there are at present included a number of species which differ greatly in the complexity of the armature of the mouth of the shell. The species are:

*Ennea bicolor* (Hutton).

*Ennea bicolor* race *barkudensis* nov.


Numerous instances of the leech *Limnatytis nilotica* causing haemorrhage in the throat of men and beasts when swallowed. This is the first record of occurrence of the Leech *Limnatytis nilotica* in Seistan and the Afgan-Baluch Desert.


The vegetation of an island in the Chilka Lake. The area of the island is about 1/3rd of the square mile, and the rocks are composed of garnet-bearing quartzite which yields an infertile and scanty soil on weathering. The climate is relatively dry. The vegetation consists mainly of trees, shrubs and perennial creepers with a great scarcity of herbs, ferns and epiphytes and a complete absence of palms, bamboos, screw-pines and orchid.


*Pisidium clessini*

In Lake Biwa in Japan, the Palaearctic *P. casertanum* is found only at considerable depths and it is probable that in Scotland *P. Clessin* lives still deeper.


"In Lt.-Col. Godwin-Austin's instructive review of the latest volume in the official 'Fauna of India' (NATURE, sept.22.pg 106) he rightly lays stress on the importance of preliminary work in the preparation of what are supposed to be authentic hand books. May I state that on hearing, I wrote offering the material on loan belongs to the Indian Museum including Nevill's Type specimens. But it was ignored. I make this statement because I find that it is commonly believed that the Zoological Survey of India, of which I have the honour to be Director, is in same way responsible for the 'Fauna of British India' This is not the actual case"

The volume of Indian Mollusca by Gude was not included the collection of Indian Museum.


Revision of the genus *Temnotaia* Annandale (Viviparidae, Mollusca) with a key to the species.

*Temnotaia incisa*

*Temnotaia fulva*

*Temnotaia concolor*

*Temnotaia bhamoensis*

   The paper dealt with the Introduction to the study of the Fauna of 
   an Island in the Cilika lake with brief notes on Mammalian Fauna, 
   Avifauna, Fauna of Reptiles and Batrachia, Fish Fauna, Molluscan 
   Fauna, Insect Fauna, Arachnid Fauna, Fauna of Myriapgda, Annelid 
   Fauna, Polyzoa and Sponges.

   Mus., 22 323-330.

   An annotated list of birds incorporated where Annandale included 
   the names only of those birds seen alighted on the island.

   Corvus macrorhynchus Wagler
   Corvus splendens Vieill
   Acridotheres tristis (Linn.)
   Copsychus saularis (Linn.)
   Arachnetchra asiatica (Latham.)
   Ceryle varia Strickland
   Merops viridis (Linn.)
   Lophoceros birostris (Scopoli)
   Eudynamis honorata (Linn.)
   Athene brama (Temm.)
   Pandion haliaetus (Linn.)
   Haliaetus leucogaster (Gmelin)
   Haliastur Indus (Bodd.)
   Astur badius (Gmel.)
   Crocopus phoenicoperterus (Lath.)
   Columba intermedia Strickl
   Turtur orientalis (Lath.)
   Turtur risorius (Linn.)
   Esacu recursirostris (Cuvier)
   Sarcogrammus indicus (Bodd.)
   Charadrius fulvus (Gmelin)
   Aegialitis alexandrina (Linn.)
   Numenius arquata (Linn.)
   Limosa belgica (Linn.)
   Totanus glareola (Gmelin)
Totanus calidris (Linn.)
Totanus glottis (Linn.)
Tringa subarquata (Guldenstorp)
Himantopus candidus (Bonn.)
Larus ichythaetus Pallas
Larus ridibundus Linn.
Sterna melanogaster (Temm.)
Sterna minuta Linn.
Phalacrocorax carbo (Linn.)
Phalacrocorax javanicus (Horsf.)
Phalacrocorax fuscicollis (Steph.)
Plotus melanogaster (Pennant)
Ibis melanocephala (Lath.)
Dissura episcopus (Bodd.)
Xenorhynchus asiaticus (L.,ath.)
Ardea cinerea, Linn.
Herodias alba, (Linn.)
Herodias intermedia (Wagler)
Herodias garzetta (Linn.)
Ardeola grayi (Sykes)
Nycticorax griseus (Linn.)
Anser indicus (Lath.)
Dendrocycna javanica (Hors.)
Dendrocycna fulva (Gmelin)
Casarca rutila (Pallas)
Anas poecilorhyncha Forst
Dendrocitta rufa (Scop.)
Dicrurus ater (Hermann)
Orthotomus sutorius (Forst.)
Alcedo ispida Linn.
Halcyon smymensis (Linn.)
Strix flammea Linn.


