

SCIENTIFIC RESULTS  
OF  
THE SECOND YARKAND MISSION;

BASED UPON THE COLLECTIONS AND NOTES  
OF THE LATE  
FERDINAND STOLICZKA PH.D.

MOLLUSCA.

BY  
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THE SECOND YARKAND MISSION.

MOLLUSCA.

By GEOFFREY NEVILL, C. M. Z. S.

I.—MOLLUSCA FROM EASTERN TURKESTAN AND LADÁK.

THE following is a list of the mollusca obtained by the late Dr. Stoliczka in Central Asia and Ladák, while attached as naturalist to the second embassy to Yárkand; Dr. Stoliczka also collected a considerable number of shells in Kashmir and its neighbourhood; as, however, nearly, if not all, the land mollusca from those parts belong to our Indian fauna proper, I have thought it best to give a separate list of them. As was to be expected, the molluscous fauna of Yárkand proves to be exceedingly poor and entirely European in its affinities; the freshwater shells, indeed, are either identical with, or most closely allied to, well-known European forms; very nearly all the species are recorded from Turkestan in the account of the Mollusca of Fedschenko's 'Reise.' I take this opportunity of acknowledging the great obligation I am under to Dr. E. von Martens, not only for a copy of the above work, of which he is the author, but also for a critical opinion on the species here recorded, of which I have availed myself in several instances. The only striking novelty is the new *Succinea martensiana*: its thickness and opaqueness of texture and its vivid orange-coloured aperture make it one of the most interesting and peculiar forms of the genus. It is interesting to find such characteristic shells as *Helix phæozona* and *H. plectotropis* extending southwards from Kokand and the Tian Shan Range as far as Sásak Taka; even more remarkable are the new localities for *Pupa cristata*, originally found in the Sarafshan Valley; the absence of the genus *Hydrobia* from Dr. Stoliczka's collection strikes me as noteworthy, especially as no species of *Valvata*, on the other hand, is recorded by von Martens from Turkestan. The most interesting fact, however, seems to me to be the entire disappearance, on leaving Sonamarg on the confines of Kashmir, of the characteristic Indo-Malayan genus *Nanina*, which re-appears again (with two species of the sub-genus *Macrochlamys*) in the Sarafshan Valley; the same is also the case with species of *Buliminus* (*Napæus*), *Parmacella*, and *Limax* (?); the two last, however, belong to the European fauna and species of them are mere stragglers on the extreme north-west confines of India. Stoliczka remarks that the shells recorded as found in the Pankong Lake were taken from a "stratified shaly and sandy deposit on the west side of the Pankong plain, about 50 feet above the level of the present edge of the water and about two miles distant from it;

some of the specimens of *Valvata* still have the epidermis, and it is possible that where the water of the lake is fresh, the shells may live."

The re-appearance of two of M. Issel's new species of *Limnæa* (originally described from Persia) is important, as proving the constancy of these respective forms. The same remark holds good with regard to one of my new Yunnan species.

### 1. VITRINA PELLUCIDA, Müll.

Shell perfectly undistinguishable from European specimens from Mennighüfen and other localities. Dr. Stoliczka had previously collected some twenty specimens of a similar form at Lahoul. Von Martens does not record the species from Turkestan, but describes a new species as *V. rugulosa*, Koch, the Latin description and measurements of which seem to agree fairly with the Mataian form; unfortunately I am unable to understand the Russian description, in which he compares his new species with *V. pellucida*. Dr. Stoliczka describes the animal of this Mataian shell as "blackish, with the tentacles very short."

Sixteen specimens from Mataian, near Drás, Upper Indus Valley: diam. 6, alt.  $3\frac{1}{4}$  mm.; apert. diam.  $3\frac{1}{2}$ , alt.  $3\frac{1}{4}$ .

### 2. HYALINA (CONULUS) FULVA, Drap.

Perfectly undistinguishable, as far at least as regards the shell, from the typical European form. Stoliczka had previously found the species in abundance at Spiti and Lahoul. Mr. Blanford also found the species at Mazendaran in Persia. Species from Pekin are well represented by Deshayes (Nouv. Archiv. Museum, vol. x, pl. 1).

Three specimens from Wakhan and three from Mataian.

### 3. HELIX (FRUTICICOLA) PHÆOZONA, v. Mart., Figs. 1—3.

E. v. Martens, Fedsch. Moll., pl. i, fig. 8 (Kokand).

Shell of solid texture, about the size of *H. similaris*, which indeed it somewhat resembles; umbilicate, conoidly globose, irregularly and roughly striate, decussated with almost microscopical spiral lines; straw-white, with a single, very broad brown band, just above the periphery; in a single specimen only is this band altogether absent; spire conoidal, varying in being more or less raised; whorls six, the last more or less subangulate, convex at base; aperture lunately rounded, with the peristome much thickened, and the columella exceedingly broadly reflected.

Diam.  $16\frac{1}{2}$ , alt.  $12\frac{1}{2}$ ; apert. diam. 9, alt. 8 mm.

Depressed variety from Pasrobat; diam. 16, alt.  $10\frac{1}{2}$ .

I ought to note that I include the margins in recording measurements of the aperture.

Twenty specimens from Sásak Taka (6,500 ft.) and five from Pasrobat, west of Yárkand.

4. *HELIX* (*FRUTICICOLA*) *PLECTOTROPIS*, v. Mart., Figs. 4—6.

E. v. Martens, Malakozoologische Blätter, XI, 1864, and Fedsch. Moll., pl. i, fig. 11 (Tianschang).

Shell about the same size as the preceding; openly umbilicate, depressedly conoidal, with a raised keel which is distinctly visible to nearly the apex, sutures not excavated; beautifully and somewhat regularly sculptured, with sharp and raised oblique ribs, about half the breadth of their interstices, above of a light brown, with the keel and ribs of a straw colour, about one-fourth of the base nearest the periphery pale brown, the rest straw colour; spire depressed, convex, with brown apex, whorls six, the last one sharply and prominently keeled and more or less convex at base, aperture diagonal (produced laterally), peristome reflected, angled at the periphery, the columella, as in the preceding, exceedingly broadly expanded; the apertures of several specimens were closed with a calcareous epiphragm.

Diam. 18, alt. 10; apert. diam. 11, alt.  $8\frac{1}{2}$  mm.

Twenty-five specimens from Sásak Taka found living with the preceding.

5. *HELIX* (*FRUTICICOLA*) *MATAIANENSIS*, n. sp., Figs. 7—9.

Shell a little smaller than *H. plectotropis*, in many respects a good deal resembling it, but of much thinner and more delicate texture; openly umbilicate, depressedly conoidal, whorls five and a half, with excavated suture and without a raised keel, in both of which respects it materially differs from the preceding, last whorls with a medium-sized keel, base convex, above sculptured irregularly, with more or less strongly developed ribs, beneath sculpture obsolete, almost smooth; white, irregularly mottled with pale horn colour, apex horn brown; aperture ovate, subangulate at periphery, almost as high as broad; peristome lightly reflected, columella expanded.

Diam.  $13\frac{1}{4}$ , alt. 7 mm.; apert. diam.  $6\frac{3}{4}$ , alt.  $6\frac{3}{4}$  mm.

Nine specimens from Mataian, in the Drás Valley, at 11,200 feet. Unfortunately most are quite young shells, only one or two being sufficiently full grown to show the reflected outer lip. Stoliczka describes the animal in his journal as "uniform greenish dusky, no trace of a tail gland, the body very short, the posterior part of the foot shorter than the anterior."

6. *HELIX* (*XEROPHILA*) *STOLICZKANA*, n. sp., Figs. 10—12.

Shell rather thin, about the size of *H. ericetorum* and closely resembling it, but more depressed, umbilicus slightly less open, colouration different and aperture differently shaped; openly umbilicate, flatly depressed; above irregularly striate, below sculpture obsolete; white; invariably ornamented with two striking brown bands, one of which in most, but not all the specimens, can be traced as far as the apex, the two bands are, of course, near the periphery; the space between them is about the width of the two bands together; apex bright brown; whorls five and a half with distinct suture, not keeled, convex at base; aperture as high as broad, dilated above, considerably higher than the periphery in fine full-grown specimens; peristome slightly thickened, columella moderately reflected; the aperture in many of the specimens was closed with a thin epiphragm.

