

I have concluded that this is due to shrinking of the alcoholic specimens. The squamosals are in contact with the parietals.

The young specimen is in less satisfactory state of preservation, but the characteristic points are readily made out and the differences in the folds between the two specimens are expressed in the diagnosis.

NOTES ON RECENT COLLECTIONS OF NORTH AMERICAN LAND,
FRESH WATER, AND MARINE SHELLS RECEIVED FROM THE
U. S. DEPARTMENT OF AGRICULTURE.

BY

ROBERT E. C. STEARNS, PH. D.,
Adjunct Curator of the Department of Mollusks.

The following species, received during the year 1892 from the Department of Agriculture, represent the Molluscan portion of the collections made during said year by Dr. C. Hart Merriam and his assistants, in the Division of Biological Explorations.

As in previous accessions from the above source, many interesting facts pertaining to the geographical distribution of the forms collected, give additional value to the material obtained, and furnish many items of importance relating to the local faunæ of various parts of the country.

Following the terrestrial species which constitute the principal part of the collection, a few fresh-water species are listed, closing with several marine forms from the Gulf border of the State of Mississippi.

Class GASTROPODA.

PULMONATA-GEOPHILA.

Family TESTACELLIDÆ.

Genus **GLANDINA** Schumacher.

Glandina truncata Gmelin.

One or two examples from each of the following localities:

Chattahoochee, Fla.; Houma, La.; Washington, Miss.; Riceboro, Liberty County, Ga.; Vernon Bailey, April, 1892. Mr. R. J. Thompson also obtained two examples of this species at the last-named place at about the same time. The Georgia specimens were found on the Le Conte plantation.

This is a widely distributed species and probably the most familiar form of the genus. It is found in the "Atlantic and Gulf States, from North Carolina to Texas, as far north as Macon in Georgia, Bibb County, Ala., and Jackson, Miss." I found it quite numerous among the grass in moist, springy ground just outside the military reservation of Fort Brooke, at Tampa City, Fla., in 1869. My collection included the typical form as well as the varieties, *parallela*, etc.

Family LIMACIDÆ.

Genus **ZONITES** Montfort.**Zonites lævigatus** Pfeiffer.

Three examples.

Washington, Miss., "in the woods," Vernon Bailey, May, 1892. Binney, in his useful "Manual of American Land Shells," says of this species, "I have received specimens from Pennsylvania to Arkansas, from Illinois to St. Augustine, Fla., and Mobile. It attains its greatest development in the Cumberland subregion."

Family PHILOMYCIDÆ.

Genus **TEBENNOPHORUS** Binney.**Tebennophorus carolinensis** Bosc.

One specimen.

Stone County, Mo., near Marble Cave; Vernon Bailey.

This large and distinctly characterized slug occurs as far north as "Canada, and as far to the south as Texas and Florida." (Binney.)

I have collected numerous examples among the bricks, ruins of an old building near the historic Burns residence at the foot of Seventeenth street, Washington, and it is apparently quite common at many places in the District of Columbia, and presumably in the surrounding country.

Family HELICIDÆ.

Genus **PATULA** Held.

Section ANGUISPIRA Morse.

Helix (Patula) alternata Say.

One dead specimen.

Washington, Miss., Vernon Bailey.

The solitary example obtained here was not quite mature. The variation exhibited by this species makes it an exceedingly interesting form to the student. While limited in this respect when compared with the protean *strigosa*, nevertheless it includes *cumberlandiana*, *Fergusonii*, and *mordax*, as heretofore indicated,* and as proven by the ample series in the National Museum, which exhibits a direct gradation of intermediate and blending varieties. Mr. Pilsbry† in this connection speaks of "*alternata*, including also *mordax* and *cumberlandiana* (which are hardly more than extreme forms of *alternata*)," etc.

"This pretty and variable species ranges from Labrador to Texas throughout the eastern United States, and is found in the postpliocene of the Mississippi Valley, retaining some of the color of the red flame-like patches." (Binney.)

* Proc. U. S. Nat. Museum, vol. XIV, 1891, p. 96.

† Manual of Conchology, vol. VIII. p. 115.

Helix (Patula) Hemphilli Newcomb.

=*H. (Patula) strigosa* Gould var.

Five examples, dead.

Fort Huachuca, Ariz., at an elevation of about 4,300 feet above the sea; Dr. A. K. Fisher, May 14, 1892. (Mus. No. 125,599.)

