



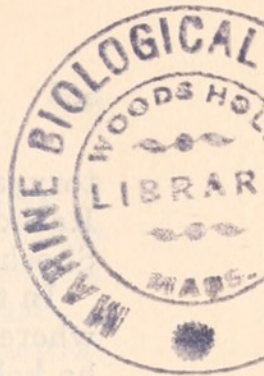
Fig. 5



Fig. 6







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**MOLLUSKS OF THE CLEARWATER MOUNTAINS, IDAHO**

BY

ALLYN G. SMITH

*Research Associate in Paleontology*

Previous to the California Academy of Sciences' expedition into the Clearwater Mountains of Idaho in the fall of 1941, this area had been relatively unknown to the conchologist. It thus affords considerable satisfaction to report on the molluscan fauna, which was collected in this region by Dr. G. Dallas Hanna, Dr. Robert T. Orr, Mr. Cecil Tose and Mr. Anatole Loukashkin.

The first extensive collection of land and fresh-water mollusks in Idaho was made by Henry Hemphill in the 1880's. The results of his work showed the extent of the fauna and brought to light a number of new species, several of them limited in range and strikingly different in their characters from species found elsewhere. The Academy, fortunately, is in possession of much of the original Hemphill material, including several lots of land slugs, which are still well-preserved in alcohol.

The route that Hemphill followed is not positively known. After collecting extensively in the vicinity of Great Salt Lake, Utah, he crossed the line into Idaho near Franklin, which was one of his collecting stations. His next group of collecting localities appears to be in the Salmon River Mountains along the banks of the Little Salmon and Salmon rivers on the road now designated as U. S. Highway 95 between New Meadows and White Bird, in Adams and Idaho counties. He did some collecting in the neighborhood of Stites, in northern Idaho County, and at Orofino, in Clearwater County, these localities being nearest to the Clearwater Mountains in northeastern Idaho County that were visited by the Academy's expedition. Hemphill also made extensive collections in the terri-

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tory around Coeur d'Alene Lake, particularly at "Old Mission," Rathdrum, and Post Falls in Kootenai County, and at Kingston in Shoshone County.

In the early 1900's, the Rev. E. H. Ashmun moved from Arizona, where he had done much careful collecting, to Weiser, Idaho, where he held a pastorate for three or four years until poor health forced another move to the San Francisco Bay region. His collection, now being held intact by the author for Mrs. Ashmun, contains much land snail material from the drainage basin of the Weiser River from Weiser north to Meadows and the Payette Lakes, in Adams County.

In 1930, Dr. H. Burrington Baker collected along Hemphill's route at least as far as Orofino, covering the Salmon River Mountains within walking distance of the highway. He discovered several striking new species and re-collected several others taken originally by Hemphill.

In 1931, and again in 1941, the author made collecting trips along the same general route between Weiser and Lewiston. While the shells collected contained no new species, the re-discovery of three of Hemphill's species, formerly designated from the "Salmon River Mountains" or from the "banks of the Salmon," makes it now possible to report them from exact localities. The three species include *Oreohelix jugalis* (Hemphill), *O. intersum* (Hemphill), and *Triodopsis harfordiana* (Cooper). The first of these was found in piles of water-worn boulders near the west bank of the Salmon River, one mile north of Riggins; the second was collected sparingly in lava rock-slides facing east, to the west of the highway but several hundred yards away from the bank of the Little Salmon, about 3 miles south of Riggins; the third was found in rock-slides of blue limestone on the right side of John Day Creek, about 2 miles from its mouth. *T. harfordiana* was not uncommon at this location but, unfortunately, was not recognized in the field and only a few specimens collected.

Compared with the relative scarcity of native land snails in California, the Idaho region, generally, is a veritable collector's paradise, except perhaps in winter when snow conditions make collecting difficult or impossible, especially in the higher mountains. In favorable forested areas *Allogona ptychophora* and one or more races of *Triodopsis mullani* are common everywhere, more often than not being found in considerable numbers crawling about on the moist vegetation. At lower elevations, small species, such as *Vallonia cyclophorella*, *Helicodiscus salmonensis*, *Polygyrella polygyrella*, and *Columella edentula*, are easy to collect in quantity. In the Clearwater Mountains the Academy's collectors found this generally true except for a relative scarcity of the smaller species and the common occurrence of *Anguispira nimapuna* and the shelled-slug *Hemphillia camelus*. This can be attributed possibly to the absence of any limestone outcrops near the Academy's collecting



stations and would also be a reason for the comparative rarity of *Oreohelix* there. As a rule, the presence of limestone formations in the Idaho region is an almost certain indication of the existence of a rich molluscan fauna, both in numbers of species and individuals.