Diam.  $16\frac{1}{2}$ , alt.  $7\frac{1}{2}$ ; apert. diam. 8, alt.  $7\frac{1}{2}$  mm.

About a hundred specimens from Sásak Taka and Pasrobat, west of Yárkand.

Twelve specimens, in poor and weathered condition, from north of Tangitar on carboniferous limestone; they are a remarkably small variety, about half the typical size, the two bands are scarcely discernible, and they are not quite so flat.

7. *HELIX (VALLONIA) COSTATA*, Müll., var. *ASIATICA*, nov.

This is probably the variety recorded by von Martens from Turkestan, measuring 3 mm. in diam. and  $1\frac{1}{2}$  in height; it only differs from the typical European form by its larger size and slightly stronger subangulation at base near the umbilicus. More than a hundred and fifty specimens were collected by Dr. Stoliczka, all of approximately the same size, at Pasrobat, Sásak Taka and Wakhan; one of the specimens from the last locality I have taken as my type of var. *asiatica*.

I take this opportunity of noting that Mr. W. T. Blanford brought back from Mazendaran in Persia numerous specimens of a variety, the same size as the European form and with similar sculpture, but having the umbilicus a shade more open.

8. *HELIX (VALLONIA) LADACENSIS*, n. sp. (an *H. COSTATA*, var.?)

I have long separated this form, which can be distinguished from all the varieties of *H. costata* at a glance by its much more open umbilicus, at least half as open again; it is a much larger shell than typical *H. costata*, about the same size (a trifle larger) as the above described var. *asiatica*; the sculpture is finer, closer together and more beautifully regular; the spire is flatter, the suture more excavated; the base is scarcely, if at all, subangulate near the umbilicus, as it is in so marked a way in the preceding; one of the best characteristics of *H. ladacensis* is the considerably higher and more expanded aperture with a corresponding less oblique columella; the umbilicus is so much more open that the whorls within can be clearly traced up to the apex itself.

Diam.  $3\frac{1}{4}$ , alt.  $1\frac{1}{2}$  mm.

Type from Mataian in the Drás Valley (Ladák), where Dr. Stoliczka found about sixty specimens. One of the specimens I sent Dr. von Martens from this locality possesses, he informs me, a "little plait on the wall of the mouth." Unfortunately I have not been able myself to detect this plait in any other specimens. Ten specimens were brought from Leh (chief town of Ladák); twenty from "Narka" (?) in West Tibet, slightly smaller and with more raised spire than Mataian specimens.

9. *PUPA (PUPILLA) MUSCORUM*, L.

Fourteen specimens from Pasrobat,  $3\frac{1}{2}$  mm. in length; fifty from Kaskasu,  $3\frac{1}{4}$  mm. in length; fifty from shores of Lake Pankong, a form remarkable for its produced whorls,  $3\frac{3}{4}$  to  $4\frac{1}{8}$  mm. in length; twenty from Spiti,<sup>1</sup> agreeing with the preceding form, in the great difference in the length of the spire in different individuals, the whorls being sometimes much produced, at other times curiously shortened and compressed; four specimens from Mataian, one only perfect unfortunately. I have considerable doubts in referring this Mataian form to

<sup>1</sup> Procured by Dr. Stoliczka on a previous visit to the Himalayas.

*P. muscorum* at all, the spire is less produced, striation less developed, form of aperture simpler and less angular; length  $2\frac{7}{8}$  mm.; no tooth.

Not a single one of the Ladák specimens possesses even a rudiment of a tooth on the wall of the aperture, nor have I been able to detect any in the Kaskasu form; in one or two of the Pasrobat shells only is a very slight tooth just discernible; as far as I have seen, this absence of the tooth appears to be characteristic of our Asiatic forms.

#### 10. PUPA (PUPILLA) CRISTATA, v. Mart.

E. v. Martens, Fedsch. Reise, Moll. pl. ii, fig. 19 (Sarafshan Valley).

The specimens of this very distinct and interesting form agree exactly with typical figures 19C. and E. Figure B, on the contrary, has the spire a little more produced, with the whorls a trifle more convex, and the aperture slightly more contracted, the margins of which, in our Museum specimens, are somewhat considerably more delicately dilated; I can only detect, after a most careful search under the lens, a single tooth on the outer margin, as in the above figure C, not two, as in the description and figure B.

Shell ovate, rimate, of horny brown colour, obliquely slightly striated, apex obtuse; seven whorls, the 4th, 5th and 6th of equal width, the last one somewhat compressed at the base, with an obtuse keel round the umbilicus continued more prominently in a raised ridge, parallel with the outer margin of the aperture; aperture small and rounded, with the peristome broadly reflected; a prominent tooth on the wall of the mouth, a single fold on the columella (lying rather far back) and a single obtuse tooth within the outer margin. Long.  $3\frac{1}{2}$ , diam. 2 mm.

Eleven specimens from Sásak Taka, where it is by no means common; sixteen from Pasrobat, where it occurs more abundantly in company with *P. muscorum*.

#### 11. SUCCINEA MARTENSIANA, n. sp., Figs. 30-31.

Shell unusually thick, about the size of *S. girnarica*, Theob., (Conchologia Indica, pl. lxxvii, fig. 6,) which it at first sight much resembles; it is, however, quite half as thick again, of much intenser colouring and of more convexly shaped whorls; whorls four, convex, produced and separated: in *S. girnarica* there are only three, which increase less rapidly and are less obliquely inclined; the last whorl of the Yárkand species is shorter and not nearly so ovately oblong; the texture is more rugose, the irregular longitudinal furrows being unusually strongly developed; the colouration is peculiar, being of an opaque milky white, more or less purple near the apex; the aperture is internally of a brilliant orange colour and more laterally expanded than in *S. girnarica*: the columella varies, but is always straighter than is the case in its ally; the callosity joining the columella and outer lip is strongly marked.

*S. martensiana* (type), long. 17, diam. 11; apert. long. 12, diam.  $8\frac{1}{2}$  mm.

*S. girnarica*, long.  $18\frac{1}{2}$ , diam.  $11\frac{3}{4}$ ; apert. long. 14, diam.  $9\frac{1}{4}$  mm.

This species is very variable in shape; the Museum possesses a very fine series of it, all from Kathiawad (Kattywar).

I have named this handsome species after Dr. E. von Martens of Berlin, to whose great kindness, in sending me a critical opinion of these Yárkand shells, I am so much indebted.

Of the Yárkand species, Dr. Stoliczka found about fifty specimens, in all stages of growth, at Sásak Taka, many of them alive; also about twenty at Pasrobat.

12. SUCCINEA PFEIFFERI, Rossm., var.

This Yárkand variety is only distinguishable from typical European specimens by its smaller proportions, slightly stouter texture, and deeper amber colour.

Long. 11, diam 6; apert. long.  $7\frac{1}{2}$ , diam. 4 mm.

Ten specimens from Yárkand and nine from Sásak Taka.

SUCCINEA PFEIFFERI, var. SUBINTERMEDIA, nov., Figs. 32-33.

From near Yárkand, Dr. Stoliczka also brought back about twenty specimens of a small form, easily distinguishable from the preceding by its less everted last whorl, thinner texture and lighter colour; it is in some respects intermediate between *S. putris* and *S. pfeifferi*, but its more produced spire seems to me to compel its classification with the latter; the nearest European form we possess in the Museum is a Transylvanian shell sent from Germany as *S. amphibia (putris) var. intermedia*. The Museum also possesses three specimens from Candahar, presented by the late Captain Hutton, in no way to be distinguished from the Yárkand form, except in being about half as large again; the columella is less rounded and decidedly more subangulate at the base, than in German and French specimens. I found a variety, however, from England agreeing in this respect with our Asiatic forms, though the spire is less produced in the latter; it seems to me that the transition as regards the shell itself from *S. putris* to *S. pfeifferi* is almost, if not quite, imperceptible?