The specimens of the above, collected by Dr. Fisher, exceed in size any of the numerous examples of the *Hemphilli* variety of *strigosa* that I have seen. In other respects, too, they are of interest, as they exemplify within a small number of individuals a range of differentiation from the subangulate to the keeled or angulate whorls. They are all more or less flattened and carinate, for extreme as the typical *Hemphilli* is when compared with the typical *strigosa*, it is nevertheless connected by a chain of intermediate and gradually connecting forms. In some of Dr. Fisher's specimens, a supersutural groove follows the whorls, and one nearly fresh example shows two color-bands, one above and one below the periphery. It is to be regretted that Dr. Fisher did not obtain more, and living examples of this interesting form from the Arizona region.

Bailey collected this form in August, 1890, "among rocks at an altitude varying from 8,000 to 11,000 feet," on the slopes of Needle Peak, Lost River Mountains, Idaho. The variety *Hemphilli* had previously been obtained in Idaho by Hemphill, and has heretofore been reported from Nevada, Utah, and Colorado.

In the May, 1892, number of "The Nautilus," I published the fact of the detection of *Patula strigosa* (Mus. No. 123,576), by Mr. Marcus Baker, of the U. S. Geological Survey, at Coon Mountain, Ariz., about 10 miles south of Canyon Diablo. Mr. Baker's specimens were found "scattered along the interior slopes of the crater;" they are mostly dead shells. The elevation, as stated, is between 5,200 and 5,700 feet above tide level. The whole region is excessively arid, and the general aspect of the shells collected by Mr. Baker implies an environment of that kind. As a whole they are rather flat than elevated, and more or less angulated at the periphery. The fresher examples are slightly rufous, with two narrow revolving bands on the body whorl. The character of the locality partially described by Mr. Baker will be still better understood by the following abstract of a paper read before the National Geographic Society of Washington, D. C., by Mr. G. K. Gilbert, in March, 1892, and it will further give a pretty fair idea of the general character of the environment elsewhere, where this remarkable species and its varieties are the prevailing forms.

From Mr. Gilbert's paper, it appears that Coon Mountain is a curiously shaped crater in a desolate region some three days journey from Flagstaff. The crater is about three quarters of a mile in diameter, bowl shaped and quite deep, and various reasons have been given at times for its existence. Near it have been discovered so many specimens of meteoric iron, that it would seem almost necessarily more than a mere coincidence. Speaking of the unequal distribution of land and water on the surface of the earth, Mr. Gilbert said that one reason given in explanation of that

was that there was a greater density in that hemisphere and hence a greater attracting power for water. This unequal density might be accounted for by some unusual accretion there, such as would arise from contact with a star. Speculation as to the possibility that the earth's greater hollows originated in this way suggested to him a similar explanation for the origin of the Arizona crater, that it was caused by the collision of an iron star several thousand feet in diameter.

In order to find out what this theory was worth, Mr. Gilbert, accompanied by Mr. Marcus Baker, visited Coon Mountain and camped near there for some time, carefully studying all the peculiarities of the place, and making a number of observations to discover whether the relation between all this meteoric iron and the crater, was one of cause and effect, or of coincidence merely. Coon Mountain rises some 400 feet above the level of the surrounding plain, and the bottom of the crater is about 600 feet below the highest point on the rim.

The rock strata of the plain are limestone and sandstone and lie nearly flat. In the rim of the crater these rocks are bent upward, and upon them lie broken fragments of the same materials. The peculiarity of the crater, from the geological point of view, is that it contains no volcanic rocks, and in this respect is unique. The phenomena observable in connection with the crater had given rise to a number of hypotheses, two of which the speaker discussed more freely than the others. The glacial hypothesis and the theory of the limestone sink are both inadequate. The true hypothesis of the crater implies the expenditure of a tremendous amount of energy in a very brief space of time. By the system of elimination all the hypotheses have been abandoned with the exception of the stellar and the explosive. Magnetic and volumetric tests were applied, and with the former the needle showed no evidence of the presence of a considerable mass of iron. After experiments with these same needles later it was estimated that if the crater was formed by the penetration of such a mass, it must have been buried 50 miles below the surface to have affected the needle so slightly.

