THE FAUNA OF THE SALT RANGE, PUNJAB.

PREFATORY NOTE.

The following series of papers is based on the results of a visit paid to the Punjab Salt Range by myself in July, 1922 at the suggestion of Dr. N. Annandale, who was aware of some of the interesting forms that inhabit that isolated range. The time of the year chosen was not particularly favourable for collecting zoological specimens as it was then extremely hot and dry. However, the collection proved to be of great interest and as most of the material could be worked out by the members of the Zoological Survey of India at Calcutta, it has been thought advisable to publish the contributions from various authors together. Special attention was paid in the field to the collection of fish, Batrachia, Reptilia, land and freshwater Mollusca and aquatic Crustacea, but incidently several species of insects were also collected. Of the insects, a representative collection was made of dragon-flies (Odonata), while the other groups are represented by a few individuals only. Some Hemiptera were collected in the garden attached to the dak bungalow at Choa Saidan Shah and three species of mosquitoes[1] from underneath furniture at the police rest house, Kallar Kahar.

I have to thank the Deputy Commissioner of the Jhelum District, the Sub-Divisional Officer and the Tehsildar of Pind Dadan Khan for the great help and useful assistance rendered to me in making arrangements for my touring. To Dr. Annandale I am greatly indebted for making valuable suggestions and for going through the manuscript.

Sunder Lal Hora.

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INTRODUCTION.

By S. L. Hora.

The position of the Salt Range is thus defined by Fleming[2] in his report on the geological structure and mineral wealth of the range.

"The hills, generally included under the designation of the Punjab Salt Range, occur in the northern part of the Sinde Saugor Doab, or district between the river Jhelum and Indus, crossing it from E. to W. between the parallels of 32° 22′ and 33° N. Latitude and 71° 30′ and 73° 30′ Longitude."

I visited only the part of the range lying in the Pind Dadan Khan Tehsil of the Jhelum District between Khewra and Nurpore, and Kallar Kahar in the Chakwal Tehsil.

During the month of July the hills through which I passed presented a dreary appearance and were almost entirely bare of vegetation. At

[1] I am indebted to Col. S. R. Christophers, C.I.E., I.M.S. for the identification of these mosquitoes. They are *Anopheles rhodesiensis* Theo., *A. stephensii* Liston and *A funestus* var. *listoni* Liston.

[2] Fleming, *Journ. As. Soc. Bengal* XXII, p. 231 (1853).

all places, with the exception of Choa Saidan Shah, the scarcity of water was badly felt and in some villages the inhabitants had to go for miles to get drinking-water. They generally depend for their necessary supply on seasonal rain-fall, which they collect in mud tanks and which are frequented indiscriminately by men and cattle so long as the supply lasts. The hills are of solid rocks and present a ragged appearance throughout. " A striking feature of the Pind Dadan Khan hills is the series of plateaux they enclose; the two parallel ranges, from 2,000 to 3,700 feet in height, support between them at an elevation of from 2,000 to 3,000 feet a series of fairly level uplands, richly cultivated and carrying a dense population. The rocks which build up the range are throughout tilted at a very high angle; but there are few peaks which are either detached or conspicuous."[1]

There are no metalled or unmetalled roads suitable for light-wheeled traffic anywhere in the portion of the range I visited, and camels formed the chief means of conveyance. The roads are usually strewn over with pebbles and small pieces of stone, which render them unsuitable for walking over long distances. The bad condition of the roads, the extremes of climate, the scarcity of drinking-water along the road side, and lastly the precipitous climbing are some of the difficulties which a collector has to encounter in these parts.

The heat never attains the extremes common in the plains of the Punjab, but even in the hills it was found to be extremely difficult to stay out in the field after 9 A.M. in the month of July. The nights were usually very pleasant. It is reported that in the winter a bitter north wind prevails and consequently the cold is severe, and sometimes light snowfall also occurs. The winter begins from the middle of October and lasts till the end of March. During the rainy season (July, August and September) the weather gets quite pleasant after a heavy fall of rain as the temperature immediately falls considerably.

The rainfall is uncertain and varies from year to year. On an average it amounts to about 20 inches in the parts I visited, but no definite statistics are available on this point.

On the whole the climatic conditions prevailing in these parts resemble those of a desert or a semi-desert region.

The geological structure of the Salt Range has been discussed in detail by several authors,[2] while in the Jhelum District Gazetteer (Lahore: 1907) Mr. (now Sir Henry) Hayden gives a short summary. " The greater part of the District," he says, " lies on the Sandstones and conglomerates of the Sewalik Series (upper tertiary), but towards the south, the southern scarp of the Salt Range affords sections of sedimentary beds ranging from cambrian upwards. The lowest bed is the salt marl and rock salt, which affords the material for extensive mining industry." The presence of salt rocks is of great importance in considering the aquatic fauna, as the water is rendered saline by their presence

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[1] *Punjab District Gazetteers. Jhelum District* (Lahore: 1907).