The reptiles are proportionately well represented on Barkuda by 6 lizards, 10 snakes and two crocodiles, i.e. eighteen species in all.
Only two species of Batrachia, both common and widely distributed, have been observed.

REPTILES

_Gavialis gangeticus_ (Gmel.)
_Crocodilus palustris_ (Lesson)
_Hemidactylus brookii_ Gray
_Hemidactylus frenatus_ D & B.
_Calotes versicolor major_ Blyth
_Vnranus bengalensis_ (Daud.)
_Lygosoma albopunctatum_ (Gray)
_Barkudia insularis_ Annandale
_Typhlops braminus_ (Daud.)
_Typhlops diardi_ Schleg.
_Typhlops porrecius_ Stol.
_Zamenis mucosus_ (Linn.)
_Dendrelaphis tristis_ (Daud.)
_Dipsadomorphus trigonatus_ (Schneid.)
_Cerberus rynchops_ (Schneid.)
_Bungarus coculeus_ (Schneid.)
_Naja tripudians_ (Merr.)
_Vipera russelli_ (Shaw)

BATRACHIA

_Rana cyanophlyctis_ Schneid.
_Bufo melanostictus_ Schneid.


The aquatic fauna of Seistan is a scanty one, fairly rich in individuals, as is usual in a fauna living in abnormal conditions, but poor in species. The most salient fact about it is that it is essentially a mountain fauna acclimatized to live in a swampy depression. Geographical and biological relations, the different species found in the different bodies of water that exist in the country, viz. desert springs, stagnant pools, rivers and other water courses, and the Hamun-i-Helmand or basin into which the Helmand finally drains. Total list of species with their habitat, geographical range and remarks are given. Paper dealt with the following fauna.
BATRACHIA
Rana cyanophlyctic seistanica Nikolsky
Rana esculenta ridibunda (Pallas)
Bufo viridis Laur.

PISCES
Discognathus phryne Annandale
Discognathus adiscus Annandale
Scaphiodon macmahoni Regan
Schizothorax zarudnyi (Nikolsky)
Schizopygopsis stoliczkae Steind.
Schizocypris brucei Regan
Nemachilus stoliczkae (Steind.)
Adiposia macmahoni (Chaudh.)
Adiposia rhadinaea (Regan)

MOLLUSCA : GASTROPODA
Amnicola sistanica Annandale & Prasad
Vivipara helmandica Annandale
Limnaea bactriana Hutton
Limnaea gedrosiana Annandale & Prasad
Limnaea gedrosiana var. rectilabrum Annandale & Prasad
Limnaea hordeum Mousson.
Gyraulus euphraticus Mousson
Gyraulus convexiusculus (Hutton)
Segmentina calathus (Benson)

PELECYPODA
Lamellidens marginalis rhadinaeus Annandale & Prasad
Corbicula fluminalis (Müller)

INSECTA : EPHEMEROPTERA
Palnigenia ? longicauda Oliver

ODONATA
Ischnura elegans Lind.

DIPTERA
Chironomus pictulus
Psychoda bengalensis Brun.
Culex fatigans Wied
Theobaldia longiareolata Macq.
Symplecta punctipennis Mg.
Symplecta elongata Lw
Halmopta viridescens Brun.

RHYNCHOTA
Notonecta glauca marmoreal Fabr.
Anisops fieberi Kirk.
Macrocorisa geffroyi Leach.
Corixa hieroglyphica IDuf.
Corixa affinis iDist.
Corixa substriata Uhlet
Corixa seistanensis Dist.
Corixa randana Dist.
Micronecta desertana Dist.
Micronecta biskrensis Horv.

CRUSTACEA : DECAPODA
Potamon (Potamon) gedrosianum iAlcock.

OSTRACODA
Eucypris clavata Baird
Ilyocypris villosai Jur.
Herpetocypris reptans Baird

CLADOCERA
Daphnia magna Straus.
Daphnia longispina var. rosea Sars.
Simocephalus vetulus O.F.M.
Ceriodaphnia pulchella Sars.
Ceriodaphnia reticulate Jur.
Bosmina longirostris O.F.M.

COPEPODA
Cyclops strenuous Fischer-Sars.
Cyclops leuckarti Claus.
Cyclops viridis Jur.

CONCHOSTRACA
Leptestheria tenuis Sars.

ANNELEDA : OLIGOCHAETA
Chaetogaster bengalensis Annandale
Chaetogaster punjabensis Stephenson
Nais communis punjabensis Stephenson

HIRUDINEA
Limnatis nilotica (Sar.)