By the volumetric test it was necessary to determine whether the débris surrounding the crater would just fill it or exceed the necessary amount by the supposed amount of the embedded star. It was found that it would just fill it, and this would seem to compel the abandoning of the stellar theory, and we are forced to believe that the relation of rock and crater is one of coincidence only, though the chances of such a coincidence are not greater than one in five thousand. After comparing the phenomena of Coon Mountain with those of the volcanic eruptions in Japan in 1888, Mr. Gilbert said that in the future Coon Mountain will probably be looked upon as an example of the bursting of the earth's surface by volcanic steam unaccompanied by lava. It is highly improbable that this catastrophe was witnessed by man.

From a description of the region and the phenomenal character of the remarkable locality where Mr. Baker collected his examples of *strigosa*, we will return to a further consideration of the shells and the varietal aspect they exhibit. In a recently published portion of his Manual in referring to the *strigosa* group of *Patula*, Mr. Pilsbry says: *

In the species of this division [Anguispira], the characters of sculpture, form and color and to a less degree of the soft parts, vary to an extent inconceivable to those who have not actually seen the shells. It may now be demonstrated that the forms described as *H. strigosa*, *Cooperi*, *idahoensis*, *Hemphilli*, *Haydeni*, etc., are connected by such a multitude of intermediate forms that it is absolutely impossible by the most acute analysis, to draw lines of demarcation between them.

It is refreshing in these days of excessive systemization and species-making to meet with a paragraph like the above by an author of justly recognized ability in a publication of standard character and impor-

* Vol. VIII Manual of Conchology page 115, Feb. 28, 1893.

tance; yet it would not be a matter that need cause surprise to find in the course of twelve months some disciple of the "new school" rushing into print with a "revision" of this peculiar group, in which every third individual shell is honored or dishonored with a generic, subgeneric, or some other title, to say nothing of elaborate, though more general, divisions, subdivisions, etc., *ad libitum*, in frivolous perplexity.

The National Museum contains a magnificent and exhaustive series of *strigosa* and what are now regarded as its varieties, probably surpassing all others excepting that contained in Mr. Hemphill's private collection; it includes not only the ample series received directly and indirectly from Mr. Hemphill, but numerous accessions, large and small, made by various parties, in the course of explorations and travel within the general territory inhabited by *strigosa* and its allies.

Genus **POLYGYRA** Say.

Helix (Polygyra) auriformis Bland.

Ten specimens.

Bay St. Louis, Mississippi; Vernon Bailey, April 30, 1892. "In the pine woods"; examples mostly dead and bleached. The foregoing has been found to inhabit Florida, Alabama, Louisiana, Texas, and the Indian Territory. Numerous beds of semifossil specimens are found in Middle Alabama. (Binney.)

Helix (Polygyra) Dorfeuilliana Lea.

Dead shells.

Stone County, Mo.; Vernon Bailey, on side hills near Marble Cave.

This form is widely distributed through many of the Southern States, having been collected in Florida, Louisiana, Texas, Arkansas, Indian Territory, etc., and as far to the north as Kentucky, opposite Cincinnati, Ohio. Mr. McDaniel reports its occurrence in eastern Texas, in Anderson County.

Genus **MESODON** Rafinesque.

Helix (Mesodon) albolabris Say.

One specimen.

Stone County, Mo., near Marble Cave, on sidehills, with the previous species; Vernon Bailey.

This familiar form has a wide geographical distribution. The national collection contains numerous examples, forming an exceedingly fine series, embracing nearly seventy trays.

The geographical range of *albolabris* extends from Maine to Minnesota, inclusive of Canada (at various places), thence southerly to Arkansas, Mississippi, and Florida, and the States and Territories included between the above northerly and southerly lines, comprising, as shown in the collection, a representation of twenty-three of the States, etc.

As would naturally be supposed, of a form inhabiting so great an area, considerable variation is exhibited, and one finds adults in some places with small shells, in others with shells conspicuously large; some with elevated and some with depressed shells. Again, in some localities, the growth lines are delicate, and the shells also light and thin; others have heavy shells, and a coarse sculpture. Another and more striking varietal character is the occasional presence of a tooth-like prominence on the parietal wall, and sometimes a toothlike process is seen at the base of columella on the peristome.

