REPORT ON THE NATURAL HISTORY RESULTS OF THE PAMIR BOUNDARY COMMISSION

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WITH A LIST OF THE PLANTS

BY

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AND

A NOTICE OF THE ROCK-SPECIMENS

BY

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REPORT
ON THE
NATURAL HISTORY RESULTS
OF THE
PAMIR BOUNDARY COMMISSION.

SECTION 1.

Introductory and Explanatory.

The Commission left Bandipur in Kashmir on the 21st June, and returned to Bandipur on the 12th October, and all the species mentioned in this report were collected between those dates.

The entire collection consists of 143 species of animals and 116 species of plants, of which 66 species of animals and 115 of plants came from the Pamirs.

These results may seem small; but it must be borne in mind, first, that, beyond the already well-known limits of Gilgit, the country traversed by the Commission is one that, except for a few isolated spots of cultivation, may be fairly described as barren and inhospitable; secondly, that considerations of decisive political importance forbade any sort of delay along the road; and thirdly, that although no overwhelming difficulties of transport actually occurred, they were anticipated to such a degree as to make rigid retrenchment of collecting material obligatory. In short, and more especially in so far as the collections made along the road are judged, it has to be remembered that the expedition was first and foremost a political one, and that any efforts in behalf of natural history that might have delayed its progress towards the scene of action, or that might have impeded its return before the closing of the passes, were quite out of question.

Since the country on this side of Gilgit was considered to be well known, or, at any rate, to be always open to future observation, and since, as already stated, economy of transport was necessary at the start, it here seemed advisable to increase our collections with judgment, and only at places—such as the higher passes—which are less easily accessible to ordinary collectors. In this part of our journey; therefore, only a few examples of the Alpine flora of the Burzil were preserved, and only such animals as were specially desirable.

Again, between Gilgit and Bazai Gumbaz, botanical collection, in the circumstances, had to be left alone. In our hurried passage it would have been impossible, even with unlimited transport, to make anything like a complete collection; and rather than bring away a few haphazard specimens, it was thought preferable to keep all collecting material intact for the less accessible flora of the Pamirs. But so far as zoology was concerned, everything that could be got along this part of the march was preserved.

On the other hand, when the Pamirs were reached, every effort was made to get together as complete and representative a collection as possible; and cabinet specimens of the rocks, and of most of the animals and of almost every plant seen, were brought away.

The rocks have been described by Mr. T. H. Holland, of the Geological Survey; the plants have been determined by Mr. Duthie, of the Botanical Survey; and the animals by myself, with the assistance of specialists whose names are mentioned in their appropriate place.
SECTION 2.

Remarks upon the More Obvious Natural Features of the Pamirs.

In a general view, the Great and Little Pamirs are simply the broad alluvial valleys of the sources of two of the large original affluents of the River Oxus. Although the Commission stayed for some days in the eastern part of the Great Pamir, the greater portion of its time was passed in the Little Pamir, which was traversed from west to east, and could therefore be more leisurely and critically observed; so that an outline of the natural features of the Little Pamir may take the first place.

The Little Pamir—assuming its extremes to be the Andamin Pass on the west, and the Kizil Rohat bluffs on the east—is the broad alluvial basin of the first fifty miles, or so, of the river Aksu. Its greatest breadth is not more than four or five miles, and it lies, east-north-east and west-south-west, at an elevation of about 13,000 feet. It is bounded north and south by grassy downs, which rise to a height of about 18,000 feet and culminate in sharp-cut peaks,—most of these, especially on their northern faces, being capped with perpetual snow. The continuity of these downs is much broken, especially on the southern side of the Pamir, by broad nullahs, which open into the Pamir almost at right-angles; every nullah having its head in a snow-field or small glacier, which drains down a bouldery channel in the nullah bed, into the river Aksu.

The basin, or valley, of the Pamir forms a broad undulating surface, with more or less distinct remains, along its sides, of old river-terraces. These show that in past times, when probably the altitude of the mountains themselves was greater, the river Aksu ran at a much higher level than it does now. These old river-terraces are most distinct at the eastern end of the Pamir, near the Mihmankyol Pass and Kizil Rohat, where they appear as sharp-cut banks of recently formed conglomerate, and as abrupt hillocks of shingle and boulders.

The surface of the Pamir, although largely covered with tussocks of grass and other stunted vegetation, often consists of bare stretches of hard sand and shingle, coated with a saline efflorescence. Here and there, especially on the old river-terraces, occur colossal boulders of gneiss and masses of limestone, which, by the chance observer, might be mistaken for ice-borne erratics; but which, by their uniformity of distribution, are clearly only "torns," or the remains of deep-seated beds that have been laid bare, and in great part denuded, by the action of the river and its numerous affluents.

The river runs with some rapidity in a broad bed of boulders, and often expands into marshes and lakelets; one chain of which, known as Chakmaktin Kul or Oi Kul, is of respectable size.

A very characteristic feature of the Pamir, in summer, are the tracts of deep grassy bog that skirt the river and all its tributaries. Equally characteristic is the rolled or beaten-down appearance of the surface soil everywhere, the evident result of a long-lying weight of snow.

The principal rocks of the Pamir, in order of abundance, are (1) black carbonaceous shales and hard argillaceous sandstones, (2) granitites, (3) quartzite conglomerate, (4) limestones, (5) true volcanic rocks. * No fossils were met with.

The shales and sandstones form the great mass of the hills that bound the Pamir, and crushed quartzite conglomerate occurs in beds of considerable thickness along the lower slopes of these hills, especially of those of the northern range. Limestone also crops out in places, all along the lower slopes of the northern range, as well as in other places to be presently mentioned. The granitites occur largely in the open Pamir, in the form of large boulders and beds of large pebbles, the river-terraces and hillocks already mentioned being formed almost entirely of the water-worn débris of these igneous rocks, though they are also found in places as colossal boulders, on the lower slopes of the hills.

* See Mr. Holland's Report, pages 20—23, from which the specific names are taken.
The true volcanic rocks occur mostly at the eastern end of the Pamir, and consist of andesite-rhyolites associated with hard limestone-conglomerate and limestone-breccia. The red rocks from which Kizil Robat derives its name are, in fact, a range of bold bluffs and scarps consisting largely of limestone-conglomerate coloured by a ferruginous cement, and of red volcanic rock.

Associated with these volcanic rocks, but on the opposite side of the river Aksu, is a cluster of sulphuretted hydrogen springs, the temperature of which is that of a comfortable hot-bath. These springs well out on both sides of a deep ravine, the rocks exposed in which are chiefly rhyolitic andesite of a dark red colour. The largest spring has formed for itself a cone of calcareous sinter about forty feet high, and there is another extinct cone and crater of not much smaller size close by.

Incidentally, it may give some idea of the summer climate of the Pamirs to note, regarding this spring, that about noon on a cloudy day in the middle of August, although the water as it welled out of the top of the cone must have been of a temperature near 105° Fahr., yet as it trickled over the stalactites of sinter at the edge of the cone it was in part converted into icicles.

Another fact of interest regarding this spring is that it is held in great medicinal repute among the Kirghiz, especially among the women. It has, therefore, been roughly walled in and somewhat imposingly decorated with rude banners and standards of yaks' tails.

The black sandstone and shale of which the downs that bound the Pamir chiefly consist, are hard, brittle, and fissile, weathering, under the action of frost, in flakes, which, on these comparatively gentle slopes, collect to form very characteristic “shoots” of talus. On these “shoots,” which as they accumulate often grow out into terraces, the “forms” of Ovis poli are often to be found, especially on southerly aspects.

As already stated, the Pamir, both as to its open surface and as to its slopes, is more or less covered with grasses, the commonest of which is a species identified by Mr. Dutchie as *Poa attenuata*. From early times the Pamir grass has been noted for its richness. Marco Polo (Marsden's translation, London, 1818, page 142) wrote of it “such indeed is its quality that the leanest cattle turned upon it would become fat in the course of ten days.” And Wood, in his journey to the source of the Oxus (London, 1841, page 366), mentions the Kirghiz telling him that “the grass of the Pamir is so rich that a sorry horse is here brought into good condition in less than twenty days.”

Our own experience quite accords with this, for of the many pack-animals met with on our return march from Gilgit to Kashmir, none approached our baggage-ponies in condition.

Besides grass there is a good deal of wormwood, the roots of which furnish a meagre fuel—the only fuel besides cattle-dung to be got in this part of the world.

There is no large vegetation of any kind; the biggest plant that I myself saw was a Larkspur about eighteen inches high and with a crown about a foot in diameter.

The most noticeable characters of the Pamir plants are the strength and bulk of the root; the large size and quick maturation of the flower, compared with the leaves; and the toughness and persistence of the seed-vessels. For instance, in exposed situations, it is not uncommon to find a Primula which consists of a large bunch of roots surmounted by a large head of flowers, with not more than two or three small leaves between, and with the dried flower-stalk and seed-capsules of the last year still attached and in perfect preservation.

These are well-known features of Alpine and boreal vegetation, and have been explained as the direct results, under Natural Selection, of a short and sudden summer following on a long and severe winter. In such circumstances the plants more likely to survive and multiply will be those in which the tendencies to store up a reserve of nutriment in a protected root rather than in an exposed stem; to mature the flower (upon which, in the first instance, the propagation of the species depends) before the leaves; and to form strong and resistant seed-envelopes, are most marked.
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That the flora of the Pamir is meagre may be judged from the fact that although I gathered specimens of every plant that I saw, except of a species of Rhubarb never seen in flower, only 116 species were yielded.

The fauna of the Pamir is as poor as the flora.

Of mammals by far the commonest is the golden marmot, whose shrill danger-signal is one of the most characteristic sounds of these silent altitudes. Another common mammal is the Tibetan or Pamir hare, which from its semi-gregarious and burrowing habits resembles a rabbit rather than a hare.

Ovis poli, though certainly abundant on its own particular grounds, is more in evidence in summer by reason of the horns and portions of skulls that strew the ground everywhere.

Much the commonest bird is the horned lark. The red-billed chough is also abundant, and the common raven quickly collects about an encampment.

Along the streams the Tibetan tern is a common bird, and in every high nullah the marks of the snow-cook abound. The Ossifrage or Lammergeyer (the "Golden Eagle" of Anglo-Indians) is the principal bird of prey, and it is said that it can often be seen chasing hares.

Not a single reptile or Batrachian was found, although they were searched for in likely places; and it seems probable that neither of these classes of animals is represented at this intensely cold elevation.

Fishes, all of the Carp family, were numerous in every stream and pool, both adults and fry, the commonest being Schizopygopsis Stoliczka. It must be either this fish, or a Schizothorax which I identify as S. Peshchenkoi, that travellers in this region have spoken of as "trout." That fishes are so abundant is probably due to the facts that they have few enemies, and that food, in the form of water-snails and larvae of chironomid flies, is plentiful. Schizopygopsis would generally take the small fly-spoon, and Schizothorax was best caught with a sunk bait of raw meat.

Insects were not numerous: the collection includes only a few species of flies and butterflies, none of which were at all abundant.

Of Crustacea, a few water-flies and sand-hoppers were found in Chakmaktin Lake.

Two species of spiders were fairly common among boulders, in damp situations, and a third species used to frequent our tents. Unfortunately my specimens of them were lost, and with them a centipede found by Colonel Wahab in his tent, and a small collection of moths.

The Great Pamir, of which, however, I explored only a small part of the eastern end, seemed to be in all respects similar to the Little Pamir. Its surface configuration is much the same, its rocks are the same, and at Jarti Gumbaz are hot sulphuretted hydrogen springs, similar to those near Kizil Robat, but more numerous and of a higher temperature.

The vegetable and animal life is quite the same, but butterflies—chiefly meadow-browns and a species of Parnassius—were considerably more numerous.

It is necessary here to refer to the climate of the Pamirs only in a general way. The Commission had experience of it from the 20th July to the 16th September. During that time the most noticeable meteorological event was the high and bitterly cold wind that, springing up nearly every day in the forenoon, would last until sunset. The nights were almost without exception intensely frosty.

A succession of many fine days was uncommon.

Snow-squalls were of frequent occurrence: there was a heavy one in the morning of the 24th July, when the snow lay thick on the ground round our tents, and did not disappear until noon; and there were two equally heavy ones in the last half of August.

There was a heavy shower of rain and sleet in the forenoon of the 15th August.

By the middle of September the ice formed at night on the marshy pools near the Aksu, did not melt until late in the morning.
Before describing the zoological collection it is necessary to correct the impression, an impression which appears to be traceable to a Kirghiz statement repeated by Wood (Journey to the Source of the Oxus, page 364), that in summer the Pamir Lakes swarm with aquatic birds, which have come to breed.