POLYZOA
Fredericella sultana jordanica Annandale
Plumatella (Afrindella) persica Annandale
Plumatella (Hyalinella) bigemmis Annandale
Lophopodella carteri (Hyatt.)

TREMATORDA
Fasciola giganta Cobboid

HYDROZOA
Hydra vulgaris Pallas

PORIFERA
Spongilla alba var. rhadinaea Annandale
Spongilla (Eunapius) carteri Carter
Ephydatia fluviatilis Auct.


Family Hydrobiidae is divided into four subfamilies, viz. Hydrobiinae (or Paludestrinae), Bithyniinae, Mysorellinae and Lithoglyphinae. All the genera are described with key.

Subfamily HYDROBIINAE
Genus Tricula Benson (1843)
Subfamily BITHYNIINAE
Genus Bithynia Leach (1818)
Genus Hydrobioides Nevill (1884)
Genus Paracerita Annandale (1920)
Genus Digoniostoma Annandale (1920)
Genus Amnicola Gould and Haldeman (1841)
Subgenus Alocinma Annandale and Prashad (1919)
Genus Sataria Annandale (1920)
Subfamily LITHOGLYPHINAE
Genus Lithoglyphus Muhlfeldt (1821)
Subfamily MYSORELLINAE
Genus Mysorea Godwin-Austen (1919)


Revision of the Indian Ampullariidae the description of all the genera and a new species are described here.
Genus Pachylabra Swainson
Genus Turbinicola gen. nov.
Turbinicola nux (Reeve)
Pachylabra nevilliana sp. nov.


Among the estuarine Gastropods of the coasts of India, Malaysia and China few are commoner and more characteristic, but smaller and less conspicuous, than the Hydrobiidae of the subfamily Stenothyrinae. All the species of subfamily Stenothyrinae are described with their keys.
Subfamily STENOThYRINAE
Genus Stenothyra Benson
Subgenus Stenothyra
Stenothyra echinata Annandale and Prashad
Stenothyra ornata, sp. nov.
Stenothyra hungerfordiana Nevill
Stenothyra mcniliifera Benson
Stenothyra soluta Annandale and Prashad
Stenothyra atomus Ncviill
Stenothyra blanfordiana Nevill
Stenothyra minima (Sowerby)
Stenothyra woodmasoniana Nevill
Stenothyra nana Nevill
Stenothyra deltae (Benson)
Stenothyra foveolata Benson

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Stenothyra puncticulata (Gould)

Subgenus Astenothyra nov.

Astenothyra miliacea (Nevill)

Astenothyra miliacea Var. gibbosula Nevill

Astenothyra miliacea Var. subangulata Nevill

Astenothyra burmanica sp. nov.


The main object of this paper was to provide an introduction to the systematic study of the freshwater Gastropod molluscs of India. In no single species had the anatomy of the animal been studied in detail and very little was known about the life-history of any one form. Even for the common European species comparatively little information was available, and there was much indirect evidence that, in bionomics at any rate, considerable differences exist, between tropical molluscs and those of temperate climates allied to them taxonomically. In the circumstances a minute comparative study was impossible and they have thought it better, while citing all relevant references to literature available to them, to deal precisely with one species as an isolated unit in the fauna, rather than to generalize on resemblances and differences prematurely. The paper was written in four parts:

Part I. Anatomical

Part II. The ornamentation of the shell

Part III. Systematic

Part IV. Bionomics


In the fauna of Barkuda the Cicindelinae play an important part, but the Collyrinae, represented by a single species, are very rare. This is not surprising, for the latter subfamily are mostly inhabitants of damp equatorial forests, while many species of Cicindela, the only Cicindeline genus represented on Barkuda, love open sandy or gravelly spaces. It is in such situations that five of the eight species taken on the island occur.

Division ALOCOSTERNALIAE

Subfamily COLLYRINAE

Neocollyris bonelli Guer.
Division PLATYSTERNALIAE
Subfamily CICINDELINAE

*Cicindela (Tetremytarsa) tetrastacta* Wied.
*Cicindela fastidiosa* Dej.
*Cicindela undulata*, Dej.
*Cicindela distinguenda*, Dej.
*Cicindela sumatrensis*, Herbst.
*Cicindela aurovittata*, Brul.
*Cicindela haemorrhoidalis*.
*Cicindela catena* Fabr.


