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THE LAND SNAILS OF ALABAMA, WITH NOTES ON THEIR ECOLOGY

By

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Table I

INTRODUCTION

This study is the culmination of almost three years of collecting land snails throughout Alabama, making notes on their ecology, and recording their distribution in the state. There were several reasons for the study. First of all, it was desirable to bring up to date our knowledge concerning the terrestrial shell-bearing mollusca recorded from Alabama, and to report such ecological data on each species as could be obtained. The last survey of the land snails of the state was that by Walker (1928), who confined his work to an enumeration of 185 species and subspecies, 15 of which he lists as doubtful members of our fauna. A number of the remaining 170 species and subspecies which he listed have since been found to be doubtful, erroneous, or taxonomically unsound. Truncatella bilabiata Pfeiffer, recorded from Mobile County by Walker (1928), is regarded as an aquatic or amphibious snail, to be classed with Pomatiopsis lapidaria Say, and thus is not considered in this paper.

Pilsbry (1940, 1946, 1948) included some mention of the ecology of various species of snails from Alabama, and Archer (1948) systematically recorded the ecology of the members of the genus Stenotrema in the Alabama region. The writer (1951) made a survey of the land snails of Tuscaloosa County, including information on the ecology of the

species collected. This was followed by a study by Hinton (1951) of the snails of the Black Belt of Alabama, recording data concerning the ecology of the species and subspecies which he found in that region. On the basis of data compiled from the foregoing authors, and observations by the writer, the number of species and subspecies of land snails in Alabama has been reduced to 147. This reduction is a result of a taxonomic reevaluation which includes the elevation of certain former subspecies to specific level, the relegation of other so-called subspecies to synonymy, and the inclusion of three species heretofore unrecorded from Alabama.

A second purpose of this work was to attempt to correlate the distribution of our land snails with the various factors of climate, soils, geology, physiography, and forest associations. Certain species are seen to be limited to definite climatic zones, others are restricted to physiographic provinces in the state, and still others are found to be limited to limestone or to noncalcareous soils. These correlations are presented in Table I.

A third purpose of this paper was to construct a useful manual of Alabama land snails. The first portion gives the salient features of the ecology of the state. The second, and largest, portion is composed of descriptions of species and subspecies, notes on their ecology and distribution, and localities in which they are found in the state. With few exceptions, the descriptions are based on

the writer's observations, in an attempt to modernize the language of shell description. Initials are used to designate authority for the recorded localities. Where those of the writer (HCR), Mr. John Hinton (JH), or Dr. A. F. Archer (AFA) are used, specimens from those sources have been studied. The initials (BW) and (HAP) refer to localities cited in Walker (1928), and Pilsbry (1940, 1946, 1948), respectively. The classification used by Walker (1928) has been brought up to date, and follows that used by Pilsbry (1940, 1946, 1948), except for the nomenclature of the genus Stenotrema, which is based on Archer (1948) and, in part, on Pilsbry (1948). A key to the families and genera of our land snails has been included to further the use of this work as a convenient manual by students and collectors of Alabama snails.

Appreciation is herewith expressed to the many persons who contributed specimens to the writer's collection. Very special thanks are due Dr. A. F. Archer, Chairman of the Biology Department of Union University, Jackson, Tennessee. Dr. Archer very kindly made available his personal collection of North American land snails for comparative purposes, and aided in the identification of species of Stenotrema. The writer also wishes to thank Dr. R. L. Chermock, under whose guidance this work was done, for making available the entire collection of land snails belonging to the Biology Department of the University of Alabama. Thanks

are due the staffs of the Library of the Philadelphia Academy of Science, and the Library of Westminster College, New Wilmington, Pennsylvania, for making available certain conchological publications. In connection with the latter, thanks are also due Mr. William Clench, of the Museum of Comparative Zoology, at Cambridge, Dr. Harald Rehder, of the U. S. National Museum, and Mr. Charles Wurtz, of the Philadelphia Academy of Science, for graciously securing references to certain papers on Alabama snails. The writer also wishes to express his appreciation to the members of his doctoral committee for their aid and patience during the writing of this thesis.

ECOLOGY OF ALABAMA

Fenneman (1938) divides Alabama into five physiographic provinces. These include the Coastal Plain, the Piedmont Plateau, the Ridge and Valley Province, the Appalachian, or Cumberland, Plateau, and the Interior Low Plateau. To these can be added the Blue Ridge Province (Plate XI). The largest physiographic division, the Coastal Plain, occupies roughly two-thirds of the total area of Alabama. Separating this province from the plateau provinces in the northern part of the state is the Fall Line. The latter extends in a regular arc from Lee County, in the east, westward and northward through Autauga, Bibb, and Tuscaloosa counties, to pass out of the state at the southwestern corner of Lauderdale County.

The Coastal Plain is divisible into three rather distinct regions on the basis of physiography and geology. These subdivisions are the Upper Coastal Plain, the Black Belt, and the Lower Coastal Plain. Fenneman (1938) refers to the Upper Coastal Plain as the Fall Line Hills, and he describes it as a dissected upland region fifty miles or less in width. It is characterized by rounded hills, up to 700 feet high, and mature valleys, 100 to 200 feet deep. Harper (1943) calls this region the Central Pine Belt, in reference to the predominance of longleaf pine (*Pinus palustris*) and shortleaf pine (*P. taeda*, *P. echinata*) forest cover.

Geologically, the Upper Coastal Plain consists of cretaceous sands, clays, and gravels of the Tuscaloosa and Eutaw formations. The latter forms a narrow belt along the lower border of the Tuscaloosa formation, adjoining the Black Belt. The soils of this region are, as a rule, low in calcium, although local areas of medium calcium content are to be found in the Eutaw Belt.

The central portion of the Coastal Plain, known as the Black Belt, is a lowland region with very low relief. It is characterized by altitudes of not more than 300 feet, according to Fenneman (1938). This belt, 20 to 25 miles in width, extends across the state, from Russell County westward through Sumter County, where it passes into Mississippi. It consists of highly calcareous soils of the Selma Chalk formation, according to Butts, et. al. (1926).

The Lower Coastal Plain, subdivided into smaller regions by Harper (1943), is characterized by a more regular topography than the Upper Coastal Plain. Along the lower margin of the Black Belt is a belt of sand and clay of the Ripley formation which rises above the Selma Chalk, reaching a height of about 200 feet in the western part of the state. Below this narrow region is a wider belt of shell marls of Eocene age. Further south, toward the Gulf Coast, is a relatively wide belt of post-eocene sands, clays, and gravels. The whole of the Lower Coastal Plain, from the Ripley belt southward, presents a fairly even

slope to the Gulf Coast.

Chermock (1952) designates as Lower Austral all of the Coastal Plain except a narrow belt across the Lower Coastal Plain. The latter belt, according to Chermock, is in the Saballian life zone. The Coastal Plain is drained in the western part by the Sipsey, Warrior, and Tombigbee Rivers. The central portion is drained by the Coosa, Cahaba, and Alabama Rivers. The eastern part of the province is drained by the Chattahoochee and Choctahatchee Rivers.

Braun (1950) includes most of the Alabama Coastal Plain in one forest group which she calls the Southeastern Evergreen Forest Region. The northwestern arm of the Coastal Plain, from Tuscaloosa County northward, is not included. Thus the Coastal Plain is characterized by a preponderance of evergreens, such as Pinus taeda, P. echinata, and P. palustris. There are, however, a few trees which are more or less characteristic for those subdivisions already given. The Upper Coastal Plain, for example, is forested chiefly by associations of evergreen and deciduous trees. One finds areas forested in beech (Fagus grandifolia), oak (Quercus stellata, Q. falcata, Q. nigra, Q. alba), and gums (Liquidambar styraciflua, Nyssa sylvatica, N. biflora), in addition to shortleaf pine (P. taeda, P. echinata), and longleaf pine (P. palustris).

The Black Belt, on the other hand, is forested with pine (P. taeda, P. echinata, P. glabra, P. palustris), oak

(Q. shumardii, Q. lyrata, Q. marylandica, Q. durandii), beech (F. grandifolia), hickory (Carya ovata, C. aquatica), and cedar (Juniperus virginiana). The cedars are to be considered rather diagnostic of such calcareous regions, along with pin-oak (Q. durandii), chinquapin oak (Q. muhlenbergii), and various species of haw (Crataegus). Large stands of cedar, and cedar associated with pine, are to be found throughout the Black Belt, on open calcareous ground, according to Harper (1943). The gums and oaks are found largely along streams and in shallow ravines. Grasses (Andropogon sp.) make up a great percentage of the ground cover, and much of the Black Belt is very typically prairie in this respect.

The Lower Coastal Plain is characterized by large stands of pine (P. taeda, P. echinata, P. palustris, P. glabra), by far the dominant tree of the region. In addition, according to Harper (1943), there are some associations of hardwoods, such as oak (Q. alba, Q. nigra, Q. stellata, Q. laurifolia, Q. phellos, Q. falcata), magnolia (Magnolia grandiflora), and gum (L. styraciflua, N. sylvatica, N. biflora), throughout the region. In ravines and valleys, along streams and rivers, mixed hardwoods such as the oaks are found, along with willow (Salix nigra), cottonwood (Populus deltoides), elm (Ulmus americana), sycamore (Platanus occidentalis), and cypress (Taxodium distichum). In areas where limestone outcrops occur are such trees as

red-bud (Cercis canadensis) and cedar (J. virginiana). The swampy section of the Lower Coastal Plain, particularly in Mobile, Baldwin, Escambia, and Covington counties, support large stands of slash pine (P. elliotii) and pond cypress (Taxodium ascendens), in addition to black pine (P. serotina) and magnolia (M. grandiflora). Shell hammocks in the vicinity of Mobile are forested with magnolia, beech, water oak, laurel oak, osmanthus, and holly.

The soils of the Lower Coastal Plain range from high to low in calcium content. The Ripley Belt, just below the Selma Chalk, is rather highly calcareous, whereas the Midway and Claiborne Belts, south of the Ripley formation, are, in general, of medium calcium content. Much of these latter regions is characterized by shell marl deposits. The lower tier of counties, from Washington eastward to Dale and Henry, is locally marked by soils of medium calcium content, though most of this area is sandy and noncalcareous.

Forming an irregularly-shaped triangle north of the Fall Line, in eastern Alabama, is the southern portion of the Piedmont Province. This region is bounded on the north by the Ridge and Valley Province and the Blue Ridge Province. According to Harper (1943), it encompasses about 5000 square miles in Alabama. Fenneman (1938) describes it as an old, dissected peneplain, marked by rolling hills and wide valleys. It is characterized by altitudes which range from 500 feet, near the Fall Line, to 1000 feet, at the

foot of the Blue Ridge Province, in Talladega, Clay, and Cleburne counties. All of this area, according to Chermock (1952), is Lower Austral. The drainage of the province is formed by the Coosa, Tallapoosa, and Chattahoochee Rivers.

Geologically, the Piedmont is composed largely of crystalline or metamorphic rocks of pre-Cambrian and Cambrian age (Butts, et. al., 1926). Harper (1943) states that belts of sandstone and dolomite, along with granites, gneiss, and schist, are characteristic formations. The soils derived from such rocks are largely sand and clay loams varying from low to medium in calcium content.

The dominant trees of the Piedmont, according to Harper (1943), are shortleaf pine (P. taeda, P. echinata), longleaf pine (P. palustris), gum (L. styraciflua, N. sylvatica), oak (Q. falcata, Q. stellata, Q. marylandica, Q. nigra, Q. alba, Q. montana, Q. velutina), beech (F. grandifolia), sycamore (P. occidentalis), maple (Acer rubrum), hickory (Carya alba, C. glabra), ash (Fraxinus americana, F. lanceolata), and birch (Betula nigra). The pines and oaks dominate the hills, and the ravines and slopes are forested in beech, gum, and hickory.

Archer (1941) describes the mountainous portion of the Piedmont, the Talladega Mountains, as typically Blue Ridge. This area, in the northern part of Clay, Talladega, and Cleburne counties, is Upper Austral, according to Chermock (1952). Topographically, it consists of ridges which lie

in line with the elements of the Blue Ridge Province in the northern part of Georgia. It is characterized by altitudes of over 2000 feet, the highest point being Mount Cheaha, which has an altitude of 2407 feet. The drainage of this region is formed by the Coosa and Chattahoochee Rivers.

Geologically, the Alabama Blue Ridge is composed largely of phyllite (Talladega slate), sandstone, and some quartzite (Harper, 1943). Butts, et. al. (1926), do not differentiate a Blue Ridge Province in Alabama, stating that the geology of the Talladega Mountains is not identical with that of typical Blue Ridge, and that the former represents a division of the Piedmont. However, Archer (1941), Harper (1943), and Chermock (1952) point out many characteristics of animal and plant life which the Blue Ridge of Alabama and the Blue Ridge of Georgia share. Harper (1943) states that Betula lenta is a typically Blue Ridge tree which, in Alabama, is found only in the Talladega Mountains. Archer (1941) notes that Azalea arborescens and Galax aphylla, both Blue Ridge plants, are limited to that section in this state. Stenotrema brevipila, a species of snail endemic to the Talladega Mountains, is very closely related to Stenotrema cohuttense of the Blue Ridge of Georgia. A logical conclusion, on the basis of such data, is that while the geology of the Talladega Mountains and that of typical Blue Ridge elsewhere may not be identical, certainly the affinities shown by certain

plant and animal species support the inclusion of the Talladega Mountains in the Blue Ridge Province.

According to Harper (1943), the most common trees of the Alabama Blue Ridge are shortleaf pine (P. taeda, P. echinata), longleaf pine (P. palustris), spruce pine (P. virginiana), oak (Q. montana, Q. alba, Q. velutina), beech (F. grandifolia), hickory (C. alba), chestnut (Castanea dentata), poplar (Liriodendron tulipifera), maple (A. rubrum), and gum (L. styraciflua). Betula lenta and Castanea dentata, both characteristic of the Blue Ridge Province, are found on the slopes and tops of the ridges, according to Harper (1943).

Adjoining the Blue Ridge and Piedmont Provinces is the Ridge and Valley Province which, in Alabama, extends southward and westward from DeKalb, Cherokee, and Cleburne counties, to the Fall Line, in Tuscaloosa, Bibb, and Chilton counties. This province includes the Coosa Valley of Harper (1943). The northern border is formed by the Cumberland Plateau, and the southern border by the Piedmont and Blue Ridge. It is characterized by ridges, running from northeast to southwest, with altitudes ranging from 400 to 1000 feet. Toward the Fall Line, the relief is less distinct, and the boundaries of the province merge with those of the Piedmont and Coastal Plain. According to Chermock (1952), Lower Austral conditions are found in much of this province. The higher elevations on Sand and Lookout

Mountains, in the northeastern part of DeKalb County, and a small section in the southern portion of Cherokee County, are in the Upper Austral zone. Chermock (1952) notes that characteristic animals of the Upper Austral, such as Desmognathus monticola and Eurycea bislineata wilderae, are to be found in these regions. The Coosa River forms the main drainage of the eastern portion of the province, and the Warrior forms the drainage of the western portion.

Geologically, the Ridge and Valley Province consists of shale and sandstone of the Pottsville formation, and shale, sandstone, and limestone of Devonian, Silurian, and Cambrian ages. The latter rocks are characteristic of the valley floors, whereas the ridges are formed from these rocks and capped by Pottsville shale and sandstone (Butts, 1926). The soils range from high to medium in calcium content, in the valleys, and medium to low, on the slopes and tops of the ridges.

According to Harper (1943), the ridges are forested with shortleaf pine (P. taeda, P. echinata) and longleaf pine (P. palustris), with spruce pine (P. virginiana) occupying some of the rocky ridges. Oaks (Q. falcata, Q. stellata, and Q. marylandica) are found on the dry upland slopes, in association with Pinus taeda and Liriodendron tulipifera. In the valleys, on limestone soils and along streams, are found cedar (J. virginiana), elm (Ulmus alata), beech (F. grandifolia), gum (L. styraciflua, N.

sylvatica), and oak (Q. alba, Q. nigra).

West of the Ridge and Valley Province lies the southern extension of the Appalachian Plateau, referred to in this region as the Cumberland Plateau. This province, as outlined by Fenneman (1938), includes the Plateau and Basin regions of Harper (1943). Entering this state in the northeastern corner, the Cumberland Plateau extends southward and westward for a distance of about 135 miles. The northern border is formed by Little Mountain and the Interior Low Plateau, and the western margin is formed by the Fall Line. The eastern and southern margins are formed by the Cahaba Ridges, Blount Mountain, and the western slopes of Sand Mountain. In the northern part of the state, according to Fenneman (1938), the old peneplain is relatively well preserved, but toward the south and west the plateau features have become less distinct through erosion. The montane portions of the Cumberland Plateau are characterized by altitudes of from 700 to 1500 feet. The plateau drops steadily toward the south and west, and the boundary between it and the Coastal Plain is, for the most part, indistinct. The higher elevations in the northwestern part of Jackson County, the western slope of Sand Mountain, and the upper slopes and top of Monte Sano, are Upper Austral (Chermock, 1952). The drainage of the Cumberland Plateau is formed by the Tennessee River, in the northern part of the state, and by the West Fork Sipsy and Warrior Rivers,

in the southern portion of the province.

Geologically, the Cumberland Plateau consists mainly of sandstone and shale of the Pottsville Formation. The major rock formation in certain localities however, as in Blount, Marshall, and Morgan counties, is Bangor limestone, which has been exposed by erosion of the Pottsville rocks. The ridges and hills of the northeastern part of the province are largely sandstone; the valleys between those ridges are floored with limestone and dolomite (Butts, 1926, and Fenneman, 1938). The soils of the plateau vary from low to high in calcium content. In the counties near the Fall Line, the soil calcium ranges from low to medium. In the counties to the north and west the soil calcium varies from low, on the ridges and hills, to high, on the slopes and in the valleys.

According to Harper (1943), the ridges and hills are forested chiefly with shortleaf pine (P. taeda, P. echinata), longleaf pine (P. palustris), and spruce pine (P. virginiana). Oaks (Q. montana, Q. velutina, Q. coccinea, Q. marylandica) are found on the dry upland slopes, along with Pinus taeda and hickory (C. alba). Along streams, in valleys, and on limestone soils, are found hemlock (Tsuga canadensis), cedar (J. virginiana), birch (Betula nigra), sycamore (P. occidentalis), gum (L. styraciflua, N. sylvatica), and maple (A. rubrum).

In the northwestern corner of Alabama, delimited from

the Cumberland Plateau by Little Mountain, lies the Interior Low Plateau, referred to by Fenneman (1938) as the Highland Rim section of the Low Plateau. This province includes all of the Tennessee Valley north and west of Little Mountain. The latter is an 800 foot cuesta which extends eastward through Colbert, Lawrence, and Morgan counties, and turns northward through Madison County, where it forms the western scarp of Monte Sano. Fenneman (1938) refers to this province as a young to maturely dissected plateau, having a local relief of 200 to 300 feet. According to Chermock (1952) all of the plateau is Lower Austral. The drainage is formed entirely by the Tennessee River and its tributaries.

The major geological characteristic of the Low Plateau in Alabama is the limestone-floored lowland, called the Moulton Valley, at the foot of Little Mountain. The latter consists of Mississippian limestones of the St. Louis series, according to Johnson (1930), and is firmly capped by shales and sandstone of the Pottsville formation. The extreme western portion of the plateau, in Colbert and Lauderdale counties, is overlain by a very thin layer of Coastal Plain deposits, representing the Tuscaloosa formation. North of the Tennessee River is the region characterized by Harper (1943) as the "Chert Belt". The rocks of this section belong to the Mississippian series, as do the rocks of the rest of the plateau, but the formation is

exposed over a large area and the ground is strewn with fragments. The soils of this province vary from low to high in calcium content. The valley floor, over most of the region, is characteristically highly calcareous. On the hills and ridges left by erosion however, the soils range from low to medium in calcium.

According to Harper (1943), the dry uplands of Little Mountain are characterized by shortleaf pine (P. taeda, P. echinata), oak (Q. velutina, Q. falcata, Q. stellata, Q. marylandica, Q. coccinea), and gum (L. styraciflua, N. sylvatica). Spruce pine (P. virginiana) and chestnut oak (Q. montana) are found on rocky ground on the slopes of the mountain. Toward the foot of the mountain, in ravines and along streams, are found maple (A. rubrum), sycamore (P. occidentalis), oak (Q. nigra), hickory (C. ovata), beech (F. grandifolia), birch (B. nigra), and hemlock (T. canadensis). Northward from Little Mountain, on the limestone flats which characterize most of the area to the Tennessee River, the most representative floristic element is cedar (J. virginiana). The valley floor is otherwise forested with shortleaf pine (P. taeda), oak (Q. muhlenbergii, Q. velutina, Q. marylandica, Q. phellos), and gum (L. styraciflua, N. sylvatica). Spruce pine (P. virginiana) and hickory (C. ovata), in association with cedar and redbud, are found on limestone slopes and ridges.

There are three broad climatic zones in Alabama,

according to the Yearbook of the Department of Agriculture (1941). A map has been constructed to show the relation of these zones to the physical divisions of this state (Plate XIV). The northern climatic zone lies above the 33rd parallel. Average January and July temperatures for this zone are 45° F. and 79.5° F. respectively. The first killing frost occurs between October 25 and November 15, and the last occurs between March 20 and April 10. The annual rainfall ranges from 50 to 54 inches. All of the Cumberland Plateau, Interior Low Plateau, Ridge and Valley Province, Blue Ridge, the northwestern arm of the Coastal Plain, and about half of the Piedmont Plateau are thus characterized by temperate to subtemperate climates.

The southern climatic division in Alabama lies below the $31^{\circ} 30'$ parallel. The average January and July temperatures for this zone are 50° F. and 81° F. respectively. The first killing frost occurs between November 5 and December 10, and the last killing frost occurs between February 18 and March 20. The annual rainfall in this area ranges from 54 to 66 inches. Thus the Saballian life zone, and a small portion of the Lower Austral zone, is characterized by a subtropical climate.

Between the northern and southern climatic divisions the climate is transitional. The average January and July temperatures are 48° F. and 81° F. respectively. The first killing frost occurs between November 5 and November 20,

and the last between March 10 and March 20. The annual rainfall in this zone ranges from 52 to 56 inches. All of the Coastal Plain, north of the Saballian zone, and about half of the Piedmont are thus characterized by a climate which is transitional between temperate and subtropical.

The relation between the foregoing factors of ecology and the distribution of land snails in Alabama is presented in Table I. Essentially five factors have been considered: domestic situations, forest associations, soil alkalinity, climate, and physiography. Table I shows that domestic situations, which offer relatively little in the way of cover for land snails, claim but a few species. To the writer's knowledge Lamellaxis gracilis and Triodopsis hope-tonensis are the only species which are restricted to such a situation; further study will no doubt show that they are to be found in other situations as well.

Of the forest associations, the hardwood-pine forest is seen to be inhabited by the greatest number of species of land snails; twenty-nine species are restricted to such associations. Pine-cedar, hardwood-cedar, and hardwood forests rank next in the number of species which are limited inhabitants. Pine and cedar woods, like domestic situations, claim but a few species. The habitats of land snails, in general, must provide sufficient cover, moisture, and food, for the snails to survive. A hardwood-pine association then, apparently presents a more suitable

habitat than any of the other associations. This environmental preference is related to the amount of cover, moisture, and food found in hardwood-pine associations. Such a forest possesses an apparently well-balanced ground cover, consisting of a mixture of deciduous and non-deciduous leaf litter, capable of holding just the right amount of water. Since snails are dependent upon water not only for bodily functions but also for the decomposition of leaf litter and other debris, it is reasonable to say that distribution is, in the main, a function of the available moisture. That excessive water, held by leaf litter, is a limiting factor in the distribution of snails is seen in the fact that hardwood forest associations are inhabited by relatively few species. The ground cover in such a forest is usually thick and very moist, and the litter is rather firmly packed down, due, possibly, to the physical nature of deciduous leaves. The canopy of deciduous trees in such an association, moreover, is sufficiently dense as to add to the slowness of evaporation by retarding air circulation and restricting the amount of light which reaches the surface litter.

Conversely, it is to be noted that pine-cedar associations, as well as pine woods or cedar stands, harbor relatively few species as limited inhabitants. In these woods the conditions mentioned above are more or less reversed. Pine straw, even in the most densely wooded areas, is never

very thick. The nature of such litter, moreover, is conducive to fairly rapid evaporation of moisture, and as a result pine woods are generally quite dry. The number of species restricted to any of the non-deciduous associations is very low. Those capable of surviving in such situations must of necessity have a relatively low moisture tolerance.

The relation between the amount of calcium in the soil and the distribution of land snails in the state is not as clear-cut as might be expected. Table I shows that most of our land snails are found on calcareous as well as noncalcareous soil. Thirteen species are limited to limestone areas, whereas only six are restricted to more or less acid soils. There is then, on the basis of the writer's data, only a slight preference for calcareous soils. Lime, in some form, is surely necessary in the diet of snails, since the basic material from which their shells are made is calcium carbonate. In view of the available information it seems likely that the majority of our species obtain calcium either from plants or, as suggested by Oughton (1948), from shells of dead snails. Allee (1950) notes that soil pH appears to influence the number of individuals in a given area more than the number of species. This is borne out by the writer's observations in the Black Belt of Alabama, and by the notes made by Hinton (1951) in the same region. Individuals of Helicina orbiculata, Mesodon thyroideus, and Mesodon clausus, for example, were found to be more numerous in

the Black Belt than on noncalcareous soils in other parts of the state. Snails of these species were also more numerous on limestone soils than on noncalcareous soils in the northern portion of the state.

With regard to the effect of climate on the distribution of land snails in this state, several rather sharply defined correlations can be seen. In the southern portion of the state, closely corresponding with the limits of the Saballian life zone, is the southern climatic belt, which is characterized by more or less subtropical temperatures and rainfall. The distribution of Polygyra septemvolva volvoxis and P. s. febigeri is seen to be limited to this zone. The higher minimum temperature and the relatively greater amount of rainfall in this area are very likely the limiting factors in the distribution of all of the twelve species and subspecies which are confined to this climatic belt. In northern Alabama, on the other hand, the conditions of the Upper Austral zone have restricted the distribution of thirteen species. Data are not available to designate the ranges of temperature and rainfall in these areas, except within the limits already given, but certainly the higher altitudes of the Upper Austral would be characterized by lower temperatures. The species which are limited to such regions are, in all likelihood, so restricted by reason of the higher temperatures of the Lower Austral zone. Eleven species and subspecies are restricted to the

latter climatic region, presumably by relatively narrow ranges of temperature tolerance, since they have not been able to survive Saballian or Upper Austral climates.

On the basis of the available data twenty-one species and subspecies are found only above the Fall Line. None are restricted to the Piedmont. One species is endemic in the Blue Ridge, one is limited to the Low Plateau Province, fourteen are restricted to the Cumberland Plateau, and four are found only in the Ridge and Valley Province; one other species is found in the latter two regions and also in the Blue Ridge. All of these species are typically northern, or have northern affinities, having been able to range into Alabama only where the climate was favorable. Thirteen of these are found only in the Upper Austral life zone, and four occur only in the Lower Austral. Of the species which are restricted to Upper Austral areas five are known to occur only on calcareous soils, two on noncalcareous soils, and one on both; data on the remaining five species are not available.

Of the four species which are restricted to Lower Austral regions above the Fall Line one is found only on calcareous soil and one is limited to noncalcareous soil; data for the remaining two species are lacking. Five of the species found only above the Fall Line are restricted to hardwood-pine associations; information concerning the preferences of the remaining species is not available.

Nineteen species and subspecies of our land snails are restricted to the Coastal Plain. Of this number only one is limited to the Black Belt. Twelve of these species are found only in the Saballian zone, two are limited to the Lower Austral, and five are found in both life zones. Of the Saballian species and subspecies one is known to be restricted to calcareous soil, and two are found on both calcareous and noncalcareous soils. Data for the nine remaining species and subspecies are lacking.

Five species are found in the Lower Austral as well as in the Saballian zone. Two of these are limited to calcareous soil, and the other three are found on calcareous and noncalcareous soils. Two species are restricted to the Lower Austral. One of these is found only on noncalcareous soils, and the other occurs on both types of soil. Three of the nineteen Coastal Plain species are found in hardwood-pine associations, one occurs only in pine forests, and one is found in both types of associations. One species occurs in hardwood-pine and hardwood-cedar forests, and two are found only in pine-cedar associations.

LAND SNAILS OF ALABAMA

Class GASTROPODA

Subclass PULMONATA

Order STYLOMMATOPHORA

Snails belonging to this order are characterized by having two pairs of retractile tentacles, the superior pair bearing the eyes at the tips.

Family POLYGYRIDAE Pilsbry

The shell varies from discoidal to globose-conic, and ranges from about 4 mm. in diameter to 35 mm. The peristome is reflected, and the aperture is often obstructed by teeth situated on the peristome or on the parietal wall. Four genera of this family are found in Alabama.

Genus POLYGYRA Say

The shell varies from discoidal to depressed-globose, and ranges from about 4 mm. to 12 mm. in diameter. The aperture is reniform or auriform, and is obstructed by teeth situated on the peristome, on the parietal wall, or on both. The embryonic whorls are smooth, and the remaining whorls are variously striated or ribbed.

Subgenus POLYGYRA Say

The shell is depressed-discoidal, and the whorls are tubular, increasing in size regularly. The aperture is slightly obstructed by a small tooth, formed by the raised margin of the parietal callus.

Polygyra septemvolva volvoxis (Pfeiffer), 1846

Plate 1, figure 1 A, B

Helix volvoxis Pfeiffer, 1846

Polygyra septemvolva Walker, 1928 (*nec* Say, 1817)

Polygyra cereolus volvoxis Walker, 1928

Polygyra septemvolva volvoxis Pilsbry, 1940

Type locality: St. Simon's Island, Georgia, by designation of Pilsbry, 1940.

The shell is depressed, umbilicate, with a low convex spire and from 6 to 7 regularly increasing whorls. The upper surface is sculptured with distinct rib-striae which pass over the bluntly angulate periphery and become obsolete on the base. The last whorl is somewhat flattened below the periphery, and slopes inward to the base. The base is marked only with light growth lines. The aperture is reniform, and the margins of the peristome are continuous, forming an elevated fold on the parietal wall. According to Pilsbry (1940), the type measured 3.6 mm. in height and 7.7 mm. in diameter; the average measurements for three shells were given as 3.7 mm. by 8.8 mm.

One shell, collected by Dr. A. F. Archer at Bear Point, Baldwin County, was referred to volvoxis. The last whorl is very bluntly angular, and only slightly flattened below the periphery. The rib-striae are low and not as distinct as in typical volvoxis, and the base is smooth. The shell measures 3.7 mm. in height and 9.0 mm. in diameter.

Volvoxis is found within the limits of the Saballian life zone from southeastern Georgia through northern

Florida, and into southern Alabama where it intergrades with septemvolva febigeri in Mobile and Baldwin counties. In a series of 20 shells taken at Alabama Port, Mobile County, 6 could be referred to volvaxis. The average measurements of these shells are 3.9 mm. by 8.4 mm. Of the remaining shells, 12 possessed intermediate characters between volvaxis and febigeri, and 2 were referred to the latter subspecies.

The distinguishing features of volvaxis are the last whorl, which is angulate at the periphery and flattened ventrally, and the smooth base. The intermediate specimens from Alabama Port exhibit some finely sculptured striae on the base, characteristic of febigeri. The last whorl is rather flattened subperipherally, this being a feature of volvaxis.

Walker (1928) recorded volvaxis under the name Polygyra cereolus volvaxis, listing localities in four counties in southwestern Alabama. He also reported typical septemvolva and septemvolva febigeri from the same area. Pilsbry (1940) recorded the localities cited by Walker for volvaxis and febigeri, but did not include Alabama as part of the range of typical septemvolva. Walker's record of septemvolva from Mobile was evidently volvaxis, since the typical species is replaced by volvaxis in northern and northwestern Florida.

Volvaxis is found in debris and surface litter on

shell hammocks in Baldwin and Mobile counties. , The shells are found among hardwoods and pines, more frequently on calcareous soils, and occasionally in almost pure pine stands which are dissected by streams. The intermediate shells from Alabama Port were collected from leaf litter in a hardwood-pine association very near the water on Mobile Bay. Further study of shells from this area, and from the region across the bay, and along the Florida-Alabama line to the Atlantic Coast will establish the range of volvaxis in Alabama.

Alabama records:

Baldwin Co. Point Clear; Week's Bay (BW); Bear Point (AFA)
 Mobile Co. Mobile (BW); Stark's Wharf (HAP); Alabama
 Port (HCR)
 Monroe Co. Claiborne (BW)
 Washington Co. Healing Springs (BW)

Polygyra septemvolva febigeri (Bland), 1866

Plate I, figure 2 A-C

Helix febigeri Bland, 1866

Polygyra cereolus febigeri Walker, 1928

Polygyra septemvolva febigeri Pilsbry, 1940

Type locality: New Orleans, Louisiana.

The shell is depressed, umbilicate, and sculptured with distinct rib-striae above, finely striated below. The last whorl is rounded below the angular periphery, in contrast to the flattened subperipheral area on the last whorl of volvaxis. Pilsbry (1940) gives the measurements of Bland's type as 3.5 mm. by 8.5 mm., and those of a New

Orleans shell as 4.0 mm. by 8.3 mm.

In the series of volvoxis and intermediates collected at Alabama Port, 2 of the latter were referred to febigeri. These two shells measure 3.6 mm. by 8.5 mm., and 3.7 mm. by 8.7 mm. The last whorl is less rounded below the periphery than in typical febigeri, and the base is rather distinctly and evenly striate.

Walker (1928) reported this subspecies as Polygyra cereolus febigeri, listing Mobile as the only locality in this state. Pilsbry (1940) reported febigeri from "Minette Bay, Baldwin Co.", saying that "Whether P. septemvolva, volvoxis, and febigeri all occur at Mobile, as recorded by Walker, seems doubtful."