The bar-headed goose, the Brahminy duck, and a few other ducks, were seen on Chakmaktin Lake and on Lake Victoria, in July, and on the 25th July I saw, at a distance, on Lake Victoria, a pair of ducks or geese with a young brood. Also, all through August and the latter part of July, the Tibetan tern was seen every day, and the cormorant, the red-shank, and several species of plovers and sand-pipers might be seen any day.

But that there was any great concourse of aquatic birds, more particularly of breeding birds, was as far as possible from being the case. Neither the Chakmaktin chain, nor the Victoria chain of lakes offer any attraction as a breeding ground; for their banks are low and bare, and they are singularly deficient in aquatic vegetation, and so they afford neither the cover nor the feeding-grounds required.

At the end of August, snipe, teal, ducks and geese began to appear in gradually increasing numbers, but they were all very clearly on their winter migration southwards.

SECTION 3.

A systematic Account of the Zoological Collection made on the Pamirs.

MAMMALS.

Order Carnivora.

Family Canidae.

1. Vulpes Alopex (L.) var. flavescens, Gray.—The pale variety of the common fox.


This race of the common fox is not uncommon on the Pamirs. The single specimen obtained is very much lighter-coloured than any of those in the Indian Museum collection.

On one occasion Colonel Wahab and I, at an elevation of over 16,000 feet, came across one stalking a flock of snow-cock: it showed great curiosity, but not much fear, at seeing us.

[No other carnivores were obtained, but the following were seen:—

A wolf, probably the common wolf (Canis lupus);

A bear, probably the brown bear (Ursus arctos);

A weasel, probably the yellow-bellied or pale weasel (Putorius alpinus), a specimen of which was shot on the Buzril Pass in Kashmir, at an elevation nearly equal to that of the Pamir.]

Order Rodentia.

Family Sciuridae.


During July and August the golden marmot was the commonest mammal of the Pamirs, and its cry, which consists of a prolonged whirring scream followed by several short sharp expletives, was one of the most familiar sounds. In September, however, the marmot was seldom seen or heard.

The relative length of the tail in this species varies greatly, and appears to decrease with age. Of five specimens shot on practically the same spot near Lake Victoria, two young males have the tail half, or a little more than half,
the length of the head and body; two females have the tail, respectively, a little less than half, and two-fifths, the length of the head and body; while in an old male the tail is between a third and a fourth the length of the head and body.

In adults the general colour, in summer, was, as described by Blanford, tawny to rich brownish yellow, irregularly shot with black; but the tip of the tail was as often dark reddish-brown as black. The general colour, however, of a very young male was more like that of *A. hodgsoni*, Blanford — a rusty cat-grey, while half the tail was black.

The Pamir marmot is extremely alert. Severtzov states definitely that the brown bear is accustomed to dig them out of their burrows, and that the Lammergeyer also preys upon them.

**Family MURIDE.**


Unfortunately, the label has come off the only specimen caught, and I am not absolutely certain whether it came from the Pamir, or from the heights near by to the south-west.


*Mus Pheus*, Pallas, Nova species Quadrupedum Girium, p. 381, pl. xve.


The habits of this little animal have been noticed by all its observers. It was constantly found in our tents on the Pamirs, especially in the one containing Commissariat stores. Scully (*loc. cit.*) was the first to recognize the probable identity of the three species, and his opinion is adopted by Sculler. Our series of specimens quite confirm Sculler's synonymy.

**Family LEPORIDE.**

5. *Lepus tibetanus*, Waterhouse.—The Hare of Little Tibet.


This, the only hare seen, was extremely common on the Pamirs, and even commoner on the high slopes of the Wakhan Valley between Langar and Bezai Gumbaz, where in places it was almost gregarious.
Vigne, who truly calls it a “lank and long-legged animal”, says that it sometimes makes its “form” in holes underneath rocks, but on the Little Pamir I often saw it run into deep burrows.

In the male the black tips to the ears are often more conspicuous than in the female. Sclater (Oat. Mamm. Ind. Mus., II., 116) has already expressed the opinion that L. Stoliczkanus and L. panirensis are, in all probability, identical with L. tibetanus, and I fully agree with him.

L. oraspedotis, which Mr. Blanford now synonymizes with L. tibetanus, is at once distinguished by the enormous relative size of the ears; so that Mr. Blanford’s statement, in the Fauna of British India, that L. tibetanus is found as low as 500 feet above sea-level—if, as appears from the context, the statement is founded on the supposed identity of L. oraspedotis with this species—needs confirmation.

For two fine specimens the collection is indebted to Colonel Wahab.

Order UNGULATA.

Family BOVIDÆ.

6. OVIS POLI, Blyth.—The Great Pamir Sheep.


During the whole time of our stay (20th July to 16th September) the great Pamir sheep was often seen in large herds numbering sometimes over a hundred individuals, which, however, at this season, were all females and young males. The only large adult males brought into our camp were two shot on the 16th September, near Bozai Gumbaz, by Lieutenant Ossetinsky of the 16th Turkistan Line Battalion, one of which Mr. Ossetinsky was generous enough to give to me for the Indian Museum.

This and three other perfect specimens make a fine series, which will shortly be exhibited in the Indian Museum, to illustrate growth-change and the development of secondary sexual characters in this species.

The only other wild ungulate seen on the Pamirs was the Himalayan Ibex (Capra sibirica).

BIRDS.

In the identification of the birds I have been very materially assisted by Mr. F. Finn, Deputy Superintendent of the Indian Museum, without whose aid I should have been unable, within the time at my disposal, to come to satisfactory conclusions in a group in which there is so much conflict of opinion.

With regard to references, we have thought it sufficient to refer, where possible, to the Catalogues of Birds in the British Museum, and, in addition, to the Reports of the more important English and Russian Expeditions to Central Asia.
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Order Carinatae.

Sub-order Passeres.

Family Corvidae.


Ravens were common on the Pamirs, and collected in great numbers near the joint camp of the two Commissions at Mihmanyol.

The bell-like note referred to by Oates, on Blanford's authority, as peculiar to the Sind raven, was frequently heard. (I have often heard the same note in E. Baluchistan.)

2. Graculus graculus (L.).—The red-billed Chough.


The red-billed chough was extremely common on the Pamirs during the whole period of our stay. On the march up in July I did not notice it until we reached Sarhad, in the Wakhan Valley, about 10,500 feet; but on the march down, in September and October, it was common enough in the Yasin Valley, down to 8,000 feet.

Family Sylviidae.

3. Phylloscopus humii (Brooks).—Hume's Willow-warbler.


A female in good plumage appears to us to correspond with this species, of which—as also of *P. superciliosus*—we have large series for comparison. It was shot on the Little Pamir, by the banks of the Aksu.

A little bird, apparently this species, used to frequent our tents at Mihmanyol.

Family Turdidae.

4. Erithacus caeruleus (Pall.).—The red-spot Bluethroat.


A single specimen was caught alive in our camp at Mihmanyol.

5. Ruticilla erythrogaster, Güldenstadt.—Güldenstadt's Redstart.


In its habits this species very much resembles the white-cap water-redstart. On the Pamirs it was only found above 15,000 feet, in sheltered nullahs, on rocks in or alongside mountain torrents. On this account specimens were hard to get, most of those shot being lost in the torrent.

One of our specimens is immature.


An adult male in winter plumage, and an immature bird.
Family ORIOLIDÆ.

7. Oriolus kundoo, Sykes.—The Indian Golden Oriole.

A young oriole caught, in an exhausted state, near our camp at Mihmanyol, on the Little Pamir, agrees with O. galbula in having the dusky marking of the head confined to the lores, but the wing-measurement is that of O. Kundoo.

Family FRINGILLIDÆ.

8. Montifringilla brandti (Bonap.).—The Sooty Mountain-finch.

Seen in July and August, in small flocks, among the flowering grasses of the lower slopes, about 15,000 feet.

Family MOTACILLIDÆ.


This wagtail was common along the banks and marshes of the River Aksu.

10. Motacilla citreoloides (Hodgs.).

Also common along the Aksu.

Family ALAUDIDÆ.

11. Otoecorys penicillata, Gould, var. pallida, Sharpe.—Horned Lark.

This is the common lark of the Great and Little Pamirs.

Our male specimens show a gradation from union of the black throat-band with the black ear-coverts, to separation.

Our series includes a fledgeling chased from its parents while being fed.

[ Hirundo sp.

A species, probably the common swallow (Hirundo rustica), which according to Severtzov ("This," 1883, p. 70) passes through the Pamirs from the end of August to the end of September, was occasionally seen near Mihmanyol in August.]

Sub-order PICARIA

Family PICIIDÆ.


A single specimen was shot on the Little Pamir, near Mihmanyol. Its colour so exactly harmonized with the tones of the country, that a casual observer might have been forgiven for supposing that it illustrated what Prof. Poulton has called antycryptic “protection.”

Severtzov has already reported this species from the Pamir.

It must be remembered that for many miles round there was not a tree or bush of any kind.
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Family UPUPIDÆ.

13. UPUPA EPOPS, L.—The common Hoopoe.


The common Hoopoe was almost common on the Little Pamir after the middle of August, and appeared to be perfectly at home, in spite of occasional snowstorms and excessively cold nights.

Family CORACIIDÆ.

14. CORACIAS GARRULA, L.—The European Roller.


Several specimens were seen on the Little Pamir about the middle of August. It does not appear to have been recorded from here before.

Sub-order STRIGES.

Family BUBONIDÆ.

15. CARINO BACTRIANA, Hutt.—The Bactrian Owl.


A young male was caught alive among the rocks, near Bozai Gumbas. It differs from adults in our collection, obtained by Scully, Stoliczka and Aitchison, much in the same way as the young of *C. brama* differs from the adult, namely, in being of a duller shade and in having the white markings—especially those on the back of the head—less distinct. *Donor*: Major-General M. G. Gerard.

Sub-order ACCIPITRES.

Family FALCONIDÆ.

16. GYPAETUS BARBATUS (L.)—The Lammergeyer.


The Lammergeyer was common on the Pamirs.

The only specimen obtained was an adult male, in beautiful plumage, presented by His Excellency General Poválo-Schveikovsky.

17. HALIAETUS LEUCORYPHUS (Pall.)—Pallas’s Sea-eagle.


The only specimen obtained is a young male in dirty and abraded condition; but specimens in adult plumage were often seen along the R. Aksu.

18. MILVUS MIGRANS, Bodd.—Kite.


Only one specimen was seen: it was shot near Mihmanyol.

[**BUTEO PEROX** (Gm.).]

Buzzards, which were almost certainly this species, frequented our camp near Mihmanyol. They were too wary to give a shot within killing distance.

[FALCO REGOLUS, Pall.]

A little hawk, which was almost certainly the Merlin, was once seen on the Little Pamir, at about 15,000 feet.]
Sub-order *HERODIONES*.

Family *ARDEIDÆ*.

19. **ARDEA CINEREA**, L.—The common Heron.


Only a few were seen, and these only at one spot in the marshes of the R. Aksu, near Mihman-yol.

They were extremely shy, and only one was shot.

Family *IBIDIDÆ*.


A male, with adult plumage nearly complete, was shot in the marshes of the Little Pamir.

This species does not seem to have been before recorded from the Pamirs.

Sub-order *STELOPODES*.

Family *PHALACROCORACIDÆ*.


An immature female, in good condition, was shot on some pools of the Aksu. Several specimens were seen.

Sub-order *ANSERES*.

Family *ANATIDÆ*.

[ANSER INDICUS (Lathi.).]

Two specimens of the bar-headed goose were shot by a sepoy of the escort on Lake Victoria. Towards the end of August large flocks of geese were seen migrating south-westwards, flying higher than the highest peaks (18,000 to 19,000 feet); they may, perhaps, have been this species.

22. **TADorna CAsArca** (L.) et auctorum.—The Brahminy Duck.


This species was seen at all times on the Pamirs.

With reference to the synonym *Vulpanser* given by Pallas, *loc. cit.*, under this species, I may mention that I myself mistook the first specimen, which was feeding alone on a dried-up marsh by the Aksu, for a fox.

23. **ANAS** (QUERQUEDULA) CIRClA, L., et auctorum.—The Indian blue-winged Teal.


*Querquedula circula*, Sharpe, Birds of 2nd Yarkand Mission, p. 131.

This species was very common among the pools and marshes of the Aksu, after the 20th August. No full-plumaged males were noticed.
Sub-order *LIMICOLE*.

Family *CHARADRIIDAE*.


This species gradually became common on the Little Pamir, after the middle of August. All the specimens procured show much of the black under-parts of the breeding plumage.


*Charadrius mongolicus*, Seeborn, Charadrida, p. 147.