Annotated list of the species of Barkuda described in this paper:
Family NYMPHIDAE
*Danais limniace* Cram.
*Danais plexippus* Linn.
*Danais chrysippus* Linn.
*Euploea core* Cram.
*Mycalesis visala* Moore
*Melanitis leda ismene* Cram.
*Eulepis athamas* Drury
*Neptis hylas astola* Moore
*Junonia lemonias* Linn.
*Junonia orithya* Linn.
*Junonia almana* Linn.
*Vanessa cardui* Linn.
*Hypolimnas bolina* Linn.
*Hypolimnas misippus* Linn.
*Atella phalanta* Drmy
*Telchinia violae*, Fab
Family PAPILIONIDAE.
*Papilio hector* Linn.
*Papilio aristolochiae* Fab.
*Papilio demoleus* Linn.
*Papilio polytes romulus* Cram.
Papilio polymnestor Cram.
Papilio nomius Esp.
Papilio doson eleius Fruh.
Family PIERIDAE
Leptosia xiphia, Fab.
Anaphaeis mesentina Cram.
Huphina nerissa evagete Cram.
Appias libythea Fab.
Appias albina confusa Fruh.
Ixias pyrene pirenassa Wall.
Ixias marianne Cram.
Catopsilia pyranthe Linn.
Catopsilia pomona Fab.
Terias libythea Fab.
Terias hecabe Linn.
Terias silhetana Wall.
Colotis Calais amatus Fab.
Hcbomola glaucippe ? australis Bert.
Pareronia Valeria hippia, Fab.
Family LYCAENIDAE
Neopithecops zaimora But.
Chilades laius Cram.
Zizera lysimon karsandra, Moore
Catachrysops strabo Fab.
Catachrysops cnejus Fab.
Azanus ubaldus Cram.
Castalius rosimon Cram
Lampides bochus Cram.
Lampides celeno Cram.
Polyommathus boeticus Linn.
Curetis phaedrus Fab.
Curetis bulls Db. and Hew.
Aphnaeus vulcanus Fab.
Iraota timoleon Stoll.
Loxura atynmnus Cram.
Family HESPERIIDAE

_Badamia exclamationis_ Fab.
_Hasora butleri_ Aurivill.
_Telicota bambusae_ Moore
_Pamara mathias_ Fab.
_Pamara bada_ Moore
_Pamara colaca_ Moore


The paper is based on a visit to the Manipur Valley paid in February and March, 1920. The specimens collected from Manipur long ago and now in the Indian Museum have proved very useful in the preparation of this paper. The paper dealt with the following chapters.

The Prosobranchia.

Fam. HYDROBIIDAE

Genus _Amnicola_ Gould and Haldeman
Subgenus _Alocinma_ Annandale and Prashad
_Amnicola (Alocinma) orcula_ (Frauenfeld)
Genus _Digoniostoma_ Annandale
_Digoniostoma pulchellum_ (Benson)
_Digoniostoma textum_ sp. nov.

Fam. VIVIPARIDAE

Genus _Vivipara_ Montfort
_Vivipara bengalensis_
_Vivipara crassispiralis_ sp. nov.
_Vivipara microchaetophora_ sp. nov.
_Vivipara oxytropis_ (Benson)
_Vivipara micron_ sp. nov.
_Lecythoconcha_ Annandale
_Lecythoconcha Iccythis_ (Benson)

Fam. AMPULLARIIDAE

Genus _Pachylabra_ Swainson
_Pachylabra maura_ (Reeve)

Family MELANIIDAE

Subfamily MELANINAE
Genus *Melanoides* Olivier
*Melanoides tuberculatus* (Muller)
Genus *Acrostoma* Brot.
*Acrostoma variabilis* (Benson)
*Acrostoma variabilis* Var. *laevis* nov.
*Acrostoma variabilis* Var. *semilaevigata* Nevill
*Acrostoma variabilis* Var. *subspinata* nov.
Subfamily PALUDOMINAE
Genus *Paludomus* Swainson
*Paludomus pustulosa* sp. nov.

The Aquatic Pulmonata
Fam. Limnaeidae
Genus *Limnaea* Lamarck
*Limnaea acuminata* Lamarck
*Limnaea ovalis* Gray
*Limnaea ovalis* sp. nov.
*Limnaea andersoniana* Nevill

Fam. PLANORBIDAE
*Indoplanorbis* gen. nov.
*Indoplanorbis exustus* (Desh.)
Genus *Gyraulus* Agassiz
*Gyraulus convexiusculus* (Hutton).
*Gyraulus cantori* (Benson).