Polygyra septemvolva febigeri ranges from the Brazos River and Galveston, in southeastern Texas, through Louisiana, Mississippi, and into southwestern Alabama where it intergrades with septemvolva volvoxis. Febigeri is found under leaf litter, along streams and ditches in hardwood-pine associations near the coast.

Alabama records:

Mobile Co.	Mobile (BW); Alabama Port (HCR)
Baldwin Co.	Cedar Point, Minette Bay (HAP)

Subgenus DAEDILOCHILA Beck

The shell is depressed-globose, with a low spire, and with regularly increasing whorls. The umbilicus is open, sometimes partially covered by the columellar insertion of

the peristome. The aperture is auriform, obstructed by three teeth, one parietal and two situated on the peristome. The greatest diameter is about 12 mm.

Polygyra auriformis (Bland), 1859

Plate I, figure 3 A, B

Helix auriformis Bland, 1859

Polygyra auriformis Walker, 1928

Polygyra espiloca Walker, 1928 (nec Bland, 1860)

Polygyra auriformis Pilsbry, 1940

Type locality: "Alabama".

The shell is depressed above, inflated below, with distinct rib-striae extending across each of the whorls to the periphery, below which they are rather obsolete. Close spiral lines are present on the last whorl, more distinct toward the base than above. The aperture is auriform, at an angle of about 45 degrees with the base. The peristome is slightly expanded and reflected, its margins joined across the parietal wall by a short, tongue-like fold which barely enters the aperture. The outer peristome bears an obtuse, submarginal, lamelliform tooth, while the basal peristome bears an oblique, diagonally placed tooth, the umbilical end of which enters the aperture for a short distance. The umbilicus is about 1.0 to 1.5 mm. across, and encircled by a slight furrow on the last whorl. A series of 20 shells from Dallas County averages 4.3 mm. in height and 8.2 mm. in diameter, with about $5\frac{1}{2}$ whorls.

Auriformis is a widely spread Coastal Plain species,

ranging from Ware County and Savannah, in southeastern Georgia, through northern Florida, the southern half of Alabama, coastal Louisiana, to the gulf coast of Texas, near Galveston. In Alabama, auriformis is generally distributed on the Coastal Plain. Walker (1928) reported it from five localities above the Fall Line, including one record from Monte Sano, Madison County. On the basis of the coastal distribution of this species, from Georgia to Texas, Walker's records from Clay, Madison, Shelby, St. Clair, and Talladega counties seem to be questionable, and need to be validated. Although the author has collected in these areas, he has seen no shells referable to this species.

Walker's record of Polygyra espiloca (Bland) is evidently a misidentification of auriformis, since espiloca is "...restricted to the coastal plain and sea islands of North Carolina to Georgia" according to Pilsbry (1940), and could be confused with the latter species.

Polygyra auriformis is found abundantly throughout the Black Belt of Alabama. In this area its habitat is at the bases of tufts of weeds and grasses, in open prairie-land with little forest cover. Hinton (1951) found it to be common on open calcareous ground. Series from Coffee, Montgomery, and Mobile counties were taken in grassland, with a sparse covering of deciduous leaf litter. In Baldwin County auriformis was found under decaying hardwood

logs; and in Sumter and Greene counties , it was found in clumps of weeds at the edge of mixed hardwood-cedar associations.

Alabama records:

Baldwin Co. Foley (AFA); Magnolia Spgs.; Week's Bay (BW);
Bon Secour (HAP)
Choctaw Co. Silas (BW)
Coffee Co. Elba (HCR)
Dallas Co. Selma; U.S. 80 at Cahaba River and Marion
Junction (HCR)
Elmore Co. Wetumpka (BW)
Greene Co. Boligee (JH)
Marengo Co. Demopolis (BW); Rembert's Landing (HAP); 3
miles E. of Demopolis on U.S. 80 (JH)
Mobile Co. Mobile; Irvington; Saraland (BW); Alabama
Port (HCR)
Monroe Co. Monroe (BW)
Montgomery Co. Barachias (BW); Montgomery (HCR)
Perry Co. Hamburg; Uniontown (BW)
Sumter Co. Livingston; Epes (HAP; JH)
Tuscaloosa Co. Northport (BW); Foster's Ferry Road (AFA)

Polygyra pustula (Ferussac), 1822

Plate I, figure 4 A, B

Helix pustula Ferussac, 1822
Polygyra pustula Walker, 1928
Polygyra pustula Pilsbry, 1940

Type locality: St. Augustine, Florida, by designation of Pilsbry (1940).

The shell is depressed above, inflated below, with sparse hairs over the epidermis of fresh specimens. The 4 to $4\frac{1}{2}$ whorls increase in size regularly; and the last whorl, which is constricted behind the outer and basal peristome margins, turns downward behind the aperture. The peristome is reflected, bearing a small tooth on the basal margin, which is supported by a low callus on the columel-

lar side. The outer peristome bears a small tooth which tapers upward into a supporting callus and ends very abruptly in another much smaller tooth. The parietal wall bears a long lamelliform tooth which extends forward from the columellar insertion of the peristome to the outer portion of the aperture. At its apical termination, the parietal tooth is joined to the outer insertion of the peristome by a thin, distinct callus ridge. The umbilical opening is about 0.7 mm. across, its edge formed by a deep concave corrugation in the last whorl. The columellar insertion of the basal peristome is dilated so as to partly cover the umbilical perforation. A series of 3 shells from Bear Point, Baldwin County, averages 2.6 mm. in height and 4.3 mm. in diameter.

According to Pilsbry (1940), this snail is a calciphile, often being found on shell mounds. The Baldwin County specimens were taken on a shell hammock at Bear Point, by Dr. A. F. Archer. No other data are available concerning the habitat of this species in Alabama. Pustula is a Coastal Plain species, extending from South Carolina through Georgia, northern and central Florida, into the Saballian life zone in Alabama, where it apparently reaches the western limit of its range. Pilsbry (1940) states that it "...will doubtless be found in all of the southern tier of counties in Georgia and Alabama, and probably also into Mississippi."

Alabama records:

Baldwin Co. Magnolia Spgs.; Point Clear (BW); Bear
Point (AFA)
Conecuh Co. Evergreen (BW)

Polygyra pustuloides (Bland), 1858

Plate I, figure 5 A, B

Helix pustuloides Bland, 1858

Polygyra pustuloides Walker, 1928

Polygyra pustuloides Pilsbry, 1940

Type locality: Near Darien, McIntosh County, Georgia.

The shell is depressed above, inflated below, and the epidermis is thinly hirsute in fresh specimens. There are 4 to 4½ regularly increasing whorls. The last whorl turns downward behind the aperture, and is constricted behind the outer and basal peristome margins. The aperture is obliquely crescentic, obstructed by a short, erect, lamelliform tooth, the apical end of which is joined to the outer insertion of the peristome by a thin callus ridge. The peristome has reflected outer and basal margins which bear two small teeth separated by a deep notch. Each of the teeth is supported by a small callus continuation; the outer tooth is buttressed on its outer side, and the inner tooth is supported on its columellar side. The umbilical opening is about 1.4 mm. across, and is not covered by the columellar insertion of the peristome as in P. pustula. The last whorl is only slightly excavated behind the columellar insertion of the lip, and not deeply furrowed as in pustula. Pustuloides is thus readily distinguished from pustula by

its greater diameter, more depressed shape, and widely open umbilicus.

This species ranges from Yemassee, South Carolina, through Georgia, southern Tennessee, Alabama, and western Florida. It is widely spread throughout Alabama, occurring mainly in deciduous woods, under rather thick leaf litter and under rotting logs. In Marengo County, it is found in grassland, and in oak-pine-cedar associations. It has been taken by the writer in weedy pastures, under stones, and in grass and weeds along roads in Tuscaloosa County. Pustuloides does not have any particular preference for limestone soils, having been collected in good series on noncalcareous soils in the southern and central portion of the state.

Alabama records:

Baldwin Co.	Point Clear (BW)
Barbour Co.	Elamville (BW)
Bibb Co.	Blocton (BW); Pratt's Ferry (HCR)
Blount Co.	Oneonta (HCR); Blount Spgs. (BW)
Chambers Co.	Langdale (BW)
Cherokee Co.	Terrapin Creek; 10 miles S.E. of Centre (BW)
Chilton Co.	Clanton (BW)
Choctaw Co.	Silas (BW)
Clarke Co.	Thomasville (BW,HCR); Jackson (BW)
Cleburne Co.	Mt. Cheaha (BW)
Conecuh Co.	Evergreen (BW)
Cullman Co.	Cullman (BW)
Dallas Co.	Pleasant Hill; Selma (BW); 6 mi. W. of Selma (JH)
Elmore Co.	Wetumpka (BW)
Etowah Co.	Big Wills Valley; Gallant (BW)
Fayette Co.	Forks of Sipsey River (BW); Berry (HCR)
Franklin Co.	Burleson (BW)
Hale Co.	Akron (HCR); Hale-Marengo line on U.S. 80 (JH)
Jackson Co.	Princeton; Stevenson; Woodville (BW); S. side of Tenn. River on Ala. 35 (HCR)
Jefferson Co.	Valley Creek Station; Birmingham (BW); 5 mi. E. of Irondale on U.S. 78 (HCR)

Lauderdale Co.	Florence (BW)
Lowndes Co.	Jct. of Ala. 11 with U.S. 80 (HCR)
Macon Co.	Tuskegee (BW)
Madison Co.	Gurley; Huntsville; Monte Sano (BW)
Marengo Co.	Demopolis (BW); 4 mi. S.W. of Demopolis on U.S. 80 (HCR)
Marion Co.	Winfield (BW)
Marshall Co.	3 mi. N. of Guntersville (HCR)
Mobile Co.	Mobile; Mt. Vernon (BW)
Montgomery Co.	McGee's Station (BW); Sprague (HCR); Montgomery (JH)
Morgan Co.	Massey (HCR)
Perry Co.	Hamburg (BW)
Pickens Co.	4 mi. E. of Reform on U. S. 82 (HCR)
Randolph Co.	Wadley; Roanoke (BW)
St. Clair Co.	Whitney; Greensport; Ten Island Shoals (BW)
Shelby Co.	Calera; Montevallo; Weduska Shoals (BW)
Sumter Co.	Epes (JH)
Talladega Co.	Three Island Shoals (BW); Munford (HCR)
Tuscaloosa Co.	Holt; Duncanville; Hagler; Tuscaloosa (BW); Vance; Cottondale; University; Hurricane Creek (HCR)
Wilcox Co.	Gastonburg; Pine Hill; Alberta (BW)

Polygyra leporina (Gould), 1848

Plate I, figure 6 A, B, C

Helix leporina Gould, 1848

Polygyra leporina Walker, 1928

Polygyra leporina Pilsbry, 1940

Type locality: White Rock Springs, Arkansas.

The shell is depressed above, inflated below, with very sparse hairs on the epidermis. There are $4\frac{1}{2}$ to 5 regularly increasing whorls. The last whorl turns downward behind the aperture, and is constricted behind the outer and basal margins. The peristome is reflected and bears a small tooth on the basal margin, which is regularly supported by a callus extension terminating at the columellar angle. The outer peristome bears a small denticle, supported by a callus ridge which terminates bluntly about midway between

the tooth and the outer insertion of the peristome. The parietal callus is thin, and bears a slender, sinuous, lamelliform tooth, the columellar end of which is continuous with the recurved basal peristome. The apical end of the parietal tooth is joined to the outer insertion of the peristome by a distinct, short callus ridge. The umbilical perforation is less than 1.0 mm. across, and it is almost covered by the columellar portion of the basal peristome. A series of 4 shells from Tuscaloosa County averages 3.0 mm. in height by 5.5 mm. in diameter.

Polygyra leporina is a very widely distributed species, ranging from eastern Texas, Oklahoma, and Missouri through southern Illinois, Indiana, Arkansas, Louisiana, Mississippi, and into western and southern Alabama. Although there are three known localities for leporina above the Fall Line in Alabama, the species appears to be more widely distributed on the Coastal Plain. It is found largely in mixed hardwood swampy lowlands, in ravines, and along streams and rivers. One series of leporina, taken by Dr. A. F. Archer, was found in a pine-cedar flat south of Demopolis, indicating that this snail is not restricted to hardwood associations. The author has collected leporina in thick deciduous leaf litter and under wet, rotting logs, in swampy lowland near Tuscaloosa.

Alabama records:

Baldwin Co.	Old Spanish Fort (AFA)
Barbour Co.	Elamville (BW)

Choctaw Co.	Silas; Black Bluff (BW)
Clarke Co.	Jackson (BW)
Conecuh Co.	Evergreen (BW)
Greene Co.	Boligee (BW)
Jefferson Co.	Squaw Shoals (BW)
Lauderdale Co.	Florence (BW)
Marengo Co.	5.8 mi. S. of Demopolis (AFA)
Mobile Co.	Mobile; Mt. Vernon (BW)
Pickens Co.	Coalfire (BW)
Sumter Co.	Epes; Livingston; York; Sucarnochee Cr. (BW)
Tuscaloosa Co.	Holt; Elrod; Tuscaloosa (BW); Cloverdale; Tuscaloosa (HCR)

Polygyra texasiana (Moricand), 1833

Plate I, figure 7 A, B

Helix texasiana Moricand, 1833

Polygyra texasiana Pilsbry, 1940

Polygyra triodontoides Hinton, 1951

Type locality: Vicinity of Brownsville, Texas, by designation of Pilsbry (1940).

The shell is much depressed above, inflated below, with a slightly subangular periphery. There are $5\frac{1}{2}$ to 6 whorls which increase in size regularly. The last whorl turns downward very abruptly and is constricted behind the lip. The embryonic whorls are marked only with faint short striae radiating from the suture; the later whorls are marked with low growth striae. The last two whorls are rib-striate on the dorsal surface and smooth ventrally, except behind the outer peristome, where the rib-striae pass over the periphery and into the umbilical region. The microscopic striation consists of fine wavy spirals, which are frequently lost through wear in older specimens. The peristome is reflected and thickened on its inner edge, and bears two perpendicular, flattened teeth, one on the basal margin, the

other on the outer margin. The outer tooth is supported by a callus ridge which tapers into the outer peristome near its insertion. The notch between the teeth is equal to the width of the basal peristome. The parietal callus is thickened and bears a long, sinuous, lamelliform tooth, the apical end of which is supported by a thick callus ridge directed toward the insertion of the outer peristome, so that the parietal tooth resembles an inverted "V".

Sixty shells from one locality in Hale County are alike in all characteristics but size. The large forms average about 5.0 mm. in height and 10.0 mm. in diameter; the smaller forms average about 4.0 mm. by 8.0 mm. Both forms have height/diameter indices of 0.5, as do individuals slightly intermediate in size. Pilsbry (1940) states that texasiana is "...a variable species", and that in shells from single colonies in Texas the diameter ranges from 7.6 mm. to 10.9 mm. Extreme diameters of Alabama specimens are well within this size range. On the basis of this similarity in morphological characteristics the specimens from Hale County, Alabama, are considered to be conspecific with typical texasiana.

According to Pilsbry (1940), the range of texasiana extends from Brownsville and San Antonio north and east through Texas into Oklahoma, western Arkansas, and Louisiana. The occurrence of this species in west-central Alabama represents an eastern extension of the known range of texasiana, and constitutes a new state record.

Hinton (1951) recorded this species from Alabama as Polygyra triodontoides (Bland), stating that it was found in abundance on open prairie-land near Allenville, in Hale County. His specimens, which were studied by the writer, were found to be misidentified. The aperture of texasiana presents an altogether different picture from that of triodontoides. The teeth of texasiana are similar, close together, and almost completely basal in appearance, while those of triodontoides are dissimilar, and widely separated. In addition, the spire of triodontoides is distinctly elevated, whereas that of texasiana is quite depressed.

The discontinuous distribution exhibited by Polygyra texasiana should not be surprising, in view of its habitat. The Alabama Black Belt is a typical long-grass prairie with a flora and fauna which show distinct western affinities. The cerambycid beetle Tetraopes femoratus Leconte, which ranges westward from central Texas, has been recorded from this region. In addition, such plant genera as Andropogon, Oenothera, and Populus are represented in the Black Belt by prairie species which are found only rarely elsewhere in Alabama.

Polygyra texasiana has not been found elsewhere in this state, and the proximity of the localities in Hale County, in which it has been found, suggests that this species may have been introduced. According to Hinton (1951), the localities for texasiana are in an area where livestock is imported from Texas, and the possibility does

exist that this species could have been introduced in the herbage used for feed during the transport of cattle. Further collecting in the Gulf States is needed to determine if the distribution is continuous or discontinuous, before such a possibility can be ignored.

Alabama records:

Hale Co. Near Hale-Marengo Co. line on U.S. 80; at
Jct. of U.S. 80 and Ala. 13; 4 mi. N. of
Faunsdale on Ala. 99 (JH)

Polygyra plicata Say, 1821

Plate I, figure 8 A-E

Polygyra plicata Say, 1821

Polygyra plicata Walker, 1928

Polygyra dorfeuilliana Walker, 1928

Polygyra plicata Pilsbry, 1940

Type locality: Alabama.

The shell is very depressed, and has a slightly convex spire. There are 5 to $5\frac{1}{2}$ whorls which increase in size regularly. The last whorl expands behind the peristome, turns downward, and is constricted. A shallow furrow curves backward from the upper margin of the peristome, delimiting a smooth convexity on the subangular periphery. The shell is sculptured with low, retractive riblets which become stronger behind the aperture, passing over the periphery and into the umbilical region. The peristome is reflected and thickened. Its outer and basal insertions approach each other across the parietal callus, recurving toward the outer peristome, where they support an obliquely placed, high parietal tooth. Deeply situated in the outer

portion of the aperture are two lamelliform teeth which are parallel with the lip margin. The upper tooth is more deeply immersed, and concave; its lower end is obscured by the thicker convex lower tooth. The columellar end of the lower tooth turns inward obliquely, toward the columella, which it joins about 2 mm. from the lip margin. Four shells average 3.0 mm. in height and 6.4 mm. in diameter.

According to Pilsbry (1940), plicata ranges from the southern part of Indiana and Kentucky through Tennessee and into Alabama. In this state the range extends from Jackson County, in the northeast, to Lauderdale County, in the northwest, and then southward along the Fall Line to Pickens, Tuscaloosa, and Bibb counties. It occurs again in Mobile County, according to Walker (1928), and Pilsbry (1940). Walker (1928) cited a record of Polygyra dorfeuilliana Lea, collected by H. E. Sargent, from Jackson County. Pilsbry (1940) states that this record must have been based on an erroneous identification of plicata or troostiana, both of which occur in northern Alabama. Dorfeuilliana is a western species, ranging from Texas, Oklahoma, and Kansas eastward to Missouri, Arkansas, and southwestern Louisiana. It is not considered to be found in Alabama.

Plicata has been found in both mixed hardwood-pine and cedar-hardwood associations in northern and western Alabama. In Madison County it was found in deciduous leaf litter and under limestone rocks, at Cave Springs Cave. In Franklin County it was taken on limestone flats near Newburg, and in

Tuscaloosa County the writer collected it in oak-pine litter on sandstone ledges along Blue Creek. The ecology of *plicata* in the southern part of the state is unknown to the writer.

Alabama records:

Bibb Co.	Pratt's Ferry (BW)
Colbert Co.	Tuscumbia (BW)
Cullman Co.	Cullman (BW)
Franklin Co.	Burleson (BW); Russellville (BW,HCR); Newburg (HCR)
Jackson Co.	Stevenson; Princeton (BW)
Lauderdale Co.	Florence (BW); Elgin (HCR)
Madison Co.	Gurley; Huntsville; Monte Sano (BW); Newhope (HCR)
Marion Co.	Bear Creek (BW)
Mobile Co.	Mobile; Saraland (BW)
Pickens Co.	Ligon's Spring (BW)
Tuscaloosa Co.	Rock Mt., Abernant (AFA); Blue Creek, on Ala. 69; Windham Springs (HCR)
Walker Co.	Corona (HCR)

Polygyra troostiana Lea, 1838

Plate I, figure 9 A-C

Polygyra troostiana Lea, 1838
Polygyra troostiana Walker, 1928
Polygyra troostiana Pilsbry, 1940

Type locality: Vicinity of Nashville, Tennessee.

The shell is depressed above, with only a slightly elevated spire. The upper surface is more heavily marked by rib-striae than in *plicata*, and the ribs pass over the periphery and onto the base. The last whorl turns downward abruptly behind the aperture. The rib-striae passing over the periphery are strongly defined in this area, unlike *plicata*, which has a smooth convexity behind the lip. The epidermis is sparsely set with long hairs, which are lost

in older specimens. The aperture is similar to that of plicata, the difference being in the lip teeth. The outer tooth is thin, concave, and deeply situated within, and parallel to, the outer margin of the peristome. The basal tooth, unlike that of plicata, is small and conical. About 2.5 mm. within the aperture there is a tiny tubercle, on the columella, which is visible only after breaking open the shell. Three shells from Huntsville, Madison County, average 2.8 mm. in height and 7.2 mm. in diameter.

Polygyra troostiana has been recorded only from central Tennessee and northern Alabama. Its known ranges extends from Nashville, Tennessee, southward on the Cumberland Plateau and the Appalachian Ridge and Valley system to northern and northeastern Alabama. In this state it is found primarily on the slopes of mountains in Madison, Cherokee, Cleburne, and Calhoun counties. It occurs in Florence, Lauderdale County, according to Walker (1928), and Dr. A. F. Archer has recorded it from Guntersville, in Marshall County. Its ecology is unknown to the writer.

Walker (1928) records troostiana from Mobile County. Pilsbry (1940) does not cite this southern locality, and Walker's record is considered to be an erroneous identification of plicata, which is known to occur in Mobile County. In addition, all other records indicate that troostiana is limited to areas north of the Fall Line.

Alabama records:

Calhoun Co. Choccolocco Mts., Germania Spring (BW)
 Cherokee Co. Craig Mt. (BW)
 Cleburne Co. Dugger Mt. (BW)
 Lauderdale Co. Florence (BW)
 Madison Co. Huntsville; Gurley; Normal; Monte Sano (BW);
 West Spur of Monte Sano (AFA)
 Marshall Co. Guntersville (AFA)

Genus STENOTREMA Rafinesque

The shell varies from globose-conic to depressed, and may be lens-shaped. The aperture is basal, and is always obstructed by a long, radially placed, parietal tooth or lamella. The basal portion of the peristome is thickened, and often notched in the middle. The epidermis is variously set with hairs or periostracal processes. The embryonic whorls are either papillose or striate.

Subgenus STENOTREMA Rafinesque

The shell varies from globose-conic to lenticular. The outer peristome bears a small conical tooth on its inner margin. The inner half of the basal peristome is either adnate and with or without the submedian notch on its margin; or free and with the submedian notch present.

Stenotrema spinosum (Lea), 1830

Plate I, figure 10 A, B

Carocolla spinosa Lea, 1830

Polygyra spinosa Walker, 1928

Stenotrema spinosum Pilsbry, 1940

Stenotrema spinosum Archer, 1948

Type locality: Claiborne, Monroe County, Alabama.

The shell is depressed, lenticular, with a convex base and an acutely carinate periphery. The embryonic whorls are sculptured with minute granules arranged in radial trends. The remaining whorls have narrow growth lines, over which are widely spaced, radially arranged, short ridges. The aperture is obstructed by a long, heavy, curved parietal lamella, which is very high in the middle and leans toward the straightened, adnate, basal peristome. The basal peristome bears a very small notch on its inner margin. The outer peristome bears a small indistinct tooth on its inner margin. A series of six shells from Morgan County averages 5.7 mm. in height and 14.0 mm. in diameter.

Stenotrema spinosum is usually found on rocky or stony ground, according to Archer (1948). It is more abundantly found on limestone, although the writer has taken it on sandstone and shale soils as well. Its habitat is on and under rocks, and in deciduous leaf litter in hardwood-cedar associations on limestone soils, and in mixed hardwood-pine elsewhere. Occasionally it is found under rotting logs, along streams.

Spinosum ranges from southwestern Virginia through Tennessee and Georgia to Alabama, where it is generally distributed over all but the southeastern quarter of the state.

Alabama records:

Blount Co. Blount Spgs. (BW); 5 mi. S. of Oneonta (HCR)

Chilton Co.	Duncan's Riffle (BW)
Clarke Co.	Salt Mt. (AFA)
Dallas Co.	Selma (BW)
DeKalb Co.	Valley Head (BW); Fort Payne (BW,HCR)
Elmore Co.	Wetumpka (BW)
Etowah Co.	Keener; Gallant (BW)
Franklin Co.	Burleson; Russellville (BW); 5 mi. N. of Russellville (HCR)
Jackson Co.	Princeton; Stevenson; Pisgah; Woodville (BW); Tenn. River, on Ala. 35 (HCR)
Jefferson Co.	Squaw Shoals (BW)
Lauderdale Co.	Florence; Killen (BW)
Madison Co.	Huntsville; Gurley; Monte Sano (BW); 2 mi. N.N.E. of Farley (AFA)
Marengo Co.	Marengo (BW)
Mobile Co.	Mobile (BW)
Morgan Co.	Cave Springs Cave (AFA); Massey (HCR)
Monroe Co.	Claiborne (AFA)
Perry Co.	"Perry Co." (BW)
Talladega Co.	Three Island Shoals; Ft. William (BW)
Tuscaloosa Co.	Tuscaloosa; Holt (BW); Lock 14 (AFA)
Walker Co.	Forks of Warrior (BW)
Wilcox Co.	Gastonburg (BW)

Stenotrema barbigerum (Redfield), 1856

Plate I, figure 11 A, B

Helix barbiger Redfield, 1856

Polygyra barbiger Walker, 1928

Stenotrema barbigerum Pilsbry, 1940

Stenotrema barbigerum Archer, 1948

Type locality: Habersham County, Georgia.

The shell is depressed, lenticular, with a low conoid spire, inflated base, and acutely carinate periphery. The embryonic whorls are sculptured with minute granules which are arranged in radial trends; the remaining whorls are marked with growth lines and fine striae, over which are widely spaced, radially arranged, interrupted ridges which are produced at the periphery and sutures into long, flattened, hair-like processes. The aperture is obstructed by

a long, low, slightly curved, parietal lamella which is less prominent than the basal peristome. The inner margin of the basal peristome lacks the notch which is characteristic of Stenotrema spinosum. A series of five shells from Tuscaloosa County averages 4.5 mm. in height by 9.1 mm. in diameter. The presence of a fringe of hair-like processes on the carinate periphery, and at the sutures between the whorls, is characteristic of barbigerum, and the absence of the lip-notch aids in its identification.

Stenotrema barbigerum ranges from western South Carolina through northern Georgia into Alabama, where it is found to be rather generally distributed over the northern half of the state. With the exception of a record from Butler County, all of the records for barbigerum are either above or very close to the Fall Line. The species occurs in Hale County, at Havana, which is a well known relict area noted for its northern affinities. This region is characterized by deep, heavily shaded, humid gorges, in which the humidity is maintained at a high level by the canopy of beech and oak trees, and by the steeply cut ravines themselves. Consequently the twenty-five mile discontinuity between the Fall Line and the Havana locality is not too surprising. The stabilizing effect of the high humidity results in a microclimate where northern forms are protected from the higher temperatures characteristic of the Coastal Plain. As a result, such northern plants as the walking fern, Camptosorus, and the filmy fern, Tricho-

manes boschianum here have their southernmost limits in the state. The population of Stenotrema barbigerum at Havana evidently represents a postglacial relict. On the basis of the distribution of barbigerum in regions above the Fall Line, and in the Havana locality, the Butler County record, taken by Dr. A. F. Archer at Fort Dale Cemetary, probably represents an introduced population.

The habitat of barbigerum is in and under leaf litter in mixed hardwood-pine associations. Occasionally it is found under rotting logs, and not infrequently it is found under stones. It is usually taken on wooded slopes, or at the bottom of ravines, along streams.

Alabama records:

Bibb Co.	Woodstock (BW)
Blount Co.	Blount Springs (BW)
Butler Co.	Fort Dale Cemetary (AFA)
Chambers Co.	Cornhouse Creek (AFA)
Cherokee Co.	Pleasant Gap; 10 mi. S.E. of Centre (BW)
Clay Co.	Pyriton (BW)
DeKalb Co.	DeSoto State Park (AFA)
Franklin Co.	Burleson (BW)
Hale Co.	Harrison Church, 7 mi. S. of Havana (HCR); 2.5 mi. S. of Havana (AFA)
Jefferson Co.	Bessemer; Squaw Shoals (BW)
Lauderdale Co.	Florence (BW)
Lawrence Co.	King Cove, in S.W. quarter of county (HCR)
Marion Co.	Bear Creek; Hamilton (BW)
Randolph Co.	Roanoke; Wadley (BW)
Shelby Co.	Gurnee (BW)
St. Clair Co.	Ragland; Beavercreek Mt. (BW)
Tuscaloosa Co.	Hurricane Cr; Peterson (HCR); Holt; Tuscaloosa (BW)
Walker Co.	Forks of Warrior River (BW)

Stenotrema stenotrema (Pfeiffer), 1842

Plate I, figure 12 A, B

Helix stenotrema Pfeiffer, 1842

Polygyra stenotrema Walker, 1928

Polygyra stenotrema seminuda Walker, 1928

Stenotrema stenotrema Pilsbry, 1940

Stenotrema stenotrema Archer, 1948

Type locality: Indiana.

The shell is depressed-globose, with a convex base and rounded periphery. The embryonic whorls are sculptured with elongate granules which are arranged in radial series. The remaining whorls are unevenly striate, and covered with short hairs. The aperture is narrow and obstructed by a slightly curved parietal lamella rising to the level of the basal peristome, and leaning toward the latter; the outer end of the lamella turns into the interdenticular sinus. A very low buttress joins the lamella to the outer insertion of the peristome. The basal peristome is adnate along its outer edge, and the inner edge bears a small median notch. The outer peristome frequently bears an indistinct tooth. A series of 20 shells averages 6.4 mm. in height and 9.2 mm. in diameter.

Stenotrema stenotrema is an extremely wide-spread species. Its range extends from southern Ohio southward to Georgia, and westward through all of the southern states, except Texas, to Oklahoma and Missouri. It is not found on the Atlantic Coastal Plain or peninsular Florida. It is generally distributed throughout most of Alabama, although records are lacking from the southeastern counties. It is

found in a number of habitats, chiefly under leaf litter in mixed hardwood-pine associations. Archer (1948) notes that it is found on mountain knobs, flood plains, under rocks and logs, and in both pine and hardwood areas. This species is the most common member of the genus in Alabama, occurring abundantly above the Fall Line, and in only slightly lesser numbers on the Gulf Coastal Plain.

Alabama records:

Baldwin Co.	Saraland (BW)
Bibb Co.	Blocton (BW)
Calhoun Co.	Anniston; Jacksonville; Piedmont; Germania Springs (BW)
Cherokee Co.	10 mi. S.E. of Centre; Pleasant Gap; Slackland; Indian Mt.; Sanford Spgs. (BW)
Chilton Co.	Yellowleaf Creek (BW)
Choctaw Co.	Bladen Spgs.; Black Bluff; Sibb; Silas (BW)
Clarke Co.	Jackson; Grove Hill; Thomasville; Culpeper (BW)
Conecuh Co.	Evergreen (BW)
Coosa Co.	Butting Ram Shoals (BW)
Cullman Co.	Wilhites (BW)
Dallas Co.	Pleasant Hill (BW)
DeKalb Co.	Fort Payne; Valley Head; Sand Mt.; Lookout Mt.; Gorge of Little River (BW)
Elmore Co.	Wetumpka (BW)
Etowah Co.	Gorge of Black Creek; Black Creek Falls; Gadsden; Gallant; Keener (BW)
Fayette Co.	Fayette Court House (BW)
Franklin Co.	Burleson (BW)
Jackson Co.	Bass; Sand Mt.; Princeton; Stevenson; Woodville; Pisgah; Fabins; Paint Rock (BW)
Jefferson Co.	Squaw Shoals; Valley Creek; Adger (BW)
Lauderdale Co.	Florence (BW); Elgin (HCR)
Lawrence Co.	King Cove, S. W. quarter of county (HCR)
Macon Co.	Tuskegee (BW)
Madison Co.	Huntsville; Gurley; Monte Sano (BW)
Marion Co.	8 mi. N. of Brilliant; 1 mi. E. of Texas (HCR)
Mobile Co.	Mobile; Mt. Vernon (BW)
Montgomery Co.	Jct. of U.S. 80 and U.S. 31 (HCR)
Perry Co.	Marion (BW)
Randolph Co.	Wadley (BW)
Shelby Co.	Gurnee (BW)
St. Clair Co.	Jefferson-St. Clair county line, on U. S. 78 (HCR)

Sumter Co.	Livingston (BW,AFA); Epes (BW)
Talladega Co.	Three Island Shoals; Ft. William (BW)
Tuscaloosa Co.	Tuscaloosa; Holt; Hagler; Vance; Jct. of North and Black Rivers; Indian Creek (BW); University; Vance; Hurricane Creek; Peterson; Windham Spgs. (HCR); Lock 14; Abernant (AFA)
Walker Co.	2 mi. S. of Corona; 8 mi. S. of Oakmon (HCR)
Wilcox Co.	Gastonburg; Camden; Pine Hill; Alberta (BW)

Stenotrema hirsutum (Say), 1817

Plate I, figure 13 A, B, C

Helix hirsuta Say, 1817

Polygyra hirsuta Walker, 1928 (in part)

Stenotrema hirsutum Pilsbry, 1940

Stenotrema hirsutum Archer, 1948

Type locality: Wissahickon Creek, Germantown, Pennsylvania, by designation of Pilsbry (1940).