This species was not uncommon in August. Three of our specimens—two females and a male—are in immature plumage.

26. *TOTANUS CALIDRIS* (L).—The common Redshank.


Very common, and very tame; and very good eating, notwithstanding Sir Thomas Brown's opinion that it is "no dainty dish."

One of our male specimens is in very abraded breeding plumage.

27. *TOTANUS GLOTTIS* (L).—The Greenshank.


Only a few were seen.


This species does not seem to have been before recorded from the Pamirs.

29. *TOTANUS GLAREOLA* (L).—The Wood Sandpiper.


30. *TOTANUS HYPOLEUCUS* (L).—The common Sandpiper.

*Totanus hypoleucus*, Seeborn, Charadrida, p. 871.


31. *TOTANUS PUGNAX* (L).—The Ruff and Reeve.

*Totanus pugnax*, Seeborn, Charadrida, p. 873.


Fairly common at the end of August.

32. *STREPSILAS INTERPERS* (L).—The Turnstone.


Our specimens include a male in breeding plumage.

33. *TRINGA SUBARQUATA* (Güldenstädt).—The Curlew Sandpiper.


One of our specimens is a male showing considerable remains of breeding plumage.
[Scolopax sp.]

A few snipe began to be seen after the middle of August.

Sub-order **GAVIÆ.**
Family **LARIÆ.**

34. **Larus, sp.**

An immature Herring Gull was shot on the Aksu by one of the Cossacks, and was presented to the collection by His Excellency General Poválo-Schweikovsky. It was the only individual seen.

35. **Sterna tibetana**, Saunders.—The Tibetan Tern.


This species was common along all the rivers and lakes of the Pamir. The feet and base of beak are orange red.

Sub-order **COLUMBÆ.**
Family **COLUMBIDÆ.**

36. **Columba rupestris**, Pall.—The Pale Rock-pigeon.


Not uncommon on the Little Pamir. Three immature specimens, one still showing the nestling down on the neck, but nevertheless flying strongly, were shot in the latter half of August.

37. **Turtur turtur** (L.)—The common Turtledove.


Severtzov ("Ibis," 1888, p. 71) has already reported the occurrence of this bird on the Pamirs, where, and for many miles around, there is not a tree or a bush to be found.

[Sub-order **GALLINÆ.**]

[Tetraogallus, sp.]

[A species of Snowcock, probably *Tetraogallus himalayensis*, was common in the high nullaha up to the snowline.]

**FISHES.**

Order **PHYSESTOMI.**
Family **CYPRINIDÆ.**

1. **Schizothorax fedschenkoi**, Keseler.

*Schizothorax fedschenkoi*, Keseler, Nouvues Memoires, Moscow, 1879, X, p. 11, figs. 15-18, and Fedschenko's Notes in Turkestan, Prcsses, p. 16, pl. ii, figs. 9-10.

Very common in the weedy reaches of the R. Aksu.

The fish caught by Stoliczka in the Oxus at Kala Panja, and described and figured by Day (P. Z. S. 1876, p. 787, and Fishes of 2nd Yarkand Mission, p. 18, pl. ii, figs. 9-10) as *S. microcephalus* appears to be extremely like Fedschenko's species: unfortunately I cannot find the specimen in the Indian Museum collection.
This is an extremely common fish in the streams and rivers of the Pamirs, growing to a length of over thirteen inches.

3. Schizopygos pygopus Severtsovi, Herz.—Plate I., fig. 1.

Schizopygos pygopus Severtsovi, Herzstein, Pusjariski Reisen, Fische, p. 196, pl. xvi, fig. 2.

I was at first disinclined to agree with Herzstein in separating this species from S. Stoliczka, but on comparing the large series of the latter in the Indian Museum collection with those collected by myself, among which are numerous spawning males and females, I can find five ripe males and a ripe female, all taken at the same spot, which differ constantly from ripe adults of S. Stoliczka in the following characters:—

(1) they are smaller, sexually-mature individuals not being longer than 175 millim.; whereas I can find no sexually-mature S. Stoliczka less than 200 millim. long, while most are about 250 millim., and some are nearly 300 millim.;

(2) the body is higher, its height in the adult being one-sixth of its total length; whereas in typical adults of S. Stoliczka the body height is only one-seventh or one-eighth the total length;

(3) as pointed out by Herzstein, the anterior end of the mouth-cleft is on a level with the lower edge of the orbit, whereas in S. Severtsovi it is altogether below the level of the orbit. This is due to the fact that in S. Severtsovi;

(4) the eye is larger, its diameter in sexually-mature adults being one-fourth, or nearly one-fourth, the length of the head; whereas in sexually-mature adults of S. Stoliczka its diameter is only one-fifth to one-sixth the length of the head.

The six adults here separated as S. Severtsovi all came from a small ice cold streamlet which seems to have only a periodic connexion with larger waters, so that, after all, they may be only dwarfs of S. Stoliczka.

4. NEMACHILUS TENUIA, Day.

Nemachilus tenius, Day, P. Z. S., 1876, p. 796, and Fishes of 2nd Yarkand Mission, p. 15, pl. v, fig. 4.

Nemachilus Stoliczka lepidosoma (part), Herzstein, Pusjariski Reisen, Fische, p. 28, pl. i, fig. 2.

A large number of ripe adults were taken in a streamlet on the Great Pamir, the largest being 6½ inches long.

In Day’s figure, which I have compared with Day’s types in our collection, the barbels are too long.

MOLLUSCA.

Order GASTROPODA PULMONATA.

Family LIMNÉIDAÆ.

Two species, and perhaps three varieties, of freshwater snails were fairly common in Lake Victoria and in the overflow pools of the R. Aksu.

I have compared them with Stoliczka’s specimens from the same locality, which were named by Nevill and are in the Indian Museum, and I have also sent specimens to Mr. Edgar Smith of the British Museum, who has kindly given me a reserved opinion upon them.

One of the Lake Victoria species is the variety of Limnea auricularia, L., mentioned by Nevill in the “Mollusca of the 2nd Yarkand Expedition,” page 6, and this opinion is confirmed by Mr. Smith. The other species from
Lake Victoria is the *Limnea defilippii* var. *pirikuensis* of Nevill (op. cit., page 7). Neither our specimens nor Stoliczka’s correspond with Issel’s figure (Moll. Persia, pl. iii, figs. 62, 63), and Nevill’s determination seems open to some doubt. Mr. Smith inclines to consider this second Lake Victoria species as a variety of *Limnea lagotis*, Schröter.

The third species, or variety, from the R. Aksu, is regarded by Mr. Smith as probably a variety of *Limnea lagotis*, Schr. I may here mention that the Lake Victoria variety of *Limnea auricularia*, L., is extremely like figs. 4, 4a of plate 17 of Jacquemont’s “Voyage dans l’Inde.”

**INSECTS.**

**Order LEPIDOPTERA.**

**Sub-order RHopalocera.**

In the preparation of the report upon the butterflies, both of the Pamirs and of Kashmir, I have been greatly indebted to Mr. L. de Nicéville the well-known authority on this branch of entomology, who not only identified such species as I could not make out, but also was kind enough to examine the entire collection, criticizing and correcting the identifications and synonymy, and giving to the whole the sanction of his high authority. With regard to references, we have given only such as are necessary.

**Family NYMPHALIDÆ.**

**Karanae Huesneri** (Felder).


*Karanae Huesneri,* Moore, Lepidoptera India, Vol. II, p. 89, pl. 101, figs. 8a, 9a, 9.

This was by far the commonest butterfly of the Great Pamir, near Lake Victoria, at the end of July. All our specimens are small, and all but one are extremely light in colour. In repose this species used always to lie over on its side, to escape the high wind.

2. **Chortobius hilaris** (Staudinger).


Several specimens were taken on the Great Pamir in July.

Groum-Greshimailo, *Fauz. Lép. Pamir,* p. 493, appears to regard this species as identical with, or at most a variety of, *C. pulchella* (Feld.). Our specimens all correspond exactly with an authentic specimen of *C. hilarii* in the Indian Museum collection.


Found on both the Great and the Little Pamir. Groum-Greshimailo, *Fauz. Lép. Pamir,* p. 459, regards this butterfly as identical with *Argynnis aglais,* L., with which opinion we are inclined to agree.

4. **Pyrameis cardui** (Linn.).


The Painted Lady was found only near Jarti Gumbas, on a slope covered
with the labiate plant *Nepeta supina*, which has, perhaps, the most attractive flower of this region.

Family LYCÆNIDÆ.


*Lycaena phlaeas*, Riv. var. lehanea (Moore), Groum-Greshimallo, Faun. Lep. Pamir, p. 239, No. 57, pl. x, figs. 4a, 4b, 2.

Found on the Great Pamir.


From the Great Pamir.

Our specimens, two in number, were determined by Dr. Staudinger of Dresden.

Family PAPILIONIDÆ.

7. **MANCIPIUM DEOTA**, de Nicéville.


*Pieris roboreus*, Alphéraky, Mémoires sur les Lépidoptères, Vol. V, p. 63, No. 6, pl. iv, figs. 2a, 2b, 2c.

A single specimen, the only one seen, was taken on the Great Pamir.

8. **COLIAS EUGENE**, Felder.


A male and two females from the Great Pamir, and a female from the Little Pamir.


Not uncommon on the southern slopes of the Great Pamir at about 15,000 feet.

Family HESPERIDÆ.

10. **HESPERIA CASHMIRENSIS** (Moore).

*Pyrgus cashmirensis*, Moore, P. Z. S., 1874, p. 274, No. 103, pl. xliii, fig. 7.

A single specimen, the only one seen, was caught on the Great Pamir.

Order DIPtera.

Family TIPULIDÆ.

[1. CHIRONOMUS sp.]

A species of *Chironomus* was extremely common on the Pamirs; but unfortunately my specimens were all lost along with my specimens of Pamir spiders and moths.

On sunny days these flies were an indescribable nuisance by getting into one's eyes, ears, and nostrils.

On the 24th July the surface of the shallow pools at the eastern end of Lake Victoria was covered with a thick layer of their drowned bodies.

None of these flies were observed to be luminous.]
A single specimen was taken on the Great Pamir. It is not in the best preservation; but it agrees with Macquart's description, and with authentically named specimens from Europe in the Indian Museum collection.

Family TABANIDÆ.

3. TABANUS sp.

A species of Tabanus was common on the Pamirs, especially in damp grassy nullahs at an elevation of about 15,000 feet—the feeding ground of Ovis poli.

I am unable to name it from the Indian and European specimens in the Indian Museum collection.

Family TACHINIDÆ.

4. ECHINOMYIA sp. 1.

A single specimen of an Echinomyia near E. ferox (of which there are authentically named specimens in the Indian Museum) was taken in the Wakhan Valley, near the entrance into the Little Pamir.

5. ECHINOMYIA sp. 2.

Another Tachinid, differing only from Macquart's definition of the genus in having the whole abdomen thickly covered with long bristles, was found on the Little Pamir. It resembles a bumble-bee even more remarkably than do the species of Polycella, not only in hairiness but also in coloration.

CRUSTACEA.

Order AMPHIPODA.

Family GAMMARIDÆ.

1. GAMMARUS PULEX, L.


My specimens have not been compared with European specimens, but they agree with the descriptions and figures of Spence Bate and other authors. This species was found in some of the Pamir lakes as well as in L. Zartighar near the Baroghil Pass.

Order PHYLLOPODA.

Family BRANCHIPODIDÆ.

2. BRANCHIPUS (CHIROCEPHALUS) BOBRINSKII, n. sp.—Plate III, figs. 1, 1a.

Closely resembles Chirocephalus diaphanus (eide Baird, Nat. Hist. of British Entomostraca, p. 53, pls. iii, iv, v; and Monograph of the Branchiopoda, Proc. Zool. Soc., 1853, p. 23) in all particulars except (1) that it is much smaller (both sexes); (2) that the antennules of the male are much larger, their length, when extended, being nearly equal to that of the thorax; and (3) that the toothed plate of the base of the second joint of the antennules is smaller and is distinctly pedicled.

Males and ovigerous females were caught in July, in the Chakmaktin Lake, by M. Bogoyevlenski, naturalist with Count Bobrinski.

The latter gentleman very generously gave them to me, and I have therefore named the species after him.
Family DAPHNIIDÆ.

3. DAPHNIA sp.—Plate III, fig. 2.

A single female, with large eggs in the brood-sack, was taken along with Branchipus in the Chakmaktin Lake.

It agrees closely with Daphnia pulex, except that it is very much larger, its length being nearly 4 millim., and it has a beak shaped like a turtle's. It differs from the description of D. magna in the form of the shell. If, as appears probable, it is an unnamed species, I would propose the name *bojalav-
łęsk* for it.