Long. 11, diam.  $5\frac{3}{4}$ ; apert. long.  $7\frac{3}{4}$ , diam.  $4\frac{1}{2}$  mm.

13. SUCCINEA PUTRIS, L. var.

About forty specimens were found living on grass in a marsh near Yárkand city; it is a small, thin and glassy variety, resembling in miniature a form from Wales sent me by the late Mr. F. Layard as *S. putris*, L., var. *vitrea*; its more swollen shape, less produced spire and more everted last whorl distinguish it from the form I have described above as *S. pfeifferi*, var. *sub-intermedia*; its more globose shape, less produced spire, thinner and more vitreous texture from my var. *yarkandensis*.

Long. 10; diam. 6; apert. long. 7, diam.  $4\frac{1}{2}$  mm.

14. LIMNÆA AURICULARIA, L., var.

This form agrees fairly with Kobelt's figure (Mal. Bl., 1870, pl. lii, fig. 8, *L. auricularia*, var. *ventricosa*; London); the principal difference is the apparently constantly more broadly reflected columella, which is also more rounded at the base; the great tendency to deformity in the Sirikul specimens is very striking; it appears to me that this form would be almost as well classified as an extreme variety of *L. lagotis*, allied to var. *obliquata*.



Long. 23, diam.  $19\frac{3}{4}$ ; apert. long.,  $18\frac{1}{2}$  diam. 14 mm. columella, at junction with body whorl, 2 to  $2\frac{3}{4}$  mm. in breadth.

About 20 specimens (dead) on the shore of Lake Sirikul or Victoria, Pámír.

Another variety is smaller and more delicate than the above, but with the same remarkably thickened and rounded columella, as is well represented on pl. ii, fig. 20, "Fedsch. Moll."; the spire, however, in the Aktásh specimens is more prominent and the broadly reflected columella even more marked.

Long.  $16\frac{3}{4}$ , diam. 13; apert. long. 13, diam. 10 mm.

A deformed specimen measures long.  $12\frac{1}{2}$ , diam. 12 mm.

About 30 specimens were taken alive in a stream at Aktásh (Sarikol).

#### 15. LIMNÆA DEFILIPPIL, Iss., var. SIRIKULENSIS, nov.

Issel, Moll. Persia, 1865, pl. iii, figs. 26 & 63 (Lake Gokcha, 5,500 feet).

This is perhaps the most remarkable of the Yárkand species of *Limnæa* and the furthest removed from the typical forms of *L. auricularia* and *L. lagotis*, even more so than typical *L. defilippii*. As justly pointed out by Issel, it is intermediate between the above group and that of *L. stagnalis*. It differs from Issel's figure by the much more swollen, subangulate whorls, and by the shorter, not twisted and evenly rounded columella; the produced spire and malleated texture are very characteristic of both.

I had already written the following description before I read that of Issel.

Shell in size intermediate between *L. stagnalis* and *L. lagotis*; of moderately thin texture, the same as in *L. stagnalis*; spire much more produced than in *L. lagotis*; whorls six, remarkably subangulate; aperture expanded as in fig. 10, pl. ii, "Mal. Bl.," 1870; columella broadly reflected, almost completely covering the umbilicus, not twisted in the least, evenly rounded at base as in fig. 9 (*loc. cit.*); very young specimens present a remarkably close resemblance to those of *L. stagnalis*, the subangulation of the whorls and short, straight columella being naturally less distinctive than in full-grown specimens; the surface of most specimens is more or less roughly decussately malleated; under the lens a very fine and close longitudinal striation can be seen.

Type of var. *sirikulensis*: long.  $30\frac{1}{4}$ , diam. 21; apert. long. 20, diam.  $14\frac{1}{2}$  mm.; the ante-penultimate whorl measured from the outer lip  $6\frac{3}{4}$  mm.; a young specimen measured long.  $24\frac{3}{4}$ , diam. 14; apert. lat. 14, alt.  $9\frac{1}{4}$ .

Fourteen dead specimens found, on the shores of Lake Sirikul, in company with *L. auricularia*, var.

#### 16. LIMNÆA LAGOTIS, Schr.

*Limnæa lagotis*, Schr., Fauna Boica, iii, 1803.

*L. lagotis*, var. *solidissima*, Kobelt, Malakozoologische Blätter, 1872, pl. ii, figs. 17 & 18.

*L. obliquata*, v. Mart., Mal. Bl., 1864, pl. iii, figs. 9 & 10 (Lake Issik-kul).

A fine series of this remarkable variety was procured by Dr. Stoliczka in all stages of growth; it varies greatly in the more or less produced spire, though never, even in its most elongated form, approaching the preceding form; there is little, if any, trace of the malleated sculpture, often so characteristic of the preceding: the same fine longi-

tudinal striation however exists; all the specimens, young and old, are without exception of the peculiar thickness which suggested its excellent name of *solidissima*; the five whorls agree with those of Kobelt's original figure, which I suspect was taken from a Lake Pankong specimen, and do not show the subangulation described in the preceding; the aperture is much more expanded than in Kobelt's typical figure, which was evidently taken from a rather young shell, the very thick columella in most specimens agrees with that of the type, but in some few it is abruptly twisted back, as in pl. ii, fig. 21 of "Fedsch. Moll." (*L. obliquata*, v. Mart.)

These specimens are interesting as removing one of the few slight differences between *L. obliquata* and *L. solidissima*; my Pankong specimens clearly show the more expanded aperture to be merely a question of age and condition, as is also the gradual slope of the outer lip; nearly all my specimens agree in this latter respect with typical *obliquata*, only very few showing the angular outer lip of typical *solidissima*; Kobelt in his description pointed out the close affinity of the two forms, and also that *L. obliquata* must be classed rather with *L. lagotis*, than *L. auricularia*; the shortened columella seems to me the best characteristic of the latter group, as shown in the form I have already described as a variety of that species; the difference is also excellently portrayed in von Marten's figures, pl. ii, figs. 20 and 21, "Fedsch. Moll." The Pankong shell, though always preserving its chief characteristics, varies most remarkably, as will be seen from the accompanying measurements.

The ordinary form:—long. 22, diam.  $17\frac{1}{2}$ ; apert. long. 18, diam.  $12\frac{1}{2}$  mm.

A form with more produced spire and contracted aperture, agreeing with Kobelt's figure:—long. 22, diam.  $15\frac{1}{2}$ ; apert. long.  $15\frac{1}{2}$ , diam.  $10\frac{1}{2}$  mm.

A unique form, with quite depressed spire:—long. 19, diam.  $15\frac{1}{2}$ ; apert. long.  $17\frac{1}{4}$ , diam. 12 mm.

A form (represented by six or seven specimens), with unusually expanded and more rounded aperture:—long. 18, diam. 17; apert. long.  $14\frac{1}{2}$ , diam. 12 mm.

About a hundred specimens from the shores of the Pankong Lake: both young and old specimens show the same peculiar thickness of shell.

#### LIMNÆA LAGOTIS, var. COSTULATA.

*Limnæa lagotis*, var. *costulata*, v. Martens, Fedsch., Reise, Moll., pl. ii, fig. 24.

More than a hundred specimens were collected by Dr. Stoliczka at Leh, agreeing exactly with figs. 22 and 24 (*loc. cit.*). I cannot consider the forms there figured as belonging to even different varieties; there are numerous individuals amongst the Leh specimens of all the forms and of every conceivable connecting link; the variety, as I understand it, appears to be fairly constant as regards size and colour; the spire, too, does not appear to vary much more than in the figures quoted; the columella, however, graduates from even a more rounded shape than in figure 22 B to the straight (or slightly bent back) form of figure 24 A.

Long. max.  $18\frac{1}{2}$ , diam. 12; apert. long.  $13\frac{3}{4}$ , diam.  $8\frac{3}{4}$  mm.

#### LIMNÆA LAGOTIS, var. YARKANDENSIS, NOV.

This is a striking and handsome form, close to the preceding, but half as large again, with more produced spire, of five less convex whorls, much stouter texture and straighter, more

evenly rounded columella, which is very broadly reflected; these characters of the columella appear to be its only marked difference from the European form figured by Kobelt, "Mal. Bl.," 1870, pl. iii, fig. 9.