Fam. ANCYLIDAE
*Ancylus* (*Ferrissia*) *verruca* Benson.
*Ancylus* (*Ferrissia*) *viola* sp. nov.
*Ancylus* (*Ferrissia*) *ceylanicus* Benson
*Ancylus* (*Ferrissia*) *baconi* Bourguignat
*Ancylus* (*Ferrissia*) *tenuis* Bourguignat

Amphibious Pulmonata
Family SUCCINEIDAE
Genus *Succinea* Drap.
*Succinea elegantior* Annandale sp. nov.
*Succinea rutilans* Blanford
*Succinea semiserica* Gould.
*Succinea indica* Pfeiffer.
THE PELECYPoda
family UNIONIDAE
Genus *Indonaia* Prashad
*Indonaia occata* (Lea)
*Indonaia bonneaudi* (Eydoux)
*Indonaia scobina* (Hanley)
*Indonaia theobaldi* (Preston)
Genus Latnellidens Simpson
*Latnellidens marginalis* (Lamarck)
*Latnellidens consobrinus* (Lea)
*Latnellidens corrianus* (lyca)
Genus Trapezoideus Simpson
*Trapezoldcus dhanushori* sp. nov.

family CYRENIDAE
Genus *Corbicula* Megerle
*Corbicula occidens* Deshayes
*Corbicula striatella* Deshayes
*Corbicula subradiata* Prime
Genus *Sphaerium* Scopoli
*Sphaerium indicum* Deshayes
*Sphaerium austeni* sp. nov.
Genus *Pisidium* Pfeifere
*Pisidium clarkeanum* G. and H. Nevill
*Pisidium hydaspicola* Theobald

And Geographical Distribution and Bionomics


In the interesting leading article in *Nature* of March 10, 1921, and in the discussion which preceded it, one method of conducting oceanographic research appears to have been practically ignored. There is nothing that has stuck us more in our own work on the Indian seas lagoons than to the same place to investigate special problems. For an example, in the investigation of the fauna of Chilka Lake, a small offshoot of the Bay of Bengal is now being completed by the Zoological Survey of India. The scope for local oceanographers to be increased and additional grant for the same to be asked from the British Government and it should be a co-ordinate research rather than only asingle stream like zoology or like that.


The Planorbidae are distinguished from their allies the Limnaeidae and Physidae by well defined conchological, anatomical and physiological characters. The genitalia of the Planorbidae show great diversity in the structure of the male organ, but otherwise conform to the same type as those of the Limnaeidae. In all the Planorbid genera, including Bullinus and Camptocerus among the Bullininae, it is some shade of red and pink, but its colour is much more intense in some species than in others. The genera dealt in this paper is Planorbis, Indoplanorbis, Segmentina, gyraulus, Diplodiscus, Hippeutis, Intha gen. nov. (Intha capitis sp. nov.).


Dock wall aws damaged by a species of mollusks, the Pholad (Martesia fluminalis). But oth species like Modiola striatula was accumulated there.


The Inlé Herring Barbel, Barbus compressiformis (Boulenger)
The Golden Sprat Barbel, Barileus auropurpureus Annand
The Scaleless Minnowlet, Sawbwa resplendens Annand
The Crimson Minnowlet, Microrasbora erythromicron Annand
The Red-headed Minnowlet, Microrasbora rubescens Annand
The Browne’s Loach, *Nemachielus brunneanusi* Annand

The Burmese Red-Finned Barbel, *Barbus sarana caudimarginatus*

*Barilius auropurpureus*

The Small Burmese Murrel, *Ophiocephalus harcourt butleri*

The Shan Carp, *Cyprinus carpio intha*

The Minnowlet, *Chaudhuria caudate*

*Discognathus* (or *Garra*) gravely

The stickle-back eel, *Mastacembelus caudiocellatus*

The stickle-back Eel, *Mastacembelus oatesii*

The Amphibious Eel, *Monopterus albus*

The Amphibious Eel, *Amphipnous cuchia*

The Black Cat Fish, *Clarias batrachus*

The Freshwater Herring, *Notopterus notopterus*

The Striped Murrel, *Ophiocephalus striatus*

*Crossocheilus latia*


392. Annandale, N. 1923. Zoological Results of the Percy Sladen Trust Expedition to Yunnan under the leadership of Professor J. W. Gregory. Aquatic Gastropod Molluscs.