SECTION 4.

A List of the Plants collected on the Pamirs.

By J. F. Dutia, Esq., R.A., F.L.S., Director of the Botanical Department of Northern India.

RANUNCULACEÆ.*

1. **RANUNCULUS AQUATILIS**, **Linn.**, var. trichophyllus, **Chaix.**

Shores of Lake Victoria and neighbouring lakelets 13-14,000 ft. Herb. No. 17678; in marshes by the R. Aksu. Herb. No. 17672.

This variety is abundant in North-West India, extending from the plains up to 13,000 ft. on the Western Himalaya; it also occurs in Kashmir and W. Tibet. As an aggregate species *R. aquatilis* is widely distributed in temperate regions.

2. **RANUNCULUS PULCHELLUS**, **C. A. Meyer**, var. longicaulis, **C. A. M.**

Passing into var. pseudo-hirculus, **Trautv.**

Occurs abundantly on both the Great and Little Pamir, in marshy and boggy land bordering running streams up to an elevation of at least 14,000 ft. Herb. No. 17676.

*R. pulchellus* and its varieties occur on the inner Himalayan ranges, in Afghanistan and through W. Tibet to Siberia and Mongolia.

3. **RANUNCULUS HYPERBOREUS**, **Rottb.**, var. natans.

In marshes along the R. Aksu, 13-14,000 ft. Herb. No. 17671.

Inner Alpine Himalaya, extending to the Arctic regions.

   **VAR. PARVISPATULUS** (**Bruh.**).

Sandy shore of Lake Victoria, 13-14,000 ft. Herb. No. 17674.

4. **RANUNCULUS RUFISEPALUS**, **Franchet.**

In moist or drying ground up to at least 15,000 ft. Herb. No. 17675.

Found also in Turkistán.

5. **DELPHINIUM CASHMIRIANUM**, **Boyle**, var. **Jacquemontianum** (**Camb.**).

Rare: found only in stony ground alongside running water in sheltered situations near the heads of nales, not lower than 15,000 ft. Herb. No. 17677.

W. Himalaya and Tibet.

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* For the identification of the plants belonging to this family I have availed myself of the kind assistance of Mr. P. Brühl, of the Sibpur Engineering College, who has made a special study of the Ranunculaceae. To Surgeon-Captain Fairn, Curator, Royal Botanic Gardens, Sibpur, I am also much indebted for the help he has afforded, especially with regard to the families Papaveraceæ and Labiatae, and the genus Pedicularis. For the correct naming of the grasses I owe many thanks to Sir Joseph Hooker, who is at present preparing a monograph of this family for the final volume of the "Flora of British India."
PAPAVERACEÆ.

6. **PAPAVER NUDICAULE, Linn., var. rubro-aurantiaca, Fischer (P. croceum Ledeb.).**

Not common; found in sheltered situations, usually over 14,000 ft. Herb. No. 17686.
Kashmir, W. Tibet, Afghanistan, Alps of Europe, extending to the Arctic region.

7. **CORYDALIS STRICTA, Steph.**

Seen only once, on a dry slope near Jarti Gumbáz at about 13,500 ft. Herb. No. 17687.
W. Tibet, Ladák, Siberia.
Surgeon-Captain Prain informs me that this is the true original form of *C. stricta*, Steph., which differs somewhat from the plant described in Fl. Brit. Ind., I. 126.

CRUCIFERÆ.

8. **DRABA ALPINA, Linn. ?**

Pamir region, 13-14,000 ft. Herb. No. 17683.
Alpine and Arctic regions in Asia, Europe, and America.

9. **DRABA LASIOPHYLLA, Royle.**

Pamir region 13-14,000 ft. Herb. No. 17679.
Alpine Himalaya, Tibet, Turkistán.

10. **? DRABA HYPERBOREA, Deest.—(D. grandis, DC.; Delless, Ic. Sel. II., t. 47).**

Pamir region, 13-14,000 ft. Not very common, and rarely found in flower. Herb. No. 17678.
Northern America and Arctic region.
The absence of sufficiently developed ovules renders the identification of this plant uncertain, though very distinct-looking as a crucifer. It has bright red flowers, and the leaves resemble those of *Christolea crassifolia*.

11. **MALCOLMIA NANA, Boiss.—(Sisymbrium binerve, C. A. Meyer; Jaub. and Spach. Ill. Or. t. 296).**

Pamir region. Not common; found only on bare shaly ground, 13-15,500 ft. Herb. No. 17681.
Caspian and Mediterranean regions.

12. **? SMELOVSKIA sp.**

Fairly common, occurring usually in mass on the dry parts of the open Pamir, 13-14,000 ft. Herb. No. 17685.
A remarkable looking plant, 6-7 inches high, with a thick woody root-stock, and pectinately pinnatifid leaves, which are densely white tomentose; flowers cream-coloured, crowded in a compact panicle; pods short ovoid; cotyledons incumbent.

13. **? SMELOVSKIA sp.**

Shores of Lake Victoria, 13-14,600 ft. Herb. No. 17682.
This looks like an annual, or at most a biennial. The pinnatifid leaves are greener and less tomentose than in the preceding; the flowers are rather smaller, and the racemes laxer in fruit.
14. Erythrinum sp., near E. lanceolatum, R. Br. (E. pumilum, Gaud.).
Fairly common and growing usually in masses on the dry parts of the open Pamir, 13-14,000 ft. Herb. No. 17684.

15. Chorispora sabinosa, Camb.
Pamir region, 13-14,000 ft. Herb. No. 17680.
W. Himalaya, Tibet, Afghanistan.

CARYOPHYLLACEÆ.

16. Lychnis himalayensis, Edgew.
Found only once, growing in sandy soil on the open Pamir, alongside the R. Aksu, 13-14,000 ft. Herb. No. 17689.
Alpine Himalaya, W. Tibet, Ladák.

17. Cerastium trigynum, Fill.
Abundant amongst the grass in the open Pamir, 13-14,000 ft. Herb. No. 17690.
W. Himalaya, Tibet, Afghanistan to Siberia and Arctic regions.

18. Cerastium sp.
Pamir region, 13-14,000 ft. Herb. No. 17690 (a).

Amongst damp grass along the R. Aksu, 13-14,000 ft. Herb. Nos. 17688, 17691, 17692.
W. Himalaya, Tibet, to Europe and Siberia.

TAMARISCINEÆ.

20. Myricaria germanica, Desv.
Seen only once in a dried-up channel of the R. Aksu, 13-14,000 ft. Herb. No. 17693.
Temperate and Alpine Himalaya, W. Asia, Europe.

GERANIACEÆ.

In sheltered nallas in the Pamir region, not common; 13-14,000 ft. Herb. No. 17694.
W. Himalaya and Kashmir.

LEGUMINOSÆ.

22. Astragalus tibetanus, Benth.
Pamir region, 13-14,000 ft. Herb. No. 17699.
W. Tibet, Ladák, Afghanistan, Kashmir.

23. Astragalus sp., near A. purpureascens, Bunge.
Pamir region, 13-14,000 ft. Herb. No. 17700.

Pamir region, 13-14,000 ft. Herb. No. 17701.

25. OXYTROPIS MICRPHYLLA, *D. C.*

In stony dry water-courses in the Pamir region, at about 13,000 ft.; not common. Herb. No. 17702.

Alpine Himalaya and Tibet.

26. OXYTROPIS sp.

One of the commoner plants of the Great and Little Pamir growing in clumps in dry ground, 13-14,000 ft. Herb. Nos. 17695, 17698.

A very showy plant with reddish-purple flowers, and silvery pubescent foliage; rootstock woody and much branched.

27. OXYTROPIS sp.

Pamir region, 13-14,000 ft. Herb. No. 17696.

Flowers purple, on elongated peduncles.


Growing in masses amongst grass in sandy soil along the R. Aksu 13-14,000 feet. Herb. No. 17697.

ROSACEAE.

29. POTENTILLA FRUTICOSA, *Linn., var.*


Temperate and Alpine Himalaya, Kashmir, W. Tibet, to Northern Asia and Europe.

30. POTENTILLA RIFUSCA, *Linn.*

One of the commoner plants of the Great and Little Pamir, growing on dry ground in the open Pamir, 13-14,000 ft. Herb. No. 17705.

Inner Alpine Himalaya, Tibet, to E. and N. Europe.

31. POTENTILLA SERICEA, *Linn., var.*

Common on the Great and the Little Pamir, 13-14,000 ft. Herb. No. 17704.

W. Alpine Himalaya, Tibet, Afghanistan to N. China and N. America.


One of the common plants of the Great and Little Pamir, growing on dry ground everywhere, 13-14,000 ft. Herb. No. 17706.

SAXIFRAGACEAE.

33. SAXIFRAGA CERNUA, *Linn.*

Pamir region, 13-14,000 ft. Herb. No. 17707.

W. Himalaya and Tibet to Europe, N. America, and Arctic regions.

34. SAXIFRAGA HIRCULUS, *Linn.*

Very common in boggy ground along the R. Aksu and its affluents, up to nearly 15,000 ft. Herb. No. 17709.

Alpine Himalaya, Alps of Europe, Caucasus, Arctic region.
Among boulders near melting snow, at about 15,000 ft. Herb. No. 17708.
Alpine Himalaya, N. Asia, Arctic region and Rocky Mountains.

**CRASSULACEAE.**

36. *Sedum rhodiola*, D. C. ?
Pamir region 13-14,000 ft. Herb. No. 17710.
Alps of Asia, Europe and America, extending to the Arctic regions.

37. *Sedum crenulatum*, H. f. and T.
In rocky dried-up water-courses up to about 14,000 ft. Herb. No. 17711.
Alpine Himalaya.

**HALORAGACEAE.**

38. *Hippuris vulgaris*, Linn.
In marsh pools by the R. Aksu, 13-14,000 ft. Herb. No. 17713.
Kashmir, Tibet, and Afghanistan to Europe and N. and S. America.

**UMBELLIFERAE.**

In nalis alongside running water, 14-15,000 ft. Herb. No. 17712.
Alpine Himalaya and W. Tibet.

**COMPOSITAE.**

40. *Aster heterochlota*, Benth.
Plentiful near melting snow at about 15,000 ft. Herb. No. 17723.
Alpine Himalaya, Tibet, Altai.


42. *Erigeron alpinus*, Linn., var. pulchella (*Traute*).
Pamir region, 13-14,000 ft. Herb. Nos. 17717, 17718.
In the Saharanpur herbarium are specimens of the same variety collected by Youngusband in 1891, near the Tagh-dum-bash Pamir; from near Gilgit 15,000 ft. (Colonel Tanner); and from the Dras Valley, 11-12,000 ft. (Duthie). The specimens bearing the number 17718 resemble as nearly as possible a plant received from St. Petersburgh under the name of *Erigeron azureus*, Regel, and collected in Turkistán in 1882.

43. *Erigeron andryaloides*, Benth.
Found on the northern slope of a hill near the Urtu Bel Pass, at about 15,000 ft. Herb. No. 17729.
Inner W. Himalaya and Tibet. I have specimens also from the Taghdum-bash Pamir collected by Youngusband in 1891.

Very common on the slopes up to 15,000 ft. Herb. No. 17731.
Alpine Himalaya, Tibet, Central Asia, and Alps of Europe ("Edel-Weiss").

45. *Allardia glabra*, Dcne.

Usually on stony ground near running water, at about 14,000 ft., but not common. Herb. No. 17732.
Inner Alpine Himalaya, W. Tibet, and Ladák.

46. *Chrisanthemum richteria*, Benth.

Fairly common, but not often found in flower, 13-14,000 ft. Herb. No. 17721.
Kashmir, W. Tibet, Sungaria.

47. *Tanacetum tibeticum*, H. f. and T.

Fairly common in dry places on the open Pamir, 13-14,000 ft. Herb. No. 17734.
W. Tibet.


Pamir region 13-14,000 ft. Herb. No. 17733.
W. Tibet.

49. *Artemisia*, sp., near A. minor, Jacquem.

One of the commoner plants of the Great and Little Pamir, growing on dry ground everywhere, 13-14,000 ft. Herb. No. 17730.


Pamir region 13-14,000 ft. Herb. No. 17724.
W. Himalaya, Kashmir, Tibet, Turkistán, Siberia. There are specimens in the Saharanpur herbarium collected by Russian botanists in the Pamir region and in Turkistán, and named A. pamirica, C. Winkl. I do not see how they differ from A. desertorum.


Pamir region, 13-14,000 ft. Herb. No. 17722.
W. Himalaya, Kashmir, Afghanistan to Europe and N. Africa.

52. *Senecio*, sp. (Section Ligularia).