In 1910 a very disastrous fire swept through a large area in central eastern Idaho, including part of the Craggs Mountains. An excellent account of this fire may be found in Vol. 48, No. 7, of *American Forests*, for July, 1942. Brush and other vegetation has regrown on the lower parts of the burned over area but a new forest growth has scarcely started. The collecting party made a trip from Selway Falls to the Craggs Mountains and careful search was made for small land shells and insects at an elevation of 6,000 to 7,000 feet where, up to the time of the fire, there had been a magnificent stand of timber. No mollusks and very few insects were found. Vegetation was limited to grasses and sedges, some annual flowering plants and scattered bushes of various kinds. In ordinary forest fires many land snails must escape destruction due to their habits and habitat but when one of these extremely hot conflagrations passes over a region it seems to wreak total extermination.

Fortunately the two camps made south of Selway Falls were in heavily forested areas which had never been burned so far as could be determined, and lumber interests had not done any logging. There most of the collection was made, and it may be assumed that the mollusks found represent the natural fauna undisturbed by man.

For an account of the geography, geology, fauna and flora of the territory visited by the expedition, the reader is referred to the preceding paper, "Mammals of the Clearwater Mountains, Idaho," by Dr. Robert T. Orr, of the Academy's Department of Ornithology and Mammalogy.

#### LIST OF THE SPECIES

The following list is based on the shells collected at four stations, ranging in elevation from around 1,900 feet to about 5,800 feet. A total of twenty-one species and subspecies were taken, including one new to science that is described and figured on subsequent pages. For several species the habitat range is extended beyond previously known limits.

#### GASTROPODA: CAMAENIDAE

##### *Oreohelix strigosa goniogyra* Pilsbry

*Oreohelix strigosa goniogyra* PILSBRY, 1939, p. 428, figs. 279:12-16.

Described originally from shells collected by H. B. Baker on lower Race Creek, in Idaho County, at 1700-1800 feet elevation, it was with some surprise that this carinated subspecies of *strigosa* was collected by the Academy's expedition at two new localities.



Specimens were scarce and hard to find in spite of a diligent search. Identification is confirmed by comparison with a set of 20 shells collected by the author at or near the type locality in June, 1941 (AGS 7848).

The expedition's shells agree well with Pilsbry's excellent figures, except that there is less of a tendency toward multiple banding. Of eight adult or nearly adult specimens collected, six were strongly double banded, the other two being plainly colored with brown flecks and subobsolete bands.

C. A. S. 31,499 Meadow Cr.,  $1\frac{1}{2}$  mi. south of Selway Falls, Idaho Co., Idaho; elev. 1900 feet. Four adults, seven immature specimens.

C. A. S. 31,500  $4\frac{1}{2}$  mi. southwest of Selway Falls; elev. 5800 feet. Three adults, three immature specimens.

Shells from Locality 31,500 are somewhat less strongly carinate with more deeply impressed sutures. Measurements of adult specimens are as follows:

C. A. S. 31,499	Diameter, 23.4 mm.	Height, 16.7 mm.	
"	" 23.6 "	" 15.5 "	(Not mature)
"	" 20.4 "	" 14.4 "	
"	" 21.2 "	" 14.6 "	
C. A. S. 31,500	" 20.4 "	" 14.6 "	
"	" 17.1 "	" 12.2 "	

At Locality 31,500 two smaller shells of beehive shape with a small umbilicus were collected, which appear to belong to a different race. Both were dead "bones," badly worn, giving no opportunity to tell more than that they are double-banded shells measuring:

Diameter, 15.4 mm.; height, 12.3 mm.  
Diameter, 15.4 mm.; height, 10.8 mm.

This extension of the range of *goniogyra* would seem to place this subspecies of *strigosa* above the level of a mere locality variation.

### ***Polygyrella polygyrella* (Bland and Cooper)**

*Polygyrella polygyrella*, HENDERSON, 1921, p. 86, fig. 43;—PILSBRY, 1939, p. 558, fig. 370.

Shells of this species were collected as follows:

C. A. S. 31,496 Lava slide 2 mi. east of Kooskia, Idaho Co., Idaho. Eleven adults, eighteen immature specimens. Diameter, 8.5-9.3 mm.; whorls  $6\frac{7}{8}$ - $7\frac{1}{4}$ .

C. A. S. 31,498 25 mi. east of Kooskia. Fifteen adults, four immature. Diameter, 9.9-11.9 mm.; whorls,  $7\frac{3}{4}$ - $8\frac{1}{2}$ .



C. A. S. 31,499 Meadow Cr.,  $1\frac{1}{2}$  mi. south of Selway Falls. Sixty-one adults, thirty-one immature. Diameter 9.0-10.5mm.; whorls,  $7\frac{1}{4}$ - $8\frac{1}{8}$ .

C. A. S. 31,500  $4\frac{1}{2}$  mi. southwest of Selway Falls. Six adults, seven immature. Diameter, 8.7-9.8 mm.; whorls  $7\frac{1}{8}$ -8.