The shell is depressed-globose, with a low convex spire. The periphery is well rounded, and the base is rather strongly convex. The embryonic whorls are sculptured with fine granules which are radially lengthened; the later whorls with short, stiff hairs. The aperture is obstructed by a slightly curved parietal lamella which is slightly sinuous in its outer third; the termination of the lamella does not turn into the interdenticular sinus. The inner margin of the basal peristome bears a large, deep, rather obliquely placed notch. The buttress between the parietal lamella and the outer insertion of the peristome is either vestigial or entirely absent. A series of 10 shells from Jefferson County averages 3.9 mm. in height and 7.2 mm. in diameter.

Stenotrema hirsutum is an extremely wide-spread

species, ranging throughout most of eastern United States, from Ontario, Canada, south to Georgia, Alabama, and Mississippi. It is not present on the Atlantic or Gulf Coastal Plain, according to Pilsbry (1940), and Archer (1948). In Alabama, this species is recorded from localities along and above the fall line. According to Archer (1948), Walker (1928) erroneously reported hirsutum from Bibb, Etowah, Jackson, Madison, and Shelby counties; these specimens have been referred to S. deceptum.

The habitat of S. hirsutum in Alabama is under logs and rocks and in leaf litter, on both calcareous and noncalcareous soils, in mixed hardwood-pine and pine-cedar associations. It is commonly found in leaf litter in ravines and gullies, along streams and creeks. In Franklin County it was taken on limestone ledges near Newburg, and in Lauderdale County it was found on the top of a limestone bluff, at Blue Water Creek.

Alabama records:

Blount Co.	Blount Spgs. (BW)
Fayette Co.	Fayette (BW)
Franklin Co.	Newburg (HCR)
Jefferson Co.	Valley Creek, Adger (BW); Graysville (AFA)
Lauderdale Co.	Killen (BW); Elgin (HCR)
Marion Co.	Hamilton (BW)
Tuscaloosa Co.	Holt (BW); Blue Creek on Ala. 69; Talladega National Forest; Windham Spgs. (HCR)

Stenotrema barbatum (Clapp), 1904

Plate I, figure 14

Polygyra barbata Clapp, 1904

Polygyra barbata Walker, 1928

Stenotrema hirsutum barbatum Pilsbry, 1940

Stenotrema barbatum Archer, 1948

Type locality: Flood-plain of Tallapoosa River, about 5 miles southeast of Wetumpka, Elmore Co., Alabama.

The shell is depressed-globose, with a low convex spire and a rather strongly convex base. The embryonic whorls are smooth; the later whorls have very short, widely spaced hairs which are arranged in spiral trends. The aperture is widely open. The long sinuous parietal lamella diverges from the basal lip for about two-thirds of its length, and then curves slightly into the aperture. The distance between the edge of the parietal lamella and the basal peristome is about twice that of S. stenotrema. A distinct buttress joins the parietal lamella to the insertion of the outer peristome. A well developed conical tooth is present on the inner margin of the outer peristome. The basal peristome bears a small median notch on its inner margin. Two shells from Jefferson County average 5.1 mm. in height and 9.0 mm. in diameter.

According to Archer (1948), this species ranges from southern Ontario throughout central United States to Iowa and eastern Kansas, and from West Virginia to Massachusetts south to coastal North Carolina. An additional population occurs in the Appalachian regions of Alabama, Tennessee, and Kentucky, and there is one isolated record in Mississippi, at Vicksburg. The distributional gaps are probably

due to inadequate data. Based on available Alabama records, barbatum is found only above the fall line in this state, although it might be found on the Coastal Plain, in view of the Mississippi record.

This species is found in leaf litter, under logs and rocks, in mixed hardwood-pine and hardwood-cedar associations. It also occurs in weeds and grasses in pine associations. It is more commonly found in lowland areas, along rivers and streams according to Archer (1948).

Pilsbry (1940), considered barbatum a subspecies of S. hirsutum, although it is morphologically distinct from that species. Archer (1948), states that "The genitalia of S. barbatum are very distinct from those of hirsutum." The presence of a distinct buttress, the absence of sculpturing on the embryonic whorls, and the widely open aperture readily distinguish barbatum from hirsutum.

Alabama records:

Cherokee Co.	Poole's Island, Coosa River (BW)
Elmore Co.	Wetumpka (BW)
Jefferson Co.	5 mi. E. of Irondale on U.S. 78 (HCR)
Morgan Co.	Cave Spgs. Cave (AFA; HCR)
Lauderdale Co.	Lock 6, and Muscle Shoals, Florence (BW)

Stenotrema exodon (Pilsbry), 1900

Plate I, figure 15 A, B; figure 16

Polygyra stenotrema exodon Pilsbry, 1900
Polygyra stenotrema subglobosa Walker, 1928
 (nec Binney, 1837)
Stenotrema exodon Pilsbry, 1940
Stenotrema exodon turbinella Pilsbry, 1940

Stenotrema exodon Archer, 1948

Stenotrema exodon turbinella Archer, 1948

Type locality: Woodville, Jackson Co., Alabama.

The shell is depressed-globose, with a rounded periphery, a low convex spire, and a somewhat convex base. The embryonic whorls are very minutely granulate, and often smooth in adult shells. The later whorls bear short stiff hairs. The aperture is obstructed by a strong, high, thickened parietal lamella which leans toward the basal peristome and rises above its margin in profile view. The outer hook-like termination of the parietal lamella turns deeply into the interdenticular sinus. A strong buttress joins the parietal lamella to the outer insertion of the peristome. The basal peristome bears a deep, narrow notch on its inner edge, which is margined by a thickened callus ridge. Shells referred to as turbinella by Pilsbry (1940), and Archer (1948), are indistinguishable morphologically from topotypes of exodon. In addition, the type locality of turbinella is cited by Archer (1948), as 2-4 miles E. of Woodville. Archer (1948), separates these forms on the basis of size. Ten topotypes of exodon average 5.43 mm. in height and 9.5 mm. in diameter; seven shells of turbinella from Molder, Madison County, average 5.1 mm. in height and 8.3 mm. in diameter. The smallest shell of exodon measures 5.0 mm. by 9.0 mm., and the largest of turbinella 5.2 mm. by 8.5 mm., showing overlap in height between the two forms.

Pilsbry (1940), quotes Archer as saying that both forms inhabit the same localities, but differ in habitat, and as a result, turbinella is regarded as an ecological form rather than a distinct race. On the basis of similarity in morphological characteristics, the proximity of type localities, and the statement by Archer (in Pilsbry, 1940), that exodon and turbinella are found together, the writer considers the two forms synonymous.

S. exodon is found on the Cumberland Plateau and the Appalachian ridge and valley system of northeast Alabama, northwest Georgia, and southern Tennessee. Its range in this state extends from Jefferson County north and east to Madison, Jackson, and DeKalb counties. Its habitat is in leaf litter, on ledges, and under rocks and logs, on both limestone and sandstone soils, in mixed hardwood-pine and cedar-hardwood associations. According to Archer (1948), it is also found under rocks and stones, in open fields.

Alabama records:

Blount Co.	Blount Co. (AFA)
DeKalb Co.	Mentone (AFA); Ft. Payne (HCR)
Etowah Co.	Etowah Co. (AFA)
Jackson Co.	Paint Rock; Woodville; Limrock; Scottsboro; Princeton; Bass; Stevenson (AFA)
Jefferson Co.	5 mi. E. of Irondale on U.S. 78 (HCR)
Madison Co.	Cave Spgs. Cave (HCR); Sharp's Cove, Molder; Gurley (AFA)
Marshall Co.	Kennamer Cove (AFA)

Stenotrema deceptum (Clapp), 1905

Plate II, figure 1 A, B, C

Polygyra decepta Clapp, 1905

Polygyra decepta Walker, 1928

Polygyra hirsuta Walker, 1928 (in part)

Polygyra pilula Walker, 1928 (nec Pilsbry, 1900)

Stenotrema deceptum Pilsbry, 1940

Stenotrema deceptum Archer, 1948

Type locality: Blount Springs, Blount County, Alabama.

The shell is small, depressed-globose, with a slightly convex spire and a convex base. The embryonic whorls are sculptured with very fine, radially lengthened granules, and the remaining whorls are covered with fine, closely set hairs. The aperture is obstructed by a well developed, slightly curved, thickened lamella which rises almost to the level of the basal peristome, and the outer end of which turns deeply into the interdenticular sinus. A moderately developed buttress joins the parietal lamella to the outer insertion of the peristome. The basal peristome is thickened on its inner margin, and bears a wide, deep, V-shaped notch which is surrounded by a thickened callus ridge. The outer peristome bears a moderately developed tooth opposite the end of the parietal lamella. Ten shells from Blount County average 4.5 mm. in height and 7.1 mm. in diameter. The small size, the ridged notch in the basal peristome, and the strong curve in the outer end of the parietal lamella are diagnostic of this species.

The known range of deceptum extends from Bledsoe County, Tennessee, southward on the Cumberland Plateau and

the Appalachian Ridge and Valley system, into northern and central Alabama. In this state, *deceptum* is found through a broad belt extending from Madison, Jackson, and DeKalb counties in the northeast, southwest to Tuscaloosa and Bibb counties. Its habitat is in leaf litter, under rocks and logs, and on ledges along streams. It is found on both limestone and noncalcareous soils, although much more abundantly on the former, in mixed hardwood and hardwood-pine associations. South of Oneonta, in Blount County, it is very abundant in leaf litter and under limestone on densely wooded, rocky slopes and bluffs along Alabama highway 38.

Walker (1928) mistakenly recorded this species as *Stenotrema pilula* (Pilsbry). According to Archer (1948), Walker's records of *pilula*, from Jackson and Madison counties, were based on *deceptum*. *Pilula* occurs in the Blue Ridge Province in western North Carolina, extreme northern South Carolina, and southeast Tennessee, according to Pilsbry (1940). Although it is not known from Alabama, it possibly will be found on Mount Cheaha, in Cleburne County, which represents a southern extension of the Blue Ridge system.

Alabama records:

Bibb Co.	Pratt's Ferry (BW, HCR)
Blount Co.	Blount Springs (BW); 5 mi. S. Oneonta (HCR)
Calhoun Co.	Dugger Mt., in Jacksonville (BW)
DeKalb Co.	Lookout Mt., in Fort Payne (BW)
Etowah Co.	Keener (BW); Stephen's Gap, 18 mi. N. of Gadsden (HCR)
Jackson Co.	Woodville; Stevenson; Princeton (BW)
Jefferson Co.	Turkey Cr., at Morris (AFA); Squaw Shoals
Madison Co.	Monte Sano; Huntsville; Gurley (BW); West

Shelby Co. slope of Monte Sano (AFA)
 Gurnee; Montevallo (BW)
 Tuscaloosa Co. Holt; Tuscaloosa (BW); Hurricane Cr. (HCR)
 Walker Co. Forks of Warrior River (BW)

Stenotrema brevipila (Clapp), 1907

Plate II, figure 2

Polygyra brevipila Clapp, 1907
Polygyra brevipila Walker, 1928
Polygyra brevipila cherokeensis Walker, 1928
Stenotrema brevipila Pilsbry, 1940
Stenotrema brevipila Archer, 1948

Type locality: West slope of Mount Cheaha, Cleburne County,
 Alabama, by designation of Archer (1948).

The shell is depressed-globose, with a low convex spire and a moderately convex base. The embryonic whorls are sculptured with small, radially lengthened granules, and the later whorls are covered with fine, short, evenly spaced hairs. The aperture is obstructed by a well developed, erect, parietal lamella which flares away from the basal peristome at about its middle, opposite the widely open, callus-ridged, submedian notch. The inner end of the parietal lamella sweeps around the columellar insertion of the basal peristome. Three shells from Mount Cheaha average 5.9 mm. in height and 8.7 mm. in diameter; a single shell from Indian Mountain, southeast of Pleasant Gap, in Cherokee County, measures 4.9 mm. by 7.8 mm.

The typical form of this species has been found only on Mount Cheaha. The smaller form, recorded as the subspecies cherokeensis by Walker (1928), has been taken near Pleasant Gap, Cherokee County, its type locality, and near

Cave Spring, Floyd County, Georgia, about twenty miles east of Pleasant Gap, according to Pilsbry (1940). The two forms are morphologically alike, differing only in size, and are considered synonymous by Pilsbry (1940), and by Archer (1948). The ecology of this species is unknown to the writer; Archer (1948) states that it is found at altitudes between 1000 and 2000 feet, under leaf litter and stones, on rocky slopes and in ravines, in mixed hardwood-pine associations.

Alabama records:

Cherokee Co. Indian Mountain, southeast of Pleasant Gap (AFA); near Pleasant Gap (HAP, BW)
 Cleburne Co. West slope of Mount Cheaha (BW, AFA)

Stenotrema maxillatum (Gould), 1848

Plate II, figure 3 A, B, C

Helix maxillata Gould, 1848

Polygyra maxillata Walker, 1928

Stenotrema maxillatum Pilsbry, 1940

Stenotrema maxillatum Archer, 1948

Type locality: Randal's Creek, 14.7 miles west of Columbus, Georgia, by designation of Archer (in Pilsbry, 1940).

The shell is depressed-globose, with a low convex spire and a moderately convex base. The embryonic whorls are sculptured with small, radially lengthened granules, and the later whorls are covered with fine, closely set, short hairs, which are arranged in obliquely radial trends. The aperture is obstructed by a long, straightened parietal lamella which turns abruptly into the aperture at its outer

end, and is strongly recurved upward, into a definite hook. A well developed buttress joins the parietal lamella to the outer insertion of the peristome. The basal peristome is thickened, and continued as a flattened plate within the aperture; there is no notch present on its inner margin. The outer peristome bears a distinct tooth, which is continuous with the apertural lamina behind the basal peristome. A series of six shells from Hale County averages 4.3 mm. in height and 6.4 mm. in diameter.

According to Pilsbry (1940), the known range of this species extends from Fulton, Harris, Muskogee, Stewart, and Troup counties in west-central Georgia, through the lower Piedmont and the Coastal Plain to Green, Wilcox, and Monroe counties in western Alabama. In this state, maxillatum is known primarily from Coastal Plain localities, with four records from the southern portion of the Piedmont province. Walker (1928), records maxillatum from Shelby and Choctaw counties; according to Archer (1940), these records are erroneous, and were based on Stenotrema leai aliciae (Pilsbry).

Stenotrema maxillatum is found in leaf litter and under rocks and logs, on slopes and in ravines, near small creeks, in mixed hardwood and hardwood-pine associations. At Havana, in Hale County, it was taken in thick beech and oak leaf litter along a small stream at the bottom of a deep ravine. Archer (1948), states that maxillatum also

occurs in rockpiles, and under stones and wood in open fields.

Alabama records:

Bullock Co.	Pinhook Creek; Peachburg (AFA)
Butler Co.	Persimmon Creek (AFA)
Chambers Co.	Langdale (BW)
Conecuh Co.	Evergreen; Herbert (BW)
Dallas Co.	Selma (BW)
Greene Co.	Near Eutaw (HAP)
Hale Co.	Havana (HCR); Harrison Church, near Havana (AFA)
Lee Co.	Auburn (BW); Chewacla Creek State Park; 5 mi. E. of Opelika (AFA)
Lowndes Co.	4 mi. E. of Ft. Deposit (AFA)
Monroe Co.	Monroe; Claiborne (BW); Randon's Creek, Frisco City (AFA)
Perry Co.	Lookout Mt. (BW); Uniontown (AFA)
Randolph Co.	Roanoke (BW)
Wilcox Co.	Pine Hill (BW; AFA); Bear Creek, 2 mi. W. of Pineapple (AFA)

Subgenus EUCHEMOTREMA Archer

The outer peristome lacks the tooth which is present in the subgenus STENOTREMA. The inner half of the basal peristome is free, and its inner margin lacks the notch of STENOTREMA.

Stenotrema leai aliciae (Pilsbry), 1893

Plate II, figure 4 A, B, C

Helix monodon aliciae Pilsbry, 1893

Polygyra monodon aliciae Walker, 1928

Polygyra monodon fraterna Walker, 1928

Polygyra maxillata Walker, 1928 (in part)

Stenotrema monodon aliciae Pilsbry, 1940

Stenotrema monodon friersoni Pilsbry, 1940

Stenotrema fraternum Pilsbry, 1940 (nec Say, 1824)

Stenotrema leai aliciae Pilsbry, 1948

Stenotrema monodon aliciae Archer, 1948

Type locality: Lake Charles, Calcasieu Parish, Louisiana.

The shell is depressed to subglobose, with a low to moderately high, convex spire. The base is strongly convex, rather deeply impressed about the axis, and almost imperforate. The embryonic whorls are sculptured with short, radially lengthened granules; the later whorls are covered with very short hairs. The aperture is obstructed by a moderately high parietal lamella, nearly parallel to the basal peristome; its axial termination tapers into a ridge which curves about the columellar insertion of the basal peristome. The inner edge of the basal peristome is somewhat thickened, the callus terminating abruptly at the columella and also in the outer arc of the peristome.

This snail has been recorded from Alabama by Walker (1928), Pilsbry (1940), and Archer (1948), as a subspecies of S. monodon (Rackett). Pilsbry (1948) notes in Additions and Corrections to Volume I that the name monodon was preoccupied as a substitute for Helix unidentata Draparnaud, and that Helix leai Binney was the first available synonym. Consequently, S. monodon aliciae must now be known as S. leai aliciae.

Both Walker (1928) and Pilsbry (1940) have recorded S. fraternum (Say) from Alabama, distinguishing it from aliciae by its more depressed shape and larger whorls. Archer (1948) states that the form of leai known as frier-soni Pilsbry has been confused with S. fraternum, which does not occur below Kentucky, and that records of fraternum

from Alabama are based on the somewhat larger and more depressed frierisoni.

A series of shells from Sumter, Tuscaloosa, and Morgan counties average 5.0 mm. by 8.9 mm., 5.4 mm. by 8.2 mm., and 5.0 mm. by 8.1 mm. respectively. The Sumter County shells represent the form frierisoni of Pilsbry (1940), and the shells from Tuscaloosa and Morgan counties represent rather typical aliciae. The two forms are indistinguishable except on the basis of size, aliciae being somewhat more elevated than frierisoni. The series of shells from these three counties show intermediates in size, globose and depressed individuals occurring together in the same localities. The type locality of frierisoni is given by Archer (1948) as Frierson's Mill, DeSoto Parish, Louisiana. On the basis of the statement by Archer (1948) that Stenotrema fraternum does not occur in Alabama, and that frierisoni represents a somewhat larger and slightly depressed form of aliciae which is often referred to fraternum, in addition to the opinion of Pilsbry (1940), that frierisoni is not a valid subspecies, the writer considers fraternum absent from Alabama, and frierisoni and aliciae synonymous.

According to Archer (1948), the range of aliciae extends from Virginia through Kentucky and southern Illinois, to central Missouri, south to Georgia and Alabama, and westward to central Texas. In Alabama, aliciae is found throughout the northern and western portions, with scattered localities known from the Piedmont and the southeastern

parts of the state.

The habitat of aliciae is under leaf litter, stones, and rotting logs, in ravines and on slopes, in mixed hardwood and hardwood-pine associations. It is found more abundantly on calcareous soils, but also occurs on sandstone formations. In Franklin County, it was taken in series along the highways, on cedar fenceposts, and on cedar trees, in limestone flats. According to Hinton (1951) it was found to be abundant on exposed calcareous areas in the Black Belt.

Alabama records:

Barbour Co.	Elamville (BW)
Bibb Co.	Eoline; Pratt's Ferry (HCR)
Choctaw Co.	Moscow Bluff (BW)
Chambers Co.	Langdale (BW)
Clarke Co.	Jackson; Thomasville (BW)
Colbert Co.	Margerum (AFA); Tuscumbia (HCR)
Dale Co.	Pinckhard (BW)
Dallas Co.	Pleasant Hill; Safford (BW)
Franklin Co.	Russellville (BW,HCR); Burleson (BW); Newburg (HCR)
Greene Co.	Boligee (HCR,JH)
Hale Co.	Hale-Marengo line (JH)
Lawrence Co.	King Cove (HCR)
Macon Co.	Tuskegee (BW)
Madison Co.	Huntsville (BW)
Marengo Co.	Marengo (BW); Demopolis (HCR)
Marion Co.	Texas (HCR)
Mobile Co.	Chastang; Mobile (BW)
Morgan Co.	Massey; Cave Spring Cave (HCC)
Perry Co.	Marion (BW)
Pickens Co.	Coalfire (BW); Tuscaloosa-Pickens line (HCR)
St. Clair Co.	Whitney (BW)
Sumter Co.	Epes (BW,JH); Black Bluff; Livingston (BW)
Tuscaloosa Co.	Elrod (BW); Samantha; New Lexington; Ralph (HCR)

Genus PRATICOLELLA Von Martens

The shell is rather small, narrowly umbilicate, depressed to subglobose, with a low spire and a rounded periphery. The aperture is lunate, and the parietal wall often bears a small curved lamella. The peristome is narrowly reflected, and somewhat thickened on its inner margin.

Subgenus PRATICOLELLA Von Martens

The embryonic whorls are sculptured with irregular spiral threads or spirally arranged granules. The parietal wall bears a small curved lamella.

Praticolella jejuna (Say), 1821

Helix jejuna Say, 1821

Praticolella jejuna Walker, 1928

Praticolella jejuna Pilsbry, 1940

Type locality: Cow Ford, Jacksonville, Florida.

The shell is small, depressed-globose, with a low convex spire and rounded periphery. The embryonic whorls are sculptured with irregular spiral threads, and the later whorls are marked with faint growth lines and uneven microscopic wrinkles. The last whorl is not contracted or guttered behind the peristome, as in P. lawae. The peristome is thickened on its inner margin, and dilated at its columellar insertion. The shell measures between 4.7 mm. and 5.8 mm. in height, and between 6.4 mm. and 8.6 mm. in diameter (after Pilsbry, 1940).

Walker (1928) states that this species was listed from Alabama, without any definite locality, by Dr. James Lewis, in 1876. It has not been subsequently recorded from the state, and it is believed that the original record was erroneous. Pilsbry (1940) states that the range of jejuna is confined to peninsular Florida and the Keys.

Praticolella lawae lawae (Lewis), 1874

Plate II, figure 5 A, B

Helix lawii Lewis, 1874

Praticolella lawae Walker, 1928

Praticolella lawae Pilsbry, 1940

Type locality: Hayesville, Clay County, North Carolina.

The shell is small, narrowly umbilicate, depressed-globose, and has a low-conoid spire. The embryonic whorls are sculptured with small, radially lengthened, spirally arranged granules which are often visible only in spots. The remaining whorls have indistinct growth lines, and fine short hairs which are arranged in diagonal trends. Parallel to the growth striae are microscopic wrinkles. The last whorl is deeply guttered behind the peristome. The peristome is reflected, except near the outer insertion, and thickened on its inner margin. The parietal callus is thin, and bears a long curved lamella. A single shell, collected by Dr. A. F. Archer in Tuscaloosa County, measures 4.0 mm. in height and 5.8 mm. in diameter. Pilsbry (1940) gives the measurements of a Shelby County specimen as 4.8 mm. by 6.1 mm.

According to Pilsbry (1940), the range of this species extends from Clay County, in southwestern North Carolina, southward to Houston County Georgia, and westward into northeastern, central, and southwestern Alabama. In this state, lawae is found in the Upper and Lower Austral areas of the Appalachian Ridge and Valley system and the Piedmont Province, and according to Walker (1928), and Pilsbry (1940), it occurs in the Saballian life zone in Mobile County. In view of the northern type locality of lawae, and the fact that the only known record below the Fall Line is in Mobile County, it appears possible that the latter record was an erroneous identification of P. mobiliana (Lea), which was described from Mobile. This species, which is about the size of lawae, differs from it by having smooth embryonic whorls, and lacking both a parietal tooth and epidermal hairs.

The writer has not collected lawae, and information concerning its ecology in the state is unavailable.

Alabama records:

Bibb Co.	Woodstock (BW)
Cleburne Co.	Mt. Cheaha (BW)
DeKalb Co.	Sand Mt., Fort Payne; Lookout Mt., Valley Head (BW)
Mobile Co.	Mobile; Irvington (BW)
Randolph Co.	Roanoke (BW)
Shelby Co.	Gurnee; Calera; Helena (BW)
Tuscaloosa Co.	Vance (BW); Rock Mt., 5 mi. E. of Aberrant (AFA)

Subgenus FARRAGUTIA Vanatta

The embryonic whorls are smooth, and the parietal

wall lacks a lamella. There are no epidermal hairs.

Praticolella mobiliana mobiliana (Lea), 1841

Plate II, figure 6 A, B

Helix mobiliana Lea, 1841

Praticolella mobiliana Walker, 1928

Praticolella mobiliana Pilsbry, 1940

Type locality: Mobile, Mobile County, Alabama.

The shell is small, narrowly umbilicate, depressed-globose, with a low spire and rounded periphery. The embryonic whorls are smooth, and the remaining whorls have weak growth lines which are paralleled by faint microscopic wrinkles. There are no epidermal hairs, as in P. lawae. The last whorl is deeply furrowed behind the aperture. The peristome is narrowly reflected, and thickened on its inner margin. A series of five shells from Mobile averages 5.6 mm. in height and 7.9 mm. in diameter.

This species has been found only in the Saballian life zone, in Baldwin and Mobile counties, according to Walker (1928), and Pilsbry (1940). A subspecies, floridana, known from Volusia and Duval counties, on the northeastern coast of Florida, differs only in having a more thickened peristome margin. Further material is needed to determine the relationship between these forms. However, specialized collecting techniques will be needed, since the available ecological information indicates that mobiliana is best collected by sweeping through weeds and grass in open pine woods with insect nets.

Alabama records:

Baldwin Co. Magnolia Springs; Foley (BW)
 Mobile Co. Mobile; Calvert (BW); Mobile (AFA)

Genus MESODON Rafinesque

The shell is small to large in size, elevated-globose to strongly depressed, and umbilicate or imperforate. The aperture is lunate; the peristome is reflected and with none to three teeth.

Subgenus MESODON Rafinesque

The shell is medium to large in size, depressed-globose to elevated; and the aperture is without teeth or with only a parietal lamella. The umbilicus is narrow, or covered entirely by the columellar insertion of the peristome. The embryonic whorls are smooth or radially striate. The remaining whorls are striate and usually engraved with microscopic spiral lines.

Mesodon thyroidus (Say), 1818

Plate II, figure 7

Helix thyroidus Say, 1818

Polygyra thyroidus Walker, 1928

Mesodon thyroidus Pilsbry, 1940

Type locality: Wissahickon Creek, Philadelphia, Pennsylvania (neotype of Pilsbry, 1940).

The shell is medium sized, depressed-globose, and with a rounded periphery. The embryonic whorls are smooth, or with short striae below the suture. The later whorls have

distinct, obliquely radiating striae, and usually distinct microscopic spiral lines. The aperture is broadly open, and guarded by a short tooth which is obliquely situated on the parietal wall. The peristome is flatly reflected, and its columellar insertion half covers the umbilicus. Thirty Alabama shells average 16.4 mm. in height and 19.5 mm. in diameter.

According to Pilsbry (1940), the range of this widely spread species extends from southern Ontario throughout eastern United States, excepting peninsular Florida, and westward to Kansas and Texas. It is generally and abundantly distributed throughout Alabama, and is one of the most common land snails in the state.

Thyroidus occupies a very wide range of habitats. It is found in leaf litter, under rocks and logs, and in weeds and grasses; occurring in mixed hardwood, hardwood-pine, and pine-cedar associations. It is found more abundantly on calcareous than on noncalcareous soils. Hinton (1951) reports that thyroidus was rarely taken on treeless chalky areas on the Black Belt, and was usually found under leaf litter in cedar associations. In Franklin County, it was found crawling on the trunks of cedar trees during a rain.

Alabama records:

Baldwin Co.	"Baldwin Co." (BW)
Barbour Co.	Elamville (BW)
Bibb Co.	Blocton; Pratt's Ferry; Eoline; Woodstock (BW); Pratt's Ferry; Centreville (HCR)

Blount Co. Blount Spgs. (BW); 5 mi. N. of Oneonta on Ala. 38 (HCR)
 Calhoun Co. Piedmont (HCR)
 Chambers Co. Langdale (BW)
 Cherokee Co. Poole's Island, Coosa River; Pleasant Gap; Slackland (BW)
 Chilton Co. Clanton (BW,HCR); Butting Ram Shoals; Duncan's Riffle (BW)
 Clarke Co. Thomasville; Jackson (BW)
 Clay Co. Pysriton (BW)
 Coffee Co. Elba (HCR)
 Conecuh Co. Evergreen; Herbert (BW)
 Dallas Co. Pleasant Hill; Selma (BW); Uniontown (JH)
 DeKalb Co. Fort Payne (BW,HCR); Valley Head (BW); DeSoto State Park (HCR)
 Elmore Co. Wetumpka (BW)
 Etowah Co. Keener; Gallant (BW); Gadsden (BW,HCR); Coosa River, on U.S. 241 (HCC)
 Franklin Co. Burleson (BW); Russellville (BW,HCR); Newburg; 5 mi. N. of Russellville (HCR)
 Fayette Co. 6 mi. S. of Winfield on U.S. 43 (HCR)
 Geneva Co. Hartford (BW)
 Greene Co. Boligee (BW,JH); 11 mi. N. of Demopolis on U.S. 43; E. side Tombigbee River Bridge, on U.S. 11 (JH)
 Hale Co. 5 mi. S. of Greensboro (HCR)
 Jackson Co. Stevenson; Princeton; Woodville; Pisgah (BW) Scottsboro; Tennessee River, on Ala. 35; Section (HCR)
 Jefferson Co. Squaw Shoals; Valley Creek; Trafford; Warrior (BW)
 Lauderdale Co. Florence (BW)
 Lee Co. Auburn (BW)
 Macon Co. Tuskegee (BW)
 Madison Co. Huntsville; Gurley; Monte Sano (BW); Monte Sano; 6 mi. N. of New Hope (HCR)
 Marengo Co. 2 mi. E. of Demopolis (HCR); 2 mi. N. of Demopolis (JH)
 Marion Co. Hamilton; Bear Creek (BW); Texas (HCC)
 Monroe Co. Drewery (BW)
 Montgomery Co. Catoma Creek (BW); Jct. of U.S. 231 and Ala. 6 (HCR)
 Mobile Co. Mobile; Chastang; Irvington; Calvert (BW)
 Morgan Co. Massey (HCR)
 Perry Co. Hamburg (BW)
 Pickens Co. Coalfire (BW)
 Pike Co. Pea River, in S.E. quarter of county (BW)
 Randolph Co. Roanoke; Wadley (BW)
 Shelby Co. Gurnee; Calera; Montevallo (BW)
 St. Clair Co. Whitney (BW)
 Sumter Co. Epes; Livingston (BW,JH,HCR)
 Talladega Co. 2 mi. S. of Munford on road to Cheaha (HCR)

Tuscaloosa Co. Duncanville; Holt; University; Tuscaloosa
 (BW,HCR); Hagler; Indian Creek (BW)
 Walker Co. Forks of Warrior (BW); Corona (HCR)
 Wilcox Co. Pine Hill; Gastonburg; Alberta (BW)
 Winston Co. 7 mi. W. of Addison (HCR)

Mesodon clausus (Say), 1821

Plate II, figure 8 A, B

Helix clausa Say, 1821
Polygyra clausa Walker, 1928
Mesodon clausus Pilsbry, 1940

Type locality: Illinois.

The shell is depressed-globose, umbilicate, with a low conoidal spire and a rounded periphery. The embryonic whorls are smooth, and the later whorls are closely and finely striate. The microscopic sculpturing consists of close spiral striae. The last whorl is rather deeply furrowed behind the toothless aperture. The peristome is narrowly reflected, thickened on its inner margin, and not as flattened as in M. thyroidus. Thirty Alabama shells average 10.7 mm. in height and 13.8 mm. in diameter.

According to Pilsbry (1940), the range of this species extends from Ohio to Georgia, westward to Minnesota and Oklahoma. It has not been recorded from Mississippi, Louisiana, or Texas. In Alabama, clausus is generally distributed in the northern tier of counties, abundantly through the Black Belt, and locally on the Lower Coastal Plain. A single record from Jefferson County interrupts the discontinuity of its distribution in the northern two-thirds of the state.

On the basis of the known localities for clausus in Alabama, it is apparent that this species prefers rather highly calcareous soils, although it is not limited to such areas. Further collecting in the state will probably establish the fact that clausus is generally distributed throughout Alabama, occurring in abundance only on calcareous soils. Its known habitat is under leaf litter, rocks, and rotting logs, in pine-cedar associations, on calcareous and occasionally on noncalcareous soil. In the Black Belt, where this species is most abundant, it is found in weeds and grasses on open prairieland, in addition to its usual habitat. The writer has taken series of clausus which were crawling on the stems and leaves of wild sunflowers, Heli-anthus tuberosa, in Wilcox County.

Alabama records:

Butler Co.	Persimmon Creek, 3 mi. N. of McKenzie (AFA)
Choctaw Co.	Black Bluff (BW)
Dallas Co.	Pleasant Hill (BW); Selma (BW,HCR); Marion Junction (JH); Safford (HCR)
Elmore Co.	Wetumpka (BW)
Greene Co.	Boligee (BW); Allison; Demopolis (JH); Culpepper Creek, on Ala. 40 (HCR)
Hale Co.	Newbern; Faunsdale; Hale-Marengo line (JH); Uniontown; Greensboro (HCR)
Jackson Co.	Princeton; Stevenson; Woodville (BW)
Jefferson Co.	Squaw Shoals (BW)
Lauderdale Co.	Florence (BW)
Lowndes Co.	Tallahassee Creek, on U.S. 80 (HCR)
Macon Co.	Tuskegee (BW)
Madison Co.	Gurley; Monte Sano (BW)
Marengo Co.	2 mi. W. of Demopolis (HCR,JH); 2 mi. N. of Demopolis on U.S. 43 (HCR,JH)
Montgomery Co.	Barachias; Catoma Creek; Montgomery; McGee's Station (BW); Montgomery (AFA)
Perry Co.	Hamburg (BW)
Sumter Co.	Epes; Livingston (BW,JH)

Washington Co. Chatom (HCR)
 Wilcox Co. Grigg's Landing (BW); Oak Hill (HCR)

Mesodon sanus (Clench and Archer), 1933

Plate II, figure 9 A, B

Polygyra sana Clench and Archer, 1933
Mesodon sanus Pilsbry, 1940

Type locality: Slopes of Big Cove, Monte Sano, Madison County, Alabama.