The genus *Mesodon* is represented on the Pacific coast of North America by several species. At the present time there is a great gap between the western and northern extension or limit of the group as we trace it *westward* from the Atlantic side of the continent, and the extremest eastern locality, at which it has been found as we follow it *eastward* from the Pacific coast. Regarding, as I do, both *H. Townsendiana* and *H. ptychophora* as *Mesodons*, and considering the latter as a variety of the former, we find these West or Pacific-coast forms extending eastward as far as Idaho, where *ptychophora* has been detected, near Salmon River and in the valleys and on the slopes of the Bitter Root Mountains; it also occurs in Montana, according to Binney. Between western Idaho and Minnesota there is, it will be seen, a great gap, in which we have no evidence of the existence or presence of any form of *Mesodon*. It is not, however, unreasonable to suppose, that sooner or later this long reach will be materially shortened by the detection of *Mesodon* at new localities, both in the easterly and westerly margins of the present boundaries.

From the Miocene of the John Day region,* in the neighborhood designated as the North Fork of the John Day River, Oregon, longitude 119° 40', latitude 44° 50', as given by Prof. Condon, we find *Mesodon* associated with *H. (Arionta) fidelis*, *H. (Patula) perspectiva* and the rare and curious *Ammonitella Yatesii* of Dr. Cooper.† To the *Mesodon*, which I regarded as an undescribed form, I gave the name of *Dallii*. The other species, from the John Day beds, are familiar to the collector and student of recent land shells, though *Yatesii* is about as rare as *fidelis* is common.

Mesodon Dallii differs from any of the living representatives of the group inhabiting the Pacific States. It suggests an ancestral form, from which may have proceeded the species known as *columbiana*, *devia*, *germana*, etc. *Ammonitella Yatesii* is so exceedingly rare, and

* Bulletin of the U. S. Geological Survey No. 18. On the Marine Eocene, Fresh-water Miocene and other Fossil Mollusca of Western North America, by Chas. A. White, M. D. Washington, 1885.

†This species is generally referred to by authors as *Gonostoma Yatesii*, but Cooper's genus *Ammonitella*, 1868, which is based on this form, is valid and should therefore stand, as Rafinesque's *Gonostoma* (applied to a group of fishes), 1810, has precedence over the use of said name in the Mollusca, (Held., 1837) by twenty-seven years, as well as over Pfeiffer's use of *Gonostoma* in 1879.

is so restricted and peculiar in its distribution, that, considered in connection with the fossil examples, it may be regarded as obsolescent or as an interesting survival of the extraordinary physical changes of the John Day epoch, and the apparent absence of *Mesodon* in the region heretofore indicated, may be due to its absolute obliteration through similar causes during the middle or later tertiary periods as well as to still later physical changes.

Helix (*Mesodon*) *dentifera* Binney.

One dead, fresh example.

Washington, Miss.; Vernon Bailey.

Mr. Bailey has carried this form quite far to the South. Its range has heretofore been given as from Maine to North Carolina.

Helix (*Mesodon*) *thyroides* Say.

Var. *bucculenta* Gould.

Several examples.

Washington, Miss. (one example living); near Marble Cave, Stone County, Mo. (three specimens), occurring on the sidehills, and at Houma, La. (nine dead specimens); Vernon Bailey.

Mr. Binney says of *thyroides*: "A post-pliocene species now found all over the eastern province. The variation in size is very great. The small or *bucculentus* form of this species is usually that found in the Southern States. Both the larger and smaller forms exhibit a small parietal callosity or tooth, and the shell is also variable in the umbilical feature." Binney credits it to Washington County, Tex., and Mr. W. L. McDaniel, of Tyler, Tex., has collected the *bucculenta* form in Williamson County in that State.

Some examples of *thyroides-bucculenta* that I have inspected are externally very close to occasional individuals of the so-called *ptychophora*, from Cœur d'Alene, Idaho.

Genus **TRIODOPSIS** Rafinesque.

Helix (*Triodopsis*) *inflecta* Say.

Two specimens, dead.

Stone County, Mo.; Vernon Bailey, July, 1892.

The above examples were found on the slopes of the hills near Marble Cave. The species inhabits a large territory, extending from the Atlantic seaboard westerly to the valley States of the Ohio and Mississippi rivers, and southwesterly to Texas. A well marked and easily recognized form.

Helix (*Triodopsis*) *Levettei* Bland.

Ten examples.

Fort Huachuca, Ariz., Dr. A. K. Fisher, May 14, 1892.