In general, shells from Idaho are slightly smaller, darker, and have a less prominent parietal tooth than those from the Bitter-root Mountains of Montana. Except in size, the Idaho lots collected by the expedition show no particular variations.

### Family POLYGYRIDAE

#### ***Triodopsis mullani magnidentata* Pilsbry**

*Triodopsis mullani magnidentata* PILSBRY, 1940, p. 862, fig. 499, f, f'.

In a lava slide two miles east of Kooskia, along with two large-sized specimens of *T. mullani olneyae* (Pilsbry), two specimens of this small subspecies were taken. One, a dead shell, shows the strong tooth characters; the other, which is a younger shell, does not have the teeth fully developed. Measurements are:

Diameter, 9.9 mm.; height, 5.2 mm.; whorls, 5.

Diameter, 10.0 mm.; height, 5.1 mm.; whorls,  $4\frac{3}{4}$ .

This is a considerable extension of range for the subspecies, the original lot (the only one known) having been found by H. B. Baker near Cul-de-Sac, Nez Perce County, Idaho ("Mission Creek, 7 or 8 miles above Jaques Spur").

#### ***Triodopsis mullani olneyae* (Pilsbry)**

*Triodopsis mullani olneyae*, PILSBRY, 1940, p. 864, figs. 499:i-1.

Shells of the *mullani* group were taken at four collecting stations visited by the expedition. Practically all specimens appear to be closest to *olneyae*, although in the two lots from near Selway Falls there is considerable variation, a fact not unusual in the group. The following lots were collected:

C. A. S. 31,496 2 mi. east of Kooskia, Idaho Co., Idaho. Two adults; nine immature specimens.

C. A. S. 31,498 25 mi. east of Kooskia. Four adults.

C. A. S. 31,499 Meadow Creek,  $1\frac{1}{2}$  mi. south of Selway Falls. One hundred twenty-three adults; fifty-two immature.

C. A. S. 31,500  $4\frac{1}{2}$  mi. southwest of Selway Falls. Twenty adults; twelve immature.



Adults from the first two of the above localities average about 17 mm. in diameter, but in the lots from near Selway Falls the size is extremely variable, as may be observed from the following measurements:

C. A. S. 31,500	Diameter, 17.7; height, 10.2 mm. Largest. Diameter, 11.9; height, 6.1 mm. Smallest.
C. A. S. 31,499	Diameter, 15.4; height, 8.0 mm. Most depressed. Diameter, 17.3; height, 11.0 mm. Most elevated.

Among the shells from Selway Falls, depressed specimens are rare. Except for the smaller umbilicus, they are close to *T. mullani clappi* (Hemphill) found farther to the south along the Little Salmon River near Lucile and Riggins, in Idaho County, although reported also from Orofino, in Clearwater County.

The surface of the shells is variable, ranging from a matte or semi-matte to highly polished. Under a magnification of  $\times 14$  few of the duller shells show hair scars and on an occasional adult specimen a few of the hairs themselves can still be seen. These are features not found on the polished shells. The matte surface, with its hair scars and occasional hairs, is very thin and apparently is easily worn off by the movement of the snail in crawling, thus exposing the polished surface underneath. Why some fully adult shells should be polished and others not is a question that cannot be answered without greater knowledge than we now have of the growth and development of the shells, and the effect of ecological conditions, particularly food and the amount of acid content in the soil.

Young shells are sparsely hirsute, but occasionally a young polished shell is found that apparently never has had any epidermal hairs except possibly in the nuclear stage. In unusually well preserved young specimens the hairs are short and more closely set than they are when the shells are closer to the adult stage. Apparently these are lost after the shells attain three or four whorls. In most half-grown shells the nuclear and two postnuclear whorls are polished. Fairly long sparsely-set hairs begin at the end of the third whorl (rarely appearing on the second) and persist in most specimens until the last whorl begins. At the stage of growth from this point until after the characteristic rolled lip is formed the hairs begin to break off, leaving scars in some shells where the matte surface is not entirely worn off.

The peristome of most of the specimens is strongly reflected and rolled back along the edge. The body whorl immediately behind it is deeply channeled. A basal lamella is present in all shells, which is typical for *olneyae*, although variable in shape and prominence. In some specimens the lamella terminates rather abruptly at its right end instead of merging evenly with the inner lip. In a number of shells this termination is decorated with a small tooth-like projection, as in typical *mullani*. In only one rather small shell from near



Selway Falls was an outer lip-tooth present. A strong parietal tooth, generally short and of a triangular pyramidal shape with a rounded top, is present in most specimens. In a few, this tooth is reduced to a weak ovate tubercle; in four or five specimens the parietal tooth is absent.

The umbilicus of a large proportion of the shells is small and open, but in many of the Selway Falls specimens this is partially covered by the basal reflection of the lip. None is imperforate.