About forty specimens from Yárkand and from near Sásak Taka, on the road to Sarikol; fourteen specimens from North Tangitar, of even stouter texture than the preceding; twenty specimens from a marsh, 5 miles west of Panjah, in Badakshán; this is a shorter, dwarf form.

Type of var. *yarkandensis* (from near Sásak Taka): long. 22, diam.  $15\frac{1}{2}$ ; apert. long. 16, diam.  $10\frac{1}{2}$  mm.

LIMNÆA LAGOTIS, var. SUBDISJUNCTA, nov.

More than a hundred specimens from the neighbourhood of Leh; shell smaller even than var. *costulata*, of a peculiarly dark horn colour; whorls four to five, more convex and generally a little more produced, though varying in this respect, than fig. 22 B (*loc. cit.*); aperture unusually narrow, especially above; columella sharp, scarcely reflected, almost or altogether detached from the body whorl, and continuous with the outer lip, in consequence of this peculiar character the variety is always more or less openly umbilicate.

Typical and ordinary form of the variety: long. 11, diam. 7; apert. long.  $7\frac{1}{2}$ , diam. 5 mm.

An extremely elongate form: long. 12, diam.  $6\frac{1}{2}$ ; apert. long.  $6\frac{1}{2}$ , diam.  $4\frac{1}{2}$  mm.

A depressed form: long.  $10\frac{1}{4}$ , diam. 7; apert. long. 8, diam. 5 mm.

17. LIMNÆA ANDERSONIANA, Nev.

This interesting small species, which I have described in my paper on the mollusca brought back by Dr. Anderson from Yunnan and Upper Burma, is probably the form mentioned in the systematic list of the "Conchologia Indica" as *L. marginata*, Mich., from the Shan Provinces; at least Mr. Theobald gave me a single specimen from the Shan States agreeing exactly with typical specimens of *L. andersoniana* from Nantin (Yunnan). Dr. von Martens by letter informs me that my Yárkand specimens belong to his "*L. pervia*, which again is the *L. davidi* of Deshayes from Tibet." I cannot, however, accept this identification as the original description throughout makes a great point of the open umbilicus, which it compares with that of *L. truncatula*, also stating that it is only half covered by the dilated columella. Out of several hundred specimens from Yárkand and Yunnan I am unable to discover a single specimen with what could be called an open umbilicus; they all have it almost, and generally quite covered with the very broadly reflected columella.

More than a hundred specimens, of a rather distinct variety, from North Tangitar and Káshghar; with distinctly rimate aperture and spire more produced, whorls more convex than in the typical Yunnan form, columella not so short or straight, and less thickened. This must be the form I suppose nearest *L. pervia*?

Long.  $11\frac{1}{4}$ , diam. 7; apert. long.  $7\frac{1}{2}$ , diam. 5 mm.

About a hundred specimens from Yárkand; after a most careful examination quite undistinguishable from the Yunnan type specimens: the umbilicus is completely covered.

## 18. LIMNÆA TRUNCATULA, Müll.

About thirty specimens from Leh, agreeing fairly with pl. ii, fig. 26 of 'Fedsch. Reise Moll.' Dr. Stoliczka on a former visit to the Himalayas, found a still more produced form abundant at Spiti; also a shorter form at Kulu, Kotegarh, &c.

## 19. LIMNÆA LESSONÆ, Iss.

Issel, Moll. Persia, 1865, pl. iii, figs. 64—66.

I cannot separate this form, even as a variety, from Issel's Persian shell, for specimens of which, from Karmán (Persia), I am indebted to Mr. W. T. Blanford. Dr. Stoliczka collected some fifty specimens of an almost perfectly similar form in a stream east of the Pamír-kul; they are like the type form imperforate, with similar short spire and rather expanded aperture. The Pamír specimens are of rather thicker substance; the characteristic orange colour is also more marked.

Long. 8, diam.  $5\frac{3}{4}$ ; apert. alt.  $5\frac{3}{4}$ , lat.  $3\frac{3}{4}$  mm.

## 20. PLANORBIS (GYRAULUS) ALBUS, Müll., var.

More than a hundred specimens were found on the shores of Lake Pankong; they consist mainly of two forms, apparently equally plentiful, one with a more narrow umbilicus than in any European specimens I have seen, in this respect agreeing with some varieties of *P. convexiusculus*, Hutt., and with pl. iv., fig. 35, "Mal. Bl.," 1875 (*P. riparius*); in other respects, however, resembling figs. 1—3, *loc. cit.*, of typical *P. albus*: diam.  $4\frac{3}{4}$ , alt.  $1\frac{1}{2}$  mm.

The other, with more open umbilicus, agreeing with figures 4—6 and 10—12, *loc. cit.*, intermediate between the two: diam. 5, alt.  $1\frac{1}{2}$  mm.

There are also two specimens with very open umbilicus, more so than in fig. 14, in other respects more like *P. lævis*: diam.  $6\frac{1}{4}$ , alt.  $1\frac{1}{2}$  mm.

Two or three deformities were also found, in which the last whorl is completely detached and the spire curiously raised, presenting some analogy to specimens of *Valvata*.

From Leh, also, some hundred specimens were brought of a form agreeing exactly in colour and every other respect with figs. 1—3. Mixed up with them equally abundantly was another allied form, which however, I have classed separately as *P. lævis*, var.

More than a hundred specimens were collected at Yárkand; the majority fairly represented by figs. 4—6, *loc. cit.* Some few however, have the last whorl near the aperture considerably deflected, as in figs. 15 and 21; the umbilicus varies in being a little more or less open. Nine specimens from 5 miles west of Panjah (Badakshan); they agree fairly with the preceding Yárkand form.

## 21. PLANORBIS (GYRAULUS) LÆVIS, Ald., var. LADACENSIS NOV.

*Planorbis lævis*, Alder, Trans. Nat. Hist. Northumb., 1830.

——— *glaber*, Jeffr., Trans. Linn. Soc. Lond., 1830.

I confess I am unable to distinguish quite satisfactorily the differences between this species and the preceding. This Leh form, in any case, seems fairly separable from all the

others brought back by Dr. Stoliczka; it differs mainly in two respects, colour and shape of the aperture, in the latter respect agreeing with pl. iv, figs. 10—12, "Mal. Bl." xxii, (*P. laevis*, Ald.)—shell resembling the above figures, but of a rich chestnut brown, and with the umbilicus a little more open; the aperture is considerably more laterally expanded than in the forms I have grouped under *P. albus*, and consequently relatively not so high.

Diam. 6, alt.  $1\frac{1}{3}$  mm.

About a hundred specimens from Leh.

22. PLANORBIS (TROPIDISCUS) SUBANGULATUS, Phil., var.

*Planorbis subangulata*, Phil., "Moll. Sicil." 1844, pl. xxi, fig. 6 (Sicily).

Four specimens only were found at North Tangitar; the form is a very remarkable one, and may, I think, prove to be new; it is very different from Persian specimens of *P. subangulatus*, as also from European *P. marginatus*; the angulation is less distinct than in the former, the whole shell more compressed and flattened out, the spire showing distinctly all five whorls; the aperture is more contracted, and the under side less deeply sunk.

Pl. iii, figs. 23-24, "Malakozoologische Blätter," 1875, gives an almost exact representation of the form; the shape of the aperture is quite different from that of fig. 22, being higher than the body whorl and not bent down; of course these figures are magnified views of a minute and quite different species; a fair idea of the shell may, however, be obtained from them.

Diam. 8, alt.  $1\frac{3}{4}$  mm.

Persian specimens of *P. subangulatus* measure—diam.  $7\frac{1}{2}$ , alt. 2 mm.

23. PLANORBIS (SEGMENTINA) NITIDUS, Müll.

*Planorbis nitidus*, Müller, Hist. Vermium, p. 163.

Twelve specimens of a small form from Yárkand.

24. PLANORBIS (HIPPEUTIS) COMPLANATUS, Lin.

*Planorbis fontanus*, Lightf. (England).