The specimens collected by Dr. Fisher, though much larger than the type, having from one-and-a-half to two-and-a-half more whorls, agree

perfectly in every other respect and also agree with examples in the U. S. National Museum (No. 124481) from Tucson, Ariz., presented by the late Dr. Isaac Lea. The Lea specimens, of which there are several, include examples that exhibit the characteristics of *Triodopsis*, as well as others, in which the peristome is simple or not tridentate or denticulate, in this respect being like other species that have been placed in the above genus, and show upon what an infirm foundation some of these genera are based.

It is quite evident that however persistent the tridentate character may be in certain forms, in others it is variable, and therefore of little value; the latter may be regarded as the connecting links which unite *Triodopsis* to *Mesodon*.

Bland's description* rests upon "two living and one dead specimen," collected by Dr. G. M. Levette, near Santa Fe, N. Mex. Binney, quoting Bland, says; "this species is quite distinct from any known North American or other form. The number of whorls and of teeth, their form and color, with the color of the shell and peristome, are its peculiar features. The striae are by no means so well developed as shown in the figures."

Further on, he observes: "the species varies in the number of teeth on the peristome. Some have one basal tooth only, which in some specimens is widely and bluntly bifid."

Attention is called to the geographical extension of the range of this species and of *Patula strigosa* var. *Hemphilli*; for this addition to our knowledge we have to thank Dr. Fisher and the Biological Division of the Department of Agriculture.

From the habitat of Dr. Levette's examples to Tucson, the locality of the Lea specimens, and Fort Huachuca, is nearly 400 miles in a southwesterly direction; the latter place is so very near the boundary line between the state of Sonora, Mexico, and the United States, that there can be hardly a doubt that further exploration of the general region will detect both *H. (Patula) Hemphilli* and *H. (Triodopsis) Levettei* south of the boundary, and add their names to the list of the Mexican fauna.

Genus **ARIONTA** Leach.

Section LYSINOE H. and A. Adams.

Helix (Arionta) californiensis Lea.

One specimen, dead.

Monterey, Cal., "in the woods," October 8, 1891; Vernon Bailey.

A familiar form, which seems to have its specific center in this region. I collected a large number of the above at this place in March, 1867, in openings on grassy slopes.

* Binney's Manual of Am. Land Shells (Bull. 28, U. S. Nat. Mus.), p. 385, 386, fig. 419.

Helix (Arionta) Dupetithouarsii Deshayes.

Two examples, dead.

Monterey, Cal., with the foregoing, on the same day; Vernon Bailey. This species is rather local in its occurrence; the Santa Cruz form, somewhat differentiated in color and epidermis, though modified environmental conditions, has received the name of *sequoicola*.

Helix (Arionta) Rowelli Newcomb.

=*H. Lohri* Gabb.

Three specimens, dead.

Fort Huachuca, Ariz.; Dr. A. K. Fisher, May 14, 1892.

Dr. Fisher's examples agree perfectly with the specimens in the National Collection, collected by the late Prof. Gabb, who found them, as elsewhere stated by me, in the table-lands of Lower California, near Mulege. It has been reported from the Salt River Mountains, 7 miles north of Phoenix, Ariz., by Pilsbry, and has been credited to Chihuahua, Mexico, and still further to the eastward in the State of Texas.

It is interesting to note its occurrence at Fort Huachuca, associated with *Patula Hemphilli* and *Triodopsis Levettei*.

Binney, on page 22 of the Manual of American Land Shells, in speaking of *H. Rowelli*, says it "has been referred to Arizona, but erroneously," and, in connection with *H. Remondi (Carpenteri)*, says "it is the only species common to the peninsula and mainland of Mexico;" these statements, in the light of later knowledge, require correction. It is highly probable that other forms now regarded as peculiar to the peninsula of Lower California, will sooner or later be detected on the mainland.

Family BULIMULIDÆ.

Genus **BULIMULUS** Leach.**Bulimulus dealbatus** Say.

Four dead shells.

Stone County, Mo., near Marble Cave, "on the side hills;" Vernon, Bailey.

The upper whorls of the adults exhibit the longitudinal ribbing characteristic of *B. Ragsdalei* Pilsbry. This species has heretofore been reported from various places in Texas by Mr. Bailey and others connected with the Biological Division of the Department of Agriculture.

William Lloyd collected several examples of this species at Monterey, Mexico, in 1891.

Family SUCCINIIDÆ.

Genus **SUCCINEA** Draparnaud.**Succinea Salleana** Pfeiffer.