The elevated form from the lots found near Selway Falls is almost a distinct race, separable from *olneyae*, in addition to the greater elevation of the spire, by the tumid body whorl, smaller half-covered umbilicus, subquadrate rather than semi-lunate aperture, narrower peristome, and more polished shell surface. In the lot from Meadow Creek, twenty-one out of one hundred twenty-three adults are of this elevated form; in the other lot from near Selway Falls about half are this form. Three adults and one immature specimen are milk-white albinos. Immature shells are sparsely hirsute and cannot be separated with assurance from the other form. The parietal tooth is usually weaker, and in four shells it is absent. In size, the major diameter ranges from 14.5 to 16.4 mm.; the height from 8.7 to 10.4 mm.; and the number of whorls from  $5\frac{1}{2}$  to  $5\frac{3}{4}$ . An average shell measures: diameter, 15.6 mm.; height, 10.1 mm. As intergrades with the other form of *olneyae* exist in both lots, the above account, rather than a formal description, will serve to call attention to this relatively minor variation in a general group of snails in which such "little races" appear to be the rule rather than the exception.

### *Allogona ptychophora* (A. D. Brown)

*Polygyra ptychophora*, HENDERSON, 1929, p. 84, fig. 41.

*Allogona ptychophora*, PILSBRY, 1940, pp. 887-891, figs. 509 g-n, 510, drawings 5, 6.

*Allogona ptychophora* form *castanea*, PILSBRY, 1940, pp. 890-891, fig. 509 g, h.

Snails of this common Idaho species were abundant. In the main, they were found crawling on the ground and over mossy rocks. The shells are rather thin-textured and medium-sized for the species, ranging from 17.5 to 22.2 mm. in diameter, and from 11.9 to 14.7 mm. in height. Transverse sculpture consists of many closely-spaced, low, sinuous ribs extending across the body whorl, with a spiral sculpture of fine, subobsolete striations. Traces of malleations occur on some specimens. On about one-third of them there is a trace of a basal tooth. The following lots were collected:

- C. A. S. 31,496 In a lava slide, 2 mi. east of Kooskia, Idaho Co., Idaho. Three adults and several immature specimens.
- C. A. S. 31,497  $8\frac{1}{2}$  mi. east of Kooskia, on a road to Selway Falls. Twenty-nine adults, three immature.
- C. A. S. 31,499 Meadow Cr.,  $1\frac{1}{2}$  mi. south of Selway Falls. Forty-five adults, fifteen immature.



All specimens of the medium-sized, thin-textured *ptychophora* collected by the expedition appear to belong to the race described as *Helix ptychophorus* var *castaneus* by Hemphill in 1890 and subsequently considered as a "form" by Pilsbry. In the Academy's Type Collection are six syntypes of the form *castanea* (Hemphill) from Rathdrum, Idaho (CAS 8136 H. H., nos. 1221-1226, incl.) and six additional syntypes from Old Mission, Idaho (CAS 8134 H. H., nos. 1227-1232, incl.). Also in the collection are six other lots comprising thirty-three shells from Spokane Falls, Washington; Weiser Canyon, Idaho; and from the banks of the Salmon River, Idaho. Comparison of expedition shells with these and with many lots collected by the late Rev. E. H. Ashmun and by the author, principally along the Weiser, Little Salmon, and Salmon rivers, brings to light no marked or constant differences. Small, heavily textured and generally light-colored shells collected with *Oreohelix idahoensis* (Newc.) one mile south of Lucile, Idaho, along a highly mineralized creek are the only exceptions observed although the conditions of their habitat are probably sufficient to result in this particular variation.

The name *castanea* is somewhat misleading. Many light-colored shells occur in freshly collected lots, although there is a larger ratio of dark-colored shells in the lots taken by the expedition. Hemphill's original lots from Rathdrum and Old Mission are now all generally light in color but may have been considerably darker when collected. One suspects that these shells may have faded considerably in the course of years. The name *castanea* might well be dropped as it does not appear to represent a race of *ptychophora* that can be easily separated from typical specimens, more particularly from the neotype collected near Ward, Montana (Pilsbry, 1940, p. 889, fig. 509, i. j.). *A. p. solida* (Vanatta) has definite and apparently constant characters that set it apart from the typical form. Although it is possible that the smooth form collected by H. B. Baker near Stites, Idaho (Pilsbry, 1940, p. 891, fig. 509, m, n.), might be a valid subspecies, more collecting in this vicinity would seem desirable to determine its range and limit of variation before such a step is taken.