The shell is depressed-globose, thin, shiny, and has a somewhat elevated spire. The peristome is flatly reflected, except at its outer insertion, and is expanded near the columellar insertion where it joins the parietal wall. The embryonic whorls are smooth, and the later whorls are sculptured with axial riblets and finely incised spiral lines (after Clench and Archer, in Pilsbry, 1940). A single shell from the collection of Dr. A. F. Archer measures 12.0 mm. in height and 19.4 mm. in diameter.

According to Clench and Archer (in Pilsbry, 1940), this species is similar to M. thyroidus (Say) and M. clausus (Say), differing from them in the following respects. It is more depressed and polished than either form, and the umbilicus is wider. The peristome is more flattened and expanded than that of clausus, and narrower than in thyroidus. The spiral lines are more strongly incised than those of clausus, and less deeply than those of thyroidus. Pilsbry (1940) states that clausus "...often has entirely similar minute sculpture and gloss." The one shell from

Dr. Archer's collection very much resembles a small thyroidus, but it is distinctly more depressed, and shinier. The sculpturing is indistinguishable from that of small edentate specimens of the latter species. One shell referred to sanus was collected by the author in St. Clair County, just north of the Jefferson County line, on U.S. 78. This specimen measures 14.1 mm. by 19.2 mm., being less depressed than typical sanus. The surface of the shell is devoid of almost all the epidermis, but that which remains appears to be more glossy than that of thyroidus. The spiral sculpture is rather weakly defined, and the peristome is flatly reflected, widening perceptibly at its juncture with the parietal wall near the columella.

The known range of sanus extends from the Upper Austral life zone of Madison and Jackson counties southward into St. Clair County. The habitat on Monte Sano is under leaves, at the foot of limestone ledges; the St. Clair County record was taken under leaf litter on a low hill, in a mixed hardwood-pine association, on rather sandy soil.

The designation of sanus as a distinct and separate species from thyroidus is somewhat questionable, in view of the fine distinction between the diagnostic characters of each of the forms. Since there are only three known localities for sanus, further collecting is necessary to ascertain whether it is a depauperate form of thyroidus.

Alabama records:

Jackson Co. Bass (AFA)

Madison Co. Big Cove, Monte Sano (AFA)
St. Clair Co. 500 yards N. of Jefferson County line, on
U. S. 78 (HCR)

Mesodon downleanus (Bland), 1861

Plate II, figure 10 A, B, C

Helix downleana Bland, 1861
Polygyra downleana Walker, 1928
Mesodon downleanus Pilsbry, 1940

Type locality: University Place, Franklin County,
Tennessee.

The shell is depressed-globose, with a low conoidal spire and a rounded periphery. The embryonic whorls are smooth, and the remaining whorls are sculptured with low rib-striae which are crossed by close, microscopic, spiral lines. The peristome is thin, rather flatly reflected, and its columellar insertion is almost completely covering the umbilical perforation. Three shells from Lauderdale County, Alabama, average 10.0 mm. in height and 15.3 mm. in diameter.

This species resembles M. clausus (Say), differing from the latter in the following respects. The rib-striae are lower and more indistinct, the last whorl is not furrowed behind the aperture, and the peristome is not thickened on its inner margin.

According to Pilsbry (1940), the range of downleanus extends from southern Kentucky southward through central Tennessee and into northern Alabama. In this state, it is found in Lauderdale County, in the northwest, and from

Jackson County, in the northeast, southwestward to Tuscaloosa County. With the exception of the record from Lauderdale County, this species is known only from the Cumberland Plateau and the Appalachian Ridge and Valley system in the state. Its habitat is under leaf litter in mixed hardwood-pine associations, on both calcareous and noncalcareous soils.

Alabama records:

Blount Co.	Blount Springs (BW)
Cullman Co.	Cullman; Wilhites (BW)
DeKalb Co.	Venaga; Sand Mt.; Valley Head (BW)
Etowah Co.	Gallant (BW)
Jackson Co.	Pisgah (BW)
Lauderdale Co.	Elgin (HCR)
Tuscaloosa Co.	Hurricane Creek, at Peterson (HCR)

Mesodon andrewsae normalis (Pilsbry), 1900

Plate II, figure 11

Polygyra andrewsae normalis Pilsbry, 1900

Polygyra andrewsae normalis Walker, 1928

Mesodon andrewsae normalis Pilsbry, 1940

Type locality: Cade's Cove, Blount County, Tennessee.

The shell is very large, globose-conic, and rather thin and fragile. The embryonic whorls are smooth, and the later whorls are sculptured with distinct axial striae which are crossed by microscopic spiral lines. The peristome is flatly reflected, and its columellar margin bears a low toothlike convexity. Two shells from northern Alabama average 30.0 mm. in height and 38.5 mm. in diameter. This snail is best characterized by its very large and

extremely fragile shell.

According to Pilsbry (1940), the range of this snail extends from extreme western North Carolina and eastern Tennessee, southward to Macon County, Georgia, and westward to Franklin and Marion counties in western Alabama. In this state, normalis is found locally from Franklin and Marion counties in the northwest, through Lawrence County to Jackson and DeKalb counties in the northeast, and southward in the Appalachian ridge and valley system, and in the Piedmont province, to Cleburne County.

On the basis of the known localities in Alabama, normalis inhabits both Upper and Lower Austral zones in the northern part of the state. In the Lower Austral, it is found in isolated stations which are characterized by humid or cool microclimates. The only habitat of normalis known to the writer is under thick deciduous leaf litter, in a deep, heavily shaded, humid valley, known locally as King Cove, in the southwestern corner of Lawrence County.

Alabama records:

Cleburne Co.	Mt. Cheaha (BW)
Calhoun Co.	Dugger Mt., Piedmont (BW)
Cherokee Co.	Little River Gorge; Lookout Mt. (BW)
Clay Co.	Pyriton (BW)
DeKalb Co.	Lookout Mt.; Valley Head (BW); Mentone (AFA)
Franklin Co.	Burleson; Bear Creek (BW)
Jackson Co.	Woodville (BW)
Lawrence Co.	King Cove, in S.W. corner of county (HCR)
Marion Co.	Hamilton; Bear Creek (BW)

Mesodon zaletus (Binney), 1837

Plate II, figure 12

Helix zaleta Binney, 1837

Polygyra zaleta Walker, 1928

Mesodon zaletus Pilsbry, 1940

Type locality: Cincinnati, Ohio, by designation of Pilsbry (1940).

The shell is depressed-globose, imperforate, solid, and glossy. The embryonic whorls are smooth, and the later whorls have fine, obliquely radial striae which are crossed by distinct, microscopic, spiral lines. The peristome is flatly reflected, and its columellar margin bears a weakly developed convexity. The parietal wall bears a very strongly developed, elongate, obliquely situated lamella. A series of twenty Alabama shells averages 17.5 mm. in height and 26.5 mm. in diameter.

According to Pilsbry (1940), the range of this species extends from eastern New York westward through Ontario, Canada, to southern Wisconsin, and southward to Arkansas and Alabama, with records lacking from West Virginia, Georgia, and Mississippi. In Alabama, zaletus ranges from Jackson County to Lauderdale County in the north, and southward to Tuscaloosa, Bibb, and Elmore counties, where the fall line marks the southernmost known limits of its range.

The habitat of zaletus is in leaf litter and under rocks and decaying logs, in mixed hardwood-pine and hardwood-pine-cedar associations, on both calcareous and

noncalcareous soils. It is found abundantly on limestone ledges in the northern portion of the state.

Alabama records:

Bibb Co.	Pratt's Ferry; 6 mi. E. of Centreville (HCR)
Blount Co.	Blount Spgs. (BW); 5 mi. S. Oneonta (HCR)
Colbert Co.	Tuscumbia (BW)
DeKalb Co.	Fort Payne; Valley Head (BW); Fort Payne, at Manitou Cave (HCR)
Elmore Co.	Wetumpka (BW)
Etowah Co.	10 mi. E. of Gadsden (HCR); Keener; Gallant (BW)
Franklin Co.	5 mi. N. of Russellville (HCR); Burleson (BW)
Jackson Co.	S. side of Tenn. River, on Ala. 35 (HCR); Princeton; Woodville (BW)
Jefferson Co.	Trafford; Squaw Shoals; Warrior (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Monte Sano; Huntsville; Gurley (BW)
Marshall Co.	Scarham Creek, Guntersville (AFA)
Shelby Co.	Yellowleaf Creek, Wilsonville (BW)
Tuscaloosa Co.	Holt; University; Tuscaloosa (BW); Lock 13; University; Tuscaloosa (HCR)
Walker Co.	Forks of Warrior (BW)

Mesodon elevatus (Say), 1821

Plate II, figure 14

Helix elevata Say, 1821

Polygyra elevata Walker, 1928

Mesodon elevatus Pilsbry, 1940

Type locality: Cincinnati, Ohio.

The shell is globose-conic, solid, imperforate, and has an elevated, convexly conic spire. The embryonic whorls are sculptured with fine striae which are crossed by closely crowded, microscopic, spiral lines. The peristome is flatly reflected, and thickened on its inner margin; the basal portion bears a long blade-like lamella, which is abruptly truncate at its outer end, near the arc of the

outer peristome. The parietal wall bears a strongly developed, high, curved lamella. Three shells from Marshall County average 14.8 mm. in height and 21.5 mm. in diameter.

According to Pilsbry (1940), the range of elevatus extends from central New York southward through western Virginia and South Carolina to Alabama, and westward to Arkansas, Missouri, and Illinois. In Alabama, this species is known only from the Tennessee Valley and the Cumberland Plateau, in the northern part of the state.

The habitat of elevatus in this state is in thick leaf litter and under rocks and decaying logs, in mixed hardwood and hardwood-pine-cedar associations, on both limestone and noncalcareous soils.

Alabama records:

Franklin Co.	Burleson (BW)
Jackson Co.	Stevenson; Princeton; Woodville (BW)
Lauderdale Co.	Cedar Island, Florence (BW)
Madison Co.	Gurley (BW)
Marion Co.	Bass Creek (BW)
Marshall Co.	Scarham Creek, near Guntersville (AFA)
Walker Co.	Walker Co. (BW)

Mesodon christyi (Bland), 1860

Plate II, figure 15 A, B, C

Helix christyi Bland, 1860

Polygyra christyi Walker, 1928

Mesodon christyi Pilsbry, 1940

Type locality: Cherokee County, North Carolina.

The shell is small, glossy, depressed, and imperforate. The embryonic whorls are smooth, and the later whorls are sculptured with strongly developed, obliquely radiating

striae. There are no microscopic spiral lines. The peristome is flatly reflected, and rather thickened on its inner margin. The parietal wall bears a strong, oblique lamella. The small size, absence of spiral lines, and the strong parietal lamella are diagnostic of this species (after Pilsbry, 1940).

According to Walker (1928), and Pilsbry (1940), this species was recorded from Alabama without any definite locality by Dr. James Lewis. It has not been subsequently recorded from the state, and it is believed that the original record was evidently erroneous.

Mesodon wheatleyi (Bland), 1860

Plate II, figure 16 A, B

Helix wheatleyi Bland, 1860

Polygyra wheatleyi Walker, 1928

Mesodon wheatleyi Pilsbry, 1940

Type locality: Cherokee County, North Carolina.

The shell is depressed-globose, thin, and imperforate. The embryonic whorls are smooth, and the later whorls are sculptured with close, fine striae. There are no spiral lines. The peristome is flatly reflected, and rather thickened on its inner margin. The parietal wall bears a small, low tooth. The average height is 12.0 mm., and the diameter is 16.5 mm. The close striation and the small tooth are diagnostic of this species (after Pilsbry, 1940).

According to Pilsbry (1940), the range of this species

extends along the Tennessee-North Carolina boundary, southward into Towns County, in northeastern Georgia. Walker (1928) records a single locality in Chilton County, in central Alabama. His record was probably a misidentification, or based on a misplaced shell, since it is far removed from the southernmost known record of wheatleyi. In view of its known range, it is not considered to be a species of the Alabama fauna.

Subgenus PATERA Albers

The shell is strongly depressed, imperforate, and rounded or subangular at the periphery. The embryonic whorls are sculptured with radial striae or radially arranged granules. The later whorls have distinct rib-striae which are crossed by spirally arranged lines or papillae. The basal peristome bears a laminar callus ridge which terminates abruptly at its junction with the outer peristome. The parietal wall bears a well developed tooth or lamella.

Mesodon appressus (Say), 1821

Plate II, figure 13 A, B

Helix appressa Say, 1821

Polygyra appressa Walker, 1928

Polygyra appressa sculptior Walker, 1928

Mesodon appressus Pilsbry, 1940

Type locality: Gallipolis, Gallia County, Ohio.

The shell is very depressed, imperforate, and has a subangulate to angulate periphery. The embryonic whorls

are sculptured with very fine radial striae, and the later whorls have regular rib-striae which are crossed by papillose microscopic spiral lines. The peristome is flatly reflected, and its basal portion bears a laminar callus ridge which terminates abruptly at its juncture with the outer peristome. The parietal wall bears a long, curved, linguiform lamella, the apical end of which is directed toward the middle of the outer peristome. Five shells from northern Alabama average 7.8 mm. in height and 17.5 mm. in diameter.

According to Pilsbry (1940), the range of apdressus extends from southern Ohio southward through western Virginia and Tennessee into northern Alabama, and westward through Kentucky to southern Illinois. In Alabama, this species is found in the northern tier of counties, ranging from Jackson and Cherokee counties westward to Lauderdale County.

The habitat of apdressus is under leaf litter, rocks and stones, on calcareous soils forested in mixed hardwood-pine-cedar associations. In Jackson County, apdressus was found under limestone slabs, in a thinly wooded area along Alabama highway 35. A single shell was found in deciduous leaf litter, at the base of a limestone bluff, near Elgin, in Lauderdale County. On the basis of the known localities for this species, it is found primarily on limestone soil, but possibly occurs on noncalcareous soils within its range in the state.

Alabama records:

Cherokee Co. Craig Mt. (BW)
 Jackson Co. Stevenson; Woodville (BW); S. side of Tenn.
 River, on Ala. 35 (HCR)
 Lauderdale Co. Florence (BW); Elgin (HCR)
 Madison Co. Huntsville; Monte Sano (BW)
 Marshall Co. Scarham Creek, Guntersville; Honeycomb Cave,
 Guntersville (AFA)

Mesodon sargentianus (Johnson and Pilsbry), 1892

Plate II, figure 18 A, B

Helix sargenti Johnson and Pilsbry, 1892
 (nec Bland, 1876)

Helix sargentiana Johnson and Pilsbry, 1892

Polygyra sargentiana Walker, 1928

Mesodon sargentianus Pilsbry, 1940

Type locality: Woodville, Jackson County, Alabama.

The shell is very depressed, imperforate, and has a strongly angulate to subcarinate periphery. The embryonic whorls are finely striate, and the later whorls have rather widely spaced rib-striae, paralleled by weakly developed wrinkles. The microsculpture consists of minute papillae between the rib-striae, partially arranged in spiral trends. The peristome is flatly reflected, its inner basal margin bearing a long, laminate callus which terminates abruptly at its juncture with the outer peristome. The parietal callus bears a long, curved, linguiform lamella. Four shells from Madison County average 12.2 mm. in height and 25.6 mm. in diameter.

Sargentianus is very similar to addressus, differing from the latter in the following respects. It is about one and one-half times the size of addressus and has a much

more angulate periphery. The microsculpture is similar to that of appressus, but stronger, and the papillae are not arranged in distinct spiral series. Pilsbry (1940), states that in one series of shells from Madison County, the papillose sculpturing on the last whorl is replaced by incised spiral lines.

According to Pilsbry (1940), the range of this snail extends over two counties in northeastern Alabama, within the southernmost known limits of appressus, to which it is evidently quite closely related. The larger size, and the more angulate periphery are diagnostic characters which readily distinguish sargentianus from appressus.

The writer has not collected this species, and its ecology is unknown to him; however, the available information indicates that it prefers hardwood-cedar associations, on limestone soils, within the Upper Austral life zone.

Alabama records:

Jackson Co.	Woodville; Princeton; Paint Rock (BW); Keel Mt., in Paint Rock (AFA)
Madison Co.	Sharp's Cove, Molder; 2 mi. E. of Gurley (AFA)

Mesodon perigraptus Pilsbry, 1894

Plate II, figure 17 A, B

Polygyra appressa perigrapta Pilsbry, 1894
Polygyra appressa perigrapta Walker, 1928
Mesodon perigraptus Pilsbry, 1940

Type locality: Woodville, Jackson County, Alabama.

The shell is depressed-globose, imperforate, and has a

subangular to rounded periphery. The embryonic whorls are finely and closely striate, and the later whorls have distinct rib-striae which are crossed by well-developed microscopic spiral lines. The peristome is flatly reflected and bears a long, laminate callus ridge on its inner basal margin. The parietal wall bears a very short, high tooth. Thirty Alabama shells average 10.5 mm. in height, and 19.2 mm. in diameter.

According to Pilsbry (1940), the range of perigraptus extends from Arkansas and Mississippi eastward through Tennessee, Alabama, and Georgia, to southwestern North Carolina and northern South Carolina. In Alabama, this species is generally and abundantly distributed over the entire state.

The habitat of perigraptus is under leaf litter, rocks, and logs, in mixed hardwood and hardwood-pine associations, on calcareous and noncalcareous soils. It is often found in domestic situations, living in leaf litter and under shrubs, and in gardens.

Alabama records:

Baldwin Co.	Baldwin Co. (BW)
Barbour Co.	Elamville (BW)
Bibb Co.	Woodstock; Eoline (BW); Pratt's Ferry (HCR)
Blount Co.	Blount Spgs. (BW)
Calhoun Co.	Anniston (BW); Piedmont (HCR)
Chambers Co.	Langdale (BW)
Cherokee Co.	10 mi. S.E. of Centre; Poole's Island; Pleasant Gap; Slackland (BW)
Chilton Co.	Yellowleaf Creek (BW)
Choctaw Co.	Bladen Spgs. (BW)
Clarke Co.	Thomasville; Jackson (BW)
Clay Co.	Pyriton (BW)

Cleburne Co. Dugger Mt. (BW)
 Conecuh Co. Evergreen (BW)
 Crenshaw Co. Searight (BW)
 Dale Co. Pinckhard (BW)
 Dallas Co. Selma (BW)
 DeKalb Co. Ft. Payne; Valley Head (BW); Manitou Cave,
 in Ft. Payne (HCR)
 Elmore Co. Wetumpka (BW)
 Etowah Co. Gadsden (BW); 10 mi. E. of Gadsden on Ala.
 74 (HCR)
 Fayette Co. Fayette (BW); 5 mi. S. of Winfield on Ala.
 43 (HCR)
 Franklin Co. Russellville; Burleson (BW); 5 mi. N. of
 Russellville (HCR)
 Geneva Co. High Bluff; Hartford (BW)
 Greene Co. Boligee (BW); E. side Tombigbee River on
 U.S. 11 (JH)
 Hale Co. Biology Farm at Tanglewood (HCR)
 Jackson Co. Woodville; Stevenson; Princeton; Pisgah;
 Limrock (BW); 3 mi. S. of Higdon at Long
 Island Cove (HCR)
 Jefferson Co. Squaw Shoals (BW)
 Lawrence Co. King Cove, in S.W. quarter of county (HCR)
 Madison Co. Huntsville; Gurley; Monte Sano (BW); Monte
 Sano State Park; 6.5 mi. N. of New Hope (HCR)
 Marengo Co. 3 mi. E. of Demopolis (JH)
 Marion Co. Hamilton; Bear Creek (BW); Winfield (HCR)
 Marshall Co. 2 mi. N. of Guntersville (HCR)
 Mobile Co. Mobile; Mt. Vernon (BW)
 Montgomery Co. Montgomery (BW); Montgomery (AFA)
 Perry Co. Perry Co. (BW)
 Pickens Co. 100 yds. W. of Tuscaloosa County line on
 U.S. 82 (HCR)
 Randolph Co. Roanoke; Wadley (BW)
 Shelby Co. Yellowleaf Creek at Wilsonville; Calera (BW)
 St. Clair Co. Ten Island Shoals; Greensport (BW)
 Sumter Co. Livingston; Moscow Bluff (BW)
 Talladega Co. Three Island Shoals (BW)
 Tallapoosa Co. Yates (BW)
 Tuscaloosa Co. Blue Creek on Ala. 69; Elrod; Samantha;
 Bethel Church; Ralph; Hurricane Creek;
 Duncanville; Tuscaloosa; University;
 Windham Spgs.; Peterson (HCR); Duncan-
 ville; Holt; Hagler; Tuscaloosa (BW)
 Walker Co. 8 mi. S. of Oakmon (HCR)
 Wilcox Co. Pine Hill; Alberta; Gastonburg (BW)
 Winston Co. 6 mi. W. of Addison at Natural Bridge (HCR)

Subgenus INFLECTARIUS Pilsbry

The shell is small to medium in size, depressed or depressed-globose, imperforate or rarely perforate, and has a well rounded periphery. The embryonic whorls are faintly striate or granulate, and the later whorls are irregularly sculptured with growth lines, along which are arranged short, curved, scaly projections of the epidermis. The peristome is flatly reflected, its inner margin thickened and bearing one or two tuberculate teeth. The parietal wall bears a long, slightly curved, linguiform lamella.

Mesodon rugeli (Shuttleworth), 1852

Plate III, figure 1 A, B, C

Helix rugeli Shuttleworth, 1852

Polygyra rugeli Walker, 1928

Mesodon rugeli Pilsbry, 1940

Type locality: Great Smoky Mountains, Tennessee.

The shell is depressed-globose, imperforate, and has a rounded periphery. The embryonic whorls are sculptured with faint, granulate striae, and the later whorls have indistinct growth lines, along which are arranged short, curved, periostracal processes. The peristome is flatly reflected, its outer arc bearing a deeply immersed tooth, and its basal portion with a smaller tooth situated on the inner margin. The parietal wall bears a long, slender, curved lamella, the apical end of which is directed toward the outer tooth. The deeply immersed tooth on the outer peristome is the most distinctive feature of this species,

readily separating it from other members of the subgenus.

According to Pilsbry (1940), the range of this species extends from western Virginia southward through Kentucky, eastern Tennessee and western North Carolina, northern Georgia, and into Alabama, where it is generally distributed over the state.

The habitat of rugeli is under leaf litter, rocks, and decaying logs, in mixed hardwood and hardwood-pine associations. It is found more commonly in ravines and gullies, under limestone rocks, although it is not restricted to calcareous soils.

Alabama records:

Barbour Co.	Elamville (BW)
Bibb Co.	Bibb Co. (BW)
Blount Co.	Blount Spgs. (BW); 5 mi. N. of Oneonta on Ala. 35 (HCR)
Calhoun Co.	Anniston (BW); Piedmont (HCR)
Clay Co.	Pyriton; Cragford (BW)
DeKalb Co.	Valley Head; Sand Mt.; Fort Payne (BW); at Manitou Cave, Fort Payne (HCR)
Conecuh Co.	Evergreen (BW)
Etowah Co.	Keener (BW)
Franklin Co.	Burleson; Russellville (BW); 5 mi. N. of Russellville on U.S. 43 (HCR)
Jackson Co.	Princeton; Stevenson; Woodville (BW)
Lee Co.	Auburn (BW)
Macon Co.	Tuskegee (BW)
Madison Co.	Monte Sano (BW)
Marion Co.	Hamilton (BW)
Marengo Co.	Demopolis (BW)
Mobile Co.	Mobile (BW)
Montgomery Co.	Montgomery (BW)
Randolph Co.	Roanoke; Wadley (BW); Cornhouse Creek (AFA)
Shelby Co.	Calera; Wilsonville; Montevallo; Helena; Gurnee (BW); Montevallo (HCR)
Talladega Co.	Munford (HCR); Kentuck Mt. (AFA)
Tuscaloosa Co.	Hagler (BW)

Mesodon smithii (Clapp), 1905

Plate III, figure 2 A, B

Polygyra smithii Clapp, 1905
Polygyra smithii Walker, 1928
Mesodon smithii Pilsbry, 1940

Type locality: Near top of Monte Sano, at about 1600 feet elevation, Madison County, Alabama.

The shell is depressed-globose, imperforate, and has a rounded periphery. The embryonic whorls are sculptured with elongate granules, and the later whorls have weakly developed growth lines, along which are arranged short, curved, periostracal scales. The peristome is flatly reflected and thickened, and its outer portion bears a blunt, conical tooth on the inner margin. The basal peristome is straight, and lacks the tooth found in shells of other species of the subgenus. A single topotype measures 7.9 mm. in height and 15.0 mm. in diameter.

According to Walker (1928), and Pilsbry (1940), the range of smithii extends over the northeastern part of Alabama; on the basis of the known localities, it is limited to the Upper Austral regions within its range. Further collecting in the adjacent portions of Tennessee and Georgia is necessary to determine whether smithii ranges farther north in the Upper Austral zone, or whether it is restricted, as it now appears, to the mountains of northern Alabama.

The ecology of this snail is unknown to the writer, but the available information indicates that it is found

in mixed hardwood and hardwood-pine associations, on calcareous as well as noncalcareous soils.

Alabama records:

Cherokee Co. Craig Mt. (BW)
 Jackson Co. Stevenson; Princeton; Fabins (BW)
 Madison Co. Monte Sano (BW); Huntsville; Gurley (AFA)

Mesodon inflectus inflectus (Say), 1821

Plate III, figure 3 A, B, C

Helix inflecta Say, 1821
Polygyra inflecta Walker, 1928
Polygyra herberti Walker, 1928
Mesodon inflectus Pilsbry, 1940

Type locality: Missouri.

The shell is depressed-globose, imperforate or rarely perforate, and has a rounded periphery. The embryonic whorls are sculptured with elongate granules, and the later whorls have indistinct growth striae and short, curved, periostracal scales. The peristome is flatly reflected and thickened, and bears two small teeth on the outer and basal margins, which are separated by a notch measuring about one-sixth of the height of the shell. The parietal wall bears a long, slender, linguiform lamella. A series of thirty shells averages 5.9 mm. in height and 10.5 mm. in diameter.

According to Pilsbry (1940), the range of this widely spread species extends from southern Ohio and Illinois south through the Gulf States, and west to Arkansas and Oklahoma. In Alabama, inflectus is generally and abundantly

distributed over the entire state.

The unique type of Polygyra herberti described by Walker (1928) from Sand Mountain, near Gallant, Alabama, has been examined by Dr. A. F. Archer, who reports in Pillsbry (1940), that it represents an abnormal and immature shell of inflectus.

The habitat of inflectus is under leaf litter, rocks, and decaying logs, in mixed hardwood and hardwood-pine associations, on limestone as well as on noncalcareous soils. Occasionally, it is found in pine and pine-cedar associations, as reported by Hinton (1951).

Alabama records:

Baldwin Co.	Fairhope (HCR); Magnolia Spgs.; Foley; Bay Minette (BW)
Barbour Co.	Elamville (BW)
Bibb Co.	Pratt's Ferry; 16 mi. N.E. of Centreville (HCR)
Blount Co.	Blount Spgs. (BW); 5 mi. S. of Oneonta on Ala. 38 (HCR)
Butler Co.	McKenzie (AFA)
Calhoun Co.	Ten Island Shoals (BW)
Chambers Co.	Langdale (BW)
Cherokee Co.	Pleasant Gap; Slackland; Poole's Island; 10 mi. S.E. of Centre (BW)
Chilton Co.	Mountain Creek; Clanton (BW)
Choctaw Co.	Black Bluff; Moscow; Silas (BW)
Clarke Co.	Thomasville; Jackson; Grove Hill (BW); 4.5 mi. S. of Thomasville (HCR)
Colbert Co.	Tuscumbia (BW)
Conecuh Co.	Evergreen (BW)
Coosa Co.	Hatchet Creek (AFA)
Crenshaw Co.	Searight (BW)
Cullman Co.	Cullman; Wilhites; Sand Mt. (BW)
Dale Co.	Pinckhard (BW)
Dallas Co.	Selma; Pleasant Hill (BW)
DeKalb Co.	Mentone (AFA); Valley Head (BW)
Elmore Co.	Wetumpka (BW)
Etowah Co.	Keener; Gadsden; Gallant (BW); Coosa River, on U.S. 241 (HCR)
Fayette Co.	2 mi. W. of Berry on Ala. 18; 6 mi. S. of Winfield on U.S. 43 (HCR); Fayette (BW)

Franklin Co.	Russellville; Burleson (BW); 2 mi. E. of Newburg (HCR)
Geneva Co.	High Bluff; Choctahatchee River (BW)
Greene Co.	Boligee (BW); E. side of Tombigbee Bridge on U.S. 11 (JH)
Hale Co.	Newbern; Hale-Marengo line (JH); Akron; Greensboro (HCR)
Jackson Co.	S. side of Tenn. River on Ala. 35 (HCR); Pisgah; Stevenson; Princeton; Woodville; Paint Rock (BW)
Jefferson Co.	Adger; Squaw Shoals; Cahaba River (BW); 5 mi. E. of Irondale on U.S. 78 (HCR)
Lamar Co.	Buttahatchee Swamp, near Sulligent (HCR)
Lauderdale Co.	Elgin (HCR); Florence (BW)
Lee Co.	Auburn (BW)
Madison Co.	Huntsville; Gurley; Normal; Monte Sano (BW)
Marengo Co.	Marengo (BW); Demopolis (JH, HCR)
Marion Co.	Bear Creek (BW); Winfield (HCR)
Marshall Co.	Guntersville (HCR)
Mobile Co.	Mobile; Alabama Port; Saraland (BW)
Monroe Co.	Drewery (BW)
Montgomery Co.	McGee's Station (BW); Sprague (HCR)
Morgan Co.	Cave Springs Cave (AFA); Massey (HCR)
Perry Co.	Marion; Hamburg (BW)
Pike Co.	Pea River, in S. E. quarter of county (BW)
Pickens Co.	Tuscaloosa-Pickens line, on U.S. 82 (HCR)
Randolph Co.	Wadley (BW)
Shelby Co.	Calera; Montevallo (BW)
St. Clair Co.	Greensport; Whitney; Ten Island Shoals (BW); 500 yards N. of Jefferson County line (HCR)
Sumter Co.	Epes; Livingston; Moscow Bluff (BW, JH)
Talladega Co.	Three Island Shoals; Fort William (BW); lake at base of Cheaha Mt. (HCR)
Tallapoosa Co.	Yates (BW)
Tuscaloosa Co.	Tuscaloosa; Hagler; Holt; Vance; Indian Creek; Duncanville (BW); University, Vance; Holt; Hurricane Creek; Windham Spgs.; Tuscaloosa (HCR)
Walker Co.	Forks of Warrior River (BW)
Wilcox Co.	Camden; Gastonburg; Pine Hill; Alberta (BW)

Mesodon inflectus mobilensis (Clapp), 1915

Plate III, figure 5 A, B, C

Polygyra inflecta mobilensis Clapp, 1915

Polygyra inflecta mobilensis Walker, 1928

Mesodon inflectus mobilensis Pilsbry, 1940

Type locality: Mobile, Mobile County, Alabama.

According to Clapp (1915), this subspecies differs from typical inflectus in being more depressed, in having weakly developed teeth, and in consistently having a partly uncovered umbilicus. In addition, it can be immediately recognized by its extremely flattened upper surface. A single topotype measures 5.0 mm. in height and 12.0 mm. in diameter. This shell is very distinct, and shows no morphological overlap with typical inflectus, although its range is within the southernmost limits of the latter.

This is the only Mesodon recorded from Dauphin Island, at the entrance to Mobile Bay, and the possibility exists that the Mobile record, which is urban (Archer, in Pilsbry, 1940), represents an introduced population. The occurrence of typical inflectus throughout the Mobile area lends support to this idea, along with the fact one would not expect two non-intergrading subspecies to occur naturally in the same small area. The absence of intergradation between the two subspecies in Mobile, and the endemicity of mobilensis on Dauphin Island, suggests the need for a reevaluation of the taxonomic status of this subspecies.

The ecology of this snail is unknown to the writer.

Alabama records:

Mobile Co. Mobile (BW,AFA); Dauphin Island (BW)

Mesodon approximans (Clapp), 1905

Plate III, figure 4 A, B

Polygyra inflecta approximans Clapp, 1905

Polygyra inflecta approximans Walker, 1928
Mesodon inflectus approximans Pilsbry, 1940

Type locality: Marion, Perry County, Alabama.

The shell is depressed-globose, imperforate, and has a rounded periphery. The embryonic whorls are sculptured with elongate granules, and the later whorls have faint growth striae and short periostracal scales. The peristome is flatly reflected, and bears two small teeth on the outer and basal margins, separated by a very narrow notch which measures about one-tenth of the height of the shell. Four specimens average 5.0 mm. in height and 8.3 mm. in diameter. Approximans differs from inflectus in the very narrow notch between the teeth of the peristome, and its smaller size.