Six examples, dead.

Houma, La., Vernon Bailey, May 8, 1892.

This is a well-marked species and quite distinct from the following:

Succinea concordialis Gould.

Six specimens.

Houma, La.; Vernon Bailey.

This also is a well-defined and characteristic form, easily separable from the preceding species, and has heretofore been credited to "Lake Concordia, in Texas."

PULMONATA-HYGROPHILA.Family **LIMNÆIDÆ.**Genus **PLANORBIS** Guettard.**Planorbis tumidus** Pfeiffer.

Numerous bleached specimens.

Pan Handle, Tex., August 25, 1892; Vernon Bailey.

The shells of this species were "found in a dry basin on the prairie, at an altitude of 3,660 feet above sea level." This form also occurs in Nicaragua.

Planorbis trivolvis Say.

Ten examples.

Houma, La.; Vernon Bailey, May, 1892.

These shells are partly juniors, but the lot contained a sufficient number of perfect adults to admit of identification. A common form found nearly everywhere in North America. The National Museum contains examples from Puebla, in the State of Puebla, and from Jalapa, in the State of Vera Cruz, received from the Mexican Geographical Commission a few years ago.

Genus **PHYSA** Draparnaud.**Physa gyrina** Say.

Numerous living examples.

Stone County, Mo., Vernon Bailey, July 7, 1892.

"Found in a creek near Marble Cave."

Physa mexicana Philippi.

Ten or more living specimens.

Houma, La.; Vernon Bailey.

These agree with the form to which Philippi gave the name *mexicana*; it appears to be a very globose variety of *heterostropha*.

SCUTIBRANCHIATA.Section **RHIPIDOGLOSSA.**Family **HELICINIDÆ.**Genus **HELICINA** Lamarek.**Helicina orbiculata** Say.

Numerous specimens.

Missouri, in Stone County, near Marble Cave; Vernon Bailey.

Common on the slopes of the hills.

In addition to the localities heretofore credited with this species, Mr. McDaniel has collected it in eastern Texas, in both Bell and Smith counties.

Writing of this form Mr. McDaniel says: "I found large numbers of this species in Bell County, Tex. The exact locality was on limestone bluffs on either side of Salado Creek. On one morning, just after a moderate rain, the whole face of the cliffs was sprinkled with them. On top of the bluffs they were found walking on twigs in the low brush and brambles and on trees 8 feet from the ground. Associated with them were found *Helix alternata* Say, and an occasional *Bulimulus Schiedeanus* var. *Mooreana* Pfr. This species also occurs in Florida. I found a solitary living example under a cedar log between Tampa and Rocky Point when collecting in this region in 1869.

The following marine species were collected by Mr. Bailey on the shores of St. Louis Bay (Mississippi), Gulf of Mexico.

Class PELECYPODA.

Family CHAMIDÆ.

Genus **CHAMA** Bruguiere.

Chama arcinella Linné.

Valves only.

A widely distributed form, ranging geographically from Hatteras in the north, on and around the shores of Florida and the Gulf of Mexico to the Antillean region as far south as the island of Guadaloupe, West Indies. When perfect this is a peculiarly interesting and striking species.

Family VENERIDÆ.

Genus **DOSINIA** Scopoli.

Dosinia discus Reeve.

One example, fresh.

This species is quite common at many places on the eastern and gulf shores of Florida and at many other places in the Gulf of Mexico. Its northern limit is given as Virginia, by Dall,* and its southerly range as Vera Cruz.

I have found it abundant on the outer beach of Amelia Island near Fernandina, Florida, associated with *Tellina alternata* Say.

* In Bull. No. 37, U. S. National Museum; Cat. marine mollusks, etc., southeastern coast of the United States, etc.



Stearns, Robert E. C. 1894. "Notes on recent collections of North American land, fresh water, and marine shells received from the U. S. Department of Agriculture." *Proceedings of the United States National Museum* 16(971), 743–755. <https://doi.org/10.5479/si.00963801.971.743>.

View This Item Online: <https://www.biodiversitylibrary.org/item/53716>

DOI: <https://doi.org/10.5479/si.00963801.971.743>

Permalink: <https://www.biodiversitylibrary.org/partpdf/53079>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Smithsonian

Copyright & Reuse

Copyright Status: Public domain. The BHL considers that this work is no longer under copyright protection.

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.