As Pilsbry has given a full account of the anatomy of *ptychophora*, none of the animals collected was dissected. To his account may be added the existence of a considerable variation in the color of the mantle of the animal. There are three well marked color groupings: first, animals with a uniformly blue-black mantle; second, those with a whitish mantle strongly marked with irregular black spots or maculations; and third, those with a uniformly light cream-colored mantle marked with faint brownish areas. There is no evident connection between the mantle color of the animal and the hue of the shell, darkest colored shells more often having light or black-spotted animals than those of the blue-black color. In a series of thirty-two shells collected in June, 1941, at the south entrance of the



Weiser National Forest (AGS 7838), nine animals had the dark mantle, thirteen had a speckled mantle, and ten had the light-colored mantle. Corresponding shells in each group varied from light to dark.

The wide range of variation in *A. ptychophora* is interesting and the relative abundance of specimens within its territory ought to present no great difficulties in working it out completely. There still remain large uncollected areas, however, to cover.

***Allogona lombardii* A. G. Smith, new species**

PLATE 48, figs. 1 to 4

The shell is large and heavy, approximately the size and texture of medium-sized *A. townsendiana* (Lea), moderately elevated, with from  $5\frac{5}{8}$  to  $6\frac{1}{8}$  whorls, the last one tumid. Nuclear whorls one and one-half to two, glossy, smooth except for fine transverse ribbing in the vicinity of the suture. Umbilicus small, contained from ten to thirteen times in the major diameter of the shell. Sutures well impressed. Aperture semi-lunate, the peristome heavy, white, strongly reflected, the edge slightly rolled back. Some shells have a subobsolete basal tooth or short basal lamella near the columellar end of the peristome. Sculpture consisting of transverse sinuous ribs, most prominent on the body whorl, closely though variably spaced, and generally extending continuously across the whorls. Closely set, wavy, spiral striations, generally present above and below, are strongest near the summits of the whorls, although on many shells these striations are subobsolete. Malleations absent. Color ranging from a dark bistre-brown to a light buff-brown, shells of darker color predominating. Ridges of the transverse sculpture in the darker specimens are light buff, serving to set them off in a most striking manner from the darker ground-color of the shell. Surface of fresh shells shining but not highly polished.

*Holotype*: C. A. S. Paleo, Type Collection, No. 7893, Major diameter, 27.0 mm.; height, 19.0 mm.; whorls,  $5\frac{3}{4}$ .

*Type Locality*: C. A. S. Locality 31,499, along **Meadow Creek,  $1\frac{1}{2}$  m. south of Selway Falls, Idaho Co., Idaho**, elevation 1900 feet. In addition to the holotype, seventy-three adult and seven immature specimens were collected.

*Paratypes*: Specimens from the type locality so designated have been deposited in the Academy's Paleo. Type Collection (Nos. 7894 to 7898, incl.); in the collections of the Academy of Natural Sciences of Philadelphia, the U. S. National Museum, Stanford University, the Los Angeles Museum, the San Diego Society of Natural History; and the private collections of Mr. and Mrs. Emery P. Chace, S. S. Berry, and A. G. Smith.



*Other Localities:* C. A. S. Locality 31,500,  $4\frac{1}{2}$  mi. southwest of Selway Falls, Idaho Co., Idaho, at an altitude of 5,800 feet, a total of eleven adult and three immature specimens.

*Remarks:* At both localities where this remarkable snail was collected it was found along with the race of *A. ptychophora* just discussed. No intergrades between the two were taken, and because the shells of the large, robust, heavily-ribbed form present so different an aspect, it is given status as a separate species.

Compared with *A. townsendiana* (Lea), a snail found only in humid coastal region west of the Cascade Mountains, it is about equal in heavy shell texture and nearly equal in size. Also, it is more elevated, has a smaller umbilicus, more prominent transverse sculpture, and differs further in the complete lack of malleations.

The shells of *lombardii* tend toward a relatively elevated spire, only five out of a total of twenty on which specific notes were made having the spire depressed. In this same group of twenty, the basal tooth is subobsolete in nine shells, in two the tooth is quite strong, while in the remaining eleven shells there is hardly a suggestion of a tooth or none at all.

In older shells the epidermis, which is thin, becomes worn off. In senile specimens often there is hardly any of it left. Two or three extremely light yellowish specimens, possibly xanthic, were taken, one being the largest shell in the following table of measurements, which demonstrates the range in size of the species:

	<i>Maj. Diam.</i>	<i>Height</i>
Largest	29.2 mm.	18.6 mm.
Most elevated	24.8 "	18.1 "
Most depressed	28.0 "	17.8 "
Smallest	24.2 "	16.9 "
Average of 20	26.6 "	18.5 "

Spacing of the transverse ribbing is quite variable, being as small as 0.5 mm. in some shells to 1.0 mm. in others, while occasional spacing of as much as 1.6 mm. occurs. On individual specimens a considerable difference in rib spacing exists. All ribs are not continuous across the body whorl and in some shells occasional ribs begin well below the suture and even at the periphery. Some ribs are broken and in others a tendency towards branching may be noted, although these are minor sculptural features.