- **Family RISSOIDAE**
  - *Lithoglyphus taliensis*
  - *Tricula gregoriana*
  - *Hydrobioides (Parafossarulus) delavayanus*

- **Family DELAVAYIDAE**
  - *Dealvaya rupicola*
  - *Parapyrgula coggini*
  - *Paraprosothenia gredleri*
  - *Fenouilla bicingulata*

- **Family MELANIIDAE**
  - *Semisulcospira (?) aristarchorum*
**Semisulcospira lauta**

**Semisulcospira dulcis**

Family **VIVIPARIDAE**

**Vivipara quadrata**

**Vivipara margarayaeformis**

**Vivipara Margaryoides**

**Margarya melanoides**

**Margarya monody**

**Lecythoconcha lecythis**

**Lecythoconcha lecythoides**

**Lecythoconcha malleata**

Family **LIMNAEIDAE**

**Limnaea andersoniana**


This work was done on the collection made by Dr. S. L. Hora from both sides of the river Indus. Following species were recorded from this place.

**Bithynia tentaculata** (Linn.)

**Digoniostoma cerameopoma** (Benson)

**Buliminus (Subzebrinus) rufistrigatus** (Reeve)

**Limnea gedrosiana** A. & P.

**Vivipera bengalensis f. halophila**

**Eulota pentepotamiensis**
Bulimus dextrosinister
Bensonia jackuemonti (Von. Martens)

Detail description of Bensonia jackuemonti (Von. Martens) is given.


All termites do not build mounds. In all our Indian mound builders the three castes - the royal caste as it is called, the working caste and the military caste- are quite distinct, each physically incapable of performing any function but its own. The mound build by the Redemann's Termite (Odontotermes redemanni), a species common in Ceylon and South India is having a sharply pointed cone with or without supplementary pinnacles of the same shape. The typical O. obesus builds a conical mound with many internal fungus gardens. The strangest of all, is the 'meridian' mound built in Australia by Hamitermes meridionalis. This termite inhabits the hot, dry, open plains of Northern Queensland. Its mound has the form of a high, narrow dyke, compressed in one direction and with a single long horizontal axis. One face is convex and the other is concave.


Only three species of molluscs were found in the Siju Cave.

Family MELANIIDAE

*Paludomus blanfordiana* Nevill (Aquatic)

*Opeas gracile* (Hutton) (Terrestrial)

*Opeas cavernicola* sp. nov. (Terrestrial)


Detailed account of the radular teeth of *Pyrazus palustris* and of the changes which take place in their structure with the growth of the shell is incorporated.


  Discussed the forms found in rapid-running water in the smaller streams. Gave certain particulars about the interesting genus named *Andamia* Blyth and five other interesting species.

  *Sicyopterus garra* Hora sp. Nov.
  *Ophiocara ophiocephalus* (Kuhl. & v. Hass.)
  *Eleotris fusca* (Bl. & Schn.)
  *Panchax panchax* (Ham. Buch.)
  *Doryichthus insularis* Hora sp. nov.
  *Andamia heteroptera* (Bleeker)


  34 species and 10 subspecies of true aquatic mollusks and 2 species of semi-aquatic habits were taken on the two visits to the Inle watershed. Of these, 7 species and 2 subspecies appear to be
extinct and were found in a fossil or subfossil condition. 23 species and 7 subspecies appear to be endemic in the watershed. Of these 7 species and 2 subspecies were only found subfossil. In this paper 6 species and 3 subspecies were described as new. Following species are described in this paper.

**Limnaea physcus** sp. Nov.

**Limnaea laticallosa** sp. Nov.

**Limnaea luteola** Lamarck

**Limnaea luteola** race *siemensis* Sowerby

**Indoplanorbis** exustus (Deshayes)

**Gyraulus velifer** (Annandale)

**Gyraulus labiatus** (Benson)

**Segmentina caenosus** (Benson)

**Segmentina taia** sp. Nov.

**Intha capitis** Annandale

**Camptoceras** sp.

**Ferrissia baconi** (Bourg)

**Hydrobioides diperistoma** sp. Nov.

**Hydrobioides nassa** (Theobald)

**Amnicola alticola** (Annandale)

**Paranerita physcus** (Annandale)

**Tricula horae** sp. Nov.

**Acrostoma elongatum** (Annandale)

**Acrostoma elongatum** form *planicostata* nov.

**Melanoides tuberculatus** (Muller)

**Melania terebra** Benson

**Taia naticoides** (Theobald)

**Taia naticoides** race *intermedia* Annandale

**Taia naticoides** race *lacustris* Annandale

**Taia shanensis** (Kobelt)

**Taia theobaldi** (Kobelt)

**Taia elitoralis** Annandale

**Taia intha** Annandale

**Taia crassicallosa** sp. Nov.

**Taia obese** Annandale

**Taia cylindrica** Annandale

**Taia conica** Annandale

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Pachylabura conica var. compacta (Reeve)


The paper is to provide a means of identifying the species of Limnaea found in the Indian region. Described all the identifying characters specially Jaws and radulae, genitalia, shell and etc. for the family Limnaeidae. Following species are dealt with in this paper.