Pilsbry (1940) records this snail from localities in Murray County, in northwest Georgia, and in Taylor County, in the west-central part of that state, in addition to Alabama records. In this state, approximans is known from a single locality in the northeast, and from several in the west-central part of the state. On the basis of the known records, it is usually found in isolated ravines, and on mountain tops, in such relict areas as Havana, Hale County, and Chimney Mountain, Calhoun County. Records from Perry and Marengo counties indicate that aproximans is possibly locally distributed throughout central Alabama. Further collecting on the Upper Coastal Plain and in the Piedmont Province is necessary to determine the extent of its distribution. In view of the known localities, its range is

well within that of inflectus, to which it has been referred as a subspecies by Walker (1928), and Pilsbry (1940). On the basis of the completely overlapping ranges of these distinctly different snails, it becomes necessary to elevate approximans to specific level.

The habitat of this species is under leaf litter, rocks, and decaying logs, in mixed hardwood-pine associations, on calcareous and noncalcareous soils. It is usually found in thick leaf litter along streams, in ravines and gullies.

Alabama records:

Bibb Co.	Bibb Co. (AFA)
Calhoun Co.	Chimney Mt., at 1400 feet elevation (AFA)
Hale Co.	Havana; Harrison Church; Payne Lake (HCR;AFA)
Marengo Co.	Marengo (BW)
Perry Co.	Marion; Hamburg (BW)
Tuscaloosa Co.	Hagler (BW)

Genus TRIODOPSIS Rafinesque

The shell, if umbilicate, is small to medium in size, and bears two teeth on the peristome margin; if imperforate, and medium in size, there is one tooth in the outer peristome and a laminate callus ridge on the basal peristome. If the shell is imperforate, and very large, there are no teeth on the peristome.

Subgenus TRIODOPSIS Rafinesque

The shell is depressed-globose, openly umbilicate, and has a rounded periphery. The whorls are sculptured with

strongly developed rib-striae, and often have distinct, minute papillae over the surface. The peristome is expanded and reflected, and the thickened inner margin bears two teeth.

Triodopsis tridentata tridentata (Say), 1817

Plate 3, figure 6 A, B; figure 7

Helix tridentata Say, 1817

Polygyra tridentata tennesseensis Walker and Pilsbry, 1902

Polygyra tridentata Walker, 1928

Polygyra tridentata tennesseensis Walker, 1928

Triodopsis tridentata Pilsbry, 1940

Triodopsis tridentata tennesseensis Pilsbry, 1940

Type locality: Montgomery County, Pennsylvania.

The shell is depressed, slightly convex above, openly umbilicate, and has a rounded periphery. The embryonic whorls are sculptured with fine radial striae; and the later whorls have strong, close, thread-like rib-striae, between which there are frequently scattered distinct, minute papillae. The peristome is reflected, and its thickened inner margin bears two small conical teeth, one on the outer, and one on the basal portion. The parietal wall bears a high, strongly developed tooth. A series of ten shells averages 9.7 mm. in height and 19.4 mm. in diameter.

According to Pilsbry (1940), the range of typical tridentata extends from New Hampshire through New York and southern Ontario, westward to Illinois and southward

through the southern Appalachians to northern Georgia and Alabama. In this state, it is found distributed above the fall line, with one record from Mobile County cited by Walker (1928). The wide disjunction between this record and the rest of the known distribution of tridentata suggests a mislabeled shell.

The form referred to as the subspecies tennesseensis Walker and Pilsbry, by Walker (1928) and Pilsbry (1940), ranges from central Kentucky through western Tennessee into Alabama, where it is found locally above the fall line. This form was based on its larger size and the presence of microscopic papillae among the striae, on the surface of the shell. Its range lies within that of typical tridentata, and the two are found in the same localities in the state. The size of tridentata is somewhat variable, as is the presence of microscopic papillae on the shell. Both forms range from about 8.0 to 10.0 mm. in height and from about 16.0 to 20.0 mm. in diameter, and there are microscopic papillae frequently present on small as well as large shells. On the basis of the known distribution, and the similarity in morphological characteristics, in addition to the graduation in size, it is evident that the form called tennesseensis is not sub-specifically distinct from tridentata, and is therefore considered a synonym.

The habitat of this species is under thick leaf litter, rocks, and decaying logs, in ravines and on slopes,

in mixed hardwood and hardwood-pine associations, on calcareous as well as noncalcareous soils.

Alabama records:

Bibb Co.	Blocton (BW); Pratt's Ferry (BW;HCR)
Blount Co.	Blount Spgs. (BW)
Cherokee Co.	Little River Gorge (BW)
Clay Co.	Pyriton (BW)
Cleburne Co.	Mt. Cheaha (BW)
DeKalb Co.	Valley Head (BW)
Elmore Co.	Elmore (BW)
Etowah Co.	Gallant; Black Creek Falls (BW)
Fayette Co.	Fayette; Forks of Sipsey River (BW)
Franklin Co.	Burleson (BW)
Jackson Co.	Princeton; Stevenson; Woodville (BW); Paint Rock (AFA); Higdon (HCR)
Jefferson Co.	Squaw Shoals; Henry Ellen; Warrior (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Gurley; Monte Sano; Huntsville (BW)
Marion Co.	Bear Creek; Hamilton (BW)
Mobile Co.	Mobile ? (BW)
Randolph Co.	Roanoke; Wadley (BW)
Shelby Co.	Gurnee (BW)
St. Clair Co.	Tumbling Gap (AFA)
Tuscaloosa Co.	Tuscaloosa; Holt; Indian Creek (BW); Lock # 13; Windham Spgs.; Hurricane Creek; Bethel Church (HCR)
Walker Co.	Forks of Warrior; Junction of Lost and Wolf Creeks (BW)

Triodopsis fraudulenta vulgata Pilsbry, 1940

Plate III, figure 8 A, B

Polygyra fraudulenta Walker, 1928 (nec Pilsbry, 1894)
Triodopsis fraudulenta vulgata Pilsbry, 1940

Type locality: Columbus, Ohio.

The shell is depressed, openly umbilicate, and has a rounded periphery. The embryonic whorls are sculptured with faint radial striae, and the later whorls are strongly and evenly rib-striate, with traces of microscopic spiral lines present below the sutures. The umbilical region is

densely papillose. The peristome is reflected and thickened. Its inner margin bears a wide, flattened, outer tooth, and a small, conical, basal tooth which is joined to the columellar insertion of the peristome by a thread-like callus ridge. Three shells from Madison County average 6.8 mm. in height and 14.2 mm. in diameter. The depressed shell and the wide, flattened, outer tooth are diagnostic of vulgata.

According to Pilsbry (1940), the range of this snail extends from New York westward to Michigan and Missouri, and southward through the Appalachians to Tennessee and Alabama. In this state, vulgata is found in the northern part, from Franklin and Lauderdale counties eastward to Jackson and Cherokee counties.

The habitat of this snail is unknown to the writer. Shells collected by Dr. A. F. Archer were taken in thick deciduous leaf litter, at the base of a limestone slope, in Madison County. The available information indicates that vulgata is found in the Upper and Lower Austral zones of northern Alabama, on limestone as well as on noncalcareous soils, in mixed hardwood and hardwood-pine-cedar associations.

Alabama records:

Calhoun Co.	Piedmont (BW)
Cherokee Co.	Slackland; 10 mi. S.E. of Centre (BW)
Cullman Co.	Wilhites; Logan's Spg. (BW)
DeKalb Co.	Ft. Payne; Valley Head (BW)
Etowah Co.	Keener (BW)
Franklin Co.	Burleson; Russellville (BW)

Jackson Co. Stevenson; Princeton; Limrock; Woodville
 (BW)
 Lauderdale Co. Florence (BW)
 Madison Co. Huntsville; Gurley; Monte Sano (BW);
 Sharp's Cove, Molder (AFA)

Triodopsis hopetonensis (Shuttleworth), 1852

Plate III, figure 9 A, B, C

Helix hopetonensis Shuttleworth, 1852

Triodopsis hopetonensis Pilsbry, 1940

Type locality: Hopetone, on the south side of the Altamaha River, about 5 miles above Darien, Georgia.

The shell is depressed-globose, openly umbilicate, and has a rounded to subangulate periphery. The embryonic whorls are sculptured with faint radial striae, and the later whorls have close, strongly developed rib-striae. The last whorl has a well defined radial furrow extending from the columellar insertion to the outer insertion of the reflected and thickened peristome. The outer peristome bears a small conical tooth on its inner margin, and the basal peristome bears a small tuberculate tooth which is buttressed on the columellar side by a low callus ridge. The parietal wall bears a short, low, slightly curved lamella, the inner end of which is joined to the basal peristome by a thin, thread-like callus. A series of six shells from Tuscaloosa County averages 5.6 mm. in height and 9.8 mm. in diameter. The continuous groove behind the peristome on the last whorl is a diagnostic characteristic of hopetonensis, readily distinguishing it from T. vannostrandi.

According to Pilsbry (1940), this species ranges from eastern North Carolina southward to Jacksonville, Florida, and westward through southern Tennessee into northern and central Alabama. In this state, the known localities for hopetonensis are urban and above the fall line. The discontinuity in its distribution between eastern North Carolina and Tennessee indicates that further collecting is necessary to determine its complete range.

The habitat of hopetonensis in Alabama is under leaf litter, rocks, and among shrubs, in inhabited situations; it has not been collected elsewhere, but in view of its known range should be found in rural localities in the northern part of the state.

Alabama records:

Etowah Co.	Gadsden (HCR)
Jefferson Co.	Birmingham (AFA)
Morgan Co.	Decatur (AFA)
Tuscaloosa Co.	University; Tuscaloosa (HCR)

Triodopsis vannostrandi vannostrandi (Bland), 1875

Plate III, figure 10 A, B, C, D; figure 11 A, B, C

Helix vannostrandi Bland, 1875

Polygyra alabamensis Pilsbry, 1902

Polygyra vannostrandi Walker, 1928

Polygyra vannostrandi alabamensis Walker, 1928

Triodopsis vannostrandi Pilsbry, 1940

Triodopsis vannostrandi alabamensis Pilsbry, 1940

Type locality: Aiken, Aiken County, South Carolina.

The shell is depressed-globose, openly umbilicate, and has a rounded to subangulate periphery. The embryonic

whorls are sculptured with faint radial striae, and the later whorls have close, strongly developed, rib-striae. The reflected and thickened peristome bears a bluntly conical, somewhat thickened and flattened, submarginal tooth in the outer arc, and a small, tuberculate, basal tooth, which is buttressed on the columellar side by a callus ridge. There are two shallow pits on the last whorl, immediately behind the peristome, which mark the position of the teeth. The parietal tooth is short, slightly curved, and joined to the columellar insertion of the peristome by a very thin, thread-like callus ridge. A series of fourteen shells averages 6.1 mm. in height and 10.6 mm. in diameter. The two distinct pits behind the peristome readily distinguish this species from hopetonensis.

According to Pilsbry (1940), the form alabamensis is distinguished from typical vannostrandii by its more depressed shape and more closely coiled whorls. Two topotypes of alabamensis from Auburn, in Lee County, Alabama, are referable to typical vannostrandii. These shells are moderately elevated, measuring 6.0 mm. by 9.5 mm., and 6.0 mm. by 10.0 mm., and are not distinguishable from the form called alabamensis except by the slightly greater height. Shells from two localities in central Alabama which are about 25 miles apart show characteristics of both vannostrandii and alabamensis. One series contains shells which fall within the height range of alabamensis but have the diameter of vannostrandii; the other population falls within

the height range of vannostrandi but has the diameter of alabamensis. This scrambling of characters is populational, rather than geographic. The writer therefore prefers to consider all Alabama shells referable to vannostrandi.

This species ranges from central South Carolina westward through Georgia to eastern Alabama, and southward to northern Florida. In Alabama, it is generally distributed in the Appalachian Ridge and Valley system, the Piedmont, and on the southeastern Coastal Plain.

The habitat of vannostrandi in this state is under leaf litter, rocks, and decaying logs, in ravines and gullies in mixed hardwood and hardwood-pine associations, and on limestone as well as on noncalcareous soil.

Alabama records:

Barbour Co.	Elamville (BW)
Bibb Co.	16 mi. N.E. of Centreville (HCR)
Calhoun Co.	Ten Island Shoals (BW)
Chambers Co.	Langdale (BW)
Cherokee Co.	10 mi. S.E. of Centre; 6 mi. W. of Cave Springs, Georgia (BW)
Chilton Co.	Butting Ram Shoals; Clanton; Duncan's Riffle (BW)
Clay Co.	Pyriton (BW)
Coosa Co.	Swamp Creek, near Rockford (AFA)
Dale Co.	Pinckhard (BW)
Elmore Co.	Wetumpka (BW)
Etowah Co.	Black Creek Falls (BW)
Henry Co.	3 mi. N. of Headland (HCR)
Lee Co.	Auburn (BW;AFA)
Macon Co.	Tuskegee (BW)
Pike Co.	Troy (BW)
Randolph Co.	Wadley; Roanoke (BW)
Shelby Co.	Calera (BW)
St. Clair Co.	Lock 3, Coosa River (BW)
Talladega Co.	Three Island Shoals; Ft. William Shoals (BW)

Subgenus XOLO TREMA Rafinesque

The shell is depressed to depressed-globose, imperforate, and has a rounded to angulate-carinate periphery. The embryonic whorls are sculptured with fine radial striae, and the later whorls have low to distinct, rather widely spaced, rib-striae which pass over the periphery and onto the base. The microsculpture is highly variable, ranging from faintly to distinctly scaly, with or without minute wrinkles, spiral granulation, or spiral lines. The peristome is reflected, and its thickened inner margin bears a strongly developed, conical, outer tooth, and a thickened, basal, laminate, callus ridge.

Triodopsis obstricta obstricta (Say), 1821

Plate III, figure 12 A, B; figure 13 A, B

Helix obstricta Say, 1821

Helix denotata Ferussac, 1823

Helix caroliniensis Lea, 1831

Polygyra palliata Walker, 1928 (nec Hartmann, 1807)

Polygyra obstricta Walker, 1928

Polygyra obstricta caroliniensis Walker, 1928

Triodopsis notata Pilsbry, 1940

Triodopsis obstricta Pilsbry, 1940

Triodopsis caroliniensis Pilsbry, 1940

Triodopsis denotata Pilsbry, 1948

Type locality: Ohio.

The shell is depressed to depressed-globose, imperforate, and has a rounded to angulate-carinate periphery. The embryonic whorls are sculptured with fine radial striae, and the later whorls have weakly defined to distinctly developed rib-striae. The microsculpture consists of faintly

to distinctly developed minute wrinkles, which are parallel to the rib-striae. In addition, faintly to distinctly developed triangulate periostracal processes are frequently present over all or part of the shell. Microscopic spiral lines, often interrupted into spirally arranged granules, are frequently present over part or all of the shell. The peristome is reflected, and its thickened inner margin bears a strongly developed, conical outer tooth, and a thickened, basal, laminate callus ridge. A series of 42 shells averages 10.5 mm. in height and 19.5 mm. in diameter.

This widespread, polymorphic species has been known, on the basis of its variations, as obstricta (Say), denotata (Ferussac), and caroliniensis (Lea). The characters which were used to distinguish these forms as species are highly variable in their development. Moreover, characters which were diagnostic of denotata are often present on shells of obstricta and caroliniensis. The presence or absence of an angulate-carinate periphery, supposedly diagnostic of obstricta, is clearly not a specific characteristic, since the periphery of denotata, and caroliniensis, is frequently angulate to carinate. Likewise, the minute wrinkles between the rib-striae, which are characteristic of obstricta, are found on both denotata and caroliniensis. The triangulate periostracal processes characteristic of denotata are often found on obstricta. Finally, the spiral lines which were diagnostic of caroliniensis are also found on shells of

obstricta, although not as well developed.

Pilsbry (1940) states that shells of denotata from Indiana show transitions to obstricta, and that they probably represent "...a hybrid notata X obstricta population", which if true would clearly indicate that the two forms are not distinct. According to Pilsbry (1940), the genitalia of an Alabama specimen of caroliniensis do not differ from those of denotata.

The ranges given by Pilsbry (1940) for denotata, obstricta, and caroliniensis completely overlap. This fact does not substantiate any suggestion of the three forms being subspecies; and the intermingling of shell characters, in addition to the absence of genitalic differences, refutes the specific identity of each of the forms.

In view of the overlapping morphological characters, and the overlapping ranges, of denotata, obstricta, and caroliniensis, in addition to the genitalic similarity, the writer considers the three forms to be representatives of an extremely variable species. Since obstricta has priority, both denotata and caroliniensis must now be regarded as synonyms.

On the basis of the known localities for obstricta, and the forms denotata and caroliniensis, the range of this species extends from Vermont southward to Georgia, and westward to Michigan, Illinois, Arkansas, and Louisiana. In Alabama, obstricta is generally distributed above the Fall Line, and occurs throughout the Black Belt and the

Upper Coastal Plain. In addition, a single record from Mobile County was cited by Walker (1928), and Pilsbry (1940).

The habitat of obstricta in Alabama is under leaf litter, rocks, and decaying logs, in mixed hardwood and hardwood-pine associations, on limestone as well as on noncalcareous soils. It is commonly found attached to the undersides of limestone rocks and decaying oak logs in the northern part of the state, and in leaf litter on low slopes, on calcareous soils in the Black Belt. The habitat in Mobile County is unknown to the writer.

Alabama records:

Blount Co.	Blount Spgs. (BW;AFA)
Chambers Co.	Langdale (BW)
Cherokee Co.	Poole's Island; Gabriel; Slackland; Maple Grove (BW)
Calhoun Co.	Anniston (BW)
Chilton Co.	Higgin's Ferry; Yellowleaf Creek (BW)
Cleburne Co.	Mt. Cheaha (BW)
DeKalb Co.	Ft. Payne (BW)
Elmore Co.	Wetumpka (BW)
Etowah Co.	Keener; Gadsden (BW)
Franklin Co.	Burleson (BW); 5 mi. N. of Russellville on U.S. 43 (HCR)
Greene Co.	Boligee (BW)
Jackson Co.	Stevenson; Princeton; Woodville (BW); Princeton (AFA)
Jefferson Co.	Squaw Shoals; Warrior (BW)
Lauderdale Co.	Florence (BW); Elgin (HCR)
Lawrence Co.	King Cove (HCR)
Macon Co.	Tuskegee (BW)
Madison Co.	Huntsville (BW); Monte Sano (BW;HCR)
Marshall Co.	Scarham Creek, Guntersville (AFA)
Mobile Co.	Mobile (BW)
Lamar Co.	Buttahatchee Swamp, near Sulligent (HCR)
Montgomery Co.	Red River (BW)
Randolph Co.	Wadley (BW)
St. Clair Co.	Whitney; Greensport (BW)
Sumter Co.	Epes (JH)
Talladega Co.	Three Mile Shoal; Ft. William Shoals (BW)

Tuscaloosa Co. Tuscaloosa; Holt (BW); University; Hurricane Creek; Duncanville (HCB)
Walker Co. Forks of Warrior River; Junction of Lost and Wolf Creeks (BW)

Subgenus NEOHELIX Von Ihering

The shell is large, depressed to globose, imperforate, and has a rounded periphery. The embryonic whorls are sculptured with fine radial striae, and the later whorls have fine, close rib-striae, paralleled by minute wrinkles and crossed by closely crowded microscopic spiral lines. The peristome is flatly reflected, greatly thickened, and bears a low convexity near its columellar insertion.

Triodopsis albolabris albolabris (Say), 1817

Plate III, figure 14

Helix albolabris Say, 1817

Polygyra albolabris fuscolabris Pilsbry, 1903

Polygyra albolabris Walker, 1928

Polygyra albolabris fuscolabris Walker, 1928

Triodopsis albolabris Pilsbry, 1940

Triodopsis albolabris fuscolabris Pilsbry, 1940

Type locality: Philadelphia, Pennsylvania.

The shell is depressed-globose, imperforate, and rounded at the periphery. The embryonic whorls are sculptured with fine radial striae; and the later whorls have fine, close rib-striae, paralleled by minute wrinkles and crossed by closely crowded, microscopic, spiral lines. The peristome is flatly reflected, thickened, and bears a low convexity on its columellar margin. Thirteen shells from localities above the Fall Line in Alabama average 21.5 mm.

in height and 31.7 mm. in diameter. The average of measurements of topotypes cited by Pilsbry (1940) is 17.4 mm. in height and 28.2 mm. in diameter. This differential in average sizes suggests that albolabris from Alabama may be constantly larger than specimens from northern states; the writer does not have sufficient material to fully substantiate this idea.

The form of albolabris referred to as the subspecies fuscolabris (Pilsbry) by Walker (1928), and Pilsbry (1940), is not deserving of subspecific rank, in view of its distribution within the known range of albolabris, and is therefore considered a synonym.

According to Pilsbry (1940), the range of typical albolabris extends from Maine southward to Georgia and westward to Arkansas, Illinois, and Wisconsin, excluding the Gulf Coastal Plain, where albolabris is replaced by the larger, more globose subspecies, major. In Alabama, albolabris is found generally distributed above the Fall Line, and has been taken on the Coastal Plain near Akron, Hale County, and at Pratt's Ferry, Bibb County. The latter localities are isolated relict areas, characterized by rather humid ravines and gullies, which have cool microclimates where northern forms such as Stenotrema barbigerum and Triodopsis albolabris can survive the higher temperatures of the Coastal Plain.

The habitat of this species in Alabama is under leaf litter, rocks, and decaying logs, in ravines and gullies

in mixed hardwood and hardwood-cedar associations, on limestone as well as on noncalcareous soils.

Alabama records:

Bibb Co.	Woodstock (BW); Pratt's Ferry; 16 mi. N.E. of Centreville (HCR)
Blount Co.	Blount Spgs. (BW)
Calhoun Co.	Anniston (BW)
Chambers Co.	Langdale (BW)
Cherokee Co.	Pleasant Gap (BW)
Clay Co.	Pyriton (BW)
Cleburne Co.	Mt. Cheaha; Dugger Mt. (BW)
DeKalb Co.	Ft. Payne; Valley Head (BW)
Etowah Co.	Keener; Gallant (BW); Stephens Gap, near Gadsden (HCR)
Franklin Co.	Burleson (BW)
Hale Co.	Akron (HCR)
Jackson Co.	Stevenson; Princeton; Woodville (BW); S. side of Tenn. River on Ala. 35; Scottsboro (HCR)
Lauderdale Co.	Florence (BW)
Lee Co.	Auburn (BW)
Madison Co.	Huntsville; Gurley; Normal; Monte Sano (BW); Monte Sano State Park (HCR)
Marion Co.	Bear Creek (BW)
Marshall Co.	Guntersville (HCR)
Randolph Co.	Wadley; Roanoke (BW)
Shelby Co.	Calera (BW)
St. Clair Co.	Shoal Creek (BW)
Tallapoosa Co.	Tallapoosa (BW)
Tuscaloosa Co.	3 mi. W. of Vance (HCR)
Walker Co.	Forks of Warrior River (BW)
Winston Co.	Natural Bridge, near Addison (HCR)

Triodopsis albolabris major (Binney), 1837

Plate III, figure 15

Helix major Binney, 1837

Polygyra albolabris major Walker, 1928

Triodopsis albolabris major Pilsbry, 1940

Type locality: Georgia.

The shell is extremely globose, imperforate, and it has a rounded periphery. The embryonic whorls are sculptured with fine radial striae. The later whorls have

rather distinct rib-striae and faintly developed, microscopic, spiral lines. The peristome is flatly reflected, rather narrow, and bears a low convexity on its columellar margin (after Binney, in Pilsbry, 1940). According to Pilsbry (1940), topotypes measure 31.0 mm. by 43.0 mm., and 32.0 mm. by 39.5 mm.

Pilsbry (1940) states that the range of major extends from coastal North Carolina southward to northern Florida and westward into eastern Alabama, citing localities above and below the Fall Line in Georgia and Alabama. Walker (1928) cites localities in northern Alabama on the Cumberland Plateau, the Appalachian Ridge and Valley system, and in the Piedmont Province, in addition to records from the Lower Coastal Plain.

In view of the otherwise coastal distribution of major, it would appear probable that Walker's northern Alabama records represent rather large albolabris, which averages 21.5 by 31.7 mm. in Alabama. This possibility in turn suggests that albolabris may prove to be highly variable in size, and that the lowland or Coastal Plain form is what is referred to as major. The writer has not collected any albolabris which could be designated as major, and because of the lack of shells for comparative study prefers to retain this doubtful subspecies until additional material has been seen.

Alabama records:

Barbour Co. Elamville (BW)

Chambers Co.	Langdale (BW)
Cherokee Co.	Pleasant Gap (BW)
Crenshaw Co.	Searight (BW)
Cleburne Co.	Mt. Cheaha (BW)
Elmore Co.	Wetumpka (BW)
Jackson Co.	Stevenson; Woodville (BW)
Marion Co.	Bear Creek (BW)

Genus ALLOGONA Pilsbry

The shell is large, depressed-globose, widely umbilicate, and has a rounded periphery. The embryonic whorls are smooth, and the later whorls have thread-like striae crossed by microscopic spiral lines. The peristome is reflected and thickened, and its basal portion bears a low convexity on the inner margin, near the columellar insertion.

Allogona profunda (Say), 1821

Plate III, figure 16 A, B

Helix profunda Say, 1821

Polygyra profunda Walker, 1928

Allogona profunda Pilsbry, 1940

Type locality: Council Bluffs, Iowa.

The shell is large, depressed-globose, widely umbilicate, and has a rounded periphery. The embryonic whorls are smooth; and the later whorls are sculptured with fine, close, thread-like striae which are crossed by close, microscopic spiral lines. The peristome is reflected and thickened, and its basal portion bears a low convexity on the inner margin near the columellar insertion. Pilsbry (1940) gives measurements of four shells, the average of

which is 15.6 mm. in height and 28.6 mm. in diameter. A Michigan shell from Dr. Archer's collection measures 15.9 mm. by 27.5 mm.

According to Pilsbry (1940), the range of this species extends from New York westward to Wisconsin, and southward to Missouri, Tennessee, northern Alabama, and North Carolina. Walker (1928) and Pilsbry (1940) record profunda from Jackson County, in northeastern Alabama. The writer has not collected it, and the Alabama record needs verification. Data concerning its habitat and ecology in Alabama are lacking.

Alabama records:

Jackson Co. Stevenson; Princeton (BW;HAP)

Family BULIMULIDAE Pilsbry

The shell is ovate to oblong, conic, perforate or imperforate, all white or with radial or spiral color-markings. The embryonic whorls are smooth or sculptured with spiral threads. The aperture is ovate to subtriangulate. The peristome is reflected at the columellar insertion, half-covering the umbilical perforation.

Genus BULIMULUS Leach

The shell is globosely ovate-conic, higher than wide, perforate, uniformly white or radially streaked with white over a brownish-gray background. The embryonic whorls are smooth and the later whorls are marked with irregular

growth wrinkles. The aperture is ovate; and the columellar margin of the peristome is slightly reflected, partially covering the umbilical perforation.

Bulimulus dealbatus dealbatus (Say), 1821

Plate IV, Figures 1 and 2

Helix dealbata Say, 1821

Bulimulus dealbatus Walker, 1928

Bulimulus dealbatus jonesi Clench, 1937

Bulimulus dealbatus Pilsbry, 1946

Bulimulus dealbatus jonesi Pilsbry, 1946

Type locality: Alabama and Missouri.

The shell is globosely ovate-conic, perforate, and uniformly white or with radial streaks of white over a brownish-gray background. The embryonic whorls are smooth, sometimes rather glassy in appearance; and the later whorls are marked with irregular growth wrinkles. The aperture is ovate, and the peristome is reflected at its columellar insertion, half-covering the umbilical perforation. A series of sixty shells averages 19.3 mm. in height and 12.1 mm. in diameter.

The form of dealbatus referred to as the subspecies jonesi Clench by Pilsbry (1946) was based on its uniformly white color, glassy embryonic whorls, and slightly more slender shell. Topotypes of jonesi from Greene County, Alabama, are indistinguishable from dealbatus from the same locality. Typical specimens of the latter often have coalescent radial streaks and are almost uniformly white,

while the topotypes examined by the writer exhibit all of the characteristics of dealbatus but the color. According to Clench (in Pilsbry, 1946), the average of five paratypes of jonesi is 20.0 mm. in height and 11.0 mm. in diameter.

The range given by Pilsbry (1946) for typical dealbatus extends from eastern Kansas, Oklahoma, and Texas eastward through Missouri, Arkansas, and Louisiana to southern Kentucky, Tennessee, and Alabama. In this state dealbatus is generally and abundantly distributed throughout the Black Belt, and has been recorded from several localities in the northern part of the state and from the Lower Coastal Plain. The known localities for the form jonesi are confined to Greene County, which is completely within the range of typical dealbatus.

On the basis of morphological similarity between dealbatus and the form jonesi, and in view of their completely overlapping ranges, the latter is not regarded as a valid subspecies and is considered synonymous with typical dealbatus.

The known habitat of this snail in Alabama is among grasses, weeds, and leaf litter, in mixed hardwood-cedar and pine-cedar associations, on calcareous soils. In the northern part of the state, dealbatus is found in the limestone valleys of the Cumberland Plateau. Walker (1928) records this snail from montane regions of Madison and Cleburne counties; that dealbatus occurs on the upper slopes of these regions, in the Upper Austral life zone,

is doubtful, since its habitat elsewhere in the state is on calcareous soils, in the Lower Austral zone. After a rain large numbers of dealbatus can be found crawling on the stems of weeds and on the trunks of small trees. During dry periods in the summer large series can be collected from weeds and shrubby trees where the snails estivate, protecting themselves against the loss of moisture by sealing the aperture to stems or twigs and branches. In the winter months, dealbatus is found buried in the surface litter and under rocks and fallen limbs.

Alabama records:

Choctaw Co.	Black Bluffs; Tombigbee River (BW)
Cleburne Co.	Duggar Mt. (BW)
Dallas Co.	Selma (BW;HCR); Safford; Cahaba River (HCR)
Franklin Co.	Newburg; Russellville (HCR)
Greene Co.	Boligee; 8 mi. S. of Eutaw (JH)
Hale Co.	Hale-Marengo Co. line; 5 mi. N. of U.S. 80 on Ala. 13; 4 mi. N. of Faunsdale on Ala. 99; Jct. U.S. 80 and Ala. 13 (JH)
Madison Co.	Huntsville; Monte Sano (BW)
Marengo Co.	Marengo (BW); Demopolis (HCR;JH); Faunsdale (HCR)
Mobile Co.	Mobile (BW)
Montgomery Co.	McGee's Station; Barachias; Montgomery (BW)
Perry Co.	Hamburg; Uniontown (BW)
Sumter Co.	Livingston; Epes (BW;JH)
Wilcox Co.	Camden (BW)

Family ACHATINIDAE Pilsbry

The shell is elongate-cylindrical, tapering toward the apex, and perforate or imperforate. The embryonic whorls are smooth or broken away, and the later whorls are lightly to coarsely striated. The aperture is ovate; and the columellar insertion of the peristome is reflected, partially

or wholly covering the umbilical perforation.

Genus RUMINA Risso

The shell is elongate-cylindrical, tapering toward the blunt apex, and usually imperforate. The apical whorls are smooth in young shells, and broken away in mature shells. The later whorls are coarsely and irregularly marked with radial growth striae. The aperture is ovate; and the columellar insertion of the peristome is reflected over, and usually covering, the minute umbilical perforation.

Rumina decollata (Linnaeus), 1758

Plate IV, figure 3

Helix decollata Linnaeus, 1758

Rumina decollata Walker, 1928

Rumina decollata Pilsbry, 1946

Type locality: Austral-Europe and the Orient.

The shell is elongate-cylindrical, tapering toward the apex, and usually imperforate. The apical whorls are smooth in young shells, and broken away in adults. The later whorls are coarsely and irregularly marked with radial growth striae. The aperture is ovate; and the columellar insertion of the peristome is reflected, almost covering the minute umbilical perforation. A series of thirty shells averages 29.5 mm. in height and 11.2 mm. in diameter.

According to Pilsbry (1946), this species of the Mediterranean region has been introduced into this country by commercial shipping. It is found in or near seaport towns

and cities on the Atlantic and Gulf Coastal Plain, from North Carolina to Texas. In Alabama, the known localities for decollata are in Mobile, and in and near Demopolis. Both cities are shipping ports, the former receiving ocean-going vessels and the latter serving as the main inland port on the Tombigbee River.

The known habitat of this species in Alabama is among weeds and grasses in mixed hardwood-cedar associations, on calcareous soils. The habitat in Mobile is unknown to the writer.

Decollata is a carnivorous species, feeding on the larger Polygyrid and Zonitid snails. Several specimens, kept alive by the author, were observed to attack Mesodon thyroïdus and Mesomphix vulgatus, entering the aperture and completely devouring the snails in each case. Presumably, it feeds on members of these genera, and others, in its natural habitat.

Alabama records:

Marango Co. Faunsdale; Demopolis (HCR;JH)
 Mobile Co. Mobile (BW)

Genus LAMELLAXIS Strebel and Pfeffer

The shell is elongate-cylindrical, tapering toward the apex, and has a minute umbilical perforation. The embryonic whorls are smooth, and the later whorls are glossy and sculptured with faint radial striae. The aperture is ovate; and the columellar insertion of the peristome is reflected,

partially covering the umbilical perforation.

Lamellaxis gracilis (Hutton), 1834

Plate IV, figure 4

Bulimus gracilis Hutton, 1834

Opeas gracile Walker, 1928

Lamellaxis gracilis Pilsbry, 1946

Type locality: Mirzapur, Ceylon.

The shell is small, glossy, elongate-cylindrical, slender, and tapers toward the apex. The embryonic whorls are smooth, and the later whorls are lightly marked with faint radial striae. The aperture is ovate; and the peristome is reflected at its columellar insertion, partially covering the umbilical perforation. A series of three shells from Dr. Archer's collection averages 6.8 mm. in height and 2.1 mm. in diameter.