Very young shells of *lombardii* cannot be separated for sure from the young of *ptychophora*. This can be done, however, when the snails are about one-quarter grown, when the heavier texture and the more prominent ribbing of the former begin to develop.

By all odds, *Allogona lombardii* is the most heavily ribbed of any of the large number of lots of the western *Allogonas* examined. Approaching it in type of sculpture, but not in size, is a lot of six



shells from Boswell, Kootenay Lake, British Columbia (C. A. S. 27,064), which probably should take the same name.

It is a pleasure to name this new and striking addition to our West Coast mollusk fauna in honor of Mr. M. E. Lombardi, whose interest and very material help made possible the Academy's recent expedition into a little-known region in the mountains of Idaho.

## SAGDIDAE

### *Microphysula ingersollii* (Bland)

*Microphysula ingersollii*, HENDERSON, 1929, p. 90, fig. 46;—PILSBRY, 1940, p. 991, figs. 579, A, B, C.

Shells of this species were picked from leaf mold as follows:

C. A. S. 31,496 Lava slide, 2 mi. east of Kooskia, Idaho Co., Idaho.  
Two adult specimens.

C. A. S. 31,500 Meadow Creek, 1½ mi. south of Selway Falls, Idaho.  
One immature specimen.

## COCHLICOPIDAE

### *Cochlicopa lubrica* (Müller)

*Cochlicopa lubrica*, HENDERSON, 1929, p. 94, fig. 55.

About thirty immature specimens were found in the leaf-mold along Meadow Creek, 1½ miles south of Selway Falls (C. A. S. 31,499). Careful search of the ground-cover failed to produce adult shells. As this species is not uncommon in the Idaho region it is difficult to account for its apparent scarcity at the expedition's collecting stations, unless it be a lack of lime in the soil.

## ZONITIDAE

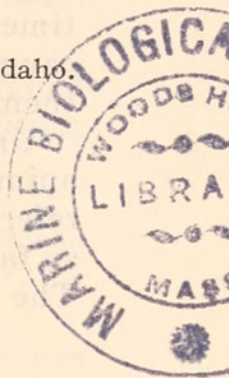
### *Zonotoides arboreus* (Say)

*Zonotoides arboreus*, BAKER, H. B., 1928, p. 39, pl. 8, figs. 6-9 (for anatomy);—HENDERSON, 1929, p. 102, fig. 65 (for synonymy).

C. A. S. 31,496 Lava slide, 2 mi. east of Kooskia, Idaho Co., Idaho.  
One adult, one immature specimen.

C. A. S. 31,498 25 mi. east of Kooskia. Two adult specimens.

C. A. S. 31,499 Meadow Creek, 1½ mi. south of Selway Falls, Idaho Co., Idaho. Five adult specimens.





## ARIONIDAE

**Hemphillia camelus** Pilsbry and Vanatta

*Hemphillia camelus* PILSBRY and VANATTA, 1898, pp. 234, 235; pl. 9, figs. 3, 4; pl. 12, figs. 41, 42; pl. 16, fig. 85.

This was the commonest slug collected by the members of the expedition and a large series from young to fully adult specimens was taken. The species was found more abundantly on Meadow Creek, around 1,900 feet elevation, than higher in the mountains. Hemphill has reported on the curious propensity of this slug to whip its tail violently from side to side when disturbed, which Dr. Hanna also stated was true from his experience while collecting it in Idaho. This brings to mind a remark, made to the author many years ago by P. B. Randolph, of Seattle, that *Hemphillia* could actually jump a short distance by a quick flexure of its tail.

According to Dr. Hanna, *Hemphillia* was collected frequently in the vicinity of traps set for the capture of small mammals, sometimes being found crawling on a mouse or shrew that had been caught. Camp refuse placed to attract slugs generally failed to draw them but the species did appear to show a fondness for orange peel.

Until positive identification is established by dissection of the animals, all specimens of *Hemphillia* collected by the expedition are referred to *camelus* rather than to *glandulosa*, its congener that has so far apparently been found only west of the Cascade Mountains. The following lots have been placed in the Academy's collection:

C. A. S. 31,499 Meadow Creek, 1½ miles south of Selway Falls, Idaho Co., Idaho. Between thirty and forty specimens of all ages, sealed in alcohol in two test-tubes.

C. A. S. 31,500 4½ miles southwest of Selway Falls. Two adult and one half-grown specimens also preserved in alcohol.

In addition to the above lots, the Academy has the following lots *Hemphillia* in its alcoholic collection:

C. A. S. 11,653 *H. glandulosa* Binney and Bland. Syntypes Nos. 2239 to 2254, inclusive. A series of seventeen small individuals from Astoria, Oregon, the label marked "original lot" and "Types" in Hemphill's handwriting.