Limnaea stagnalis (Linn.)

Limnaea stagnalis race kasmiriensis Prashad, nov.

Limnaea stagnalis form minor Kobelt.

Limnaea persica Issel

Limnaea lagotis (Schrank) Martens

Limnaea lagotis form striata Andreae

Limnaea lagotis form costulata Martens

Limnaea lagotis form solidissima Kobelt

Limnaea lagotis form subdisjuncta Nevill

Limnaea lagotis form bactriana Hutton

Limnaea lagotis form defilippi Issel

Limnaea brevicauda Sowerby

Limnaea auricularia (Linne)

Limnaea truncatula (Muller)

Limnaea andersoniana Nevill

Limnaea hookeri Reeve

Limnaea bowelli Preston

Limnaea hordeum Mousson

Limnaea laticallosa Annandale and Rao

Limnaea iranica Annandale and Prasad

Limnaea gedrosiana Annandale and Prasad

Limnaea gedrosiana form rectilabrum Annandale and Prasad

Limnaea shanensis Annandale

Limnaea shanensis form typical Annandale

Limnaea shanensis form superstes nov.

Limnaea shanensis form hehoensis nov.

Limnaea physcus Annandale and Rao

Limnaea mimetic Annandale
**Limnaea horae** sp. Nov.
**Limnaea horae** form *latior* nov.

**Limnaea acuminate** Lamarck
**Limnaea acuminate** form *typical* Lamarck
**Limnaea acuminate** form *patula* Troschel
**Limnaea acuminate** form *chalmys* Benson

**Limnaea acuminate** form *rufescens* Gray
**Limnaea acuminate** form *gracilior* Martens
**Limnaea acuminate** form *hians* Sowerby
**Limnaea acuminate** form *malleata* nov.

**Limnaea acuminate** form *brevissima* nov.

**Limnaea blacuminata** sp. Nov.

**Limnaea luteola** Lamarck
**Limnaea luteola** form *typica* Lamarck
**Limnaea luteola** form *ovalis* Gray

**Limnaea luteola** form *australis* nov.

**Limnaea luteola** form *impura* Troschel
**Limnaea luteola** form *succinea* Deshayes
**Limnaea luteola** form *siamensis* Sowerby

**Limnaea ovalior** Annandale and Prashad


Included the specimens from Nepal, Kumaon, Simla.

BATRACHIA

Leptobrachium monticula
Rana cyanophlyctis
Rana vicina
Rana tigrina
Rana limnocharis
Rana Formos

LACERTILIA

Hemidactylus nepalensis sp. nov.
Acanthosaura major
Acanthosaura kumaonensis sp. nov.
Acanthosaura tricarinata
Calotes versicolor
Agama tuberculata
Mabuia macularia
Lygosoma sikkimense
Lygosoma himalayanum
OPHIDIA

Python molurus
Tropidonotus piscator
Tropidonotus platyceps
Tropidonotus stolatus
Tropidonotus chrysargus
Trachischium tenuiceps
Lycodon aulicus
Zamenis mucosus
Dipsadomorphus multifasciatus
Lachesis monticola
Lachesis gramineus

FISHES

CYPRINIDAE

Barbus ticto
Oreinus richardsonii
Diplychus annandalei
Basilius bendelisis

SILURIDAE

Saccobranchus fossilis
Euchiloglanis
Ophiocephalus punctatus


The paper deals with hydrological parameters and invertebrate fauna.
Survey of the Chilka Lake was made in 1914-1920.

**PROTOZOA**

**TRICHODINA**

**PORIFERA**

*Cliona vastifica* Hancock
Suberites sericeus Theile
Laxosuberites lacustris (Annandale)

**COELENTERATA**

*Gyrostoma glaucum*
*Phytocoetes chilkaeus*
*Pelocoetes exul*
*Halianthus limnicola*
*Edwardsia tinctrix*
*Virgularia* sp.
*Acromitus rabanchatu*
*Dicyclocoryne filamentala*
*Bimeria fluminalis*

**CTENOPHORA**

*Pleurobrachia globosa bengalensis*

**POLYZOA**

*Membranipora hippopus* Levinsen

**ANNELIDA**

**HIRUDINEA**

*Glossosiphonia ceylonensis*

*Piscicola* (a new species of the genus)

**OLIGOCHAETA**

*Enchytraeus barkudensis* Stephenson

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Pontodrilus barmudensis Beddard
Monophylephorus parvus Ditlevsen
Polychaeta (Published by Mr. R. Southern)
CRUSTACEA
AMPHIPODA
Orchestia platensis Kroyer
Talorchestia martensi (Weber)
New species of Niphargus
Quadrivisio bengalensis Stebbing
Grandidierella megnae (Giles)
ISOPODA
Ligia exotica Roux
CUMACEA
Iphinoe sanguine
Paradiastylis culicoides Kemp
STOMATOPODA
Squilla scorpio Latreille
MYSIDACEA
Rhopalopthalmus egregious Hansen
Macropsis orientalis
Potamomysis assimilis Tattersall
DECAPODA
23 species : 10 belong to Reptantia, 6 crabs, 3 hermit crabs, 1 burrowing shrimp-like form belonging to the Tribe Thalassinidea.
INSECTA
Ephemeroptera, Odonata, Rhynchota, Diptera
MOLLUSCA
20 species : Gastropoda 12, Pelechypoda 8.


**REPRINTS**


**PUBLICATIONS ON BOTANY**


**PUBLICATIONS ON ANTHROPOLOGY**


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462. Annandale, N. 1903. Fasciculi Malayenses; anthropological and zoological results of an expedition to Perak and the Siamese Malay States, 1901-1902, undertaken by Nelson Annandale and Herbert C. Robinson, under the auspices of the University of Edinburgh and University College, Liverpool. Published for the University Press of Liverpool by Longmans, Green & Co., London, New York [etc.].

Result of Skeat Expedition published under the title Fasciculi Malayenses, includes ethnography, on physical anthropology on folklore and on religion and magic, showing in his anthropological observations.


490. Annandale, N. 1906. The introduction of the blow-gun into Southern India. Man, no. 15.


Mud-turtles kept living in shrines at the present day: The practice of keeping tortoises living in shrines as sacred animals is probably one of wide distribution in the east and is not now confined to any race or cult. Both land-tortoises and aquatic species are thus honoured in China. In India and Burma the animals are usually, if not always, mud-turtles of the family Trionychidae. Dr. Annandale visited three shrines, one of them Hindu, one Mahommedan and the third Buddhist, at which mud-turtles of the genus *Trionyx* live in a semi-domesticated state.

Some instances of the use of mud-turtles in worship and iconography in Northern India: Altars (*Vedi*) raised for vedic sacrifices are generally built on bricks. They put a mud turtle and give it food to last till the end of the sacrifice. If the turtle is alive, the sacrifice is regarded as auspicious; if it dies, inauspicious.

Chelonia play an important part in Hindu iconography mainly in two connections viz., the Tortoise incarnation of Vishnu and the myth of the Churning of the ocean. Both are frequently illustrated in the stone carvings of temples, in the wood-carvings of processional cars and in paintings of various kinds, more particularly in south India. The larger Trionichidae are very scarce in Peninsular India south of the Mahanadi and indeed, are probably absent altogether from the greater number of the rivers of the Madras Presidency. *Chitra indica* is only known from the Ganges, the Indus and the Irrawaddy River systems. The genus *Emyda* on the other hand, to which the little soft shelled pond-turtles of the plains belong, is common both in the valleys of the Ganges and the Indus and also all over the Peninsular area.

Tortoise of Indian iconography is not one of the land-tortoises (*Testudinidae*) but a mud turtle belonging to the family probably Trionychidae and that the reverence for the animal originated in Northern India. All representatives of the family share or shared in
the respect due to the form assumed in an incarnation, but it is possible that the actual species at one time revered was *Chitra indica*, which may very well have been the totem or the ancestral god of some particular clan or tribe.


The apparatus described in these notes is that commonly used for weighing agricultural produce and dried fish in the markets of the villages situated round the Inlé Lake in the state of Yawngwe.


The loom here described was seen in use in a Gaodar encampment on the shores of the Hamun-i-Helmand. The woolen cloth made with this loom is a coarse blanket like material, as a rule black with white and grey transverse stripes but without other pattern. It is produced in long strips not more than two and a half feet wide.


The paper was dealt with the measurements of anglo Indian, Chinese, Javanese, American man from the Ispahan district, Persia etc.


"I was unable to take part in the discussion on a possible anthropological service at Edinburgh. Anthropological study should be made scientifically rather than old belief. If anthropology is a branch of science, or rather as I believe, a complex of the terminal twigs of several distinct branches, it must be studied seriously and scientifically, not merely tacked on as a kind of floral decoration to a classical or commercial education."


509. Annandale, N. & Phillott, D.C. 1907. Miscellanea ethnographica, II. Publisher Asiatic Society of Bengal, Calcutta.