Ten specimens were found with the preceding at Yárkand; they are also a small variety.

25. PLANORBIS (ARMIGER) NAUTILEUS, Lin.

(Fide Westerl., Mal. Bl., 1875, p. 115 = *P. crista*, Lin., var.)

I detected seven specimens of this interesting minute form inside the apertures of the Yárkand specimens of *Limnæa*; the margins of the aperture are continuous; I can detect no signs of transverse ribs, and the form is most certainly specifically distinct from my English specimens of *L. crista*, L., as represented in "Malakozoologische Blätter," pl. iv, figs. 25—27; the Yárkand shells agree very fairly with figs. 28-30, *loc. cit.*

Diam.  $2\frac{1}{4}$  mm.

## 26. VALVATA PISCINALIS, Müll.

*Nerita piscinalis*, Müller, Hist. Verm., p. 172.

About thirty specimens from the Pankong Lake, quite undistinguishable from European specimens.

## 27. VALVATA STOLICZKANA, n. sp. Figs. 34—36.

This is a distinct and interesting new species; in its size and depressed form it resembles *V. depressa*, C. Pfr., Küster, pl. xiv, figs. 20 & 21; it can be at once distinguished from it by the remarkably deep and narrow umbilicus, only half as open as that of Pfeiffer's shell. There are four whorls, which are slightly subangulate, forming a faint depression near the suture; under the lens it is distinctly, closely and regularly striated; the colour is a light glossy green, the aperture is not perfectly circular and is not quite so broad as high.

Diam 4, axis  $1\frac{3}{4}$  mm.

Abundant at Yárkand.

## 28. PISIDIUM, n. sp.

It is a great pity that the figures in Clessin's new monograph of *Pisidium*, in Küster's edition of the "Conchylien-Cabinet," are so bad as to be almost without exception perfectly unrecognizable; a glance at Baudon's figures, "Monog. Pisidies Francaises," published in 1857, will show the great inferiority of the former; the shell described by Clessin as *Corbicula* (?) *minima* in "Fedsch. Moll.," pl. iii., fig. 30, is a most remarkable form, and I hope Dr. von Martens will give us further and more correct information as to its proper classification.

The present species bears a close resemblance to European forms of *P. pulchellum*; it is certainly not allied even to the species represented in Fedschenko's Mollusca; the form is well characterized by its obtuse and tumid umbones, by its extreme shortness, by its distinct concentric sculpture, and by its light-grey (cineraceous) colour; it somewhat resembles Baudon's pl. i, fig. E (*P. obtusale*), but is less extremely tumid, and not so high, compared with its breadth; compared with pl. iii, fig. D, *loc. cit.*, it is not so high, more tumid at the umbones, which are less central, and Baudon's shell is apparently smooth; the position of the umbones is exactly represented by pl. ii, fig. H. (*P. limosum*), *loc. cit.*, from which indeed the Yárkand shell would seem to be scarcely separable.

Diam. 3, alt.  $2\frac{1}{2}$ , crass.  $2\frac{1}{8}$  mm.

Abundant at Yárkand.

## 29. PISIDIUM, n. sp.

This is a very small, almost circular species, flatter than the last when of the same size and with the umbones less tumid and more central; the sculpture is the same; it is more tumid and less polished than the next form, with the sides less produced and more

rounded, the umbones more central; it has more the shape of Baudon's pl. III, fig. D, than the last species has.

Diam.  $2\frac{1}{4}$ , alt. 2, crass.  $1\frac{3}{4}$  mm.

About a dozen specimens from Yárkand.

30. PISIDIUM, n. sp.

This small form is quite distinct from the two preceding; it can be at once distinguished by its great flatness, by being more broadly truncate anteriorly, more produced posteriorly, by its very flatly appressed umbones and by its polished glabrous surface; it resembles Baudon's pl. ii., fig. E, (*P. thermale*, Dup.), and also somewhat "Fedsch. Moll.," pl. iii., fig. 33, though apparently the latter does not possess the characteristic appressed umbones.

Diam. 3, alt.  $2\frac{1}{3}$ , crass.  $1\frac{1}{3}$  mm.

Only two or three specimens from Yárkand.

31. PISIDIUM OBTUSALE, Pfr.

Agrees fairly with Clessin's figure of *P. obtusale*, *loc. cit.*, pl. ii., fig. 22.

Diam.  $4\frac{1}{4}$ , alt.  $3\frac{3}{4}$ , crass.  $2\frac{3}{4}$  mm.

About twenty specimens from Pankong Lake.

II.—MOLLUSCA FROM KASHMIR AND THE NEIGHBOURHOOD OF MARI  
(MURREE) IN THE PUNJAB.

THE change from the Indo-Malayan to the so-called European molluscous fauna at the northern watershed of the Kashmir Valley is most abrupt and distinct; every species found at Sonamarg belonging to the former, while, at only two days' march from thence at Mataian, every shell belongs to the latter, as already above recorded. Major Godwin-Austen, who has personally visited the locality, has been kind enough to inform me that it is on crossing the pass called the "Zoji-la" into Drás, that the change becomes at once very great, the aspect of the country entirely changing, the forest-clad hills of Kashmir disappear, and, instead, one enters a sterile, dry country of higher elevation, altogether Tibetan in character; Sonamarg is within the drainage of the River Jhelum, whilst Mataian, on the other hand, is within that of the River Indus.

1. HELICARION AUSTENIANUS, n. sp., Figs. 22—24.

This is a very distinct and peculiar form, well distinguished from all other Indian species; it is most like a dwarf *H. flemingi*, from which it is distinguished by its short, almost globose form, &c.

Shell much smaller than that of *H. flemingi*, more globose, suture more excavated, and the spire more raised, apex more distinct; more rudely and regularly concentrically plicated; whorls five, more convex, the last one not nearly so much dilated; texture thinner and more membranaceous, of an equally dark, but brighter and more glossy colour; aperture about as high as broad; base a shade more convex, imperforate; columella less oblique, very short and abruptly triangularly reflected.

Diam.  $15\frac{1}{2}$ , axis  $7\frac{1}{2}$ ; apert. lat.  $9\frac{1}{2}$ , alt.  $9\frac{1}{2}$  mm.

Some dozen specimens, several of which are preserved with the animal in spirit, were brought back from Sonamarg.

2. HELICARION FLEMINGI, Pfr.

*Vitrina flemingi*, Pfr., P. Z. S., 1856, p. 324 (Sind).

Young specimen, of approximately same size as full grown *H. austenianum* (for comparison): diam.  $14\frac{1}{2}$ , axis  $5\frac{3}{4}$ , alt. max. 9; apert. lat.  $8\frac{3}{4}$ , alt.  $8\frac{3}{4}$  mm.

Dr. Stoliczka found this fine species tolerably abundant at Murree and Tinali. There are several specimens with the animal in spirit.

Diam. 40, axis 12, alt. max. 23.5; apert lat. 25, alt. 20 mm.



## 3. HELICARION STOLICZKANUS, n. sp., Figs. 19—21.

*Vitrina monticola* of Reeve and Conchologia Indica, not Pfr.

(?) *Vitrina* sp., from Almora, Bens., J. A. S. B., VII, p. 214.

(?) *Vitrina monticola* of Benson in MSS., not of Pfr.