C. A. S. 11,652 *H. glandulosa* Binney and Bland. Kalama, Wash. One very large specimen collected by Henry Hemphill.

C. A. S. 28,093 *H. glandulosa* Binney and Bland, Olympia, Wash. Eighteen specimens (including only three full-grown or nearly so) collected by Henry Hemphill.

C. A. S. 11,654 *H. camelus* Pilsbry and Vanatta. Near Old Mission, Idaho. Six topotypes, probably from the original lot, collected by Henry Hemphill.



C. A. S. 31,788 *H. camelus* Pilsbry and Vanatta. Old Mission, Idaho, or Coeur d'Alene, Idaho. About fifteen specimens collected by Hemphill.

C. A. S. 31,748 *H. camelus* Pilsbry and Vanatta. Near Stites, Idaho. Seven full-grown specimens collected by Hemphill.

C. A. S. 28,077 *H. camelus* Pilsbry and Vanatta. Slate Creek, Idaho Co., Idaho. Twelve adult specimens collected by Hemphill.

C. A. S. 31,743 *H. camelus* Pilsbry and Vanatta. Slate Creek, Idaho Co., Idaho. Four adult specimens collected by Hemphill.

These lots are still in a fair to good state of preservation, in spite of having been collected in 1889 or earlier.

### ***Prophysaon andersoni* (J. G. Cooper)**

*Prophysaon andersoni*, PILSBRY and VANATTA, 1898, pp. 245-248; pl. 10, figs. 18-22; pl. 11, figs. 28, 29; pl. 13, figs. 59-62; pl. 16, figs. 92, 93.

Slugs of the genus *Prophysaon*, which are provisionally assigned to this species, were collected at two localities. They did not appear to be at all common.

C. A. S. 31,499 Meadow Creek, 1½ mi. south of Selway Falls, Idaho Co., Idaho. Four medium-sized individuals preserved in alcohol.

C. A. S. 31,500 4½ mi. southwest of Selway Falls. Four specimens preserved in alcohol.

Confirmation of the identification of these slugs must await dissection of the animals. In the Academy's alcoholic collection is a lot of three that appear to be this same species. They were collected by Henry Hemphill near Stites, Idaho (C. A. S. 31,747).

### ***Zacoleus idahoensis* Pilsbry**

*Zacoleus idahoensis* PILSBRY, 1903, pp. 626-629, pl. 28, figs. 1-11.

This little-known small black slug was described from specimens sent to Dr. Pilsbry by the Rev. E. H. Ashmun, who collected it, apparently in quantity, at Meadows, Washington Co. (now Adams Co.), Idaho. Although confirmation must depend upon dissection, specimens of what are almost certainly this species were collected by the members of the Academy's expedition as follows:

C. A. S. 31,499 Meadow Creek, 1½ mi. south of Selway Falls, Idaho Co., Idaho. Three specimens preserved in alcohol.

C. A. S. 31,500 4½ mi. southwest of Selway Falls. Three specimens preserved in alcohol.



The Academy's alcoholic collection contains the following additional lots that are provisionally referred to this species:

- C. A. S. 31,544 Meadows, Adams Co., Idaho. About twenty-five specimens, probably topotypes from the original lot, collected around 1900 by E. H. Ashmun.
- C. A. S. 31,511 Meadows, Adams Co., Idaho. Another lot of thirty to forty topotypes, possibly from the original lot collected by Ashmun.
- C. A. S. 31,546 Weiser, Idaho. Two specimens collected by Ashmun.
- C. A. S. 31,549 2 mi. south of Tamarack, Adams Co., Idaho. One specimen collected by A. G. Smith, June 3, 1941.

## ENDODONTIDAE

### *Anguispira kochi* (Pfeiffer)

*Anguispira kochi occidentalis* Martens, HENDERSON, 1929, p. 112, fig. 77.

*Anguispira kochi kochi*, MACMILLAN, 1940, p. 394, pl. 40, figs. 2, 3.

Common around Selway Falls, being taken crawling on mossy rocks and vegetation along with *Allogona ptychophora*, *A. lombardii*, *Triodopsis mullani olneyae*, and *Anguispira nimapuna*.

- C. A. S. 31,499 Meadow Creek, 1½ mi. south of Selway Falls, Idaho Co., Idaho. Twenty-nine adults, forty-four immature specimens.

- C. A. S. 31,500 4½ mi. southwest of Selway Falls. Seven adults, four immature specimens.

From the first-listed locality fully-grown shells were fairly large and show considerable variation in the height of the spire. Sample measurements are:

- Diameter, 25.2; height, 18.2 mm. (moderately elevated)  
Diameter, 23.9; height, 19.0 mm. (elevated)  
Diameter, 26.3; height, 17.6 mm. (depressed)

Shells from Locality 31,500 are smaller, probably due to the less favorable conditions found at the higher altitude. The largest shell in this lot has a diameter of 18.9 mm., and a height of 13.5 mm.