According to Pilsbry (1946), the range of gracilis extends throughout the tropics of both the eastern and western hemispheres. It has evidently been introduced into this country by commercial shipping; Pilsbry (1946) states that it is found in and near seaports on the Atlantic and Gulf Coastal Plain, from South Carolina to Louisiana.

In Alabama, gracilis has been recorded from Mobile and Birmingham; the former locality is near the Mobile River, and the latter is at the fairgrounds on the outskirts of Birmingham. In all probability, this species was transported from Mobile to Birmingham Port by riverboats. How it came to be at the fairgrounds in Birmingham

is a matter for speculation; possibly it was brought in on herbage used as food for cattle or other animals to be displayed.

The habitat of gracilis at the fairgrounds is under stones and debris. The Mobile locality is in a domestic situation, and the habitat is presumably similar to that in Birmingham.

Alabama records:

Jefferson Co. Birmingham Fairgrounds (AFA)
Mobile Co. H. P. Loding Estate, Mobile (BW;AFA)

Family OLEACINIDAE

The shell is large, elongate-ovate, and imperforate. The embryonic whorls are smooth, and the later whorls are sculptured with irregular radial striae and growth wrinkles. The aperture is elongate-ovate; the peristome is not reflected. The family is represented in Alabama by a single genus and species.

Genus EUGLANDINA Fischer and Crosse

Euglandina rosea (Ferussac), 1821

Plate IV, figure 5

Helix rosea Ferussac, 1821
Euglandina rosea Walker, 1928
Euglandina rosea Pilsbry, 1946

Type locality: St. Augustine, Florida.

The shell is elongate-ovate, imperforate, and tapers toward the apex. The embryonic whorls are smooth, and the

later whorls are marked with distinct, irregular, radial striae and growth wrinkles. The aperture is elongate-ovate, and the peristome is not reflected. Twenty shells average 56.5 mm. in height and 21.5 mm. in diameter.

According to Pilsbry (1946), the range of this species extends from coastal South Carolina and Georgia through all of Florida, coastal Alabama and Mississippi, to Louisiana. In Alabama, rosea is found throughout the southern part of the state, on the Coastal Plain, reaching its northernmost known limit in the state near the Tuscaloosa-Greene county line.

The habitat of this species is among weeds, grasses, and leaf litter, in mixed hardwood-pine and pine-cedar associations, on calcareous and noncalcareous soils. It is more abundant on the chalk soil of the Black Belt than on the sandy soils of the Lower Coastal Plain.

E. rosea is a carnivorous snail, feeding on representatives of several genera, notably Mesodon, Mesomphix, and Anguispira. A specimen of rosea which was kept alive for several months by the writer was fed individuals of these genera, and its feeding habits were observed. The snail was kept in a small tin pan which was filled with soil and leaf litter and covered with cheesecloth. A small amount of water was poured over the leaf litter about twice weekly, and the soil and litter were changed about once a month.

Each week several specimens of Mesodon thyroideus or

Mesomphix vulgatus were placed in the container and observed. The specimen of rosea, usually withdrawn into its shell, became active at once, moving rapidly toward the introduced snails. On reaching either a Mesodon or a Mesomphix, rosea appeared to explore the shell, evidently in search of the aperture. After locating the opening, it pushed its head into the aperture, at the same time evert- ing its long proboscis, and began to devour the snail. In two to five minutes rosea had completely eaten the food snail. This same behavior was noted when specimens of Anguispira were fed to rosea, and there seemed to be no preference for any one genus when all three were placed in the container. A single snail was usually sufficient for one feeding, although several Mesomphix were consumed by rosea during one feeding period.

In one instance, M. vulgatus was seen to combat rosea and force it to withdraw. Usually, however, the food snail appeared to completely passive toward the attack, resisting only by withdrawing into its shell. Smaller snails, such as Gastrodonta interna and species of Retinella, were not attacked. Attempts by the writer to feed bits of lettuce to rosea were unfruitful, indicating that this species is possibly wholly carnivorous in habit.

The snail was kept alive through the fall and early winter months, although it was much less active during the latter period. Finally, during an extremely cold week, a broken radiator fitting permitted live steam to escape,

which killed the snail and ended the writer's observations of its habits.

Alabama records:

Baldwin Co.	Bear Point (AFA); Magnolia Spgs.; Point Clear (BW)
Barbour Co.	Elamville (BW)
Bibb Co.	Bibb Co. (BW)
Choctaw Co.	Wood's Bluff; Black Bluff; Silas; Bladon Spgs. (BW)
Clarke Co.	Jackson (BW)
Conecuh Co.	Herbert; Evergreen (BW)
Crenshaw Co.	Searight (BW)
Dale Co.	Pinckhard (BW)
Dallas Co.	Cahaba River; 10 mi. W. of Selma; Safford; 6 mi. W. of Selma; 2 mi. E. of Marion Junction (HCR;JH)
Elmore Co.	Grandview; Wetumpka; Mountain Creek (BW)
Geneva Co.	Geneva; Gillie's Mill Creek (BW)
Greene Co.	Boligee (BW); 7 mi. N. of Demopolis (JH)
Hale Co.	5 mi. N. of U.S. 80, on Ala. 13 (JH)
Lee Co.	Auburn (BW)
Macon Co.	Tuskegee (BW)
Mobile Co.	Mobile (BW); Spring Hill (BW;HCR)
Marengo Co.	2 mi. W. of Southern R.R. on U.S. 80 (HCR)
Montgomery Co.	McGee's Station; Barachias (BW); Pintlalla Creek on U.S. 80 (HCR)
Perry Co.	Hamburg (BW); Uniontown (BW;JH)
Pike Co.	S.W. corner, near Pea River (BW)
Tuscaloosa Co.	2 mi. N. Tuscaloosa-Greene Co. line (HCR)
Washington Co.	S. entrance to Tombigbee Bridge on U.S. 43 (HCR)
Wilcox Co.	Pine Hill (BW)

Family HAPLOTREMATIDAE Baker

The shell is very depressed and widely umbilicate. The light-colored whorls are tubular, rather smooth, and glossy. Very low growth wrinkles and spiral striae are usually present on the last whorl and on the base. The aperture is lunate; and the slightly expanded, unreflected peristome is continued as a thin callus over the parietal wall. This family is represented in Alabama by a single

genus and species.

Genus HAPLOTREMA Ancey

Haplotrema concavum (Say), 1821

Plate IV, figure 6 A, B

Helix concava Say, 1821

Haplotrema concava Walker, 1928

Haplotrema concavum Pilsbry, 1946

Type locality: Illinois and Missouri.

The shell is very depressed, widely umbilicate, glossy, and yellowish to white in color. The whorls are smooth, the last with rather low and widely spaced irregular growth wrinkles which continue over the rounded periphery and onto the base. Faint microscopic spiral lines are often present on the last whorl and on the base. The aperture is lunate, and the simple peristome is slightly expanded, its margins continued as a thin callus over the parietal wall. A series of twenty shells averages 7.5 mm. in height and 19.5 mm. in diameter.

According to Pilsbry (1946), this species ranges from Maine westward through Michigan to Iowa, Missouri, and Arkansas, and southward to northern Florida, Alabama, and Mississippi. It is generally distributed over most of Alabama, with records lacking from the southeastern section of the state.

The habitat of concavum in this state is under leaf litter, rocks, and decaying logs, usually in ravines and

gullies, in mixed hardwood-pine and pine-cedar associations, on both calcareous and noncalcareous soils.

According to Walker (1928) and Pilsbry (1946), this species is carnivorous in habit. The writer has kept it in captivity with species of Mesodon, Mesomphix, and Anguispira, and has not observed concauum to feed on any of the latter; possibly it preys on smaller snails, such as Retinella or Zonitoides.

Alabama records:

Baldwin Co.	Week's Bay (BW)
Bibb Co.	Pratt's Ferry (HCR)
Blount Co.	Blount Spgs. (BW); 4 mi. S. and 5 mi. N. of Oneonta (HCR)
Calhoun Co.	Anniston; Piedmont (BW)
Chambers Co.	Langdale (BW)
Cherokee Co.	10 mi. S.E. of Centre; Poole's Island; Slackland; Maple Grove (BW)
Choctaw Co.	Silas (BW)
Clarke Co.	Bashi Creek, near Thomasville (BW)
Clay Co.	Pyriton (BW)
Cleburne Co.	Dugger Mt.; Mt. Cheaha (BW)
Cullman Co.	Wilhites (BW)
DeKalb Co.	Valley Head; Lookout Mt. (BW); DeSoto State Park (HCR)
Elmore Co.	4 mi. and 7 mi. S. of Wetumpka (BW)
Etowah Co.	Black Creek Falls (BW); 10 mi. E. of Gadsden (HCR)
Franklin Co.	Burleson (BW)
Greene Co.	Boligee (BW)
Jackson Co.	Sand Mt.; Princeton; Stevenson; Woodville; Paint Rock (BW); Long Island Cove (HCR)
Jefferson Co.	Squaw Shoals (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Huntsville; Gurley; Monte Sano (BW)
Marion Co.	Hamilton (BW)
Mobile Co.	Mobile (BW)
Montgomery Co.	McGee's Station (BW)
Monroe Co.	Claiborne (BW)
Perry Co.	Perry Co. (BW)
Randolph Co.	Wadley (BW)
Shelby Co.	Gurnee (BW)
St. Clair Co.	Whitney (BW)
Sumter Co.	Epes (BW)
Talladega Co.	2.5 mi. S.E. of Munford (HCR)

Tuscaloosa Co.	Holt; Indian Creek (BW); Tuscaloosa (BW; HCR); Duncanville; Blue Creek, on Ala. 69; Bethel Church; Hurricane Creek (HCR)
Walker Co.	Forks of Warrior River (BW); 2 mi. S.W. of Corona; 8 mi. S. of Oakmon (HCR)
Wilcox Co.	Camden; Grigg's Landing (BW)
Winston Co.	6 mi. W. of Addison, at Natural Bridge (HCR)

Family ZONITIDAE

The shell varies from large to small or minute, and from depressed to globose-conic. The whorls are sculptured with rib-striae, growth wrinkles, radial grooves, and often with microscopic spiral lines or granules. The last whorl frequently bears teeth or lamellae deeply situated on the basal wall or on the columellar wall. The umbilicus varies from imperforate or minutely perforate to widely open. The aperture is rounded or lunate, and the peristome is simple or partially reflected at the columella. This family is represented in Alabama by three subfamilies.

Subfamily EUCONULINAE Baker

The shell is very small or minute, depressed-globose or globosely conic, and imperforate or minutely perforate. The whorls are smooth or sculptured with microscopic radial lines. The last whorl often bears one or more radially arranged, evenly spaced, callus ridges situated within on the basal wall and visible through the shell. There are two genera in Alabama.

Genus EUCONULUS Reinhardt

The small shell is globosely conic, minutely perforate, and sculptured with microscopic radial lines. The last whorl often bears from one to four radially arranged, evenly spaced, callus ridges which are visible through the base.

Euconulus chersinus chersinus (Say), 1821

Plate IV, figure 7 A, B

Helix chersina Say, 1821

Euconulus chersinus Walker, 1928

Euconulus fulvus Walker, 1928 (in part)

Euconulus chersinus polygyratus Walker, 1928 (in part)

Euconulus chersinus dentatus Walker, 1928

Euconulus chersinus Pilsbry, 1946

Type locality: Sea Islands of Georgia.

The shell is small, globosely conic, minutely perforate, and sculptured with fine, microscopic, radial lines. The last whorl is somewhat subangulate in immature stages, rounded in adult shells, and frequently bears from one to four radially arranged, evenly spaced, callus ridges which are deeply situated within the whorl on the basal wall. The aperture is lunate, and the peristome is very slightly reflected at its columellar margin. Ten shells average 2.8 mm. in height and 3.0 mm. in diameter.

The range of chersinus, according to Pilsbry (1946), extends from coastal New Jersey southward to Florida and westward to Illinois and Louisiana. In Alabama, this species is distributed throughout the state.

Euconulus fulvus, recorded from Alabama by Walker (1928), is not found in the Gulf and South Atlantic states, according to Pilsbry (1946). Walker (1928) states that the Alabama records for fulvus probably represent chersinus. The presence of microscopic spiral lines separates fulvus from chersinus, which has radial, rather than spiral, striae.

The subspecies polygyratus, recorded from this state by Walker (1928), ranges from Maine westward through Ontario and Wisconsin to Saskatchewan. This subspecies is a distinct northern race, according to Pilsbry (1946), and for this reason it is not included in this paper.

Walker (1928) and Pilsbry (1946) record from Alabama the form dentatus, as a subspecies of chersinus. The range given by Pilsbry (1946) for this form extends from eastern Pennsylvania southward through the District of Columbia, Virginia, and North Carolina, and westward and southwestward through Tennessee and Alabama to Arkansas and Louisiana. This range lies completely within that of typical chersinus. In addition, there is no distinction other than the internal radial calluses of dentatus between chersinus and the latter form. Pilsbry (1946) states that fully adult dentatus usually lacks the radial calluses and is not distinguishable from the typical species. In view of their completely overlapping ranges and the lack of constant diagnostic differences in morphology, the writer considers the form dentatus synonymous with typical chersinus.

The habitat of this species in Alabama is among weeds and grasses, under rocks, leaf litter, and decaying logs, in mixed hardwood-pine and pine-cedar associations, on both calcareous and noncalcareous soils.

Alabama records:

Baldwin Co.	Week's Bay; Foley; Magnolia Spgs. (BW)
Barbour Co.	Elamville (BW)
Bibb Co.	Eoline (BW)
Blount Co.	Blount Spgs. (BW); 5 mi. S. of Oneonta (HCR)
Calhoun Co.	Sanford Spg. (BW)
Chambers Co.	Langdale (BW)
Cherokee Co.	Pleasant Gap (BW)
Chilton Co.	Clanton (BW)
Choctaw Co.	Silas (BW)
Clarke Co.	Thomasville (BW)
Conecuh Co.	Evergreen (BW)
DeKalb Co.	Valley Head (BW)
Elmore Co.	Wetumpka (BW)
Etowah Co.	Attalla (BW)
Franklin Co.	Russellville; Burleson (BW)
Greene Co.	Boligee (BW); Allison (JH)
Jackson Co.	Princeton; Woodville; Stevenson (BW)
Jefferson Co.	Squaw Shoals (BW)
Lauderdale Co.	Florence (BW)
Macon Co.	Tuskegee (BW)
Madison Co.	Huntsville; Gurley; Monte Sano (BW)
Marion Co.	Hamilton (BW)
Mobile Co.	Mobile; Calvert (BW)
Montgomery Co.	McGee's Station (BW); Sprague (HCR)
Perry Co.	Marion; Hamburg; Uniontown (BW)
Pickens Co.	Tuscaloosa-Pickens County line (HCR)
Randolph Co.	Roanoke (BW)
Shelby Co.	Calera; Montevallo (BW)
St. Clair Co.	Whitney (BW); St. Clair-Jefferson County line (HCR)
Sumter Co.	York; Livingston (BW); Epes (BW;JH)
Tuscaloosa Co.	Holt; Vance; Duncanville; Tuscaloosa (BW); New Lexington (HCR)
Wilcox Co.	Pine Hill (BW)

Genus GUPPYA Morch

The shell is minute, depressed-globose, and imperforate. The whorls are smooth or sculptured with microscopic

spiral striae. This genus is represented in Alabama by a single species.

Guppya sterkii (Dall), 1888

Plate IV, figure 8 A, B, C

Hyalinia sterkii Dall, 1888
Euconulus sterkii Walker, 1928
Guppya sterkii Pilsbry, 1946

Type locality: New Philadelphia, Ohio.

The shell is minute, depressed-globose, and imperforate. The whorls are sculptured with microscopic spiral striae, and often have very weak growth wrinkles. The columellar insertion of the peristome is reflected and impressed over the umbilical region. Two shells average 0.7 mm. in height and 1.2 mm. in diameter.

According to Pilsbry (1946), this species ranges from New York and New Jersey southward to peninsular Florida and westward to Ohio and Louisiana. The known records from Alabama indicate that it is probably generally distributed throughout the state.

The habitat of sterkii in Alabama is in leaf litter in mixed hardwood-pine and pine-cedar associations, on calcareous and noncalcareous soils. It is most easily found by sifting the surface litter and by examining the undersides of damp leaves and debris. It is very easily overlooked, due to the extremely small size.

Alabama records:

Baldwin Co. Magnolia Spgs. (BW)

Blount Co.	5 mi. S. of Oneonta (HCR)
Chambers Co.	Langdale (BW)
Choctaw Co.	Silas (BW)
Conecuh Co.	Evergreen (BW)
DeKalb Co.	Valley Head (BW)
Greene Co.	Allison (JH)
Jackson Co.	Stevenson; Pisgah; Woodville (BW)
Jefferson Co.	Squaw Shoals (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Huntsville; Monte Sano (BW)
Mobile Co.	Mobile (BW)
Randolph Co.	Wadley; Roanoke (BW)

Subfamily ZONITINAE Pilsbry

The shell varies from large to very small, and from depressed to globose. The whorls are smooth, or sculptured with radial striae, growth wrinkles, or impressed radial grooves. In addition, microscopic spiral lines or granules are often present on the last whorl. The umbilical region is imperforate, minutely perforate, or widely open. There are occasionally several pairs of tuberculate teeth situated deeply within the last whorl, on the basal wall. This subfamily is represented in Alabama by four genera.

Genus RETINELLA Fischer

The shell is small, depressed, and somewhat transparent. The whorls are sculptured with impressed, usually evenly spaced, radial grooves, and there are usually very fine, microscopic, spiral lines on the last whorl. The umbilical region is rarely imperforate, usually minutely perforate or widely open. There are two subgenera in Alabama.

Subgenus GLYPHYALUS Baker

The sculpturing of the shell consists of irregularly spaced, impressed, radial grooves, and faintly to distinctly developed spiral striae. The widely open umbilicus is one-fifth of the diameter of the shell.

Retinella cumberlandiana (Clapp), 1919

Plate IV, figure 9

Polita cumberlandiana Clapp, 1919

Vitrea cumberlandiana Walker, 1928

Retinella cumberlandiana Pilsbry, 1946

Type locality: Cumberland Plateau, near Stevenson, Jackson County, Alabama.

The shell is small, depressed, and widely umbilicate. The whorls are thin, transparent, polished, and sculptured with irregularly spaced, impressed, radial grooves. The aperture is lunate, and the columellar insertion of the peristome is slightly reflected. The shell measures 1.25 mm. in height and 3.0 mm. in diameter (after Pilsbry, 1946).

The known range of this species extends from eastern Tennessee southward into northeastern Alabama. In this state it is known only from the type locality, in the Upper Austral of the Cumberland Plateau. According to Pilsbry (1946), cumberlandiana appears to be confined to the non-calcareous tops of hills.

The writer has not collected this species; Pilsbry (1946) states that it is usually found in deep humus, and that it prefers damp situations.

Alabama record:

Jackson Co. Near Stevenson (BW)

Retinella circumstriata (Walker), 1928

Plate IV, figure 10 A, B

Vitrea radiatula Walker, 1928 (nec Taylor, 1908)

Vitrea radiatula circumstriata Walker, 1928

Retinella circumstriata Pilsbry, 1946

Type locality: Wetumpka, Elmore County, Alabama.

The shell is small, depressed, and widely umbilicate. The whorls are thin, translucent, yellowish, and sculptured with unevenly spaced, impressed, radial grooves and close, distinct, microscopic, spiral striae. The aperture is lun-ate, and the peristome is not reflected at its columellar insertion. One shell measures 2.2 mm. in height and 4.5 mm. in diameter.

According to Pilsbry (1946), the known range of this species is confined to Alabama, where it is evidently rather generally distributed. The only known habitat is under leaf litter in mixed hardwood-pine associations on calcareous soils. The localities recorded by Walker (1928) indicate that circumstriata is not restricted to calcareous regions in the state.

Walker (1928) recorded this species and radiatula, to which the former was then referred as a subspecies, from a number of localities in the state. According to Pilsbry (1946), the range of radiatula extends from northeastern United States through southern Canada to the northwestern

part of the United States. In view of its known range, the latter species is not considered to be present in this state, and Walker's records for radiatula are therefore included with those for circumstriata.

Alabama records:

Clarke Co.	Jackson (BW)
Choctaw Co.	Silas (BW)
Elmore Co.	Wetumpka (BW)
Franklin Co.	Burleson; Sherwood (BW)
Jackson Co.	Princeton; Woodville (BW)
Jefferson Co.	Squaw Shoals; Valley Creek (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Huntsville; Monte Sano; Gurley (BW)
Marion Co.	Hamilton (BW)
Mobile Co.	Mobile (BW)
Morgan Co.	Falkville (HCR)
Randolph Co.	Roanoke (BW)
Tuscaloosa Co.	Hagler; Duncanville; Tuscaloosa (BW)
Walker Co.	Forks of Warrior River; Jct. of Lost and Wolf Creeks (BW)

Retinella wheatleyi (Bland), 1883

Plate IV, figure 11 A, B

Zonites wheatleyi Bland, 1883

Vitrea wheatleyi Walker, 1928

Retinella wheatleyi Pilsbry, 1946

Type locality: The Cliffs, Knoxville, Tennessee.

The shell is small, depressed, and widely umbilicate. The whorls are thin, transparent, polished, and somewhat brownish in color. The sculpturing consists of fine, unevenly spaced, impressed, radial grooves. Very faint, microscopic, spiral striae are sometimes visible on the base. The aperture is lunate, and the peristome is not reflected. Three shells average 2.0 mm. in height and 4.2 mm. in diameter.

The range given by Pilsbry (1946) for wheatleyi extends from western Pennsylvania and Michigan westward to eastern Missouri and Arkansas, and southward through western North Carolina to northern Alabama. In this state, wheatleyi is found in Upper and Lower Austral regions of the Cumberland Plateau and the Appalachian Ridge and Valley system.

The habitat of this species in Alabama is under leaf litter, stones, and decaying logs, in mixed hardwood-pine associations on calcareous and noncalcareous soils.

Alabama records:

Blount Co.	5 mi. S. of Oneonta (HCR)
DeKalb Co.	Manitou Cave, Ft. Payne (HCR)
Jackson Co.	Woodville (BW)
Tuscaloosa Co.	Bethel Church (AFA)

Retinella lewisiana (Clapp), 1908

Plate IV, figure 12

Vitrea lewisiana Clapp, 1908
Vitrea lewisiana Walker, 1928
Retinella lewisiana Pilsbry, 1946

Type locality: Monte Sano, Madison County, Alabama.

The shell is small, depressed, and widely umbilicate. The whorls are thin, translucent, highly polished, and yellowish in color. The sculpturing consists of fine growth lines, which are very closely and somewhat evenly spaced. The measurements of the shell are 1.5 mm. in height and 3.5 mm. in diameter (after Clapp, in Pilsbry, 1946).

The known range of this species, according to Pilsbry (1946), extends from southern Tennessee southward to coastal Alabama. In this state, lewisiana is found in the Upper and Lower Austral of the Cumberland Plateau and the Appalachian system, and on the Piedmont Plateau in eastern Alabama. A single record from Mobile extends the range onto the Coastal Plain. In view of its distribution above the Fall Line elsewhere in the state, the Mobile record by Walker (1928) possibly represents a misplaced or mislabeled shell. Further collecting on the Alabama Coastal Plain is needed to verify the latter locality.

The writer has not collected this species; Pilsbry (1946) states that it was found under sandstone slabs near the top of Monte Sano. On the basis of the known localities however, lewisiana is not restricted to sandstone soils.

Alabama records:

Blount Co.	Blount Spgs. (BW)
Conecuh Co.	Evergreen (BW)
Elmore Co.	Wetumpka (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Monte Sano (BW;HAP); Huntsville; Gurley (BW)
Mobile Co.	Mobile (BW)
Randolph Co.	Cragford; Roanoke (BW)

Subgenus GLYPHYALINIA Von Martens

The shell is small, depressed, and minutely perforate or imperforate. The whorls are thin, highly polished, and sculptured with evenly spaced, impressed, radial grooves.

Microsculpturing of fine, close, spiral lines is frequently present. The aperture is lunate; and the columella insertion of the peristome is reflected over the umbilical perforation.

Retinella indentata paucilirata (Morelet), 1851

Plate IV, figure 13

Helix paucilirata Morelet, 1851

Vitrea indentata Walker, 1928

Retinella indentata paucilirata Pilsbry, 1946

Type locality: Salama, Guatemala.

The shell is small, depressed, and minutely perforate. The whorls are thin, highly polished, and sculptured with about thirty evenly spaced, impressed, radial grooves. Very weakly developed, microscopic, spiral lines are visible on the last whorl. The aperture is lunate; and the peristome is slightly reflected at its columellar insertion, partially covering the umbilical perforation. Twenty shells average 2.3 mm. in height and 5.0 mm. in diameter.

According to Pilsbry (1946), paucilirata differs from typical indentata by having a larger umbilicus and by being larger in size. Both forms have about thirty radial grooves on the last whorl. Measurements given by Pilsbry (1946) for indentata are: 3.0 mm. in height and 5.7 mm. in diameter; those given for paucilirata average 2.5 mm. by 6.0 mm. The significant difference in size appears to be that of height, paucilirata being more depressed than the typical species.

The writer has not seen indentata, but the diagnostic characteristics of both the typical form and the subspecies are quite finely drawn, and further investigation is needed to substantiate the status of paucilirata.

The range of indentata, according to Pilsbry (1946), extends from Maine and Ontario southward to North Carolina and Tennessee, and westward to eastern Kansas. Paucilirata ranges from Mexico and New Mexico eastward to Florida, and northward through Tennessee and Kentucky to southern Indiana. The ranges of the two snails overlap through Missouri, Illinois, Kentucky, and Tennessee. In view of the recognized distribution of indentata and paucilirata, the latter is retained by the writer, although the differences between the typical species and the subspecies are quite indistinct.

Paucilirata is generally distributed throughout Alabama. Its habitat in this state is under leaf litter, rocks, and decaying logs in mixed hardwood-pine and pine-cedar associations on calcareous and noncalcareous soils.

Alabama records:

Baldwin Co.	Magnolia Spgs.; Week's Bay; Foley; Point Clear (BW)
Bibb Co.	Pratt's Ferry (HCR)
Blount Co.	5 mi. S. of Oneonta (HCR)
Chambers Co.	Langdale (BW)
Cherokee Co.	10 mi. S. of Centre; Sandford (BW)
Chilton Co.	Clanton (BW)
Clarke Co.	Jackson; Thomasville (BW)
Conecuh Co.	Evergreen (BW)
Cullman Co.	Cullman (BW)
Dallas Co.	Selma (BW); 10 mi. W. of Selma (HCR)
DeKalb Co.	Ft. Payne (BW)
Fayette Co.	Fayette (BW); 6 mi. S. of Winfield (HCR)
Franklin Co.	3 mi. W. of Newburg (HCR)
Greene Co.	Allison; Boligee (JH)

Hale Co.	Havana (BW)
Jackson Co.	Princeton; Woodville (BW)
Jefferson Co.	Squaw Shoals; Valley Creek (BW); 5 mi. E. of Irondale on U.S. 78 (HCR)
Lauderdale Co.	Elgin (HCR)
Lowndes Co.	Tallahassee Creek, on U.S. 80 (HCR)
Madison Co.	Monte Sano (BW); 6.5 mi. N. of Newhope (HCR)
Mobile Co.	Mobile; Calvert (BW)
Marion Co.	Texas; Winfield (HCR)
Marengo Co.	4 mi. N. of Demopolis; 2 mi. W. of Southern R.R. on U.S. 80 (HCR)
Marshall Co.	3 mi. N. of Gunterville (HCR)
Monroe Co.	Drewery (BW)
Montgomery Co.	Sprague (HCR)
Morgan Co.	Massey (HCR)
Pickens Co.	Pickens-Tuscaloosa county line, on U.S. 82 (HCR)
Randolph Co.	Roanoke (BW)
Shelby Co.	Calera; Montevallo (BW)
St. Clair Co.	Ten Island Shoals (BW); Jefferson-St. Clair county line (HCR)
Sumter Co.	Epes (BW); S. bank of Tombigbee River (HCR)
Talladega Co.	Munford (BW;HCR)
Tuscaloosa Co.	New Lexington; Tuscaloosa; Talladega National Forest (HCR); Elrod; Holt (BW)
Wilcox Co.	Alberta; Gastonburg; Pine Hill (BW)

Retinella carolinensis (Cockerell), 1890

Plate IV, figure 14

Zonites carolinensis Cockerell, 1890

Vitrea carolinensis Walker, 1928

Vitrea carolinensis wetherbyi Walker, 1928

Retinella carolinensis Pilsbry, 1946

Type locality: Lower northern slopes of Roan Mountain, North Carolina.

The shell is small, depressed, and minutely perforate. The whorls are thin, highly polished, and sculptured with about forty evenly spaced, impressed, radial grooves. A microsculpture of close, distinct, spiral lines is visible on the last whorl. The aperture is lunate; and the columellar insertion of the peristome is abruptly reflected,

partially covering the umbilical perforation. A series of thirty shells averages 3.2 mm. in height and 6.8 mm. in diameter. The stronger, more pronounced microsculpture readily separates this species from indentata paucilirata.

The form referred to by Walker (1928) as the subspecies wetherbyi is indistinguishable from typical carolinensis except on the basis of size. According to Pilsbry (1946), the latter is somewhat larger, averaging about 4.2 mm. by 9.0 mm. In addition, Pilsbry states that wetherbyi is found with the typical species throughout the range of the latter, and is regarded as a variation not deserving of subspecific rank.

The range of carolinensis, according to Pilsbry (1946), extends from southwestern Virginia through the Great Smoky Mountains of North Carolina and Tennessee to Alabama, where it is generally distributed throughout the state.

The habitat of this species in Alabama is under leaf litter, rocks, and decaying logs in mixed hardwood-pine and pine-cedar associations on calcareous and noncalcareous soils.

Alabama records:

Baldwin Co.	Magnolia Spgs.; Foley; Point Clear (BW)
Barbour Co.	Elamville; Pea River (BW)
Bibb Co.	Woodstock; Blocton (BW); Pratt's Ferry (HCR)
Blount Co.	Blount Spgs.; Oneonta (BW); 5 mi. S. of Oneonta (HCR)
Calhoun Co.	Piedmont (HCR)
Cherokee Co.	Pleasant Gap; Poole's Island (BW)
Choctaw Co.	Silas (BW)
Coffee Co.	Enterprise (BW)
Clarke Co.	Thomasville; Jackson (BW)
Conecuh Co.	Herbert (BW)

Cullman Co.	Sand Mountain (BW)
DeKalb Co.	Valley Head (BW)
Dallas Co.	Pleasant Hill (BW); Marion Junction (JH)
Escambia Co.	Foshee (BW)
Elmore Co.	Wetumpka (BW)
Fayette Co.	Fayette (BW)
Franklin Co.	Burleson (BW)
Geneva Co.	High Bluff (BW)
Greene Co.	Boligee (BW); 8 mi. S. of Eutaw (JH)
Hale Co.	Newbern; 5 mi. N. of U.S. 80, on Ala. 13; Hale-Marengo county line (JH)
Jackson Co.	Paint Rock; Stevenson; Limrock; Pisgah; Sand Mountain; Princeton (BW)
Lauderdale Co.	Florence; Killen (BW)
Madison Co.	Huntsville; Gurley; Monte Sano (BW)
Marion Co.	Winfield; Hamilton (BW)
Montgomery Co.	Montgomery (BW)
Monroe Co.	Monroe; Claiborne (BW)
Mobile Co.	Mobile; Calvert (BW)
Randolph Co.	Roanoke (BW)
Perry Co.	Marion; Hamburg (BW); Uniontown (JH)
Shelby Co.	Calera (BW)
St. Clair Co.	Greensport (BW)
Sumter Co.	Epes (BW;JH); Livingston (BW)
Talladega Co.	Banks of Coosa River; Talladega-Cleburne county line (BW)
Tuscaloosa Co.	Holt; Hagler; Tuscaloosa (BW); Hurricane Creek; University (HCB)
Walker Co.	Junction of Lost and Wolf Creeks; Forks of Warrior River (BW)

Retinella cryptomphala (Clapp), 1915

Plate IV, figure 15

Vitrea cryptomphala Clapp, 1915

Vitrea cryptomphala Walker, 1928

Retinella cryptomphala solida Baker, 1930

Retinella cryptomphala Pilsbry, 1946

Retinella cryptomphala solida Pilsbry, 1946

Type locality: Knoxville, Tennessee.

The shell is small, depressed, and imperforate. The whorls are thin, highly polished, and sculptured with about thirty evenly spaced, impressed, radial grooves, and many distinct, microscopic, spiral lines. The aperture is

lunate; and the columellar insertion of the peristome is thickened and abruptly reflected, entirely covering the umbilical region. Twenty shells average 3.9 mm. in height and 6.4 mm. in diameter.

According to Pilsbry (1946), this species is known only from the type locality. The form solida, referred to as a subspecies by Baker (1930), and Pilsbry (1946), ranges from southern Kentucky southward to Florida, and westward to eastern Arkansas. Solida is distinguishable from the typical species only by being larger and by having stronger sculpture, according to the original description. In view of the fact that the type and only recorded locality of cryptomphala lies completely within the known range of solida, the latter is not regarded as a valid subspecies, and must be considered a synonym of cryptomphala.

Cryptomphala is generally distributed throughout Alabama. Its habitat in this state is under leaf litter, rocks, and decaying logs in mixed hardwood-pine and pine-cedar associations on calcareous and noncalcareous soils.