This shell is a close ally of *H. cassida*, and might indeed be ranked as a smaller variety, with less exerted whorls and with a rather differently coloured epidermis; the close relationship was noted as above by Benson, and is well shown by Reeve, figs. 10 and 11, and by Hanley, pl. clii, figs. 1—4, who represent both species side by side, no doubt purposely. A comparison of these figures with Pfeiffer's original description, as detailed here under the next species, at once shows that the two belong to totally different sections of the genus. I have discovered a very similar misunderstanding with *Nanina petrosa*, Hutton, originally described from Mirzapur. On Benson informing Hutton that his Mirzapur *N. petrosa* was only the Calcutta *N. vitrinoides*, the latter transferred his name of *N. petrosa* to an undescribed Himalayan allied smaller form, the animal of which he knew to be distinct. Benson was wrong; Hutton's species from the Rájmahál Hills (Bhágapur, Mirzapur, &c.), proves quite different, both as regards shell and animal, from the Calcutta form, and of course retains its name *N. petrosa*. It is well and correctly figured in the "Conchologia Indica," pl. lxxxviii, figs. 7 and 10, where our common Calcutta *N. vitrinoides* is not represented at all. I think it very likely something similar may have happened, causing the confusion of this *Helicarion* and the next species; some one may have pointed out that Pfeiffer's flat and depressed shell was only a variety of Benson's *H. scutella* from Teria Ghát, whereupon the name of *monticola* was transferred to the other North-West form, which had previously not been distinguished by a separate name from *H. cassida*, though probably the allied form from Almorah referred to by Benson in the original description (J. A. S. B., VII, p. 214). Indeed from this passage I conclude Benson's manuscript name of *monticola* really referred to this shell, and not to the species described as such by Pfeiffer. This would account for this form being named *monticola* in Cuming's collection, and hence figured for it by Reeve and Hanley; Pfeiffer's actual type of *monticola* should be looked for in the Cumingian collection, amongst the variety of *Vitrina scutella* from the North-West Himalayas. Benson probably, when describing his *Vitrina scutella*, did not compare it with Pfeiffer's *monticola*, because he assumed the latter to be his own true manuscript *monticola*, and not the flat-whorled, depressed shell Pfeiffer really described for it, and which Benson considered (possibly correctly) to be a variety of his Teria Ghát *scutella*.

Dr. Stoliczka found a single specimen at Tinali. I have not taken this specimen as my type, but one of the common Naini Tál specimens, represented in most collections. Type from Naini Tál: diam. 22, axis 8, alt. 13; apert. lat.  $14\frac{1}{2}$ , alt. 12 mm.

## 4. HELICARION MONTICOLA, Pfr.

*Vitrina monticola*, Pfr., P. Z. S., 1848 (Landour, Almorah, &c.)

*Vitrina scutella* (pars), Bens., Ann. & Mag. Nat. Hist., 1859, ser. 3, vol. iii, p. 188 (Khási Hills and Kashmir).

Unfortunately, in his original description of *H. scutella*, Benson does not say whether he takes the Khási or Kashmir form for his type; the two must, I believe, be specifically separated. If, however, they should prove identical, the *scutella* of Benson will be a synonym

of *monticola*. According to the "Conchologia Indica," the type form of *H. scutella* is from the Khási Hills, and the variety from Kashmir; after a careful consideration of the original description, I think Mr. Hanley is correct in this view. Instead of  $3\frac{1}{2}$ , *H. monticola* has  $4\frac{1}{2}$  whorls, which increase more regularly than in *H. scutella*; the colour is of a greenish-brown, instead of bright green; the apex less acute; the aperture much higher in proportion to its breadth; the columella not oblique at all, almost straight and rounded at the base. This species is found abundantly everywhere throughout the North-West Himalayas in company with the preceding.

Specimen from Murree: diam.  $16\frac{1}{2}$ , axis  $5\frac{1}{2}$ , alt.  $8\frac{1}{2}$ ; apert. alt.  $10\frac{1}{2}$ , alt.  $10\frac{1}{2}$  mm.

Pfeiffer's original measurements of *H. monticola* are:—diam. maj. 18, alt.  $7\frac{1}{2}$  mm. This is evidently an even more depressed form than the one here recorded from Murree, and does not at all agree with the preceding species, which possesses moderately exerted whorls and has been figured by both Reeve and Hanley for *H. monticola*; the latter author's figure measures:—diam.  $20\frac{1}{2}$ , alt. 13 mm. Pfeiffer's description, too, suits this shell, and not the preceding, when he says, "*Depressa, &c., spira plana; anfract. 4, celeriter accrescentes planiusculi, ultimus depressus, non descendens, &c.*"

#### 5. NANINA (ROTULA) CHLOROPLAX, Bens.

*Helix chloroplax*, Benson, Ann. & Mag. Nat. Hist., 1865, ser. 3, vol. xv, p. 14 (near Simla).

Found abundantly near Murree, agreeing exactly with the original description and the figure in "Conchologia Indica," pl. xxxii, figs. 1 and 4.

A few of the specimens found were larger than the type, which was only 8 mm. in diameter. Diam. max. 11, axis 5, alt. 6; apert. lat. 6, alt. 4 mm.

#### 6. NANINA (ROTULA) KASHMIRENSIS, n. sp., Figs. 13—15.

Shell small, closely resembling the preceding, from which it can, however, be easily distinguished by its smaller size, less depressed shape, much more closely wound whorls, higher spire and less acute keel; by the more convex base, which does not possess the excavated depression round the umbilicus so characteristic of its ally; the umbilicus itself also is smaller; the sculpture is apparently the same, above subplicately striate, below the same but less developed than above. I think both should rather be described as most minutely punctuate, rather than "*tenuissime decussata*" as in the original description of *N. chloroplax*. The aperture is quite different, being much less dilated in the present species, with scarcely any trace of the acute angulation in the middle of the outer margin, and with the columella less oblique and more rounded at the base. Full-grown type of *N. kashmirensis*, diam  $7\frac{1}{2}$ , axis  $3\frac{3}{4}$ , alt.  $4\frac{1}{2}$ ; apert. lat.  $3\frac{1}{2}$ , alt. 3 mm. Young specimen of *N. chloroplax* (for comparison): diam  $7\frac{1}{2}$ , axis  $3\frac{1}{2}$ , alt.  $4\frac{1}{4}$ ; apert. lat. 4, alt. 3 mm.

Abundant at Sonamarg.

#### 7. NANINA (MICROCYSTIS?) SONAMURGENSIS, n. sp., Figs. 16—18.

Shell small, depressed, thin, horny-brown, with the suture distinct; roughly, regularly and closely ribbed above; sculpture of a similar kind, but almost obsolete, can be traced on the

base; whorls seven, closely wound; the last scarcely, if at all, broader than the previous one, more or less subangulate at the periphery: base convex, distinctly excavated round a deep narrow umbilicus; aperture very shallow, the outer margin distinctly thickened, slightly subangulate in the middle; columella very slightly reflected, oblique, evenly rounded, without any angulation at the base, in this character resembling *N. splendens* and differing from *N. prona*. I know of no Indian species like this interesting little shell; in shape it somewhat resembles the smooth *N. woodiana*. Diam.  $11\frac{1}{2}$ , alt.  $5\frac{1}{2}$ , axis  $4\frac{1}{2}$ ; apert. lat.  $5\frac{1}{2}$  mm.

Dr. Stoliczka found a few specimens alive at Sonamarg; he notes that the animal is provided with a mucous pore.

#### 8. NANINA (MACROCHLAMYS) PRONA, n. sp.

Shell small, of the same group as *N. petrosa*, Hutt., &c., but with closer wound whorls; it is a form which apparently is widely spread throughout the North-Western Himalayas, as the Museum possesses numerous specimens from Simla, Masuri, Naini Tál and Saháranpur; two specimens, found by Colonel Godwin-Austen in the Daffla Hills, also apparently belong here. A very similar small form, but I think specifically distinct, is also found in the Bombay Presidency. Dr. Stoliczka's specimens from Murree are all young, or in bad preservation; I have therefore determined on not naming the species from his Murree specimens, but take as my type the common North-West Himalayan form, the animal of which is known and which is usually recorded in collections as *N. petrosa*. Colonel Godwin-Austen informs me that Hutton himself transferred his own name *petrosa* from the Mirzapur shell to the Masuri one, on the strength of Benson's statement that the former was identical with the Calcutta *N. vitrinoides*, in which, as already stated, Benson was quite wrong. This species is not figured in the "Conchologia Indica," as far as I can see. Whorls six, closely wound, the last only slightly deflected, sometimes not at all, in which case, of course, the aperture is quite vertical; spire almost or quite flat; periphery rounded; umbilicus resembling that of *N. petrosa*, more open than in all the other allied species; horny-brown colour, smooth and polished above and below; margins of aperture distinctly, but slightly thickened. Type from Naini Tál: diam. 12, axis  $4\frac{1}{2}$ , alt.  $5\frac{3}{4}$ ; apert. lat. 6, alt.  $4\frac{3}{4}$  mm.