In drying water-courses, sometimes alongside running streams, 14-15,000 ft., but not of wide distribution. Herb. No. 17715.
Collected also by Younghusband near the Tagh-dum-bash Pamir in 1891.
The flower-heads are of about the size of those of S. Jacquemontianus, Dcne but the panicle is more compact; the leaves are very different, being quite entire, lanceolate or obovate, and coriaceous.


Found on dry sandy soil, not common. Herb. No. 17719.
Caucasus and N. Asia.

There is a specimen of this plant at Saharanpur, which was collected 1878 by a Russian botanist on the banks of the Aksu River.
54. **Saussurea sorocephala, H. f. and T.**

In boggy ground at the top of the Bendersky Pass at 15,000 ft. Herb. No. 17714.
Inner W. Himalaya and Tibet to Siberia.

55. **Taraxacum officinale, Wigg. var.**

In dampish sandy soil, 13-14,000 ft. Herb. Nos. 17726, 17727.
Temperate regions of the N. and S. Hemispheres. A very variable species. The Pamir plant is dwarf, with very narrow leaves.

56. **Tragopogon gracile, Don.**

Only two specimens of this were found, one at over 15,000 ft. Herb. No. 17725.
Central and W. Himalays, Kashmir, Tibet.

**PLUMBAGINÆ.**

57. **Acantholimon diapensioides, Boiss.**

One of the commonest plants of the Great and Little Pamir, growing on dry soil in clumps resembling a sponge or brain-stone coral. It does not flower very freely. Herb. No. 17735.

Found in Afghanistan 14-15,000 ft. (Griffith); Chitral Expedition (Dr. Giles).

**PRIMULACEÆ.**

58. **Primula sibirica, Jacq.**

Very common in marshy ground along the banks of the R. Aksu and its affluents, 13-14,000 ft. Herb. No. 17737.
W. Tibet, Europe, North America, Arctic region.

59. **Primula Stuartii, Wall., var. purpurea.**

In boggy ground by streams of melting snow at about 15,000 ft.; not very common. Herb. No. 17736.
Alpine Himalaya, Tibet, Afghanistan.

**GENTIANACEÆ.**

60. **Gentiana prostrata, Hanke.**

In damp ground amongst grass, on the open pamir, 13-14,000 ft. Herb. Nos. 17738, 17739.

61. **Gentiana detonsa, Rottb.**

Amongst grass in the open pamir, 13-14,000 ft. Herb. No. 17740.
Alpine Himalaya, Kashmir, Tibet to Europe, N. Asia and N. America.

62. **Pleurogyne sp., near P. carinthiaca, Griseb.**

Common amongst grass in damp or recently dried ground, up to 15,000 ft. Herb. No. 17742.

63. **Pleurogyne Thomsoni, C. B. Clarke.**

Growing in masses amongst grass in sandy rather moist soil, 13-14,000 ft. Herb. No. 17748.
Western Tibet.
64. Swertia sp., near S. marginata, Schrenk.
Common in moist ground up to at least 15,000 ft. Herb. No. 17741.
Collected also by Younghusband in 1891 on the Wakhijrui Pass near the Little Pamir.

BORAGINEÆ.

65. Paracaryum heliocarpum, A. Kerner.
In hollows and shallow ravines of the open pamir, 13-14,000 ft.; not very common, and rarely found in flower. Herb. No. 17745.
W. Himalaya, W. Tibet, Kashgár.

66. Echinopspermum barbatum, Lehm.
Pamir region, 13-14,060 ft. Herb. No. 17746.
W. Himalaya, Tibet, Baluchistan, Afghanistan, N. Asia, and N. Africa.

67. Myosotis sylvatica, Hoffm.
In sheltered nalas, 14-15,000 ft., but not common. Herb. Nos. 17744, 17747.
W. Himalaya, Kashmir to N. Asia, Europe, and Canary Islands.

SCROPHULARINEÆ.

68. Scrophularia sp., near S. scabiosaeolia, Benth.
In stony dried-up water-courses, not common, 13-14,000 ft. Herb. No. 17748.

69. Pedicularis rhinanthoides, Schrenk (typical).
In marshy land along the R. Aksu, common in places; 13-14,000 ft. Herb. No. 17749.
Afghanistan, Altai, Turkistán.

70. Pedicularis uliginosa, Bunge.
Marshy ground by the R. Aksu, 13-14,000 ft. Herb. No. 17751.
Sungaria, S. Altai, Transbaikalia.

71. Pedicularis cheilanthifolia, Schrenk.
Common in damp ground all along the banks of the R. Aksu and its affluents, up to at least 14,000 ft. Herb. No. 17752.
W. Himalaya, W. Tibet, Sungaria, Kansu.

72. Pedicularis ederi, Vahl. (typical).
Marshy land along the R. Aksu, 13-14,000 ft. Herb. No. 17760.
W. Himalaya, Kashmir, Alps of Europe and Siberia, Arctic Europe, Asia, and America.

LABIATÆ.

Occurs in masses on the slopes of the hills up to at least 14,000 ft., but is not very common. Herb. No. 17755.
W. Himalaya, W. Tibet, Caucasus.
74. DRACOCEPHALUM ORIGANOIDES, Steph.

On bare shaly ground from 13,000 to 16,000 ft., not common, but abundant when it does occur. Herb. No. 17754.

Siberia.

75. DRACOCEPHALUM PALMATUM, Steph.

One of the common plants of the Great and Little Pamir, growing in clumps on dry ground in the open pamir. Herb. No. 17753.

Siberia.

CHENOPODIACEÆ.

76. ATRIPLAX LACINIATA, Linn.

Pamir region, 13-14,000 ft. Herb. No. 17756.

N. America.

77. EUROTIA CERATOIDES, C. A. Meyer.

One of the commonest plants of the Great and Little Pamir, growing everywhere on dry soil. It was found to be the most useful plant as fuel. Herb. No. 17738.

Inner Himalaya, Tibet, Afghanistán, Siberia, Europe, N. America.

78. HALOGETON GLOMERATUS, C. A. Meyer.

Found only once on a bare gravel hillock between Kizil Robát and Mihmanyol. Herb. No. 17761.

W. Tibet, Afghanistán, Caspian region, N. Asia.

POLYGONACEÆ.

79. POLYGONUM PARONYCHIODES, C. A. Meyer.

On bare shaly ground at about 16,000 ft. Herb. No. 17760.

W. Himalaya, Afghanistán, Persia.

80. POLYGONUM VIVIPARUM, Linn.

Very common in the boggy turf on the banks of streams of the Oxus system. Herb. No. 17758.

Alpine Himalaya, W. Tibet to Arctic regions.

81. POLYGONUM MOLLILEFORME, Boiss.

Pamir region, 13-14,000 ft. Herb. No. 17759.

W. Tibet, Persia.

82. OXYRIA DIGyna, Hill.

In stony ground near running water, at about 14,000 ft., but not common. Herb. No. 17757.

Alpine Himalaya, W. Tibet to Arctic regions.

GENTACEÆ.

83. EPHEDRA GERARDIANA, Wall.

In a sheltered nala over 14,000 ft., not common. Herb. No. 17762.

Inner Himalaya, W. Tibet, W. and Cent. Asia, Europe.
LILIACEÆ.

84. *Allium blandum*, Wall.
On hill sides, at about 14,000 ft. Herb. No. 17765.
W. and Cent. Himalaya, W. Tibet.

NAIADACEÆ.

85. *Triglochin maritimum*, Linn.
Pamir region, 13-14,000 ft. Herb. No. 17763.
W. Himalaya, W. Tibet to N. Temp. regions.

86. *Potamogeton pectinatus*, Linn.
Common in marsh pools along the R. Aksu, 13-14,000 ft. Herb.
No. 17764.
Temperate regions of the world.

CYPERACEÆ.

87. *Scirpus* sp.
Very common along the R. Aksu, 13-14,000 ft. Herb. No. 17767.

Pamir region, 13-14,000 ft. Herb. No. 17766.
Himalaya, W. Tibet, Caucasus, Cent. Asia, Siberia.

89. *Kobresia royleana*, Nees.
Pamir region, 13-14,000 ft. Herb. No. 17768.
Alpine Himalaya, W. Tibet, Afghanistan, Central Asia.

90. *Carex nivalis*, Boott.
Pamir region, 13-14,000 ft. Herb. No. 17773.

91. *Carex melanantha*, C. A. Meyer.
Fairly common along the banks of the R. Aksu and its affluents,
13-14,000 ft. Herb. Nos. 17771, 17772.
Kashmir, Afghanistan, Cent. Asia.

92. *Carex ampullacea*, Good.
In marshy ground along the R. Aksu, 13-14,000 ft., but not common.
Herb. Nos. 17769, 17770.
Kashmir, Lahoul, and N. Temp. regions.

GRAMINEÆ.

93. *Alopecurus alpinus*, Sm.
Pamir region, 13-14,000 ft. Herb. No. 17774.
Northern and Arctic regions, Chili.
94. Stipa orientalis, Trin.
Pamir region, 13-14,000 ft. Herb. No. 17786.
N. Asia.

95. Deschampsia sp.
Pamir region, 13-14,000 ft. Herb. Nos. 17785, 17782.

96. Deschampsia koeleanoides, Regel.
Pamir region, 13-14,000 ft. Herb. No. 17780.
Temperate Asia.

97. Poa attenuata, Trin. (Poa sterilis Bieb).
One of the commonest grasses of the Great and Little Pamir, growing
in thick tussocks, both on the open pamir and on the slopes up to the limit of
vegetation, 14-16,000 ft. Herb. No. 17777.
N. Kumaon, Kashmir, Asia Minor, Tauria.

98. Poa pratensis, Linn. var. alpigena.
Pamir region, 13-14,000 ft. Herb. Nos. 17788, 17789, 17790.
Alpine Himalaya, Kashmir to Northern and Arctic regions.

99. Festuca ovina, Linn. var. pubescens, Hack.
Pamir region, 13-14,000 ft. Herb. No. 17776.

100. Festuca ovina, Linn. var. valesiaca (Hack).
Pamir region, 13-14,000 ft. Herb. No. 17776.

101. Bromus grinitus, Boiss.
Pamir region, 13-14,000 ft. Herb. No. 17781.
W. Tibet, Afghanistan, Persia, Turkistan.

102. Bromus erectus, Huds.
Pamir region, 13-14,000 ft. Herb. No. 17775.
Europe, Asia Minor.

103. Agropyron striatum, Nees.—Triticum striatum, Stend.
Flourishes in the neighbourhood of sites of old Kirghiz encampments
13-14,000 ft. Herb. No. 17792, 17793, 17794.

104. Hordeum violaceum, Boiss and Hohen.
Pamir region, fairly common, 13-14,000 ft. Herb. No. 17791.
Asia Minor.

105. Elymus dasytachys, Trin.
Pamir region, 13-14,000 ft. Herb. No. 17795.
Siberia.

FILICES.

106. Cystopteris fragilis, Bernh.
Under boulders near melting snow, at about 15,000 ft., not common.
Herb. No. 17796.
107-111. Specimens comprising five species of mosses have been forwarded to Dr. Brotherus for determination.

CHARACEAE.

[CHARA sp.]

Sarkhin Lake, near the Baroghill Pass, Hindu Kush, at about 12,000 ft. Herb. No. 17802.]

112-116. ALGÆ. Four species were collected, one of which has been identified by Mr. George Murray of the British Museum as Nostoc zethè-stedtii, Aresch., previously known only from a lake in Sweden.

SECTION 5.

A Notice of the Specimens of Rocks collected on the Pamirs.


The 18 specimens collected in the Pamirs and sent to me for examination are, on account of their similarity to rocks obtained in Kashmir and further east in the Himalayas, decidedly interesting to the Geological Survey.

Four of them resemble the common so-called gneissose granite of the Himalayas (Dr. Stolicska’s “central gneiss”), especially in the frequent association of biotite with muscovite as the principal ferro-magnesian constituents, and in the presence of sufficient plagioclase-felspar to lower the silica percentage to that of rocks now generally known as granitites—rocks which form a link between the granites proper and the quartz diorites.

Two are specimens of volcanic rocks representing the group of andesite rhyolites, and thus belonging to a class which must very nearly resemble the volcanic representatives of the gneissose granite of the same area.

Although the evidence relating to the field characters of these two groups is wanting, to make any conclusions concerning their genetic connexion free of question, yet their lithological similarity is certainly suggestive.

Whilst there is little doubt, from internal evidence, that some, if not the main mass, of the so-called central gneiss of the Himalayas is a true intrusive granitic rock of igneous origin, the absence of proof of the existence of its volcanic representatives adds value to any evidence like this which bears directly on the subject.