Alabama records:

Baldwin Co.	Foley (BW)
Bibb Co.	Woodstock (BW); Pratt's Ferry (HCR)
Blount Co.	Blount Spgs. (BW); 5 mi. S. of Oneonta (HCR)
Cherokee Co.	Pleasant Gap; Poole's Island (BW)
Chilton Co.	Clanton (BW)
Calhoun Co.	Piedmont (BW)
Cleburne Co.	Dugger Mountain (BW)
Clarke Co.	Thomasville; Jackson (BW); 5 mi. S. of Thomasville (HCR)
Conecuh Co.	Evergreen (BW)
DeKalb Co.	Ft. Payne (BW;HCR); Valley Head (BW)

Elmore Co.	Wetumpka; Elmore; Noble's Ferry (BW)
Fayette Co.	6 mi. S. of Winfield (HCR)
Franklin Co.	Russellville; Sherwood (BW)
Hale Co.	Havana (HCR)
Jackson Co.	Stevenson (BW); Scottsboro (HCR)
Lauderdale Co.	Florence (BW); Elgin (HCR)
Madison Co.	Gurley (BW); New Hope (HCR)
Marion Co.	Winfield (HCR)
Mobile Co.	Mobile; Irvington (BW); Spring Hill (HCR)
Pickens Co.	Picken-Tuscaloosa county line (HCR)
Shelby Co.	Calera (BW); Montevallo (HCR)
Sumter Co.	Epes (JH)
Tuscaloosa Co.	Hagler; Tuscaloosa; Indian Creek; Vance (BW); Hurricane Creek (HCR)
Walker Co.	Junction of Lost and Wolf Creeks (BW)
Wilcox Co.	Alberta; Gastonburg (BW)

Retinella praecox Baker, 1930

Plate IV, figure 16

Retinella praecox Baker, 1930

Retinella praecox Pilsbry, 1946

Type locality: Slate talus near Laurel Creek, Tellico Plains, Monroe County, Tennessee.

The shell is small, depressed, thin, translucent, and minutely perforate. The whorls are sculptured with about twenty-eight widely spaced, impressed, radial grooves, and rather widely spaced, microscopic, spiral lines are distinctly developed on the last whorl. The aperture is sub-circular. The shell is 2.8 mm. in height and 6.4 mm. in diameter (after Baker, 1930).

The range of this species, according to Pilsbry (1946), extends from southern Kentucky through eastern Tennessee, southwestern North Carolina, and northwestern Georgia, to Alabama. In this state, Pilsbry (1946) lists Wetumpka, in Elmore County, which he regards as question-

able, and five additional counties from which he omits localities. These records are all located above the Fall Line, on the Interior Low Plateau, the Cumberland Plateau, and in the Appalachian system. The Wetumpka locality is situated at the Fall Line, bordering on the Piedmont Plateau. According to Pilsbry (1946), praecox is easily confused with carolinensis, and anatomic investigation is needed to verify its status and range.

The writer has not collected this species, and data concerning its ecology and habitat in Alabama are lacking.

Alabama records:

Blount Co.	Blount Co. (HAP)
Elmore Co.	Wetumpka (HAP)
Jackson Co.	Jackson (HAP)
Lauderdale Co.	Lauderdale Co. (HAP)
Madison Co.	Madison Co. (HAP)
Shelby Co.	Shelby Co. (HAP)

Retinella sculptilis sculptilis (Bland), 1858

Plate IV, figure 17

Helix sculptilis Bland, 1858
Vitrea sculptilis Walker, 1928
Retinella sculptilis Pilsbry, 1946

Type locality: Nantahala Mountains, North Carolina.

The shell is small, depressed, thin, highly polished, and minutely perforate. The whorls are sculptured with about seventy-five evenly spaced, impressed, radial grooves. Weakly developed, microscopic, spiral lines are often visible on the last whorl. The aperture is lunate; and the columellar insertion of the peristome is abruptly reflected,

partially covering the umbilical perforation. Five shells average 5.2 mm. in height and 9.5 mm. in diameter. The large number of radial grooves is a diagnostic feature, readily separating sculptilis from other species of Retinella.

According to Pilsbry (1946), the range of this species extends from eastern Tennessee and western North Carolina through northern Georgia to Alabama, where it is generally distributed above the Fall Line.

The habitat of sculptilis in Alabama is under leaf litter, rocks, and decaying logs in mixed hardwood-pine and pine-cedar associations on calcareous and noncalcareous soils.

Alabama records:

Chambers Co.	Langdale (BW)
DeKalb Co.	Valley Head (BW); Ft. Payne (HCR)
Franklin Co.	Burleson (BW)
Jackson Co.	Long Island Cove, Higdon; S. side of Tenn. River, on Ala. 35 (HCR)
Madison Co.	Gurley (BW)
Randolph Co.	Wadley; Roanoke (BW)
Shelby Co.	Calera (BW)
Talladega Co.	Munford (HCR)
Tuscaloosa Co.	Elrod; Ralph (HCR)

Genus MESOMPHIX Rafinesque

The shell is small to large, depressed to globose, and perforate or openly umbilicate. The whorls are rarely smooth, usually being sculptured with radial striae, growth wrinkles, and spirally or radially arranged microscopic papillae or granules. The aperture is rounded to lunate,

and the peristome is thin and unreflected.

Subgenus MESOMPHIX Rafinesque

The shell is rarely smooth and polished, usually being sculptured with radial striae, growth wrinkles, and spirally arranged microscopic papillae or granules. The umbilical perforation is small, measuring one-twelfth or more of the diameter of the shell.

Mesomphix andrewsae andrewsae (Pilsbry), 1895

Plate V, figure 1 A, B

Omphalina andrewsae Pilsbry, 1895

Mesomphix andrewsae Pilsbry, 1946

Type locality: Thunderhead Mountain, Great Smoky Mountains, Tennessee.

The shell is small to medium in size, depressed, thin, transparent, highly polished, and yellowish in color. The width of the spire, measured from the upper insertion of the last whorl to the opposite suture, is about one-half the diameter of the shell. The whorls are nearly smooth and marked only by very faint growth striae. There are no microscopic series of granules or papillae. Two shells from Tuscaloosa County, Alabama, average 5.8 mm. in height and 11.2 mm. in diameter. The depressed form, narrow spire, and very highly polished shell, lacking the microsculpture of the other species of Mesomphix present in Alabama, are diagnostic characteristics of andrewsae.

According to Pilsbry (1946), the range of this species

extends from southern West Virginia southward through western North Carolina and eastern Tennessee. In Alabama, it is known only from central Tuscaloosa County, at the southern end of the Appalachian Ridge and Valley system. This locality is about 250 miles southwest of the previously known range of andrewsae and constitutes a new record for the species.

The habitat of this snail, in Alabama, is in leaf litter at the base of a sandstone face, in a mixed hardwood-pine association. A living specimen was found crawling over the rock, near the ground, and a single shell was found in the leaf litter.

Alabama record:

Tuscaloosa Co. One-half mile N.E. of Bethel Church, on Watermelon Road (HCR)

Mesomphix latior (Pilsbry), 1900

Plate V, figure 2 A, B

Omphalina laevigata latior Pilsbry, 1900
Mesomphix laevigata latior Walker, 1928
Mesomphix laevigata monticola Walker, 1928
Mesomphix latior Pilsbry, 1946
Mesomphix latior monticola Pilsbry, 1946

Type locality: Tallassee ford of the Little Tennessee River, Monroe County, Tennessee.

The shell is medium to large in size, depressed, thin, polished, and yellowish-green in color. The embryonic whorls, and those of the spire, are sculptured with coarse, uneven, low growth wrinkles and a microsculpture of spirally arranged papillae which are typically well developed,

but rather obsolete on some shells. The umbilical perforation measures more than one-twelfth of the diameter of the shell. The aperture is lunate, and the peristome is unreflected. Ten shells average 12.0 mm. in height and 21.0 mm. in diameter.

The form referred to as the subspecies monticola by Walker (1928) and Pilsbry (1946) is indistinguishable from the typical species except by being somewhat smaller and more depressed, and by having weaker microsculpture. Pilsbry (1946) states that the sculpturing of monticola is like that of latior, and that separation of the former as a subspecies is doubtful.

According to Pilsbry (1946), the ranges of both the typical species and monticola extend from eastern Tennessee and western North Carolina southward to northeastern Alabama. In addition, the type locality of monticola is adjacent to that of typical latior; and the former has been collected, according to Pilsbry (1946), at the type locality of the latter. In view of the morphological similarity between latior and monticola, their coincidental ranges, and the occurrence of monticola at the type locality of latior, the two are considered synonymous.

The range of latior in Alabama extends from the northeastern part of the state southward through the Appalachian system to Tuscaloosa and Bibb counties. Its habitat in this state is under leaf litter, rocks, and decaying logs, in mixed hardwood-pine associations, on calcareous and

noncalcareous soils.

Alabama records:

Bibb Co.	Pratt's Ferry (HCR)
Blount Co.	5 mi. N. of Oneonta on Ala. 38 (HCR)
DeKalb Co.	Fort Payne (BW)
Jackson Co.	Long Island Cove, near Higdon (HCR)
Madison Co.	Monte Sano State Park (HCR); Sharp's Cove, Molder (AFA)
Talladega Co.	2.5 mi. S.E. of Munford (HCR)
Tuscaloosa Co.	2.5 mi. N.E. of Windham Spgs. on Ala. 69; 1.5 mi. N.E. of Bethel Church on Watermelon Road (HCR)

Mesomphix vulgatus Baker, 1933

Plate V, figure 3 A, B

Helix laevigata Ferussac, 1821 (nom. nud.)

Mesomphix laevigata Walker, 1928

Mesomphix perlaevis vulgatus Baker, 1933

Mesomphix vulgatus Pilsbry, 1946

Type locality: Kentucky.

The shell is medium to large in size, depressed-globose, and olive-green to yellowish-green in color. The upper surface is sculptured with fine, close, evenly spaced, radial striae, and has a microsculpture of spirally arranged papillae. The base is rather smooth, having only weakly developed growth wrinkles and subobsolete spiral series of papillae. The umbilical perforation is more than one-twelfth of the diameter of the shell. The aperture is rounded to lunate, and the peristome is unreflected. A series of sixty shells averages 15.2 mm. in height and 23.5 mm. in diameter.

The range of this species, according to Pilsbry (1946), extends from western Pennsylvania southward to northern

Florida, and westward to southern Illinois, eastern Arkansas, and western Louisiana. Vulgatus is generally and abundantly distributed throughout Alabama and is one of the most common members of the genus in the state. Its habitat is under leaf litter, rocks, and decaying logs, in mixed hardwood-pine and pine-cedar associations, on calcareous and noncalcareous soils. During rainy weather, vulgatus is frequently found crawling over the surface of leaf litter and rocks; in dry, hot weather, it is usually found half-buried in the subsurface litter and soil.

Alabama records:

Baldwin Co.	Magnolia Spgs. (BW)
Barbour Co.	Elamville (BW)
Bibb Co.	Eoline; Woodstock (BW); Pratt's Ferry (BW;HCR)
Blount Co.	Blount Spgs. (BW); 5 mi. N. of Oneonta, on Ala. 38 (HCR)
Calhoun Co.	Anniston; Ten Island Shoals (BW); Piedmont (HCR)
Chambers Co.	Langdale (BW)
Cherokee Co.	Pleasant Gap; Poole's Island; Slackland; Maple Grove; Sandford Ridge (BW)
Chilton Co.	Butting Ram Shoals (BW)
Choctaw Co.	Silas (BW)
Clarke Co.	Bashi Creek, near Thomasville; Jackson; Thomasville (BW)
Clay Co.	Pyriton (BW)
Cleburne Co.	Near Piedmont (BW)
Conecuh Co.	Evergreen (BW)
Cullman Co.	Sand Mountain; Wilhites (BW)
Dale Co.	Pinckhard (BW)
Dallas Co.	Selma; Pleasant Hill (BW)
DeKalb Co.	Valley Head; Little River Gorge; Lookout Mt. (BW); Manitou Cave, Ft. Payne (HCR)
Elmore Co.	Wetumpka (BW)
Etowah Co.	Black Creek Falls; Gallant; Keener; Gadsden (BW); Coosa River, on U.S. 241; Stephens Gap, on U.S. 11 (HCR)
Fayette Co.	Forks of Sipsey River; Fayette (BW)
Franklin Co.	Burleson; Russellville (BW); Newburg (HCR)
Geneva Co.	High Bluff; Choctahatchee River (BW)
Greene Co.	Boligee (BW)

Hale Co.	Payne Lake; 5 mi. S. of Greensboro (HCR)
Jackson Co.	Stevenson; Woodville; Princeton; Paint Rock; Pisgah; Sand Mt. (BW)
Jefferson Co.	5 mi. E. of Irondale on U.S. 78 (HCR); Red Mt.; Valley Creek; Adger; Squaw Shoals (BW)
Lauderdale Co.	Florence (BW)
Lee Co.	Auburn (BW)
Lawrence Co.	King Cove (HCR)
Macon Co.	Tuskegee (BW)
Madison Co.	Gurley; Monte Sano; Huntsville (BW); Cave Springs, near New Hope (HCR)
Marengo Co.	2 mi. W. of Southern R.R., on U.S. 80 (HCR)
Marion Co.	Texas; Brilliant; Tusker's Gulf (HCR)
Mobile Co.	Mobile; Alabama Port; Mt. Vernon (BW); Spring Hill (HCR)
Morgan Co.	Massey (HCR)
Monroe Co.	Drewery; Suggsville; Claiborne (BW)
Montgomery Co.	McGee's Station (BW); Jct. of U.S. 231 and Ala. 6 (HCR)
Perry Co.	Hamburg; Marion (BW)
Pickens Co.	Pickens-Tuscaloosa county lines (HCR)
Pike Co.	S.E. corner of county (BW)
Randolph Co.	Roanoke; Wadley (BW)
Shelby Co.	Yellowleaf Creek; Gurnee (BW); Montevallo (HCR)
St. Clair Co.	Mt. Chandler; Whitney; Greensport; Ten Island Shoals (BW)
Sumter Co.	Epes; Livingston (BW;JH)
Talladega Co.	Munford, on road to Cheaha (HCR); Three Island Shoals (BW)
Tuscaloosa Co.	Duncanville; Tuscaloosa (BW;HCR); Hagler; Holt; Indian Creek; Wawah (BW); Vance; Peterson; Elrod; Coker; Hurricane Creek (HCR)
Walker Co.	Jct. of Lost and Wolf Creeks; Forks of Warrior River (BW); Corona; Oakmon (HCR)
Wilcox Co.	Camden; Pine Hill; Alberta (BW)
Winston Co.	Natural Bridge, near Addison (HCR)

Subgenus OMPHALINA Rafinesque

The shell is sculptured with radial striae or growth wrinkles, and has a microsculpture of spirally and radially arranged granules or papillae. The umbilical opening is larger than in the subgenus Mesomphix, measuring less than one-twelfth of the diameter of the shell.

Mesomphix friabilis (Binney), 1857

Helix friabilis Binney, 1857

Omphalina friabilis Walker, 1928

Mesomphix friabilis Pilsbry, 1946

Type locality: Banks of the Wabash River, Indiana.

The shell is rather large, globose, transparent, polished, and reddish in color. The whorls are somewhat glossy, sculptured with indistinct growth wrinkles, and only occasionally with very faint, microscopic, spiral lines. The umbilical opening is about one-twelfth of the diameter of the shell (after Binney, in Pilsbry, 1946). According to Pilsbry (1946), six shells average 18.6 mm. in height and 24.6 mm. in diameter.

The range of this species, according to Pilsbry (1946), extends from central Indiana and eastern Oklahoma southward to central Texas and west-central Alabama. In this state, friabilis has been recorded by Walker (1928) from Perry County, on the Gulf Coastal Plain. It has not been subsequently found in the state by any collector. With the exception of the single Alabama record, and one Mississippi record, the distribution of this species is above the Fall Line in the Central Lowland Province, the Ozark Plateau, and the Interior Low Plateau. In view of its distribution above the Fall Line elsewhere, the single Coastal Plain record of friabilis in Alabama is considered doubtful and probably erroneous, and will not be included in this paper.

Mesomphix cupreus kopnodes (Binney), 1857

Plate V, figure 4 A, B

Helix kopnodes Binney, 1857

Omphalina kopnodes Walker, 1928

Omphalina cupreus Walker, 1928 (nec Rafinesque, 1831)

Mesomphix capnodes Pilsbry, 1946

Type locality: Uniontown, Perry County, Alabama.

The shell is large, depressed-globose, thin, and is olive-green in color. The whorls are sculptured on the upper surface with very low, irregularly spaced, coarse, growth wrinkles, and have a microsculpture of closely crowded papillae which are arranged in radial and spiral series. The base of the shell is smooth and polished. The umbilicus measures about one-ninth of the diameter of the shell. The coarsely wrinkled shell and the distinctive microsculpture are diagnostic features of this subspecies. Ten shells average 18.5 mm. in height and 26.5 mm. in diameter.

Kopnodes differs from the typical species only in being somewhat more elevated, and by usually having a smaller umbilicus. In addition, the microsculpture is usually more regular and more distinct than that of the typical species.

Typical cupreus, according to Pilsbry (1946), ranges from Vermont and Massachusetts southwestward to western Arkansas and Missouri, and southward to northern Tennessee and northwestern North Carolina. Walker (1928) records this species from localities throughout Alabama; Pilsbry

(1946) states that all Alabama specimens have the microsculpture of kopnodes, and that Walker's records are questionable. The range of kopnodes, according to Pilsbry (1946), extends from northcentral Tennessee southward through the Appalachian system to the Coastal Plain of Alabama. On the basis of the known localities for cupreus and kopnodes, their ranges overlap through northern Tennessee.

According to Pilsbry (1946), specimens of kopnodes from Natural Bridge, Virginia, are smaller than typical kopnodes and have a large umbilicus, both of which features are characteristic of cupreus; however, these specimens also have the close, distinct microsculpture of kopnodes rather than the somewhat irregular and indistinct microsculpture of cupreus. In view of the similarity in morphology between cupreus and kopnodes, and because of the lack of constant specific characters, the latter is not considered deserving of specific rank and is therefore relegated to subspecific level.

In Alabama, kopnodes is known from several localities in the Upper and Lower Austral zones of the northeastern part of the state and from a few scattered localities along the fall line and on the Coastal Plain. Its habitat in Alabama is under thick leaf litter, usually in ravines and gullies, in mixed hardwood-pine associations, on calcareous and noncalcareous soils.

Alabama records:

Blount Co.	5 mi. S. of Oneonta, on Ala. 38; 4 mi. N. of Oneonta on Ala. 32 (HCR)
Cherokee Co.	10 mi. S.E. of Centre (BW)
Clarke Co.	Jackson; Suggsville (BW)
Cleburne Co.	Mt. Cheaha (AFA)
Dallas Co.	Dallas Co. (BW)
DeKalb Co.	Mentone (AFA;HCR)
Elmore Co.	Wetumpka (BW)
Etowah Co.	10 mi. E. of Gadsden on Ala. 74 (HCR)
Franklin Co.	5 mi. N. of Russellville (HCR)
Jackson Co.	Stevenson; Paint Rock; Woodville; Princeton; Pisgah (BW); 3 mi. N. of Scottsboro (AFA)
Madison Co.	Huntsville; Gurley; Monte Sano (BW)
Perry Co.	Uniontown (BW)
Shelby Co.	Montevallo (BW)
Tuscaloosa Co.	Holt (BW)

Mesomphix pilsbryi (Clapp), 1904

Plate V, figure 5 A, B

Omphalina pilsbryi Clapp, 1904
Omphalina pilsbryi Walker, 1928
Mesomphix pilsbryi Pilsbry, 1946

Type locality: Wetumpka, Elmore County, Alabama.

The shell is rather large, depressed-globose, thin, and is a lustrous reddish-brown in color. The whorls are sculptured with fine, close, and distinct radial striae. The microsculpture consists of very distinct, radially and spirally arranged granules. The umbilicus measures about one-eighth of the diameter of the shell. Twelve shells average 13.5 mm. in height and 23.0 mm. in diameter. The color of the shell and the nature of the sculpturing are diagnostic characteristics of pilsbryi, readily separating it from the other members of the subgenus Omphalina.

According to Pilsbry (1946), the range of this species

extends from southwestern South Carolina westward to Alabama, where it is generally distributed throughout the state.

The habitat of pilsbryi in Alabama is under thick leaf litter and decaying logs in mixed hardwood associations, on calcareous and noncalcareous soils.

Alabama records:

Barbour Co.	Pea River (BW)
Bibb Co.	Pratt's Ferry; 16 mi. N.E. of Centreville (HCR)
Blount Co.	Blount Spgs. (BW)
Chambers Co.	Langdale (BW)
Choctaw Co.	Silas (BW)
Grenshaw Co.	Searight (BW)
Cherokee Co.	Centre; Craig Mt. (BW)
Conecuh Co.	Evergreen (BW)
DeKalb Co.	Valley Head (BW)
Dale Co.	Pinckhard (BW)
Elmore Co.	Wetumpka (BW)
Franklin Co.	Russellville (BW); 5 mi. N. of Russellville on U.S. 42 (HCR)
Jefferson Co.	Warrior; Squaw Shoals (BW)
Macon Co.	Tuskegee (BW)
Madison Co.	Monte Sano; Normal; Smithers Mt. (BW); 6.5 mi. N. of New Hope (HCR)
Shelby Co.	Montevallo (BW;HCR); Calera (BW)
Tuscaloosa Co.	Vance; Samantha (HCR)
Walker Co.	Forks of Warrior (BW)

Genus PARAVITREA Pilsbry

The shell is small, depressed, thin, minutely or openly umbilicate, and highly polished. The last whorl often has from one to three evenly spaced radial rows of teeth situated within on the basal wall. These denticles are usually present only in young shells, rarely persisting in adult specimens. The aperture is rounded to lunate, and the peristome is unreflected.

Paravitrea multidentata (Binney), 1840

Plate V, figure 6 A, B

Helix multidentata Binney, 1840
Vitrea multidentata Walker, 1928
Paravitrea multidentata Pilsbry, 1946

Type locality: Eastern slope of the Green Mountains,
 Vermont.

The shell is small, depressed, thin, umbilicate, and highly polished. The whorls are sculptured with very faintly impressed radial grooves which become obsolete on the base. The last whorl has two or more evenly spaced radial rows of minute teeth situated within, on the basal wall, and visible through the shell. The aperture is lunate, and the peristome is unreflected. The height is about 1.5 mm. and the diameter is about 3.0 mm. (After Binney, in Pilsbry, 1946)

According to Pilsbry (1946), the range of multidentata extends from Maine and Ontario southward to Alabama and Arkansas. Its distribution in Alabama, on the basis of known records, is confined to the Upper and Lower Austral zones of the northern part of the state. The writer has not collected this species, and data concerning its ecology are lacking.

Alabama records:

Jackson Co.	Stevenson (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Monte Sano; Huntsville (BW)

Paravitrea capsella (Gould), 1851

Plate V, figures 7 A, B, and 8 A, B

Helix capsella Gould, 1851

Vitrea capsella Walker, 1928

Vitrea capsella lacteodens Walker, 1928

Paravitrea capsella Pilsbry, 1946

Paravitrea capsella lacteodens Pilsbry, 1946

Type locality: Tennessee.

The shell is small and depressed, umbilicate, thin, transparent, and highly polished. The whorls are sculptured with rather widely spaced, impressed, radial grooves which become indistinct on the base. The last whorl is toothless in adult shells, and may possess from one to three pairs of tuberculate teeth in immature stages. The aperture is rounded, and the peristome is unreflected. The shell averages 2.5 mm. in height and 5.5 mm. in diameter (after Pilsbry, 1946).

Typical adult capsella, according to Pilsbry (1946), are toothless, although younger shells may have one or two pairs of tuberculate teeth within the last whorl. The form lacteodens, referred to as a subspecies by Walker (1928), and Pilsbry (1946), differs from typical capsella only in having from one to three pairs of teeth "...in most apparently adult shells of any given lot..." (Pilsbry, 1946). The suggestion is thus made that lacteodens may represent immature capsella. This suggestion is somewhat substantially borne out by a study of the ranges of the typical species and lacteodens.

Typical capsella, according to Pilsbry (1946), ranges

from Illinois and Indiana southward to western North Carolina, eastern Tennessee, and northern Alabama. Lacteodens, according to Pilsbry (1946), is known only from western North Carolina, central Alabama, and northern Florida. Walker (1928) recorded the typical species from a number of localities in Alabama other than those cited by Pilsbry (1946); he also recorded lacteodens from five of the fourteen localities which he cited for capsella. Pilsbry (1946) either overlooked Walker's records or did not regard them as being correct, and since the deletion was not explained, the writer will include Walker's records in this paper. On the basis of records by Walker (1928) and Pilsbry (1946), the ranges of capsella and lacteodens overlap for a distance of about 400 miles. This fact alone very strongly suggests the invalidity of lacteodens as a subspecies. In addition, lacteodens is separable from typical capsella only by possessing teeth. Since immature stages of the typical species may resemble lacteodens in this respect, it seems proper to relegate the latter to synonymy.

On the basis of Walker's records (1928) for capsella, this species is generally distributed in the state, having been recorded from the Upper and Lower Austral and from the Saballian life zones. The writer has not collected capsella, and its ecology is unknown; however, the records indicate that it is found on calcareous as well as noncal-

careous soils, probably in mixed hardwood-pine associations.

Alabama records:

Cherokee Co.	Pleasant Gap (BW)
Choctaw Co.	Silas (BW)
Clarke Co.	Jackson (BW)
Dallas Co.	Pleasant Hill (BW)
Elmore Co.	Wetumpka (BW;HAP)
Etowah Co.	Keener (BW)
Jackson Co.	Woodville; Stevenson; Paint Rock; Princeton (BW;HAP)
Jefferson Co.	Warrior (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Gurley; Monte Sano; Huntsville (BW;HAP)
Mobile Co.	Mobile (BW)
Randolph Co.	Wadley; Roanoke (BW)
Tuscaloosa Co.	Holt (BW;HAP)
Walker Co.	Forks of Warrior River (BW)
Wilcox Co.	Gastonburg (BW)

Paravitrea conecuhensis (Clapp), 1917

Plate V, figure 9 A, B

Vitrea conecuhensis Clapp, 1917
Vitrea conecuhensis Walker, 1928
Paravitrea conecuhensis Pilsbry, 1946

Type locality: Evergreen, Conecuh County, Alabama.

The shell is small, depressed, thin, umbilicate, and highly polished. The whorls are sculptured with unevenly spaced, impressed, radial grooves which become indistinct on the periphery. The last whorl is depressed and somewhat flattened on the upper surface; and the aperture is sub-triangulate. The peristome is slightly reflected at the columellar insertion. Two shells average 2.5 mm. in height and 4.8 mm. in diameter. The depressed last whorl and sub-triangulate aperture are diagnostic features.

Conecuhensis is known only from the Coastal Plain of Alabama. Walker (1928) and Pilsbry (1946) have recorded it from the type locality, and the writer has recorded it from two additional localities. Further collecting is needed in order to determine its distribution.

The known habitat of conecuhensis is under the bark of a decaying oak log in a mixed hardwood-pine association, on calcareous soil.

Alabama records:

Conecuh Co.	Evergreen (BW)
Monroe Co.	Randon's Creek, 4.5 mi. W. of Frisco City (AFA)
Montgomery Co.	Sprague (HCR)

Paravitrea calcicola Baker, 1931

Plate VI, figure 1

Paravitrea calcicola Baker, 1931
Paravitrea calcicola Pilsbry, 1946

Type locality: West-facing hillside south of big spring forming eastern source of Battle Creek, at Dove, Marion County, Tennessee.

The shell is small, depressed, and openly umbilicate. The whorls are sculptured with unevenly spaced, impressed, radial grooves which continue over the base and into the umbilicus. The last whorl in young shells, and occasionally in adults, bears from one to four pairs of evenly spaced tuberculate teeth within, on the basal wall. The umbilicus measures about one-fifth of the diameter of the shell. The aperture is rounded, and the peristome is not reflected. The type measures 3.7 mm. in height and 6.2 mm.

in diameter (after Baker, in Pilsbry, 1946).

This species differs from capsella by being greater in height, having a much larger umbilicus, and being distinctly sculptured on the base. It differs from pilsbryana by being higher and by usually lacking teeth in adult stages.

Calcicola is known only from the type locality, in Tennessee, and from five counties above the Fall Line in Alabama; specific localities in the latter state were not given by Pilsbry (1946). The distribution indicated by the records, however, suggests that this species is probably restricted to the Appalachian system and the southern Piedmont region in Alabama. The writer has not collected this species, and data concerning its habitat in the state are lacking.

Alabama records:

Jackson Co.	Jackson Co. (HAP)
Madison Co.	Madison Co. (HAP)
Randolph Co.	Randolph Co. (HAP)
Jefferson Co.	Jefferson Co. (HAP)
Elmore Co.	Elmore Co. (HAP)

Paravitrea pilsbryana (Clapp), 1919

Plate VI, figure 2

Vitrea pilsbryana Clapp, 1919
Vitrea pilsbryana Walker, 1928
Paravitrea pilsbryana Pilsbry, 1946

Type locality: Cumberland Plateau, 3 miles north of Anderson, Franklin County, Tennessee.

The shell is small, depressed, and openly umbilicate. The whorls are sculptured with unevenly spaced, impressed,

radial grooves which continue over the base and into the umbilicus. The last whorl bears three or four evenly spaced pairs of tuberculate teeth within on the basal wall; these denticles are visible through the shell at all stages of growth. The umbilicus measures about one-third of the diameter of the shell. The aperture is rounded, and the peristome is not reflected. The type measures 2.0 mm. in height and 5.0 mm. in diameter (after Clapp, in Pilsbry, 1946). The more depressed form and the presence of teeth in all stages of growth distinguishes this species from calpicola.

According to Pilsbry (1946), pilsbryana is known only from two localities in Tennessee and one in northeastern Alabama. The latter locality is in the Upper Austral zone in northern Jackson County, near the Tennessee line. The writer has not collected this species, and ecological data are lacking.

Alabama records:

Jackson Co. 3 mi. S. of Anderson, Tennessee (BW)

Paravitrea smithi (Walker), 1928

Plate VI, figure 3

Vitrea smithi Walker, 1928

Paravitrea smithi Pilsbry, 1946

Type locality: Sand Mountain, near Pisgah, Jackson County, Alabama.

The shell is small, depressed, thin, and umbilicate. The whorls are whitish in color, and are sculptured with

unevenly spaced, radial grooves which become indistinct on the base. The last whorl is rounded, and the aperture is lunate. The type measures 2.25 mm. in height and 4.5 mm. in diameter. This species resembles conecuhensis, differing in the more depressed form, the narrower umbilicus, and the rounded, rather than depressed, last whorl. (After Walker, 1928)

This species has been recorded only from the type locality. The writer has not collected it, and data concerning its habitat are lacking.

Alabama record:

Jackson Co. Sand Mountain, near Pisgah (BW)

Genus HAWAIIA Gude

The shell is very small, depressed, thin, and openly umbilicate. The whorls are sculptured with unevenly spaced radial striae which become indistinct on the base. The umbilicus measures about one-half of the diameter of the shell. The aperture is rounded, and the peristome is unreflected. This genus is represented in Alabama by a single species.

Hawailia minuscula (Binney), 1840

Plate VI, figure 4

Helix minuscula Binney, 1840
Zonitoides minusculus Walker, 1928
Hawailia minuscula Pilsbry, 1946

Type locality: Ohio.

The shell is very small, depressed, thin, and widely umbilicate. The embryonic whorls are rather smooth, and the later whorls are distinctly sculptured with unevenly spaced radial striae which become indistinct on the base. The umbilicus measures about one-half of the diameter of the shell. The aperture is rounded, and the peristome is unreflected. A series of twenty shells averages 1.5 mm. in height and 2.5 mm. in diameter.

According to Pilsbry (1946), minuscula ranges from Maine southward to Florida and westward to Montana, Colorado, and Arizona. On the basis of the known records for this species, it is evidently distributed throughout Alabama.

The habitat of minuscula in this state is under leaf litter, rocks, and decaying logs, in mixed hardwood-pine and pine-cedar associations, on calcareous and noncalcareous soils. In addition, it is often found under stones and boards and in weeds and grasses in domestic situations.

Alabama records:

Baldwin Co.	Point Clear; Week's Bay (BW)
Barbour Co.	Elamville (BW)
Blount Co.	Blount Spgs. (BW); 5 mi. S. of Oneonta (HCR)
Chambers Co.	Langdale (BW)
Coffee Co.	Enterprise (BW)
Colbert Co.	Tuscumbia (BW)
Conecuh Co.	Evergreen (BW)
Dallas Co.	10 mi. W. of Selma (HCR); 5 mi. E. of Uniontown (JH)
DeKalb Co.	Valley Head; Fort Payne (BW)
Elmore Co.	Wetumpka (BW)
Franklin Co.	Russellville; Burleson (BW)
Greene Co.	Boligee (BW;JH); Allison; 8 mi. S. of Eutaw (JH)

Hale Co.	Newbern; Hale-Marengo county line, on U.S. 80; 5 mi. N. of U.S. 80 on Ala. 13 (JH)
Jackson Co.	Princeton; Stevenson; Pisgah (BW)
Lauderdale Co.	Florence (BW); Elgin (HCR)
Lowndes Co.	3 mi. W. of Ala. 11, on U.S. 80 (HCR)
Madison Co.	Huntsville; Monte Sano (BW)
Marengo Co.	Demopolis (BW;JH)
Mobile Co.	Mobile; Oak Grove; Coden; Magazine Point (BW)
Montgomery Co.	Barachias; McGee's Station (BW)
Morgan Co.	Massey (HCR)
Perry Co.	Hamburg (BW); Uniontown (BW;JH)
Randolph Co.	Wadley; Roanoke (BW)
Sumter Co.	Livingston (BW); Epes (BW;JH)
Tuscaloosa Co.	Tuscaloosa; Hagler (BW); University (HCR)
Walker Co.	Forks of Warrior River (BW)
Wilcox Co.	Alberta (BW)

Subfamily GASTRODONTINAE Tryon

The shell varies from very small to large, depressed to depressed-globose, and perforate to openly umbilicate. The embryonic whorls are smooth or sculptured with microscopic granules; the later whorls are sculptured with growth wrinkles or distinct rib-striae, and often have faintly to distinctly developed microscopic spiral lines. The last whorl frequently bears tuberculate denticles, lamelliform teeth, or a thickened callus, within on the basal wall. The aperture is rounded or lunate, and the peristome is unreflected. This subfamily is represented in Alabama by five genera.

