

COMPARISON OF THE FISH FAUNA OF THE NORTH
AND THE SOUTH FACES OF THE GREAT
HIMALAYAN RANGE.¹

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In the area of the "North face of the Great Himalayan Range" it is intended to include not only the north face of the great range proper, but the whole area bounded on the south by the crest of the Himalayas, and on the north by the Karakorum range and its continuation eastward. This area is composed of the Trans-Himalayan portions of the catchment-areas of the Brahmaputra on the east and of the Indus on the west, with the Mansarowar and the Trans-Himalayan Sutlej areas lying in the centre. It extends through twenty degrees of longitude and has an area of about 203,000 sq. miles.

As far as our present subject is concerned the principal physical characteristics of this region are—

1. Its great elevation above sea-level (Chaksam ferry on the Brahmaputra, longitude $90^{\circ} 45' E.$, 11,550 feet; Rham-Tso, near the crest of the range, $89^{\circ} 30' E.$, 14,700 feet; Shigatse on the Brahmaputra, $89^{\circ} E.$, 12,800 feet; sources of the Brahmaputra, between 82° and $83^{\circ} E.$, 16,000 feet; Lake Mansarowar, $81^{\circ} E.$, 14,900 feet; Gartok on the sources of the Indus, $80^{\circ} 25' E.$, 15,100 feet; Leh on the Indus, $78^{\circ} E.$, 11,300 feet; Indus at Skardo, $75^{\circ} 30' E.$, 8,900 feet).

2. Its very low rainfall. The greater portion of the water appears to be derived from springs.

3. The very sparse vegetation.

4. The rapidity of flow of the streams.

The south face of the great chain on the other hand includes the catchment-areas of the Manas, Raidak, Tista, Kosi, Baghmati, Rapti, Karnali, Kali, Ramganga, Ganges, Jumna, Beas, Ravi, Chenab and Jhelum, and the Cis-Himalayan portions of the areas of the Brahmaputra, Sutlej and Indus.

In regard to the elevation of this area from the zoologist's point of view, it must be remembered that most specimens have been taken from rivers running in the depths of the valleys at probably not more than 3—4,000 feet above sea-level.

In contrast to the north face the south face is, of course, a region of heavy rainfall and abundant vegetation.

It should be noted that the crest of the Himalayan range does not correspond with the watershed, but that the former lies considerably to the south of the latter. As will be pointed out below, we have at present no data which would enable us to decide which of these two lines forms the zoological boundary between the two regions.

¹ For the geographical facts in this note I am chiefly indebted to Burrard and Hayden [2].

The records of fish obtained from the northern area are, of course, still somewhat scanty. They are to be found in the *Fauna of British India* (comprising fish from Leh and Ladak), Tate Regan's reports on the fish collected during the Tibet mission, and Lloyd's report in the present series.

From the northern area seventeen species of fish are at present known, belonging to the families Siluridæ and Cyprinidæ.¹ From the southern area thirty-six species of these two families are recorded in the *Fauna of British India*. These two groups have only two species in common (*Schizothorax esocinus* and *Diptychus maculatus*). (These two species are also the only forms from the Trans-Himalayan Indus which have not hitherto been found in the Trans-Himalayan Brahmaputra. Thus there are no species common to the latter and to the rivers of the south face of the Himalayas.) Thus of these two families there are fifteen species confined to the northern region, thirty-four to the southern, and two are found in both.

The separation of the two groups may be chiefly due to (1) a physical obstacle separating the two water-systems and preventing the passage of fish from one system to another, or (2) some difference in the biological environment in the two systems.

(1) It would appear that the importance of a watershed as a barrier might be very easily exaggerated. The Tang-la is the watershed between the Nyang-chu, which runs into the Brahmaputra, and the Amu-chu, which runs into the Raidak. With a height of 15,200 feet it might be expected to form a fairly efficient obstacle. We find, however, that the streams on the two sides of the pass are separated by a distance of at the most one mile, and that this mile consists, not of abrupt cliffs, but of gently sloping open ground. In the rainy season the smallest rivulets doubtless approach each other much more closely. To the north of the Tang-la a series of rivulets and marshes extends throughout the twenty miles which separate the pass from the Rham-Tso. Such a watershed is not likely to prove a more efficient barrier in its purely physical aspect, than, for instance, the watershed separating the Clyde and the Tweed.

In this connection it may be noticed that the young of these river fish are extremely fond of intruding themselves into the smallest and shallowest streams.

(2) With no further data than those at present at our disposal, it is not possible to discuss differences in biological surroundings

¹ Salmonidæ are not known from the basins of either the Indus or Brahmaputra. In the collections of the Indian Museum are specimens of a *Salmo* which have been identified by Tate Regan as *S. oxianus*, Kessler. Tate Regan considers this species to be only doubtfully distinct from *S. fario*, the common British brook trout. These specimens come from (1) the Koksha river, Zila, Chitral, at a height of 8,000 feet above sea-level, and (2) from small tributaries of the Bammian river in Northern Afghanistan at a height of 10,000 feet. Both the Koksha and Bammian rivers run northward into the Oxus.

These are the two points at which the Salmonidæ approach most closely to the rivers of the Himalayas.

between the two regions. One fact may, however, be worth recording, namely, the remarkable quantity of mud and decomposable organic matter suspended in the water of the Nyang-chu. Water placed in a bottle deposited a considerable layer of mud, and if allowed to stand for more than a day, began to give off a most objectionable odour.

It is much regretted that no collections were made from streams to the south of the Tang-la, especially in the plains of Phari and Ling-matang, where the character of the surroundings is still largely Tibetan. As far as I am aware no collections have ever been made from the rivers of the south face of the Himalayas near their sources between the watershed and the crest of the range. It is, therefore, not possible to say with which of these two lines the line of separation of the faunas corresponds.

Dr. Annandale informs me that *Rana pleskii*, the only amphibian at present known from the provinces of Tsang and Ü, is not known to occur on the south face of the Himalayas. This animal, in addition to frequenting the marshes of the valleys, penetrates into the most minute streams on high and bare hillsides. A watershed would, therefore, be no obstacle to it.

LIST OF PAPERS REFERRED TO.

1. Boulenger, G. A. "On some Batrachians and Reptiles from Tibet," *Ann. Mag. Nat. Hist.* (7), vol. xv (1905), p. 378.
 2. Burrard, S. G., and Hayden, H. H. *A sketch of the Geography and Geology of the Himalaya Mountains and Tibet*, Calcutta, 1907.
 3. Tate Regan, C. "Descriptions of five new Cyprinid fishes from Lhasa, Tibet," *Ann. Mag. Nat. Hist.* (7), vol. xv (1905), p. 185.
 4. Tate Regan, C. "Descriptions of two new Cyprinid fishes from Tibet," *Ann. Mag. Nat. Hist.* (7), vol. xv (1905), p. 300.
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