The remainder of the specimens are, with one exception, sedimentary in origin, and are quite as interesting as the igneous rocks in the resemblances they bear to some representatives of a great system of strata occurring in different parts of the Himalayas, whose age, in the absence of fossils, remains undetermined, and in which therefore the correlation of the representatives in isolated areas is necessarily based on purely lithological resemblances and similarity of succession.

The lithological characters of the specimens under report can be completely matched by rocks found further south-east.

The specimen of crushed quartzite-conglomerate, for instance, resembles the conglomerate of the Pir Panjal system of Kashmir, described by Lydekker. The occurrence of this rock with red quartzite, banded carbonaceous fossil limestone, and black carbonaceous shales with sulphurretted-hydrogen springs, gives an association similar to that found in the carbonaceous system whose members occur over a large area south of the snowy range, from Kashmir to Nepal, and probably still further east.

Although there is no paleontological evidence to fix the age of these beds, yet the constant presence of a boulder bed of assumed glacial origin suggests a correlation with the boulder-bed which is associated with a fauna of
There are, however, certain resemblances to the Silurian portion of Mr. Griesbach’s Haimanta series in the Central Himalayas of Hunud and Spiti, and to the limestones in Kulu, Jaunsar, and Kumaon, in which imperfect stromatoporoid structures also suggest a lower Palaeozoic age; but as the points of evidence are inconclusive, it is impossible to settle at present whether these beds belong to the Lower or to the Upper section of the Palaeozoic groups of stratigraphical systems.

The following is a description of the specimens:

I. IGNEOUS ROCKS.

A.—PLUTONIC.

No. 1.—Muscovite-biotite-granitite, from the river-terraces of the Little Pamir.

A large pebble, in which the quartz, felspar, and mica are easily distinguished by the naked eye. There is no appearance of foliation in the hand-specimen, but under the microscope signs of mechanical deformation appear in the form of undulose extinctions in the quartz-crystals, and in the crumpled condition of the bundles of mica. The felspars, which are largely plagioclastic, have suffered a considerable amount of kaolinization with the formation of minute, spindle-shaped, secondary crystals possessing the high double refraction of muscovite. The muscovite occurs in large quantities in nests, and the biotite has become almost completely converted into green chlorite by hydration. The presence of large quantities of free silica in the form of quartz, and of potash in the muscovite, would give a chemical composition very nearly approaching that of a normal orthoclase-granite; but the presence of so much plagioclase gives an appearance under the microscope which more strongly recalls that of typical granitites, and indicates a closer relationship with the less acid types associated with it—types that form a link with the quartz-diorites—than with the normal orthoclase-granites, which pass by reduction of silica into the syenites. Classification by silica-percentage alone might thus very easily bring together rocks which, according to the microscopic evidence, show no relationship; and might just as easily separate rocks whose mineralogical characters show a strong family likeness.

No. 2.—Muscovite-biotite-granitite, from the lower slopes of the hills bounding the Little Pamir.

There is a slightly smaller quantity of quartz than in No. 1, and the biotite is less decomposed, but the muscovite and felspars occur in about the same proportion and give a similar granitic structure.

No. 3.—Biotite-granitite from the river-terraces of the Little Pamir.

In this rock muscovite is practically absent, and as the plagioclase-felspar still predominates, the rock forms a link with the quartz-diorites, by increase of soda over potash and by reduction of silica. The zoning of the plagioclase-felspars, by gradual increase of acidity, from the centre, recalls a similar feature very characteristic of the porphyritic felspars of andesites. Around these felspars, which generally show well-defined crystal-outlines, the quartz has been moulded, and in some sections even shows an ophitic disposition. The kaolinization of the more basic, and consequently more decomposable, cores of the felspar, and the conversion of biotite into chlorite along the margins of the mica-bundles, show the effect of weathering-agents on the rock.

No. 4.—Biotite-granitite from the lower slopes of the hills bounding the Little Pamir.—Geological Plate I.

The principal feature noticeable in this rock is the advanced stage of change due to weathering-agents. The biotite-crystals, which retain their
crystal-outlines, are almost completely changed into chlorite, with the forma-
tion of colourless epidote; and the felspars are quite brown with the products
of kaolinization. Probably connected with this decomposition and secondary
silicification is the presence of beautiful specimens (see Geology of the Pamir
Commission, Plate I) of micropegmatitic intergrowths of quartz, forming the
quartz de corrosion of French petrographers. When large quartz-crystals dis-
figured with bands of minute cavities are in crystallographic continuity with
irregular clear extensions of the same material in the adjoining decomposed
felspars, the secondary origin of the irregular outgrowths is beyond question,
and there is no reason why a similar origin should not be assumed for the more
characteristic micrographic structures, which are remarkable for the regularity
and parallelism of crystal-outline in the isolated sections. The micropegmatitic
portions are generally fine-grained in the centre, and gradually increase to
broad plates further from the centre of growth. Since Professor Judd showed,
in 1889, the connexion between the secondary enlargement of crystals in igneous
rocks after their consolidation, and the structures known as granophytic
and micropegmatitic (Quarterly Journal of the Geological Society, Volume
XLV, page 176), a sufficient number of similar cases has been described to warrant
my ascribing, without further discussion, a secondary origin to the present
instance of micropegmatitic intergrowth.

II. SEDIMENTARY ROCKS.

No. 7.—LIMESTONE-CONGLOMERATE.
With a ferruginous and calcareous cement: Kizil Robát.

No. 8.—LIMESTONE BRECCIA.
Kizil Robát.

No. 9.—BANDED LIMESTONE.
With a small quantity of magnesia and carbonaceous matter: Lower
slopes of the Little Pamir.
No. 10.—Black argillaceous sandstone.
Harden by secondary silicification like Lydian stone: Hills bounding the Pamirs.

No. 11.—Black carbonaceous shale.
Hills bounding the Pamirs.

No. 12.—Crushed quartzite-conglomerate.
Lower slopes of hills bounding the Little Pamir, near Bendersky Pass.

No. 13.—Calcaceous sinter (travertine).
Associated with hot sulphuretted-hydrogen spring near Kizil Robat.

SECTION 6.

A brief notice of some of the features of the road from Kashmir to the Pamirs.

From Bandipur the road ascends over the Tragbal Downs, a height of more than 11,000 feet, and thence descending, runs along the beautiful wooded valleys of the Kishenganga basin towards the Burzil Pass.

At the time of our upward march, in June, the open southern slopes of the hills along this part of the road were vivid, past all expressing, with colour; and to have to leave untouched all the plants that were seen demanded the inflexible resolution of the philosopher of Horace’s ideal:

“Quisquis ingentes oculo irretorto spectat acervos.”

The snow had not yet melted from the summit of the Tragbal, but where the ground was clear it was carpetted with Primulas and with Ranunculaceaeous and Iridaceous flowers, and innumerable little skink lizards basked on the rocks. These skinks (Lygosoma himalayana) as well as an Agama (A. tuberculata), and the pit-viper Aescrodon himalayana, were very common all along the road, as far as the Burzil.

Amid the still unmelted snows of the Burzil we found a brilliant Alpine flora in full bloom, the most conspicuous and most numerous plants being Primulas, with flowers of scarlet and purple and pale-yellow, purple Saxifrage, and wild-onions with fine yellow flowers; and the patches of blood-red Primula stretching into the expanse of snow made an effect of unique beauty, even under a dull cloudy sky. In many places also the snow was pink with some microscopic organism.

Not much animal life was noticed in the neighbourhood of the Burzil: the principal forms seen were the Alpine weasel, a marmot, a mouse-hare (Lagomys macrotis I am nearly sure), the Himalayan vulture, the lammergeyer, the Himalayan skink, and some beetles for the most part of, or closely allied to, European species.

From Chilam Chowki, on the far side of the Burzil, to Doyan, the road follows, crosses, and follows again the Astor river. The scenery is only less beautiful, and the flora only less brilliant, than that of Kashmir; but as one passes northwards the trees, which are now almost entirely conifers, become fewer, and the wild-flowers give place more and more to wormwood, which at last becomes the principal small plant. Along this part of the road the lizard Agama himalayana is extremely common, and in the river the water-ouzel.

From Doyan to Gupis the road suddenly descends in the precipitous gorge through which the Astor river flows to meet the Indus, then runs along and crosses the Indus, and then gradually ascends along the alternating rocky gorges and stony alluvial stretches of the Gilgit river. Except for occasional oases of cultivation dependent on irrigation, this part of the country is barren and desolate. Of the few wild trees seen the commonest were a tamarisk—then in flower, and growing plentifully in the beds of the rivers—and a willow; and almost the only small plants were a wormwood, and where that
even failed, the common caper. Very little could be added to the zoological collections along this part of the road, except fishes, which were numerous in the river.

From Gupis to Darkot the road, after crossing the Gilgit river, ascends gradually towards the sources of the Yasin river. The river-bed was full of flowering tamarisk, and numerous oases of cultivation were passed, but though the country was by no means bare, yet vegetation on the whole was stunted and scanty, and animal life was scarce.

Near the village of Darkot the river runs through a large osier swamp, in which also were many spreading poplars, the leaves and small twigs of which were most extensively affected with galls.

Above the village of Darkot are several fine glaciers.

On the 14th July we crossed the Darkot Pass into the Yarkhun basin. The pass is a glacier bounded by bare precipitous rocks, and is devoid of life.

From the far side of the Darkot to Bosai Gumbaz, where the Little Pamir is entered, the highlands traversed are very much like the Pamir country already described, only the valleys are much narrower and deeper and the hills are much steeper. The rocks are much the same, consisting largely of hard sandstones and fissile black shales. At Sarhad is a hot sulphuretted hydrogen spring, around which however is no deposit of sinter. The vegetation is of much the same character as that of the Pamir, only it is considerably more abundant and varied: for instance, in the beds of the rivers and nullahs there are frequent thickets of a small willow and of birch and wild-rose, and on the slopes many flowering plants are common which on the Pamir are rarely seen. The animal life also is much the same, the golden marmot being very common on the heights.

SECTION 7.

A systematic account of the Zoological Collection made on the road to the Pamirs.

MAMMALS.

Order CARNIVORA.

1. Putorius alpinus (Gebler).—The pale Weasel.


An adult male from the Bursiil Valley, about 11,000 feet.

The other mammals seen and recognised along the road were the pale variety of the common fox, two species of marmots, the Gilgit vole, the grey hamster, and the Tibetan hare.

BIRDS.

As in the case of the Pamir birds, Mr. F. Finn is again my collaborateur.

Order CARINATÆ.

Sub-order PASSERES.

Family CORVIDÆ.

1. Pica pica (L.).—The common Magpie.


The common magpie was especially numerous in September above Darkot village, at a height of over 9,000 feet. Our specimens show no unusual amount of white on the primaries.
2. Nucifraga multipunctata, Gould.—The Large-spotted Nutcracker.


Very common in the Astor Valley in September-October. The crops of our specimens were full of pine seeds. Fine specimens were presented to the collection by Colonel Holdich and Captain McSwiney.

Family PARIDÆ.

3. Parus (Lophophanes) rufonuchalis, Blyth.


Astor Valley, 8,000 feet.

Family CRATEROPODIDÆ.

4. Trochelopterus lineatum, Vigors.—The Striped Babbler.


Astor Valley, 8,000 feet.

Family TURDIDÆ.

5. Monticola cyanus (L).—The blue Rock-thrush.


Gilgit Valley, about 5,000 feet.

6. Rhipidura rufiventris (Vieillot).—The Indian Redstart.


Darkot Valley, 10,000 feet.

7. Chimarrhornis leucocephalus (Vigors).—The White-cap Water-redstart.


*Chimarrhornis leucocephalus*, Sharpe, Birds of 2nd Yarkand Mission, p. 65.

Only occasionally seen in June and July, and then only in streams near their sources (8,000 to 11,000 feet); but fairly common in October, and at much lower elevations.

8. Saxicola picata, Blyth.—The Pied Chat.


Gilgit Valley, 5,000 to 7,100 feet.

9. Oriolus Kundoo (Sykes).—The Indian Golden Oriole.

Common in the orchards of the Gilgit Valley up to 7,100 feet.

Family FRINGILLIDÆ.


Darkot Valley, 10,000 feet.
Family MOTACILLIDÆ.

11. Anthus maculatus, Hodgs.—The Indian Tree-pipit.

Yasin Valley, 7,500 feet.


Astor Valley, 8,500 feet.

13. Motacilla citreolaoides.—(Hodgs.).

Family ALAUDIDÆ.


Gilgit Valley, 5,000 feet.

Sub-order PICARIÆ.

Family CORACIIDÆ.

15. Coracias garrula (L.)—The European Roller.

Gilgit Valley, 5,000 feet.

Sub-order ACCIPITRES.

Family VULTURIDÆ.


A magnificent male from near the Burzil Pass, about 11,000 feet.
Shot and presented by Captain E. F. H. McSwiney.

Family FALCONIDÆ.

17. Cerchneis tinnunculus (L.).—The Kestrel-hawk.

Common along the Gilgit Valley.

Sub-order LIMICOLÆ.

18. Vanellus cristatus, Wolf and Meyer.—The common Lapwing.

*Vanellus cristatus*, Seeborn, Charadrii, p. 210; Sharpe, Birds of 2nd Yarkand Mission, p. 188.
A single specimen—a female in immature plumage, and the only one seen—was taken at Sarhad in the Wakhán Valley, 10,500 feet.

REPTILES.

Order SQUAMATA.

Sub-order LACERTILIA.

Family AGAMIDÆ.

1. Agama himalayana, Stdr. 

Adults were very common at the end of June and beginning of July, and
young ones at the beginning of October, on the Gilgit road between the Bursil and Doyan at 13,000 to 9,000 feet.

In life, in the males at any rate, even in non-adults, the gules are dusky red.

**AGAMA TUBERCULATA, GRY.**


_Stanis tuberculata_, Blanford, Reptiles and Amphibia of 2nd Yarkand Mission, p. 23.

Common in June between Karagbal and the Bursil, 8,000 to 10,000 feet, but none were seen on the return march in October.

Family _SCINCIDÆ._

**3. LYGOSOMA HIMALAYANUM (Gthr.).**


This little skink was very common, at the end of June, on the Tragbal Pass at a height of about 11,000 feet, and on the ascent to the Bursil Pass at 11,000 to 13,000 feet. At these heights its habits were quite gregarious; numerous individuals living together in separate little burrows among the grass and stones. It was also frequently found along the road between the Tragbal and the Bursil. This was during the breeding season, and the ventral surface, which in spirit is leaden or greenish white, was orange or red in both sexes.

4. LYGOSOMA HIMALAYANUM, var. TRAGBULENSE.—Plate III, figs. 1, 1a.

Founded on two specimens.

In this variety, which was found on the descent from the Tragbal Pass, at an elevation of about 9,000 feet, the crown of the head is beautifully mottled; and the back, from the nape to the root of the tail, is traversed longitudinally by ten or eleven sharply-defined, alternate dark brown and greyish-white stripes.

There are 31 scales on the under-surface of the fourth toe.

In one specimen the 6th upper labial enters the orbit, in the other the 5th as usual.

Sub-order _OPHIDIA._

Family _VIPERIDÆ._

5. _ANCISTRODON HIMALAYANUS_ (Gthr.).

_Ancistrodon himalayanus_, Boulenger, Fauna of Brit. Ind., Reptiles, etc., p. 424.


This pit-viper was very common in June on the Gilgit road between Karagbal and the Bursil, especially at about 8,000 feet.

All our specimens have 21 rows of scales round the body.

**AMPHIBIA.**

Order _ECAUDATA._

Family _BUFONIDÆ._

1. _BUFO VIBIDIS_, LAR.


This toad was very common about the numerous water-courses at Gilgit,
in the beginning of July; but on the return march, at the end of September, I did not see any.

It is worthy of mention that our ducks ate these toads greedily.

2. Bufo himalayanus, Gthr.


Numerous young, with the metamorphosis recently complete, found in an overflow pool of the River Yasin at about 8,500 feet, are probably referable to this species.

They agree closely with the description of _B. sikkimensis_ given by Boulenger _loc. cit._, and by Stoliczka in the Proc. A. S. B., 1872, p. 112.

**FISHES.**

Order PHYSTOMI.

Family CYPRINIDÆ.

1. _Schizothorax nasus_, Heckel.


Specimens from the Yasin river at 7,500 feet agree perfectly with Heckel's figure and description. On the other hand, the fish, now in the Indian Museum collection, figured by Day (Fishes of 2nd Yarkand Mission, pl. iv., fig. 3) as _S. nasus_, Heckel, has no likeness whatever to Heckel's figure. Heckel's fish is represented with a short wide mouth-cleft and an overhanging snout, whereas the fish of Day's figure has a long mouth-cleft and a projecting mandible.

2. _Schizothorax hodgsonii_, Gthr.


Found in the Yasin river between 7,000 and 8,000 feet. The fish that I identify with Dr. Günther's description does not correspond with the _S. progastus_ of Day, with which Day has, wrongly I think, synonymized _S. hodgsonii_ of Günther.

In Day's typical specimen of _S. progastus_, which is in the Indian Museum collection, the scales are comparatively large, and fall into regular cross-rows in every part of the body; the mouth is without the broad fleshy upper lip, with its remarkable sub-triangular excrescence at the snout, of _S. hodgsonii_; and the anal fin is short, falling far short of the base of the caudal when laid back.

3. _Ptychocharus conirostris_, Stier. Plate I., fig. 2 8, fig. 3 9.


From the Yasin river at about 8,500 feet. The fine male figured, which is 10½ inches long, has the eye relatively smaller than that of the figures and descriptions of authors, its major diameter being but ⅓ the length of the head, while in two fine females 13 inches long—one of which is figured—the eye is even smaller, its major diameter being only ⅔ the length of the head.

These two females—one of which is nearly ripe, while the other appears to be just spent—are singular in having the upper lip greatly broadened and thickened, and the profile of the snout conspicuously concave.
If they did not agree with *P. conirostris* in every other particular, and if they had not been taken in the same pool with males of this species, they might have been regarded as distinct.

4. **NEMACHILUS STOLICZEK, Stfr.**

*Cobitis Stoliczka* and *tannicicula*, Steindachner, Verh. zoöl.-bot. Ges. Wien, XVI., 1885, pp. 723 and 722, pl. xvi., fig. 2, and xvii., fig. 2.


Very common in the small tributaries of the Yasin river, at about 9,000 feet. In the young the cross-bars along the back are very distinct.

5. **NEMACHILUS YASINENSES, n. sp.—Plate II., figs. 2, 2a.**

D. 9 A. 6.

Distinguished by the long narrow tail and forked caudal fin.

The greatest height of the body is one-seventh to one-eighth of the total without the caudal: the least height of the tail, in a specimen over four inches long, is equal to the major diameter of the orbit.

The length of the head is a little more than two-ninths the total without the caudal.

The snout is slightly longer than the post-orbital part of the head, and is broad, rounded and depressed.

The eyes and visual axis are distinctly superior (uranoscopic), the diameter of the eye being about one-sixth the length of the head.

The dorsal fin arises immediately above the origin of the ventrals, midway between the tip of the snout and the base of the caudal: its height is half again that of the body below it, or more.

The anal when laid back reaches but little over halfway to the base of the caudal.

The caudal is conspicuously forked.

The pectorals are as long as the head, and reach considerably beyond halfway to the ventrals, which latter reach a little beyond the origin of the anal.

No scales. The lateral line is remarkably prominent and conspicuous in the anterior fourth of the body, and remarkably inconspicuous, or obsolete, in the posterior two-fourths.

Colours: back yellowish green with numerous indefinite blackish-green cross-bars: head, and sides of body, yellowish with much fine dark-green mottling: under-surface, yellow. Fins yellowish, the caudal and first one or two rays of the dorsal speckled.

From the Yasin river at about 8,500 feet.

**MOLLUSCA.**

Order **GASTROPODA PULMONATA.**

Family **LIMNÆIDÆ.**


Our specimens exactly resemble von Marten’s figure. Abundant in stagnant overflow pools of the Yasin river at Handur, at an elevation of about 8,600 feet.
INSECTS.

Order HYMENOPTERA.

Family APIDE.

1. ANTHOPHORA sp.


In the undetermined collection of bees in the Indian Museum collection are specimens of the Bunji species from Bushire and Baluchistan.

2. BOMBUS sp. 1 and 2.

Two species of bumble-bee mere taken in June, one near the top of the Tragbai Pass (at about 10,000 feet), the other on the ascent to the Burail Pass (at about 11,000 feet).

They do not agree with any of the species collected by the 2nd Yarkand Mission, or with anything in the Indian Museum.

Family VESPIDÆ.

4. VESPA ORIENTALIS, Fabr.


Very common at Bunji on ripening galls.

5. VESPA GERMANICA, Fabr.


Very common at Bunji on ripening galls.

6. POLISTES sp.

A species of Polistes bearing a very close resemblance to P. gallica, Fabr. (St. Fargeau, Hist. Nat. Ins., Vol. I, p. 527, pl. ix, figs. 4, 5, 6, and de Saussure, Monogr. des Guepes Sociales, p. 48), was common at Bunji on ripening galls.

It appears to differ from P. gallica only (1) in being rusty brown where that species is black, and (2) in having the pronotum traversed fore and aft, in the middle, by two nearly parallel bright yellow lines.

Order COLEOPTERA.

Family DYTISCIDÆ.

1. DYTISCUS (HYDROSPERUS) GRISEOSTRIATUS, de Geer.

This small water-beetle, which I identify from specimens in the Indian Museum collected by the 2nd Yarkand Mission (Coleoptera of 2nd Yarkand Mission, p. 37), was common in July in Lake Sarkhin, near the Baroghil Pass, about 14,000 feet.

Family SILPHIDÆ.

2. SILPHA OPACA, L.

Fairly common in June on the Gilgit Road as far as the Burzil Pass, and up to 11,000 feet.
It corresponds completely with a specimen from the Jhelum Valley determined, for the Indian Museum, by M. Grouvelle.

Family SCARABÆIDÆ.

3. SCARABÆUS SYLVAVICUS, Panz.


Found on the ascent to the Burzil Pass about 11,000 feet.

Identical with, but a little larger than, the Yarkand specimens so named by Sharpe: identical with Panzer's coloured figure.

Family MALACODERMIDÆ.

4. LAMPROPHORUS sp.

A single specimen almost exactly resembling specimens in the Indian Museum collection that have been identified by the Rev. H. S. Gorham as _L. nepalensis_, Gray.

Found on the Gilgit road, in June, at an elevation of 8,700 feet. Strongly luminous.

Family TENEBRIONIDÆ.

5. PROSODES TRISULCATA, Fk. Bates.

_Prosodes trisulcata_. Fk. Bates in Coleoptera of the 2nd Yarkand Mission, p. 68, pl. ii fig. 11.

Ascent to Burzil Pass, about 11,000 feet.

Family CANTHARIDÆ

6. MELOC PROSCARABÆUS, L.


A male and female, from the ascent to the Burzil Pass, 11,000 feet, agree in every particular with Olivier's description and copious figures.

7. MYLABRIS MACILENTA, Marseul.


Very common in June along the Gilgit road between 8,000 and 9,000 feet, on the flowers of a sort of hemlock.

8. MYLABRIS sp. 2.

In the Wakhan Valley, at 13,000 feet.

Family CURCULIONIDÆ.

9. CATAPIONUS BASILICUS, Bohem.


Ascent to Burzil Pass, 11,000 feet.

Order LEPIDOPTERA.

Sub-order RHopalocera. Butterflies.

Mr. de Nicéville has again been the directing collaborateur in this report upon the butterflies. In fact, had it not been that I was officially responsible
for the preparation of the report, I should have preferred to leave these insects entirely to him.

Family NYMPHALIDÆ.

1. **Lasiommata menava**, Moore.
   
   *Lasiommata menava*, Moore, P. Z. S. 1865, p. 469, pl. xxx., fig. 8, 9, and Lepidoptera India, Vol. II, p. 9, pl. 98, figs. 4, 6, 8, 9.

   
   *Lasiommata baldiva*, Moore, P. Z. S. 1865, p. 469, pl. xxx., fig. 4, 8.

3. **Eumenis Telephassa** (Hübner).
   

   
   *Aulocera swaha*, Kollar in Hübner’s Kaschmir, Vol. IV., pl. ii., p. 444, No. 3, pl. xiv., figs. 1, 2, 1844 ; Moore, Lepidoptera of 2nd Yarkand Mission, p. 2, pl. 2, fig. 11, 12; Marshall and de Niéville, Butterflies of India, Vol. I., p. 105, pl. 98, figs. 2, 8a, 9 (obi synan.).

5. **Karnasa Huxbneri** (Felder).
   

6. **Kanetisa Pimfla** (Felder).
   

On the Gilgit road, between Dashkin and Doyan, 8,000 to 9,000 feet.

Two perfect specimens were taken in July on the heights of the Wakhan Valley, between 12,000 and 13,000 feet.

In one the inner edge of the tawny band on the forewing runs obliquely inwards posteriorly, and the small ocellus at the anal angle of the hindwing is present: in the other there is no special inclination inwards posteriorly of the tawny band, and the ocellus is absent. For these among other reasons we consider ourselves justified in uniting Moore’s two species.

8. **Eumenis thelephassa** (Hübner).
   

Very numerous in July on the Gilgit road, between Dashkin and Doyan, 8,000 to 9,000 feet.

   
   *Aulocera swaha*, Kollar in Hübner’s Kaschmir, Vol. IV., pl. ii., p. 444, No. 3, pl. xiv., figs. 1, 2, 1844 ; Moore, Lepidoptera of 2nd Yarkand Mission, p. 2, pl. 2, fig. 11, 12; Marshall and de Niéville, Butterflies of India, Vol. I., p. 105, pl. 98, figs. 2, 8a, 9 (obi synan.).

Gilgit road, between Dashkin and Doyan, 8,000 to 9,000 feet.

9. **Karnasa Huxbneri** (Felder).
   

These specimens are much darker and much larger than those from the Great Pamir.

10. **Kanetisa Pimfla** (Felder).
    

Gilgit road, between Dashkin and Doyan, 8,000 to 9,000 feet.

11. **Kanetisa Pimfla** (Felder).
    

Gilgit road, between Dashkin and Doyan, 8,000 to 9,000 feet.

    

Gilgit road, between Dashkin and Doyan, 8,000 to 9,000 feet.
8. CHROTIOBIUS HILARIS (Staudinger).
Northern side of Darkot Pass, 12,000 feet.

9. PARALASIA JORDANA (Staudinger).
en Faune Lépidoptéropiques, Mem. Lép. IV, 1890, p. 449, No. 141, pl. xiii, figs. 44, 46.
Paralasia jordana, Moore, Lepidoptera India, Vol. II., p. 106.
A single specimen was taken at about 14,000 feet near the Baroghil Pass.

10. ARGYNNIS VITATHA, Moore.
Northern side of Darkot Pass, about 12,000 feet, and also near the Baroghil Pass, at about 14,000 feet.

Melitaea trivis, Wies. Verz. (Schiff.), p. 176, No. 4, 1776 : Lang, Rhopaloptera Europe, p. 187, No. 9, pl. 46,
fig. 5.
Common in July on certain barren slopes of the Wakhan Valley at about
12,000 feet.

12. MELITAEA BALBITA, Moore.
Melitaea balbita, Moore, P. Z. S. 1874, p. 268, No. 26, pl. xiii, fig. 5 : de Nieville, Butterflies of India,
Vol. II., p. 26, No. 311, pl. xviii, fig. 4b, 9.
Wakhan Valley, about 12,000 feet, and also on the ascent to the Tragbal
Pass, about 9,000 feet.

Family LYCÆNIDÆ.

13. LYCÆNA OMPELLA (Moore).
Polyommatus omphilla, Moore, P. Z. S. 1866, p. 573, pl. lxxi, fig. 2, 9.
Lycaena omphilla, de Nieville, Butterflies of India, Vol. III., p. 84, No. 607.
Between Dashkin and Doyan, 8,000 to 9,000 feet.

14. LYCÆNA ARIANA (Moore).
Polyommatus ariana, Moore, P. Z. S. 1865, p. 103, pl. xiii, fig. 2, 9, and Lepidoptera of 2nd Yarkand
Mission, p. 6, No. 22.
Northern side of Darkot Pass, about 12,000 feet.

15. CHRYSOPHANUS EASYAPA.
Chryosophus Easyapa, Moore, P. Z. S. 1865, p. 505, No. 111, pl. xxxii, fig. 10, 9 : de Nieville, Butterflies of
Ascent to Tragbal Pass, 8,000 to 9,000 feet.

16. THECLA SASANIDES, Kollar.
p. 298, No. 822, pl. xxvii., fig. 202, 9 (sæ synöse) : Groom-Grahamallo, Faun. Lépidopt. Pamir,
p. 354, No. 45.
Near Dashkin, Gilgit road, about 8,000 feet.

Family PAPILIONIDÆ.

17. SYNCHLOE CALLIDICE (Esper).
Papilio callidice, Esper, Schmett. I. 2, pl. 22., figs. 3, 3.
Phéis callidica, Moore, P. Z. S. 1866, p. 499, pl. xxxi., fig. 16, 9.
Phéis callidica, var. aurea Groom-Grahamallo, Faun. Lép. Pamir, p. 228, No. 27.
Northern side of Darkot Pass, about 12,000 feet.


Colias hyale, Moore, Lepidoptera of 2nd Yarkand Mission, No. 14, p. 4; Leech, Butterflies from China, Japan, and Core, pl. II., p. 473, pl. xxiv, figs. 2—14.

Colias melanoleuca, Felix apud Gray, Lep. Am. Nepal, p. 9, pl. v, fig. 3.

Singal, Gilgit river valley, 7,100 feet.

19. Colias fieldii, Ménétriès.

Colias fieldii, Ménétriès, Cat. Lep. Mus. Petrop. pl. II., p. 79, No. 253, pl. I, fig. 6, 7, 8, 1855. Moore, Lepidoptera of 2nd Yarkand Mission, p. 4, No. 15; Leech, Butterflies from China, Japan and Core, pl. II., p. 473, pl. xxxiv, figs. 6, 7, 8, 9.

Colias addans, Gray (see Linn.), Lep. Am. Nepal, p. 9, pl. v, fig. 3, 9.

Chorwán, Gilgit road, 8,100 feet, and also at Singal, Gilgit river valley, 7,100 feet.

20. Mancipium brassicae (L.).


Pieris brassicae, Gray, Lep. Am. Nepal, p. 9, pl. vi., fig. 2, 3, 4, 5, 6, 7, 8, 9.

Sympalpus brassicae, Moore, Lepidoptera of 2nd Yarkand Mission, p. 4, No. 10 (abi syma.).


Singal, Gilgit river valley, 7,100 feet.


Gilgit road, 8,100 feet.

22. Parnassius xiphalus, Oberthür.

Common on the northern side of the Darkot Pass, at about 12,000 feet.

23. Parnassius charitonius, Gray.


Northern side of Darkot Pass, about 12,000 feet.


Ascent to Barzil Pass, 11,000 feet, and also near the Baroghil Pass, about 14,000 feet.

LEPIDOPTERA HETEROCEBRAE. Moths.

Family SPHINGIDÆ.

25. Macroglossa stellatarum, L.


Astor valley, about 7,000 feet.

26. Macroglossa sp. 2.

From the ascent to the Barzil Pass, about 10,600 feet, a species nearer to M. vialis Butler, than to any other Indian species.
Order **Diptera**.

The only dipterous insect in the collection is a large and rapacious species of Asilid fly, which was very common in June, along the Gilgit road, at about 8,000 feet. One of these was caught flying with a moth several times its own size in its forelegs.

Order **Hemiptera**.

Family **Pentatomidae**.

1. *Eurydema* sp.  
A species closely allied to *E. pulchrum*, Westwood, and still more closely to *E. ornatum*, Linn. (vide Wolff, Icones Cimicium, I., p. 15, pl. ii., fig. 15) and to *E. herbaceum*, Herrich-Schäffer (vide Panzer, Faun. Ins. German., 115, 12, and Hahn, Wanzenartig. Insect. III, 13, pl. lxxxvii., fig. 239), with the last of which (which from a comparison of Hahn's and Panzer's figures appears to be a somewhat variable species) it is perhaps identical.

From the ascent to the Burail Pass, about 11,000 feet.

Family **Reduviidae**.


Reduvius (Harpiscus) reuteri, Distant, Trans. Entomol. Soc. Lond., 1877, p. 126, and Rhyynchota of 2nd Yarkand Mission, p. 11, fig. 9.

From the ascent to the Bursil Pass, about 11,000 feet. Compared with Yarkand specimens in the Indian Museum.

Family **Aphidae**.

At Bunji the aspens were profusely affected by a gall-insect, the resulting galls being objects of great interest to the three species of wasps above mentioned.

Near the village of Darkot also the poplar trees were most remarkably infested by gall-insects.

Specimens of the galls and their contents were sent to Mr. G. B. Buckton, F.R.S., who has been kind enough to furnish the following account of them:—

"Unfortunately the galls have been cut out and their constructors have, therefore, with the exception of 5 or 6 individuals, escaped. Out of such slender materials I cannot do more than hesitatingly express an opinion that the galls are the work of two new species of *Pemphigus*. I will make a short diagnosis of each."

7. "**Pemphigus napeus**, n. s. (?), G. B. Buckton.


*Pupa*: all green and of a long oval form.

*Larva*: forms galls on the poplar trees growing in the Yasin River Valley, at an elevation of 9,000 feet, near Darkot.

The galls measure about 0'90 inch, have a smooth and shiny exterior, and bright green colour mottled with yellow. They consist of one chamber, and their interior is smooth. They are unlike the galls of the European *Pemphigus burserius*, but the insects are closely allied."

8. "**Pemphigus immiunis**, n. s. (?), G. B. Buckton.

*Winged female*: Head and thorax shiny piceous brown. Head and eyes small. Antennae short, composed of six joints: the 3rd the longest, not annulated, and not longer than the 4th and 5th together. Abdomen green and mottled with yellow. Wings as in *Pemphigus burserius*. Body 0'11 x 0'04 inch.

*Pupa*: ovate, without nectaries, and green: 0'08 inch.
Larva: constructs hard woody rugose galls on the twigs of the aspen trees at Bunji on the Gilgit Road, at an elevation of 4,000 feet. Size of galls 0'80 inch. Externally the galls are in colour and texture like a walnut shell. The natural exit of the flies is at the summit of the gall. Afterwards the gall appears to split open. The interior has deep furrows, and it has only one chamber."

Order ORTHOPTERA.

Family ACRIDIDÆ.

1. PACHYTYLUS CINERASCENS, Fabr.


Common in the cornfields of Sarhad in the Wakhan Valley, 10,500 feet.

I have compared ours with Indian specimens determined by M. DeSaussure.

2. SPHINGONOTUS INDUS, SAUSS.

Sphingonotus indus, DeSaussure, Prod. Oedipod. ex ord. Orthopt., p. 204, and Additamenta, p. 78.

Common in the fields about Sarhad in the Wakhan Valley, about 10,500 feet.

3. SPHINGONOTUS NEBULOSUS, Fisch. ?


Having nothing for comparison, I have some hesitation in identifying this species, which is very common near Gilgit. But although it was so common, it was so alert, and such a powerful flyer, that I could only manage to get one specimen.

It differs most conspicuously from S. indus in being larger; in having the head, thorax and abdomen very much lighter in colour; in having the elytra beyond the second cross-band much more, and more definitely, spotted; in having the black (in life prussian-blue) band on the hind-wings more than twice as broad; and in having the hind-angle of the wings more marked.

It agrees with DeSaussure's description of S. nebulosus in all particulars except in having the inner side of the femora of the hind legs dark blue, instead of black.

I am much indebted to Mr. E. Barlow, Assistant in the Entomological Department of the Indian Museum, for assistance in comparing my specimens with those in the Museum collection.

ANNElIDA ORTHOPTODA.

Three species of earthworms were obtained, one in the Kishenganga Valley at 8,100 feet, one in the Gilgit River Valley at over 7,000 feet, and one in the Yasin Valley at 8,000 feet. Specimens of all of these were sent to Mr. F. E. Beddard, F.R.S., who writes as follows concerning them:—

"They are entirely European, i.e., Palaearctic species; they belong, in fact, to the usual British forms. This is of interest, as being an approximation to discovering the limits of the Oriental region for worms."
EXPLANATION OF THE PLATES.

PLATE.

Head and skin of Ovis poli.

'GEOL0GY PLATE I.

"Quartz de Corrosion" in Biotite Granitite, × 25.

'ZOOLOGY PLATE I

Fig. 1. Schisopygopsis severzovi, Herz.
Fig. 2. Ptychobarbus conirostris, Stdr., ♂.
Fig. 3. Ptychobarbus conirostris, Stdr., ♀.

'ZOOLOGY PLATE II

Fig. 1, 1a. Lygusoma himalayanum (Gthr) var. tragulense.
Fig. 2, 2a. Nemachilus yasinensis, Alo.

'ZOOLOGY PLATE III

Fig. 1. Branchipus bohrinskii, Alo. ♂, × 10.
Fig. 1a. Head of Branchipus bohrinskii, Alo. ♂, × 12.
Fig. 2. Daphnia bogouavlenskii, ♀, × 18.
"QUARTZ DE CORROSION" IN BIOTITE GRANITITE, FROM THE LITTLE PAMIR. X 25. NICOLS.

T. H. Holland, Photo.

Photo-etching, Survey of India Offices, Calcutta, July 1898.