#### 9. NANINA (BENSONIA) MONTICOLA, Hutt., var. MURRIENSIS, nov.

*Nanina monticola*, Hutt., J. A. S. B., vii, 1838, p. 215 (North-Western Himalayas).

*Helix labiata*, Pfr., P. Z. S., 1845, p. 65 (Loc.—?—)

Both species are recorded and figured in the "Conchologia Indica" as distinct, and I think very possibly the two forms there given may prove separable. Unfortunately, typical *N. monticola* is typical *N. labiata*, as figured l. c., pl. xxvii, fig. 5. This I am able to prove by a fine series of typical *N. monticola*, presented years ago by Captain Hutton to the Asiatic Society, and now in the Indian Museum. Theobald correctly unites the two species in his catalogue, though I consider him mistaken in also uniting Reeve's *H. convexa*. The form found by Dr. Stoliczka is near the much rarer one figured in the "Conchologia Indica," pl. lii, fig. 3, as *H. monticola*, and may prove distinct; the Murree specimen differs indeed, even more markedly than the one there figured, in the characters which separate it from the type

form, namely, open umbilicus, compressed whorls, more vertical aperture and peculiar, abruptly raised apical whorls.

A single specimen only was found at Changligali near Murree.

#### 10. NANINA (BENSONIA) SPLENDENS, Hutt.

*Nanina splendens*, Hutton, J. A. S. B., 1838, p. 216 (North-Western Himalayas); "Conchologia Indica," pl. li, figs. 7 and 10.

This is one of the puzzling species, apparently intermediate between *Macrochlamys* and *Xesta*. The question of its correct generic rank can only be settled by a careful examination of its anatomy. In the excellent original description, the animal is described as of "a dark verdigris green, living under fallen timber at 9,000 to 11,000 feet above the sea," &c. Dr. Stoliczka found a few specimens at Tinali.

#### 11. NANINA (BENSONIA) ANGELICA, Pfr.

*Helix angelica*, Pfr., P. Z. S., 1856, p. 33 (Punjab).

Dr. Stoliczka found several living specimens, all unfortunately young, at Uri (between Tinali and Srinagar). The form is distinguished from the preceding by the almost closed umbilicus, more closely wound whorls, &c.; the rounded periphery and numerous varices appear to be characteristic.

#### 12. NANINA (BENSONIA) JACQUEMONTI, v. Mart.

*Nanina jacquemonti*, v. Mart., Mal. Bl., xvi, 1869, p. 75 (Himalayas).

A single specimen of this well-marked species was found at Murree; it is a common shell in the Punjab Salt Range. I give below the measurements of the Murree specimen, as they differ somewhat considerably from those of the type.

Diam. 20, axis  $7\frac{1}{4}$ ; alt.  $10\frac{1}{4}$ , apert. lat.  $10\frac{3}{4}$ , alt.  $8\frac{1}{4}$  mm.

#### 13. HELIX (PATULA) HUMILIS, Hutt.

*Helix humilis*, Hutt., J. A. S. B., 1838, p. 217 (Simla).

Found tolerably abundant near Murree. Hutton records the animal "as that of a true *Helix*, of a dark grey or blackish colour, abundant during the rains on moist rocks, under dead leaves, &c., and at the roots of shrubs."

#### 14. SUCCINEA PFEIFFERI, Rossm.

A few specimens from near Srinagar.

15. *CLAUSILIA WAAGENI*, Stol.

*Clausilia waageni*, Stoliczka, J. A. S. B., 1872, pl. ix, fig. 19 (Changligali).

About a dozen specimens of this species were found near Murree, under the bark of trees.

16. *CLAUSILIA CYLINDRICA*, Gray.

*Clausilia cylindrica*, Gray, Pfr., Symb. III, p. 93 (India).

Found in great abundance, under the bark of oak trees, near Murree.

17. *BULIMINUS (PETRÆUS) STOLICZKANUS*, n. sp., Figs. 25—27.

Shell in shape resembling *B. rufistrigatus*; deeply and narrowly rimate, oblong, for a species of *Petræus* of rather thin and diaphanous texture; obliquely, very irregularly striated, the striæ often very broad, more or less crowded together, with gaps between the "fasciculi." The ground colour is dark horny brown, with the striæ pure white, having the appearance (owing to the epidermis) in a fresh state of being a bright yellow; spire oblong, conical, apex obtuse; whorls seven, scarcely convex; aperture oblique and oblong, peristome white, outer margin scarcely reflected, columella moderately broad. It can be easily distinguished from its next ally *B. rufistrigatus*, by the less convex whorls, the more produced spire, less obtuse apex, by the considerably broader last whorl (in proportion to the others) and by the more dilated aperture; the sculpture also is peculiar and characteristic: it is nearer pl. xxiii, fig. 10, of the "Conchologia Indica" than pl. xx, fig. 4.

Long. 16, diam. 7 (last whorl to base of aperture 9); apert.  $5\frac{3}{4}$ , lat.  $4\frac{1}{4}$  mm.

Found fairly abundant living on currant-bushes at Sonamarg.

18. *BULIMINUS (PETRÆUS) MAINWARINGIANUS*, n. sp., Fig. 28.

There is no Indian species with which I can compare this species. As to shape, the nearest I know of are some small dwarf forms of *Cylindrus insularis*; the species is, however, next allied to *B. pretiosus* and *B. rufistrigatus*.

Narrowly and superficially rimate, subcylindrically conical, of stout, smooth and polished substance; striated, striæ less oblique than in the preceding, fewer and more regular, not crowded together in the same way, here and there one more developed than the others, with intermediate ones more or less obsolete; light horny-brown, variegated with opaque white markings, as in *B. pretiosus*; these markings are fewer, of a more zigzag, broader and more irregular nature than those of the preceding; spire produced, apex scarcely obtuse; whorls 7, the three apical ones unusually short compared with the others, last whorl compressed; aperture very small, almost as broad as high, peristome pure white, outer margin considerably thickened, columella very broadly reflected, straighter than in the preceding, slightly subangulate, instead of rounded, at base.

Long. 10, diam.  $4\frac{1}{3}$  (last whorl to base of aperture,  $5\frac{1}{4}$ ); apert. alt.  $3\frac{7}{8}$ , lat. 3 mm.

Fairly abundant, near Murree.

I have named this pretty little shell after my friend Colonel Mainwaring, B.S.C., who has lately discovered very many interesting, rare and new forms round Calcutta, in Behar, and near Darjiling.

19. BULIMINUS (PETRÆUS) BEDDOMEANUS, n. sp., Fig. 29.

This is a very interesting species, resembling somewhat, in shape of the whorls and aperture, *B. smithi*, "Conchologia Indica," pl. xx, fig. 3, but it is still nearer *B. eremita*, Bens., l. c., fig. 8, from which its produced spire, narrower whorls, and aperture easily distinguish it. Narrowly rimate, subcylindrically turreted, of solid, scarcely polished substance; closely, obliquely striate, striæ more regular and crowded together than in the two preceding forms; of a very pale horn colour, only here and there discernible, on account of the crowded striæ, which are of a chalk white colour; spire much produced, apex obtuse; whorls 10, increasing very gradually and regularly, last whorl compressed; aperture very small, peristome white, outer margin broadly reflected, very slightly arcuate (much as in pl. xx, fig. 3, l. c.), columella dilated, obliquely rounded at base.

Long.  $13\frac{3}{4}$ , diam.  $4\frac{3}{4}$  (last whorl to base of aperture, 5); apert. alt.  $3\frac{1}{2}$ , lat.  $2\frac{7}{8}$  mm.

Rather scarce near Murree.

I have named this shell after Colonel Beddome, who has contributed so extensively to our knowledge of the plants, reptiles and mollusks of South India.

20. BULIMINUS (PETRÆUS) PRETIOSUS, Cantor.

Four specimens were found at Tinali, and a single one, of a slightly different form, near Murree.

21. BULIMINUS (PETRÆUS) RUFISTRIGATUS, Bens.

A single specimen of the typical form from the Jhelum Valley, and two specimens from Kashmir of the var. *gracilis* of the "Conchologia Indica."

22. BULIMINUS (PETRÆUS) DOMINA, Bens.

A few specimens were found alive near Murree.

23. BULIMINUS (PETRÆUS) CANDELARIS, Pfr., var.

A peculiarly shortened form found very abundantly near Tinali; the dextral form appears to have been found more abundant than the sinistral. Mr. Lydekker, of the Geological Survey of India, informs me he has noticed that the two forms are not usually found absolutely together.

## 24. ANADENUS ALTIWAGUS, Theob.

*Limax altivagus*, Theob., J. A. S. B., 1862, p. 489.

A few specimens were found at Changligali, under a log of wood. I am by no means sure that my friend Mr. Theobald is correct in uniting with this species the *A. giganteus*, Heyn.; the latter seems to me to agree better with a still larger slug of which the Indian Museum possess several fine specimens in spirit, found at Katmandu in Nipal.

## 25. ANADENUS MODESTUS, Theob.

*Limax modestus*, Theob., J. A. S. B., 1862, p. 489 (Simla Hills).

A few specimens of this small form, as far as I can see, only differing in external aspect by their smaller size and finer texture, were found with the preceding.

## 26. ANADENUS, sp.

I should not have ventured on separating this single specimen, found with the two preceding, but for a note of Dr. Stoliczka, which says—"I also found near here four specimens of an *Arion*, and specimens of two other *Arion*-like slugs." It is slightly larger than the preceding, and of a black, instead of light liver colour; otherwise I can see no difference.

## 27. ANADENUS, sp.

Described by Stoliczka in his notes as "a slug like the one I found at Changligali, but with the foot sharply crested."

## EXPLANATION OF THE PLATE.

- Fig. 1—3. *Helix (Fruticicola) phæozona*, v. Mart., p. 2.  
 „ 4—6. „ „ *plectotropis*, v. Mart., p. 3.  
 „ 7—9. „ „ *mataianensis*, Nevill, p. 3.  
 „ 10—12. „ (*Xerophila*) *stoliczkana*, Nevill, p. 3.  
 „ 13—15. *Nanina (Rotula) kashmirensis*, Nevill, p. 16.  
 „ 16—18. „ (*Microcystis*) *sonamurgensis*, Nevill, p. 16.  
 „ 19—21. *Helicarion stoliczkanus*, Nevill, p. 15.  
 „ 22—24. „ *austenianus*, Nevill, p. 14.  
 „ 25—27. *Buliminus (Petræus) stoliczkanus*, Nevill, p. 19.  
 „ 28. „ „ *mainwaringianus*, Nevill, p. 19.  
 „ 29. „ „ *beddomeanus*, Nevill, p. 20.  
 „ 30—31. *Succinea martensiana*, Nevill, p. 5.  
 „ 32—33. „ *pfeifferi*, var. *subintermedia*, Nevill, p. 6.  
 „ 34—36. *Valvata stoliczkana*, Nevill, p. 12.

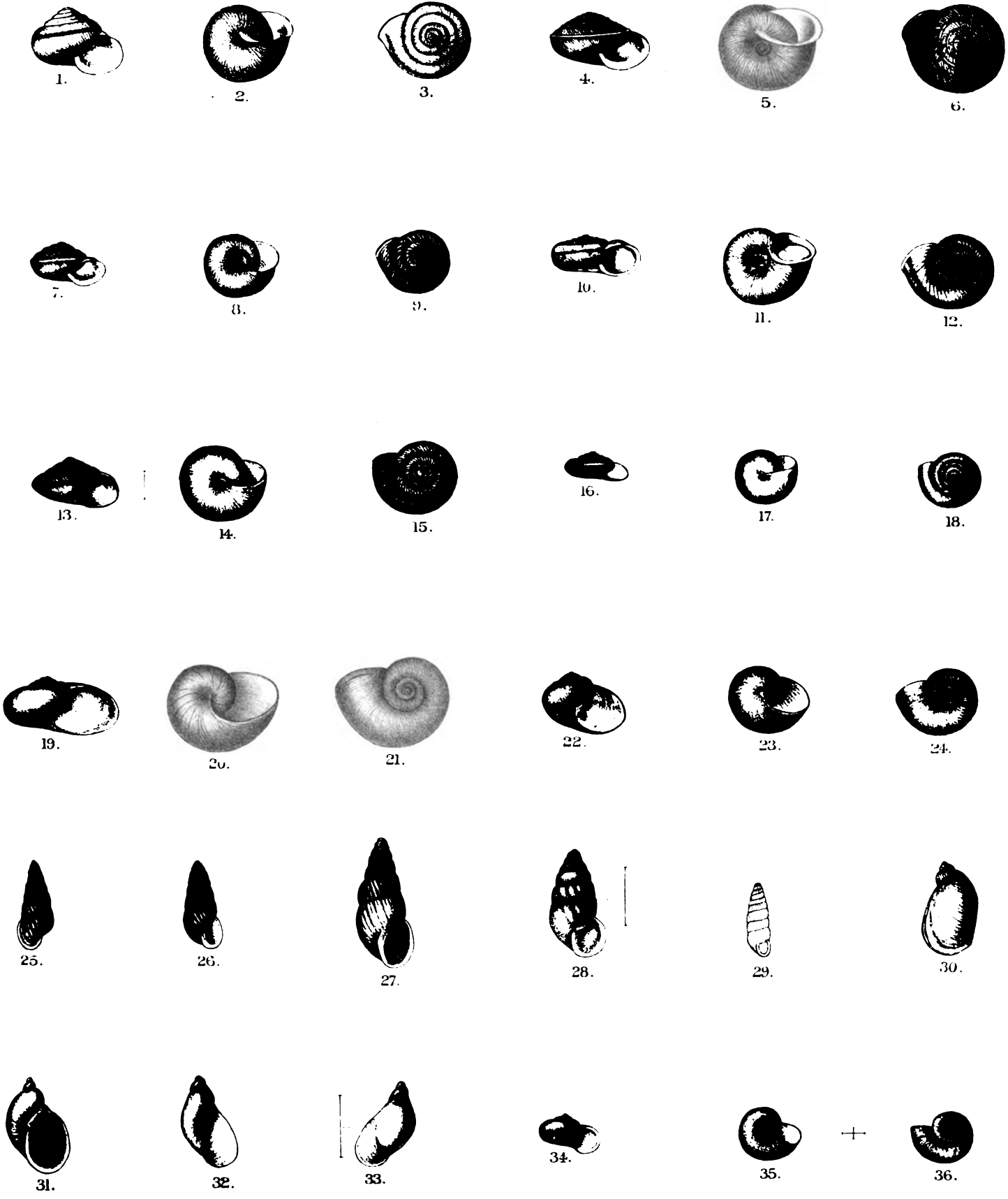
## ERRATUM.

In names at foot of plate for "var. *intermedia*," read "var. *subintermedia*."





MOLLUSCA.



R Mintern lith.

Mintern Bros imp.

- |     |     |                                 |     |     |                                                     |
|-----|-----|---------------------------------|-----|-----|-----------------------------------------------------|
| 1.  | 3.  | <i>Helix phaeozona.</i>         | 22. | 24. | <i>H. austenianus.</i>                              |
| 4.  | 6.  | <i>H. plectotropis.</i>         | 25. | 27. | <i>Buliminus stoliczkanus.</i>                      |
| 7.  | 9.  | <i>H. mataianensis.</i>         | 28. |     | <i>B. mainwaringianus.</i>                          |
| 10. | 12. | <i>H. stoliczkana.</i>          | 29. |     | <i>B. beddomeanus.</i>                              |
| 13. | 15. | <i>Nanina kashmirensis.</i>     | 30. | 31. | <i>Succinea martensiana.</i>                        |
| 16. | 18. | <i>N. sonamurgensis.</i>        | 32. | 33. | <i>Succinea pfeifferi (var. <i>intermedia</i>.)</i> |
| 19. | 21. | <i>Helicarion stoliczkanus.</i> | 34. | 36. | <i>Valvata stoliczkana.</i>                         |