Genus GASTRODONTA Albers

The shell is small, depressed-globose, minutely perforate, and reddish-brown. The embryonic whorls are microscopically granulate; and the later whorls are sculptured

with very distinct, evenly spaced rib-striae which become indistinct at the periphery. The base of the shell is smooth, polished, and impressed around the minute umbilical perforation. Mature shells have a single pair of tuberculate teeth, situated within the last whorl on the basal wall and visible through the narrow aperture. Immature specimens possess two or three pairs of teeth, equidistantly spaced on the basal wall within the last whorl and visible through the base. The aperture is lunate, and the peristome is unreflected. This genus is represented in Alabama by a single species.

Gastrodonta interna (Say), 1822

Plate VI, figure 5 A, B

Helix interna Say, 1822

Gastrodonta interna Walker, 1928

Gastrodonta interna Pilsbry, 1946

Type locality: Cincinnati, Ohio, by designation of Pilsbry (1946).

The shell is small, depressed-globose, minutely perforate, and reddish-brown. The embryonic whorls are microscopically granulate; and the later whorls are sculptured with distinct, evenly spaced rib-striae which become indistinct at the periphery. The last whorl of mature shells bears a pair of tuberculate teeth within on the basal wall; young shells have two or three pairs, equidistantly spaced, and visible through the base. The base of the shell is smooth, polished, and distinctly impressed around the

minute umbilical perforation. A series of sixty shells averages 4.2 mm. in height and 7.0 mm. in diameter.

The range given by Pilsbry (1946) for this species extends from southern Ohio and Indiana southward on the Interior Plains and the Appalachian Highlands to northern Georgia and Alabama. In the latter state, interna is generally and rather abundantly distributed above the fall line, and has been recorded from several localities on the Coastal Plain.

The habitat of interna in this state is under leaf litter, rocks, and decaying logs, in mixed hardwood-pine associations, on calcareous and noncalcareous soils.

Alabama records:

Bibb Co.	Eoline; Woodstock; Blocton (BW); Pratt's Ferry (BW;HCR)
Blount Co.	Blount Spgs (BW); 2.4 mi. N. of Cleveland, on U.S. 31; 5 mi. S. of Oneonta, on Ala. 32 (HCR)
Calhoun Co.	Anniston; Piedmont (BW)
Chambers Co.	Langdale (BW)
Cherokee Co.	Pleasant Gap; 10 mi. S.E. of Centre (BW)
Choctaw Co.	Silas (BW)
Clay Co.	Pyriton (BW)
Cullman Co.	Cullman; Sand Mountain (BW)
Colbert Co.	Tuscumbia (HCR)
Cleburne Co.	Mt. Cheaha (BW)
DeKalb Co.	Ft. Payne; Valley Head; Sand Mt. (BW); Mentone (AFA); Manitou Cave, Ft. Payne (HCR)
Etowah Co.	Black Creek Falls; Keener (BW)
Fayette Co.	Forks of Sipsey River; Fayette (BW); 6 mi. S. of Winfield, on U.S. 43 (HCR)
Franklin Co.	Russellville; Burleson (BW); 5 mi. N. of Russellville; The Dismals (HCR)
Hale Co.	Havana; Harrison Church (HCR;AFA)
Jackson Co.	Pisgah; Stevenson; Limrock; Princeton; Paint Rock; Woodville (BW); Scottsboro; S. side of Tennessee River, on Ala. 35 (HCR)
Jefferson Co.	Cahaba River; Cohort; Adger; Henry Ellen; Squaw Shoals (BW); 5 mi. E. of Irondale, on U.S. 78 (HCR)

Lauderdale Co.	Florence (BW); Elgin (HCR)
Lee Co.	Auburn (BW)
Madison Co.	Huntsville; Gurley; Monte Sano (BW)
Marengo Co.	Demopolis (BW)
Marion Co.	Hamilton; Bear Creek (BW); Winfield (BW;HCR); Texas (HCR)
Mobile Co.	Mobile (BW)
Perry Co.	Marion (BW)
Randolph Co.	Roanoke; Wadley (BW)
Shelby Co.	Calera; Montevallo; Gurnee (BW)
Talladega Co.	Munford (HCR)
Tallapoosa Co.	Yates (BW)
Tuscaloosa Co.	Hagler; Tuscaloosa; Holt (BW); Duncanville (BW;HCR); Hurricane Creek; Talladega National Forest; Peterson; Ralph; Lock 13; Windham Springs; Vance (HCR)
Walker Co.	2 mi. S.W. of Corona; 8 mi. S. of Oakmon (HCR)
Winston Co.	Natural Bridge, near Addison (HCR)

Genus CLAPPIELLA Baker

The shell is minute, depressed, greenish-white, translucent, and widely umbilicate. The whorls are highly polished and sculptured with very faint growth lines. The last whorl bears a few unevenly spaced impressed radial lines on the upper surface, and within the last half on the basal wall are about four evenly spaced tuberculate teeth which are visible through the shell. The umbilicus measures about one-third of the diameter of the shell. The aperture is rounded, and the peristome is unreflected. (After Pilsbry, 1946)

This genus is represented in Alabama by a single species.

Clappiella aldrichiana (Clapp), 1907

Plate VI, figure 6

Vitrea aldrichiana Clapp, 1907
Vitrea aldrichiana Walker, 1928
Clappiella aldrichiana Pilsbry, 1946

Type locality: Cumberland Plateau, 2 miles south of Anderson, Tennessee, in Jackson County, Alabama.

The shell is minute, depressed, translucent, and widely umbilicate. The greenish-white whorls are highly polished and sculptured with very faint growth lines; the last whorl bears a few unevenly spaced impressed radial lines. Within the last half of the last whorl are four evenly spaced tuberculate teeth, visible through the base of the shell. The umbilicus measures about one-third of the diameter of the shell. The aperture is rounded, and the peristome is unreflected. The type measures 1.0 mm. in height and 2.0 mm. in diameter. (After Clapp, in Pilsbry, 1946)

This species superficially resembles Helicodiscus parallelus (Say), differing from the latter in having a highly polished shell, impressed radial lines, and four teeth within the last whorl; parallelus is sculptured with microscopic spiral lines, giving the shell a satiny luster, and there are several pairs of teeth within the last whorl.

According to Pilsbry (1946), the known range of aldrichiana is confined to valleys and coves in the Cumberland Plateau of southern Tennessee and northern Alabama. With the exception of a single record from Lauderdale County, its distribution in the latter state is in the Upper Austral zone. Further collecting in the northern

part of Alabama is needed to determine the full extent of the range of aldrichiana in this state. The writer has not collected this species, and its ecology is unknown.

Alabama records:

Jackson Co. 2 mi. S. of Anderson, Tennessee; Cove in Valley of Little Crow Creek; Bennett's Cove, near state line (BW)
 Lauderdale Co. Tennessee River flood plain (HAP)

Genus VENTRIDENS Binney

The shell varies from small to large, depressed to depressed-globose, and perforate to openly umbilicate. The whorls are sculptured with faintly to distinctly developed growth wrinkles and microscopic spiral lines. The last whorl bears lamelliform teeth or a thickened callus within on the basal wall. The aperture is rounded or lunate, and the peristome is often reflected at its columellar insertion. This genus is represented in Alabama by eleven species.

Ventridens suppressus magnidens Pilsbry, 1946

Plate VI, figure 7 A, B

Gastrodonta suppressa Walker, 1928

Ventridens suppressus magnidens Pilsbry, 1946

Type locality: Cherokee National Forest, Polk County, Tennessee.

The shell is small, depressed, highly polished, and minutely perforate. The whorls are sculptured with weakly developed growth wrinkles and faint microscopic spiral

lines. The last whorl bears a short, well developed columellar lamella and a long, curved, outer basal lamella. The aperture is lunate, and the peristome is very slightly reflected at its columellar insertion. A series of forty shells averages 4.2 mm. in height and 7.1 mm. in diameter. This subspecies is frequently confused with Ventridens gularis (Say); both have lamellae within the last whorl, but those of gularis are more widely spaced, and the shell is consistently larger.

According to Pilsbry (1946), the range of typical suppressus extends from New York and Michigan southward to Kentucky and Virginia and is replaced in the southern Appalachians by magnidens. This subspecies ranges from northeastern Tennessee and northwestern North Carolina southwestward on the Cumberland Plateau and in the Appalachian system to the northern half of Alabama, where it is generally and rather abundantly distributed above the fall line.

The habitat of magnidens in this state is under leaf litter, rocks, and decaying logs, in mixed hardwood-pine associations, on calcareous and noncalcareous soils.

Alabama records:

Bibb Co.	Woodstock (BW)
Blount Co.	5 mi. S. of Oneonta (HCR)
Calhoun Co.	Anniston (BW)
Cleburne Co.	Mt. Cheaha (BW)
DeKalb Co.	Valley Head (BW)
Elmore Co.	Wetumpka (BW)
Fayette Co.	Fayette; Forks of Sipsey River (BW); 2 mi. W. of Berry (HCR)
Jackson Co.	Woodville (BW)

Jefferson Co.	Upper Cahaba River (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Gurley; Normal; Monte Sano (BW)
Marion Co.	1 mi. E. of Texas (HCR)
Shelby Co.	Montevallo (BW;HCR)
Talladega Co.	Banks of Coosa River (BW); Munford (HCR)
Tuscaloosa Co.	Hurricane Creek; University; Windham Spgs.; Samantha; New Lexington; Holt (HCR)

Ventridens gularis gularis (Say), 1822

Plate VI, figure 8 A, B, C

Helix gularis Say, 1822

Gastrodonta gularis Walker, 1928

Ventridens gularis Pilsbry, 1946

Type locality: Allegheny County, Pennsylvania.

The shell is small, sub-globose, dome-shaped, polished, and minutely perforate. The whorls are sculptured with prominent, low, and somewhat regularly spaced growth wrinkles which become indistinct on the periphery. The last whorl bears a short columellar lamella, often not visible through the aperture, and a rather short, low, outer-basal lamella. A series of twenty shells averages 5.2 mm. in height and 8.0 mm. in diameter. The dome-shaped form and the lower and more widely spaced lamellae distinguish this species from suppressus magnidens.

According to Pilsbry (1946), the range of gularis extends from western Pennsylvania and southern Indiana southward to Georgia and Alabama. On the basis of known records, the species is distributed throughout the latter state.

The habitat of gularis in Alabama is under leaf litter, rocks, and decaying logs, in mixed hardwood-pine associa-

tions, on calcareous and noncalcareous soils.

Alabama records:

Baldwin Co.	Baldwin Co. (BW)
Bibb Co.	Woodstock (BW); Pratt's Ferry; 16 mi. N.E. of Centreville (HCR)
Blount Co.	Blount Springs (BW)
Cherokee Co.	Pleasant Gap (BW)
Choctaw Co.	Silas (BW)
Conecuh Co.	Evergreen (BW)
Clarke Co.	4.5 mi. S. of Thomasville (HCR)
Dallas Co.	Pleasant Hill (BW)
DeKalb Co.	Lookout Mountain; Valley Head (BW)
Fayette Co.	Forks of Sipsey River (BW)
Geneva Co.	High Bluff (BW)
Hale Co.	Newbern (JH)
Jackson Co.	Stevenson; Princeton; Woodville; Paint Rock; Pisgah; Sand Mountain (BW)
Jefferson Co.	Upper Cahaba River; Squaw Shoals; Adger; Red Mountain (BW)
Lamar Co.	6 mi. N. of Sulligent, in Buttahatchee Swamp (HCR)
Lauderdale Co.	Florence (BW)
Lee Co.	Auburn (BW)
Madison Co.	Huntsville; Monte Sano; Mathews Hill (BW)
Marion Co.	Bear Creek; Hamilton (BW); Texas, at Mallard Creek (HCR)
Mobile Co.	Mobile (BW)
Morgan Co.	Decatur (BW)
Perry Co.	Perry Co. (BW)
Randolph Co.	Roanoke; Wadley (BW)
St. Clair Co.	Gallant (BW)
Sumter Co.	Livingston (BW); 3 mi. N. of Livingston (JH)
Tuscaloosa Co.	Hagler; Indian Creek; Squaw Shoals (BW); Tuscaloosa; Blue Creek, on Ala. 69 (HCR)
Walker Co.	Forks of Warrior River (BW); 2 mi. S. of Corona (HCR)
Wilcox Co.	Gastonburg; Pine Hill (BW)

Ventridens theloides (Walker and Pilsbry), 1902

Plate VI, figure 9 A, B

Gastrodonta gularis theloides Walker and Pilsbry, 1902
Ventridens gularis theloides Pilsbry, 1946

Type locality: Bluff Mountain, in Black Mountains, North Carolina.

The shell is small, sub-globose, dome-shaped, polished, and perforate. The whorls are sculptured with coarse growth wrinkles which become indistinct at the periphery; weakly developed microscopic spiral lines are often present on the distinctly impressed base, around the umbilicus. Immature shells have two long, curved lamellae within on the basal wall of the last whorl; adult shells have a thickened basal callus in place of lamellae. The aperture is lunate, and the peristome is not reflected. Four shells average 5.5 mm. in height and 8.5 mm. in diameter. The dome-shaped shell, distinctly impressed around the umbilical perforation and lacking teeth or lamellae in adult stages, is diagnostic of this species.

Pilsbry (1946) refers to theloides as a subspecies of gularis, stating that its range extends from western North Carolina southwestward to eastern Alabama; in addition, the writer has recorded theloides from the southwestern and southeastern portions of the state. This distribution lies completely within that of gularis. In view of the distinctive shell characters of theloides, in addition to its distribution within the range of gularis, it is obviously not a subspecies of the latter and must therefore be elevated to species level.

On the basis of the records cited by Pilsbry (1946), and those of the writer, theloides is evidently distributed throughout this state and will probably be found in western Georgia and eastern Mississippi. The habitat of this

species in Alabama is under leaf litter, rocks, and decaying logs, in mixed hardwood-pine associations, on calcareous and noncalcareous soils.

Alabama records:

Henry Co.	3 mi. N.E. of Headland, on U.S. 241 (HCR)
Pickens Co.	Pickens-Tuscaloosa county line (HCR)
Randolph Co.	Roanoke (HAP)
Washington Co.	S. entrance to Tombigbee Bridge (HCR)

Ventridens collisella (Pilsbry), 1896

Plate VI, figure 10

Gastrodonta collisella Pilsbry, 1896

Gastrodonta collisella Walker, 1928

Ventridens collisella Pilsbry, 1946

Type locality: Knoxville, Tennessee.

The shell is small, sub-globose, polished, and minutely perforate. The upper surface is sculptured with very strong, irregular, growth wrinkles which become indistinct at the periphery. The base is smooth and highly polished, and very faintly sculptured with microscopic, spiral lines. The last whorl bears a low, short, columellar lamella and a low, short, outer-basal lamella. The aperture is lunate, and the columellar insertion of the peristome is abruptly reflected over the umbilical perforation. Measurements given by Pilsbry (1946) for six shells from Tennessee average 6.9 mm. by 8.9 mm. According to Pilsbry (1946), the strong sculpturing is diagnostic of collisella. The larger and more globose shell is also characteristic, readily distinguishing this species from

gularis.

On the basis of records cited by Pilsbry (1946), this species ranges from central Virginia southward through the Appalachian system and on the Cumberland Plateau to northern Alabama, where it has been recorded only from Upper Austral portions of the state. The writer has not collected this species, and its ecology is unknown.

Alabama records:

Jackson Co. Paint Rock (BW)
Madison Co. Huntsville; Gurley; Monte Sano (BW)

Ventridens cerinoideus (Anthony), 1865

Plate VI, figure 11 A, B

Helix cerinoidea Anthony, 1865
Ventridens cerinoideus Pilsbry, 1946

Type locality: Southport, North Carolina.

The shell is small, depressed, polished, and minutely perforate. The whorls are sculptured with fine, close, distinct, growth wrinkles which become much weaker on the base. The last whorl of immature shells bears a small columellar tooth and a low, short, outer-basal lamella; mature shells are toothless. The aperture is lunate, and the columellar insertion of the peristome is abruptly reflected, half covering the umbilical perforation. A single shell measures 4.5 mm. in height and 7.5 mm. in diameter.

The range given by Pilsbry (1946) for cerinoideus extends from coastal North Carolina southward to northern Florida, and westward on the Gulf Coastal Plain to Alabama.

In view of its distribution elsewhere, this species probably ranges throughout the Coastal Plain of Alabama, although there are but two records from the state.

The known habitat of cerinoideus in Alabama is under leaf litter in a deep ravine, in a mixed hardwood association on noncalcareous soil.

Alabama records:

Elmore Co.	Wetumpka (HAP)
Hale Co.	Havana (AFA)

Ventridens lawae (Binney), 1892

Plate VI, figure 12 A, B

Zonites lawae Binney, 1892

Gastrodonta gularis lawae Walker, 1928

Ventridens lawae Pilsbry, 1946

Type locality: Monroe County, Tennessee.

The shell is small, depressed, polished, and openly umbilicate. The whorls are sculptured with distinct, irregular, growth wrinkles which become indistinct at the periphery; the base is smooth and polished. The last whorl in immature shells bears two thin lamellae within, on the basal wall, replaced in adults by a heavy basal callus. The umbilicus measures about one-fourth of the diameter of the shell. The aperture is rounded, and the peristome is unreflected. Ten shells average 4.2 mm. in height and 8.0 mm. in diameter. This species resembles V. lasmodon, but differs from the latter by being more dome-shaped and by having a smaller umbilicus.

According to Pilsbry (1946), the range of lawae extends from eastern Tennessee and western North Carolina southward to northeastern Alabama; in this state, it is known from only three localities and is evidently limited to the Cumberland Plateau and the Appalachian Ridge and Valley system.

The habitat of this species in Alabama is under leaf litter and rocks in mixed hardwood-pine associations, on calcareous and noncalcareous soils.

Alabama records:

Blount Co.	4 mi. S. of Oneonta, on Ala. 38 (HCR)
Clay Co.	Pyriton (BW)
Cleburne Co.	Mt. Cheaha (BW)
St. Clair Co.	Jefferson-St. Clair county line, on U.S. 78 (HCR)
Talladega Co.	2.5 mi. S.E. of Munford (HCR)

Ventridens lasmodon (Phillips), 1841

Plate VI, figure 13

Helix lasmodon Phillips, 1841
Gastrodonta lasmodon Walker, 1928
Ventridens lasmodon Pilsbry, 1946

Type locality: St. Clair County, Alabama, by designation of Pilsbry (1946).

The shell is small, depressed, polished, and widely umbilicate. The whorls are sculptured with fine, close, and distinct growth wrinkles. The last whorl of immature shells bears a low, blunt, columellar tooth and a long, low, outer-basal lamella; both denticles are usually absent in adult specimens. The umbilicus is large, measuring about one-third of the diameter of the shell. The aperture

is rounded, and the peristome is not reflected. (After Pilsbry, 1946) Measurements given by Pilsbry (1946) for two Tennessee shells average 3.7 mm. in height and 7.6 mm. in diameter.

The range of lasmodon, according to Pilsbry (1946), extends from eastern Tennessee to northeastern Alabama. It was reported from this state, without locality, by Walker (1928). Pilsbry (1946) chose a shell from St. Clair County as neotype, in view of the fact that Phillips' specimen was lost. Further collecting on the Cumberland Plateau and in the Appalachian system is needed to establish the distribution of this species in Alabama. The writer has not collected it, and ecological data are lacking.

Alabama records:

"Alabama" (BW)
St. Clair Co. St. Clair Co. (HAP)

Ventridens demissus (Binney), 1843

Plate VI, figure 14 A, B

Helix demissa Binney, 1843
Gastrodonta demissa Walker, 1928
Ventridens demissus Pilsbry, 1946

Type locality: Western part of Pennsylvania.

The shell is small, depressed, polished, and minutely perforate. The whorls are sculptured with fine, unevenly spaced growth wrinkles which become indistinct at the periphery; the base is smooth and highly polished. The last whorl of young shells bears a strong, outer-basal lamella

which is replaced, in toothless adult specimens, by a thick basal callus. The columellar wall lacks lamellae in both immature and mature stages. The aperture is rounded, and the peristome is unreflected. A series of sixty shells averages 5.8 mm. in height and 9.5 mm. in diameter. The single lamella in young shells, and the heavily callused inner basal wall of adults, are diagnostic characteristics of demissus.

The range of this species, according to Pilsbry (1946), extends from Michigan and Pennsylvania southward to Mississippi and Florida. It is generally and abundantly distributed throughout Alabama, from the Upper Austral zone in the north to the Saballian zone in the southern part of the state.

The habitat of demissus in Alabama is under leaf litter, rocks, and decaying logs, in mixed hardwood-pine and pine-cedar associations, on calcareous and noncalcareous soils. In addition, it is very commonly found in domestic situations under stones and boards, in gardens and beneath shrubbery, and in grasses and weeds.

Alabama records:

Baldwin Co.	Foley; Magnolia Spgs.; Point Clear (BW)
Bibb Co.	Eoline; Woodstock (BW); Pratt's Ferry (HCR)
Blount Co.	Blount Spgs. (BW); 4 mi. N. of Oneonta (HCR)
Choctaw Co.	Black Bluff; Moscow Bluff; Silas (BW)
Clarke Co.	Thomasville; Jackson (BW)
Conecuh Co.	Evergreen (BW); Junction of U.S. 31 and Ala. 3 (HCR)
Cullman Co.	Sand Mountain (BW)
Dallas Co.	Pleasant Hill (BW); Cahaba River, on U.S. 80 (HCR); Marion Junction (JH)
Elmore Co.	Wetumpka; Elmore (BW)

Fayette Co.	2 mi. W. of Berry on Ala. 18 (HCR)
Franklin Co.	Burleson (BW)
Greene Co.	Boligee (BW); Allison; 6 and 11 mi. N. of Demopolis (JH)
Hale Co.	Jct. U.S. 80 and Ala. 13; 5 mi. N. of U.S. 80 on Ala. 13; 4 and 11 mi. N. of Faunsdale, on Ala. 99 (JH); Havana (HCR)
Jackson Co.	Princeton (BW)
Jefferson Co.	Upper Cahaba River; Adger; Squaw Shoals; Birmingham (BW)
Lauderdale Co.	Florence (BW); Elgin (HCR)
Macon Co.	Tuskegee (BW)
Madison Co.	Huntsville; Normal; Monte Sano (BW)
Marengo Co.	Marengo (BW); 3.5 mi. S. of Linden, on U.S. 43 (HCR); 3 mi. E. and 1 mi. W. of Demopolis (JH)
Mobile Co.	Mobile; Saraland (BW); Spring Hill; Alabama Port (HCR)
Monroe Co.	Drewery; Monroe (BW)
Morgan Co.	Massey (HCR)
Montgomery Co.	Montgomery; McGee's Station (BW)
Perry Co.	Marion (BW)
Pickens Co.	Coalfire (BW); Pickens-Tuscaloosa county line (HCR)
Shelby Co.	Calera; Wilsonville; Gurnee (BW); Montevallo (HCR)
St. Clair Co.	Gallant (BW)
Sumter Co.	Livingston (BW); Epes (BW;JH)
Talladega Co.	Three Island Shoals (BW); Munford (HCR)
Tuscaloosa Co.	Hagler; Holt (BW); Duncanville; University; Tuscaloosa (BW;HCR); Ralph; Hurricane Creek; Peterson; Vance (HCR)

Ventridens acerra (Lewis), 1870

Plate VI, figure 15 A, B

Helix acerra Lewis, 1870

Gastrodonta acerra Walker, 1928

Ventridens acerra Pilsbry, 1946

Type locality: Monroe County, Tennessee.

The shell is large, depressed-globose, highly polished, and minutely perforate. The whorls are sculptured with rather coarse, unevenly spaced, growth wrinkles. The last whorl bears a thickened callus within on the basal

wall; there are no teeth or lamellae present at any stage of growth. The base of the shell is distinctly impressed about the umbilical perforation. The aperture is lunate, and the peristome is unreflected. Three shells average 11.2 mm. in height and 16.5 mm. in diameter. The large, depressed, and highly polished shell readily distinguishes acerra from all other species of Ventridens.

According to Pilsbry (1946), this species ranges from eastern Kentucky and western Virginia southward to northeastern Alabama. Its distribution in this state, based on records by Walker (1928) and Pilsbry (1946), extends from the Upper and Lower Austral of the Cumberland Plateau and the Appalachian system, and the Piedmont Province, to the Upper Coastal Plain, just below the fall line. In view of its Appalachian and Piedmont distribution elsewhere, Walker's Coastal Plain record of acerra is regarded as doubtful and is probably attributable to a mislabeled shell.

The habitat of acerra in Alabama is under thick leaf litter in ravines and gullies, in mixed hardwood-pine associations, on calcareous and noncalcareous soils.

Alabama records:

Blount Co.	Blount Springs (BW)
Calhoun Co.	Piedmont (BW)
Cleburne Co.	Dugger Mountain (BW)
Cherokee Co.	Pleasant Gap (BW)
DeKalb Co.	Valley Head; Little Wills Valley; Lookout Mountain (BW); Mentone (AFA)
Elmore Co.	Wetumpka (BW)
Jackson Co.	Princeton; Stevenson (BW)
Madison Co.	Huntsville (BW)
Montgomery Co.	Montgomery (BW)
Randolph Co.	Wadley (BW)

Ventridens ligera (Say), 1821

Plate VI, figure 16 A, B, C

Helix ligera Say, 1821

Gastrodonta ligera Walker, 1928

Ventridens ligera Pilsbry, 1946

Type locality: Missouri.

The shell is large, sub-globose, polished, and rather minutely perforate. The whorls are sculptured with very strong, unevenly spaced, growth wrinkles. The last whorl bears a thickened callus within, on the basal wall; there are no teeth or lamellae present at any stage of growth. The base of the shell is somewhat impressed, and rather indistinctly marked with spiral lines, about the umbilical perforation. The aperture is rounded, and the peristome is unreflected. Four shells average 7.5 mm. in height and 10.2 mm. in diameter.

This species, according to Pilsbry (1946), ranges from New York southward to northern Florida and westward to eastern Oklahoma and Missouri. It is generally distributed throughout Alabama, from Upper and Lower Austral zones in the north to the Saballian zone in the south; records are lacking from the southeastern counties, but in view of its distribution in northern Florida, ligera will probably be found in the southeastern portion of Alabama.

The habitat of ligera in this state is under leaf litter and decaying logs in ravines and gullies, in mixed hardwood-pine associations on calcareous and noncalcareous soils.

Alabama records:

Baldwin Co.	Baldwin Co. (HAP)
Choctaw Co.	Black Bluff (BW)
Conecuh Co.	Evergreen (BW)
Jackson Co.	Stevenson; Princeton; Woodville (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Monte Sano; Huntsville (BW)
Marshall Co.	Scarham Creek, near Guntersville (AFA)
Mobile Co.	Alabama Port; Mobile (BW)
Shelby Co.	Montevallo (BW)
Sumter Co.	Tombigbee River, on U.S. 80 (HCR)
Tuscaloosa Co.	Tuscaloosa (BW)

Ventridens intertextus (Binney), 1841

Plate VI, figure 17 A, B

Helix intertexta Binney, 1841
Gastrodonta intertexta Walker, 1928
Ventridens intertextus Pilsbry, 1946

Type locality: Cabarrus County, North Carolina.

The shell is large, sub-globose, and minutely perforate. The whorls are sculptured on the upper surface with strong, unevenly spaced, growth wrinkles and very distinct spiral lines; the base is less distinctly sculptured. The last whorl is acutely angulate in immature specimens, becoming bluntly angulate or rounded in adults. There are no teeth or lamellae present at any stage of growth. The aperture is usually rounded in adult shells, and the peristome is not reflected. Twenty shells average 11.2 mm. in height and 15.5 mm. in diameter.

According to Pilsbry (1946), this species ranges from New York and Ontario southward to northern Florida and coastal Texas. On the basis of the writer's records, in addition to those of Walker (1928), intertextus is gener-

ally and rather abundantly distributed throughout Alabama. Its habitat in this state is under leaf litter, rocks, and decaying logs, in ravines and gullies, in mixed hardwood-pine associations, on calcareous and noncalcareous soils.

Alabama records:

Baldwin Co.	Magnolia Spgs. (BW); Fairhope (HCR)
Barbour Co.	Elamville (BW)
Bibb Co.	Woodstock (BW); 16 mi. N.E. of Centreville, on Ala. 25; Pratt's Ferry (HCR)
Blount Co.	Blount Spgs. (BW); near Oneonta (HCR)
Calhoun Co.	Anniston (BW)
Chambers Co.	Langdale (BW)
Cherokee Co.	10 mi. S.E. of Centre; Little River Gorge (BW)
Cleburne Co.	Dugger Mt.; Mt. Cheaha (BW)
Clay Co.	Pyrition (BW)
Clarke Co.	Jackson (BW); 4.5 mi. S. of Thomasville (HCR)
Colbert Co.	Tuscumbia (HCR)
Conecuh Co.	Evergreen (BW); Jct. of Ala. 3 and U.S. 31 (HCR)
Dallas Co.	Pleasant Hill (BW)
DeKalb Co.	Ft. Payne; Valley Head; Lookout Mt. (BW); Manitou Cave, Ft. Payne (HCR)
Elmore Co.	Wetumpka (BW)
Etowah Co.	Gallant; Keener; Atalla (BW)
Franklin Co.	Burleson (BW); 5 mi. N. of Russellville (HCR)
Fayette Co.	Fayette; Forks of Sipsy River (BW)
Jackson Co.	Stevenson; Princeton; Woodville; Pisgah (BW); 2 mi. S. of Scottsboro (HCR)
Jefferson Co.	Squaw Shoals; Adger (BW); 5 mi. E. of Irondale on U.S. 78 (HCR)
Lauderdale Co.	Florence (BW)
Lee Co.	Auburn (BW)
Macon Co.	Tuskegee (BW)
Madison Co.	Huntsville; Gurley; Monte Sano (BW)
Marengo Co.	Demopolis (BW)
Marion Co.	Bear Creek; Hamilton (BW); Winfield; 8 mi. N. of Brilliant (HCR)
Mobile Co.	Irvington; Mobile; Calvert (BW)
Perry Co.	Marion (BW)
Pike Co.	S.E. corner of county (BW)
Pickens Co.	Pickens-Tuscaloosa county line (HCR)
Randolph Co.	Roanoke; Wadley (HCR)
Shelby Co.	Montevallo (HCR); Calera; Wilsonville (BW)
St. Clair Co.	Ten Island Shoals; Riverside; Whitney (BW)
Sumter Co.	Livingston; Epes (BW)

Talladega Co. Three Island Shoals (BW)
 Tallapoosa Co. Yates (BW)
 Tuscaloosa Co. Tuscaloosa; Vance (BW;HCR); Hagler; Wawah
 (BW); Hurricane Creek; Ralph (HCR)
 Walker Co. Forks of Warrior River (BW)

Ventridens ellioti (Redfield), 1856

Plate VI, figure 18

Helix ellioti Redfield, 1856
Zonitoides ellioti Walker, 1928
Ventridens ellioti Pilsbry, 1946

Type locality: Mountains of Georgia and North Carolina.

The shell is small, depressed, and narrowly umbilicate. The whorls are sculptured with fine radial striae over the upper surface; the base is smooth and polished, and lacks conspicuous sculpturing. The aperture is lunate; the unreflected peristome is thickened on its inner margin. The type measures 4.0 mm. in height and 9.0 mm. in diameter (after Redfield, in Pilsbry, 1946).

According to Pilsbry (1946), this species ranges from western West Virginia and eastern Kentucky southward to northern Georgia and Alabama. Walker (1928) reported ellioti from Alabama, but gave no locality; Pilsbry (1946) records it from one locality in the Upper Austral of the northeastern part of the state. The writer has not collected this species, but the available information indicates that it is found under loose bark of logs in mixed hardwood-pine associations, on calcareous soils. Further collecting in the Upper and Lower Austral zones of northeastern Alabama is needed to determine the full extent of

the range of elliotti in this state.

Alabama records:

"Alabama" (BW)
Jackson Co. Woodville (HAP)

Genus ZONITOIDES Lehmann

The shell is small, depressed, transparent, and openly umbilicate. The tubular whorls are faintly to distinctly sculptured with radial striae, and microscopic spiral lines are often visible on the base. The umbilicus measures from one-fifth to one-third of the diameter of the shell. The aperture is rounded to lunate, and the peristome is not reflected. This genus is represented in Alabama by two species.

Zonitoides arboreus (Say), 1817

Plate VII, figure 1 A, B

Helix arboreus Say, 1817
Zonitoides arboreus Walker, 1928
Zonitoides arboreus Pilsbry, 1946

Type locality: Philadelphia, Pennsylvania.

The shell is small, depressed, transparent, glossy, and openly umbilicate. The whorls are weakly and irregularly sculptured on the upper surface with radial striae and very faint, microscopic, spiral lines; the base is smooth and highly polished. The aperture is rounded, and the peristome is not reflected. The umbilicus measures about one-fifth of the diameter of the shell. Fifty shells

average 3.0 mm. in height and 5.8 mm. in diameter.

According to Pilsbry (1946), the range of this widely spread species extends from British Columbia and Quebec southward to Central America and the West Indies. Arboreus is generally and very abundantly distributed throughout Alabama. Its habitat in this state is under leaf litter, rocks, and decaying logs in mixed hardwood-pine and pine-cedar associations, on calcareous and noncalcareous soils.

Alabama records:

Baldwin Co.	Week's Bay; Foley; