

ZOOLOGICAL SURVEY OF INDIA, 1942-1945.

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I. TEMPORARY REMOVAL OF HEADQUARTERS FROM CALCUTTA.

On the outbreak of war with Japan in December, 1941, the safety of the standard zoological collection of the Indian Empire, which is under the charge of the Zoological Survey of India and had been housed in the Indian Museum at Calcutta since the museum came into existence, became liable to serious damage or destruction by enemy action. As a first step all the type-specimens and class I exhibits of the Indian Museum were evacuated to the Forest Research Institute, Dehra Dun. Though all normal air-raid precautions were adopted, it was however, felt that the safety of the collections that were still in Calcutta could not be ensured, unless they were totally removed to a less vulnerable area. On account of the very large quantities of Rectified Spirit, Naphthalene and other chemicals that are used for the preservation of the collections, books and other articles, there was not only the risk of serious damage to these highly inflammable collections, but it was apprehended that the safety of the whole Museum and even of men and property in the locality would be threatened. The Government of India, in consultation with the Bengal Government, therefore, decided that the entire collections and library etc. should be removed from Calcutta at as early a date as possible. As the Zoological Survey of India could not function without its collections and library, it became necessary to shift the entire headquarters of the Survey.

The finding of suitable accommodation, reasonably out of range of possible enemy action and sufficiently large to house the Survey, with its vast collections, library, laboratories and offices etc. was a difficult problem. Through the kindness of H. E. Supradipta Manyabara Commanding General Sir Kaiser Shamsere Jung Bahadur Rana, G. B. E., who generously placed his "Kaiser Castle" at Benares at the disposal of the Government free of rent, this difficulty was, however, ultimately overcome and the Government of India decided to remove the Zoological Survey of India to Benares. The evacuation to Benares was completed in a remarkably short time, with comparatively little damage to the collections, and Kaiser Castle, Benares Cantt. became the temporary headquarters of the Zoological Survey of India, with effect from the 11th May, 1942.

II. DAMAGE TO THE COLLECTIONS AND LIBRARY ETC. IN THE VARUNA FLOOD OF 1943.

Kaiser Castle is a large building, or rather a number of semi-detached and detached buildings, in its own compound, situated on the bank of the Varuna River, well above its water-level. Some of the buildings are on somewhat higher ground than others and the plinth-level is not

the same even throughout the main building. The Varuna is a tributary of the Ganges, and, except during the rains, is a very small stream, with water only a few feet in depth. During the rains it swells up considerably and in many years of even normal rainfall, a small amount of its water enters the compound of the Kaiser Castle. At the time of the shifting of the Zoological Survey of India to Benares, the Varuna had never been in real flood within, living memory.

For the sake of safety, the spirit collections of the Survey are stored in a series of rooms in a separate block in the Kaiser Castle. These are arranged in open racks, six feet high, the racks being made firm to the walls by iron tie-rods. Two cellars in this block are also used for the storage of collections, but as the walls of these are lined with thick slabs of stone, it had not been found possible to fix tie-rods there. The dry collections of the Insect Section were housed in another separate building. In the main building were located, among others, the offices, laboratories, library, and most of the dry collections, excluding Insects.

In September, 1943, owing to very heavy and continuous rain for about three days all along its water-shed, there was a heavy flood in the Varuna, the water-level rising to an unprecedented height. By the evening of the 26th September water had entered the compound of the Kaiser Castle. The level continued rising, and on the afternoon of the 27th there was more than three feet of water above the plinth-level in most parts of the main building and even more in the other buildings. The flood began to recede on the morning of the 28th and by the 29th most of the rooms were more or less dry, though the underground cellars had still water in them up to the ceiling. The cellars had to be cleared later by means of trailer and centrifugal pumps.

As a result of the flood, large parts of the collections and library etc. were thus under water for more than two days and naturally suffered serious damage. Large numbers of bottles were washed off the shelves by the force of the current and were smashed. In the cellars, where no tie-rods had been fixed, the racks were lifted bodily and overturned. Some almirahs and boxes that had been stored on the verandahs were washed away. Labels came off the bottles in many cases even when the bottles remained standing on the shelves, and in most other cases became practically illegible by the deposition of silt. Parts of the building, including floors, were seriously damaged and caused further damage to the collections. Unfortunately the type-specimens had just been got back from Dehra Dun and were being unpacked and arranged in some sections, when the calamity occurred. Books in the library, Specimen Registers and other records also suffered serious damage on account of long immersion in water.

The work of salvaging the collections etc. was taken in hand immediately, and every effort was made to save as much as possible. Books, registers, records and dry collection were put out in the sun and thoroughly dried and first-aid rendered promptly, wherever possible. The collections were put in some sort of order as soon as the buildings had been repaired and with the help of temporary staff, specially sanctioned by the Government, the work of repair and reconstruction was started without delay, and is still going on. Thanks to the zeal, untiring efforts

and willing co-operation of the whole staff, who had to work under high pressure for months without a single holiday, a great deal has been saved. I take this opportunity of expressing my sincere thanks to the officers and staff of the Zoological Survey of India, but for whose selfless and sustained labour the damage to the national collections would have been far more serious than it is now.

Though the work of accurately assessing the extent of damage caused to the collections etc. in the Varuna flood of September, 1943, could not be started till the more urgent work of repair and reconstruction had been more or less completed, it is considered desirable to give to the scientific world at least a preliminary and rough idea of the damage suffered by the standard zoological collections of India. It is hoped that the work of correctly assessing the extent of damage, which on account of its nature and the size of collections involved, is bound to be long, slow and laborious, will be taken in hand shortly.

FISHES.

The collections of the Fish Section had been stored on 67 racks, 25 in one large room and 42 in a cellar under this room. In addition to the Cyclostoma, the Elasmobranchii, the Chondrostei and the Holostei, fishes of the sub-orders Ostariophysii and Malacopterygii of the order Teleostei and the entire unregistered collection of this Section had been kept in the cellar. In the upper room, where the rest of the collection had been stored, the racks, held fast and the damage was only slight. In the cellar, however, on account of the overturning of racks, large numbers of bottles were smashed and the specimens contained in them, including some types, remained in water for a number of days. Many of these specimens were lost and some, especially those of small size, disintegrated more or less completely on account of long immersion in water. Most of the type-specimens were fortunately saved, but a few of the deep-sea fishes of the sub-order Malacopterygii, which are generally brittle, were badly damaged or lost. Further, on account of the breaking of bottles, large numbers of specimens got mixed. In many cases number-tags made of metal had been fixed to individual specimens; the correct sorting of these presented little difficulty, but where no tags or other labels remained attached to the specimens, the work was extremely difficult and in many cases hopeless. Great care has been taken in this sorting out, and as far as possible, only specimens, about the authenticity of which there is no reasonable doubt, have been put back in the named collection. The bulk of the remaining material has been kept aside for the present and will be dealt with gradually.

A considerable part of the affected material consisted of unnamed specimens, and the damage suffered by these should not be regarded as serious. The loss and damage in the sub-orders Ostariophysii and Malacopterygii of the order Teleostei is however, of a serious nature. The following families of these sub-orders have been affected:—

Ostariophysii : Amblycipitidae, Ariidae, Bagridae, Chacidae, Clariidae, Mochokidae, Pangasidae, Plotosidae, Schilbeidae, Siluridae, Sisoridae, Homalopteridae, Psilorhynchidae, Cyprinidae, Cobitidae and

Adiposiidæ; Malacopterygii: Alepocephalidæ, Stomiatidæ, Engraulidæ, Clupeidæ, Dorosomidæ, Dussumieriidæ, Chanidæ, Chirocentridæ, Elopidae, Megalopidae, Notopteridæ and Salmonidæ.

Two other orders of the Teleostomi, *viz.* Chondrostei, with its single family, the Acipenseridæ and Holostei, also with its single family, the Amiidæ, were also affected.

In the Elasmobranchii, the damage, though quite extensive, was not as serious as in the Teleostomi, on account of the fact that most of the Elasmobranchs are of a large size and could, therefore, better stand the effects of long immersion in water. The following families of the different orders and sub-orders have been damaged:—

Order Palagiostomi, sub-order Selachii: Scyllidæ, Carchariidæ, Sphyrinidæ, Spinacidæ and Rhinidæ; sub-order Batoidei: Pristidæ, Rhinobatidæ, Rajidæ, Trygonidæ, Torpedinidæ, Myliobatidæ and Rhinopteridæ; Order Holocephali: Chimeridæ.

In the Cyclostoma, the few specimens in the collection of the families Bodellostmoatidæ, Myxinidæ and Petromyzontidæ were damaged.

It is impossible at this stage to give anything like an accurate assessment of the extent of damage suffered by the fish collections of the Zoological Survey of India. The orders and families mentioned above have been affected seriously, some others have suffered lightly, while many more have completely escaped damage. It is very roughly estimated that the total loss to these collections is in the neighbourhood of 20%.

REPTILIA AND AMPHIBIA.

The collections of this Section were stored in two rooms above ground and a small part in one of the cellars. In the smaller room, on account of the subsidence of floor, a rack, containing Amphibia, was overturned, but fortunately damage to the collection was only slight. In the other room in which Lizards and most of the Snakes were kept, the racks held fast and the damage there also was slight. The Chelonia and the larger Snakes were stored in the cellar and damage to these was heavy, on account of their long immersion in water. Fortunately very few types have been lost in this Section also.

In the order Testudines, the families Emydidæ and Trionychidæ and in the order Squamata, sub-order Serpentes, the family Uropeltidæ have been seriously damaged. The Agamidæ, Scincidæ and Lacertidæ in the sub-order Sauria and the Colubridæ in the Serpentes have also been somewhat damaged. The Amphibians have practically escaped damage.

The total damage to the collections of the Reptilia and Amphibia Section is very roughly estimated at under 20%.

BIRDS AND MAMMALS.

More than half the collection of this Section was under water. Fortunately no specimens were actually lost, but nearly 27,000 of them (skins, bones, eggs and nests) got soaked and were more or less damaged. These are being attended to, but the work of repairing and restoring them is very slow and laborious. Many of the skins were very old, and it

is feared that damage to some of them can never be satisfactorily repaired. The Mammal types were not affected, except the type of dolphin *Tursiops perniger* (Blyth) which suffered damage, but it is now repaired, but nearly half the bird types were submerged; with proper care it has been possible to save practically all of them.

In the Mammals, the families Muridae, Ochotonidae and Leporidae of the order Rodentia, families Canidae, Mustelidae, Procyonidae and Ursidae of the Carnivora, and families Camelidae, Bovidae, Cervidae and Tragulidae of the order Ungulata have been seriously affected. The few specimens in the collections of the extra-Indian sub-order Hyracoidea of the Ungulata were also badly damaged.

In the Birds, the following families and subfamilies have suffered serious damage :—

Order Coraciiformes : Capitonidae, Coraciidae, Meropidae, Bucconidae, Cypselidae, Caprimulgidae, Podargidae, Trogonidae, Psittacidae, Strigidae, Asionidae and Cuculidae.

Order Accipitres : Falconidae, Gypaetinae and Pandionidae.

Order Gallinae : Phasianidae and Megapodidae.

Order Charadriiformes : Haematopodinae, Totaminae and Scolopacinae of the family Charadriidae.

Order Tubinariae : Procellariidae.

Order Anseres : Anatidae.

It is roughly estimated that in about 15% of the Bird specimens and about 12% of the Mammals the damage is too serious to be satisfactorily repaired.

MOLLUSCA.

The spirit collection of this section has suffered very little damage. Though large parts of the collection were under water, very few specimens have been lost or damaged. The dry collection, which is a very large one, is stored in two rooms in the main building. In this also there was comparatively little actual loss of specimens, but heavy damage was caused by the mixing up of the specimens, on account of the disintegration of labels and the card-board boxes in which the shells were kept. Some amount of mixing up in this collection had already taken place, when the collections were evacuated from Calcutta. Every effort is being made to sort out the specimens correctly, but the work is proving extremely difficult. Most of the type-specimens are fortunately safe, but a few, that were very fragile, have been badly damaged, on account of continued immersion in water.

Dry specimens of about 40 families have been seriously damaged, and it is estimated that loss in the Section amounts to approximately 10% of the total collections.

CRUSTACEA.

Very little damage has been caused in the Crustacea Section. Some bottles were broken but most of the specimens contained in them have been saved and correctly sorted out. Practically all the types are safe. The total damage to the Crustacea collections will probably be in the neighbourhood of 5%.

INSECTA.

The damage to the Insect collections has been unfortunately heavy. A considerable number of bottles in the spirit collections was broken, and a large number of specimens, including those of the Arachnida, were lost or got irretrievably mixed. The dry collection had been stored in a number of rooms in a separate block, and a part was kept in almirahs and racks on the verandah. Some almirahs and boxes stored on racks were washed away by the current and nearly 30% of the remaining dry collection was submerged in water. The damage to this collection has been serious not so much due to loss of specimens, but chiefly on account of the deposition of fine and sticky silt on a very large number of them. The work of removing this silt, even from hard-bodied insects, is bound to be very slow and extremely laborious, and will be almost impossible in the case of Diptera, Lepidoptera and other small and fragile insects. This work will take many years, and it is feared that a large number of specimens, in spite of every effort that is being made to restore them, will cease to be of much scientific value.

The dry types in the collection are fortunately all safe, but two boxes containing a large number of types in spirit, including a few of the Arachnida were washed away.

The following orders and families and special collections have suffered the greatest damage :—

Orthoptera : Phasmidae, Acridiidae and Gryllidae.

Rhynchotha, Heteroptera : Pentatomidae, Lygaeidae and Reduviidae ; Homoptera : Fulgoridae, Cercopidae, Jassidae, Aleyrodidae, Aphididae and Coccidae.

Neuroptera, Megaloptera : Sialidae and Raphidiidae ; Planipennia : Myrmeleonidae, Ascalaphidae, Mantispidae, Hemerobiidae, Chrysopidae and Nymphoptera.

Mecoptera : Panorpididae.

Trichoptera : Rhyacophilidae, Hydroptilidae, Philopotamidae, Stenopsychidae, Psychomyidae, Polycentropidae, Arctopsychidae, Hydropsychidae, Calamoceratidae, Odontoceridae, Molannidae, Leptoceridae, Sericostomatidae, Phryganeidae and Limnophilidae.

Lepidoptera, Rhopalocera : Nymphalidae, and Hesperiiidae ; Heterocera : Noctuidae, Bombycidae, Eupterotidae, Sphingidae, Lasiocampidae, Lymantriidae, Hypsiidae, Uraniidae, Epiplemidae, Notodontidae, Cymatophoridae, Sessiidae, Tinaegeriidae, Zygaenidae, Psychidae, Hepialidae, Callidulidae, Drepanulidae, Cossidae and Saturniidae.

Green's Collection of Butterflies and Dudgeon's collection of moths have also suffered considerable damage.

Coleoptera, Adephaga : Carabidae, Dytiscidae, Gyrinidae, Paussidae, and Rhysodidae ; Polyphaga : Staphylinidae, Endomychidae, Dermestidae, Byrrhidae, Nosodendridae, Georyssidae,

Parnidae, Hydrophilidae, Heteroceridae, Dascillidae, Helodidae, Malacodermidae, Buprestidae, Elateridae, Xylophilidae, Anthicidae, Tricentotomidae, Bruchidae, Chrysomelidae, Cerambycidae, Lamiidae, Brentidae, Curculionidae, Passalidae and Scarabaeidae.

Hymenoptera, Apocrita : Ichneumonidae, Formicidae, Vespidae, Mutillidae, Chrysididae, and Colletidae.

Diptera, Nematocera : Tipulidae, and Mycetophilidae ; Brachycera : Coenomyiidae, Tabanidae, Cyrtidae, Nemestrinidae, Therevidae, Bombyliidae and Asilidae ; Cyclorrhapha : Saproxyzidae, Ochthiphilidae, Agromyzidae, Celyphidae, Diopsidae, Borboridae, Heteroneuridae, Sciomyzidae, Helomyzidae, Cordyluridae, Oestridae, Tachinidae, Calliphoridae, Hippoboscidae, Nycteribidae and Streblidae.

Aphaniptera : Pulicidae.

In many of the families mentioned above, specimens of only one or two subfamilies have been damaged, while those of the remaining subfamilies are safe. Families that have been lightly affected and the very large number of those that have not suffered at all are not mentioned. It is very difficult to estimate at this stage even the approximate extent of damage to the collections of the Insect Section, but it seems likely that the total damage will turn out to be in the neighbourhood of 20%.

OTHER INVERTEBRATES.

The spirit collection of this Section has not been seriously affected, but the dry collection has suffered damage.

Porifera : The spirit collection is nearly intact, but approximately 15% of the dry specimens have been damaged on account of long soaking in water.

Coelentrata : The dry collections of the Madreporaria and the Gorgonacea have suffered most. In the former, paper-tags and plaster numbers attached to many specimens have been completely destroyed ; the sorting out of these specimens is proving extremely difficult, and it is possible that about 40% of these corals may have to be written off. The Gorgonacea had been left packed in boxes and, on opening, most of the specimens were found broken in bits, with their paper labels completely destroyed. The damage to the Hydrozoa, Alcyonaria and other groups is negligible.

Platyhelminths, Nematelminths and Polyzoa, etc. have suffered practically no damage.

Echinodermata : A few dry specimens have been damaged or lost.

Annulata : In the Polychaeta about a hundred bottles were broken and some specimens, including two types of the family Nereidae, were lost. In the Oligochaeta, Hirudinea and other group there was very little damage.

The collection of slides, including some type-slides, has also been damaged. The slides were kept in cabinets in the main building, and, on account of long immersion in water, some of these were damaged

and the labels of most of them came off. These are being attended to, and it is hoped that a large number of them will be correctly sorted out.

The total damage to this Section is roughly estimated at about 10%.

SPECIMEN REGISTERS.

Out of the 70 Registers in which records of specimens in the collection are kept, 43 were immersed in water. Many of the Registers are very old and on account of the age and brittleness of their paper, have suffered considerable damage in the flood. Fortunately the entries in the Registers are still legible. All the damaged and old Registers are being copied and it is hoped that this work will be satisfactorily completed before long.

LIBRARY.

About one-third of the books in the Library, approximately 10,000 in number, were wholly or partially under water and, therefore, suffered damage. Most of these damaged books have been repaired and rebound, and fortunately total loss is only slight, as not more than 200 books only have to be written off. In another 500 or so, some pages have been torn or lost. In addition, in quite a large number, printed wholly or partially on art paper, pages, specially those containing illustrations, got stuck; these were separated with as much care as possible, but even then considerable damage has been caused. The stock of Departmental publications and unbound reprints and other papers also suffered some damage.

MICROSCOPES, CAMERAS AND OTHER INSTRUMENTS.

All these were submerged in water, but fortunately little permanent damage has been caused to these.

I have given in the foregoing paragraphs a brief account of the nature of damage suffered by the collections etc. of the Zoological Survey of India in the Varuna flood and have very roughly indicated the extent of this damage, as known at present. The damage to the National collections has been serious, but fortunately the collections are still substantially intact. Every effort is being made to repair and make good the damage and loss as far as possible. I take this opportunity of appealing to all naturalists, zoologists and other scientists in India and abroad to help us in adding to these collections and thus in not only making good the loss suffered, but in making them better and more representative of the Indian fauna than they have been ever before. Though all presentations and exchanges will be gratefully received, it will be specially appreciated if specimens of the orders and families that have been seriously damaged are sent to us.

III. THE PUBLICATIONS OF THE ZOOLOGICAL SURVEY OF INDIA.

The publication of the *Records of the Indian Museum*, *Memoirs of the Indian Museum* and *Report of the Zoological Survey of India* had unfortunately to be suspended in 1942, in view of the urgent need for

economy in the use of paper. The last issues of these publications, prior to suspension, were : *Records*, XLIV, part III, *Memoirs*, XIII, No. 4 and *Report*, for the years 1938-41.

The publication of the *Records of the Indian Museum* is now being resumed. The present issue will be the concluding part of volume XLIV, and an index to the volume will be issued as soon as possible. The next volume, XLV, will commence in 1947 and attempts will be made to complete it within the year. From 1948, it is hoped to bring out a yearly volume, as previously.

IV ANTHROPOLOGY.

The Anthropology Section of the Zoological Survey of India has been separated from the Survey with effect from the 1st December, 1945, with a view to converting it into a separate Department or Survey. Anthropological work, that was formerly being done in the Zoological Survey of India is now under the care of the Director, Anthropological Survey of India, with his temporary headquarters at 64, Cantonment Benares. The Ethnological and Anthropological collections are also now housed at the same address.