MacMillan states that the range of *kochi* extends "west to California and north to Southwestern British Columbia." This should be clarified, for specimens are not known to have been collected in California, or west of the Cascade Mountains in the Pacific Northwest. It has not been reported from Nevada or Arizona. It is common in suitably forested areas in Idaho, eastern Oregon, and eastern Washington at least as far west as Spokane.



### *Anguispira nimapuna* H. B. Baker

*Anguispira nimapuna* BAKER, 1932, p. 82, pl. 5, figs. 4-6;—MACMILLAN, 1940, p. 391, pl. 38, figs. 7, 8.

A large series was collected by the expedition near Selway Falls, where it was common crawling over mossy rocks in the moist weather. Identification is made certain by comparison with paratypes furnished the Academy by Dr. Pilsbry.

C. A. S. 31,498 25 mi. east of Kooskia, Idaho Co., Idaho. One full-grown large (but dead) adult specimen.

C. A. S. 31,499 1½ mi. south of Selway Falls, Idaho Co., Idaho, along Meadow Creek. One hundred sixty adults, one hundred thirteen immature specimens.

C. A. S. 31,500 4½ mi. southwest of Selway Falls. Six adults, ten immature specimens.

Measurements of three shells from C. A. S. 31,499 give the extremes in size and shape:

	Diameter	Height	Height (not including aperture)
Largest	14.5 mm	6.0 mm.	4.0 mm.
Most elevated	13.3 "	7.0 "	4.0 "
Most depressed	12.7 "	5.0 "	3.6 "

Before these shells were collected by the expedition, *A. nimapuna* was known only from the type locality near Stites, in northwestern Idaho County, Idaho.

### *Discus cronkhitei* (Newcomb)

*Discus cronkhitei cronkhitei*, HENDERSON, 1929, p. 113, fig. 78;—MACMILLAN, 1940, p. 405, pl. 39, figs. 15, 16.

A single specimen, found 4½ miles south of Selway Falls, Idaho County, Idaho, is not different from those found commonly in the mountains of northern California and at several Oregon localities, with which it was compared.

### *Helicodiscus salmonensis* Hemphill

*Helicodiscus salmonensis*, PILSBRY and FERRISS, 1906, p. 157;—HENDERSON, 1929, p. 114, fig. 80;—HANNA, 1939, p. 301, pl. C, figs. 11-13.

A single specimen was taken in a lava slide, 2 miles east of Kooskia, Idaho County, Idaho (CAS 31,496).



**Punctum randolphii** (Dall)

*Pyramidula ? randolphii* DALL, 1895, p. 130.

*Punctum randolphii*, HENDERSON, 1929, p. 117, fig. 84.

But one specimen of this minute species was collected in leaf mold  $4\frac{1}{2}$  miles southwest of Selway Falls, Idaho County, Idaho. Comparison was made with a topotype collected by P. B. Randolph at Seattle (AGS 7087).

**Radiodiscus abietum** H. B. Baker

*Radiodiscus abietum* BAKER, H. B., 1930, p. 124, pl. 6.

This little-known species is limited to Idaho, so far as is known. The expedition collected it at three localities:

C. A. S. 31,496 Lava slide, 2 mi. east of Kooskia, Idaho Co., Idaho.  
Three adult specimens.

C. A. S. 31,499 Meadow Creek,  $1\frac{1}{2}$  mi. south of Selway Falls, Idaho  
Co., Idaho. Six adults, six immature specimens.

C. A. S. 31,500  $4\frac{1}{2}$  mi. southwest of Selway Falls. Three adult  
specimens.

Comparison of shells from the above lots were made with a series collected by H. B. Baker collected on John Day Creek in Idaho County, and placed in the Academy's collection for this purpose through the courtesy of Dr. H. A. Pilsbry of the Academy of Natural Sciences of Philadelphia.

## PELECYPODA: MARGARITIFERIDAE

**Margaritifera margaritifera falcata** (Gould)

*Margaritifera margaritifera falcata*, HENDERSON, 1929, p. 53, fig. 1.

One specimen was collected from Meadow Creek,  $1\frac{1}{2}$  miles south of Selway Falls, Idaho County, Idaho (CAS 31,499).

## SPHAERIIDAE

**Pisidium** (species?)

*Pisidium* (various species), HENDERSON, 1929, pp. 66-71, figs. 19-27.

Twenty specimens of a small representative of this genus were collected in Meadow Creek,  $1\frac{1}{2}$  mi. south of Selway Falls (CAS 31,499).





Smith, Allyn Goodwin. 1943. "Mollusks of the Clearwater Mountains, Idaho." *Proceedings of the California Academy of Sciences, 4th series* 23, 537–554.

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