[2] Fleming, *Journ. As. Soc. Bengal* XXII, pp. 229-279, 333-368, 444-462 (1853); Theobald, *ibid.*, XXIII, pp. 651-677 (1854); Oldham, *Manual Geol. Ind.* 2nd. edition, pp. 109, 118 (1893); Wynne, *Mem. Geol. Surv. Ind.* XIV, pp. 1-303 (1878); Middlemiss, *Rec. Geol. Surv. Ind.* XXIV, p. 19 (1891).

at several localities. The inhabitants of these parts distinguish two kinds of rocks, white and red. They say that so long as water flows over white rock it is fresh, but when it comes in contact with red rock it becomes saline. Water in all the streams becomes saline after flowing for a few miles and is thus rendered useless for irrigation purposes.

I visited several streams *viz.* Mitha-patan near Khewra, Katas nallah and Kas Gandhala near Choa Saidan Shah, Kas Pir-khara near Sardhi, and Nilawan below Nurpore among others. These after heavy rainfall acquire the characteristic impetuosity of mountain torrents. The streams referred to above flow over huge rocks and the water in them is usually low and clear except after heavy rain, when it becomes red on account of the silt that is washed down into it from the neighbouring hills. Each stream flows through a beautiful gorge. The scenery of some of these gorges and especially that of the Nilawan gorge is extremely picturesque and imposing. All the streams from this region discharge themselves into the Jhelum river.

It has already been remarked that after flowing for some distance the water of these streams becomes saline. This change is usually brought about within a short distance, and its effect on the fauna is remarkable. I made some observations on this point at Mitha-patan. It was found that animals such as fish, frogs and crabs could live comfortably in slightly saline water and that with the increase in salinity the fauna became disproportionately poorer. In distinctly salt water young of fish, dragon-fly larvae and a few beetles were captured. When the water became absolute brine, no animal was found to live in it. For the sake of an experiment I transferred a few living fish from fresh water into distinctly salt water. They were observed to live in it for at least one hour quite actively. I regret that owing to bad weather I was not able to carry these experiments to a successful issue.

There are several lakes in this range, but most of these are situated in the Khushab Tehsil of the Shahpur District. I visited one at Kallar Kahar. "Its extent varies much in different seasons, but may be stated as about a mile long by half a mile broad, its greatest length being from east to west. It receives the drainage from the various hills around, and also a small stream of fresh water which enters it at its West end near the village of Kuhar. Its depth nowhere exceeds three or four feet, and its margin is formed of black fetid mud, outside which is a thick saline incrustation produced by the evaporation of its water."[1] In May, 1921 the lake is said to have dried up completely, and when I visited it in the third week of July this year, it was almost drying up. When I passed through Kahar for the second time a week later, the lake was almost full and presented a beautiful view from the neighbouring hills. No animals were found to live in it.

Very little attention has so far been paid to the fauna of the Salt Range and all that has hitherto been known from this part is chiefly due to the efforts of earlier geologists who besides attending to their duties made valuable collections of animals. Mr. W. Theobald was the first to make zoological collections in this isolated range, in the cold

[1] Fleming, *Journ. As. Soc. Bengal,* XXII, p. 235 (1853).

weather of 1851-52, when he was attached to the Survey party under Dr. Andrew Fleming. Unfortunately specimens from Theobald's collection, most of which are now preserved in the collection of the Indian Museum, bear no precise locality and are labelled merely as being from Salt Range. But from Fleming's report [1] it appears that his assistants went all over the range and remained for a considerable time at Pind Dadan Khan. Theobald's collection was rich in reptiles and molluscs and contained a few species of birds also. Dr. W. Waagen, to whom we are indebted for the earliest record of fishes, visited the range in 1870–71. He appears to have collected fishes only at several places in the range, all to the east of the Indus.

In the following series of papers as many as sixty-three species of animals are either recorded or described as new. They are distributed among five groups of animals. The geographical distribution of these species is given in a tabular form below :—

No. of species.	Class of animal.	New.	Ende-mic	N. India or India.	Orien-tal.	Afghan-Baluch-Persian desert.	Palae-arctic.
22	Reptiles ...	–	2	6	5	9	–
4	Batrachia ...	–	–	3	–	–	1
14	Fish	2	4	10	–	–	–
21	Mollusca ...	2	4	9	6	2	–
2	Aquatic Crustacea	–	–	2	–	–	–

It is not surprising to find that 30 out of a total of 63 species are widely distributed in N. India or throughout India generally, while another 11 are still more widely distributed in the Oriental Region. The most interesting feature is the presence of an Afghan-Baluch-Persian element as well as of many endemic species ; the former element is found both among aquatic and among terrestrial forms. Remembering that the climatic conditions in the Salt Range are similar to those that prevail in the Afghan-Baluch-Persian desert, it is easy to account for the invasion of the desert fauna into a territory that otherwise belongs geographically to the Indo-Gangetic plain.

[1] Fleming, *Journ. As. Soc. Bengal*, XXII, p. 235 (1853).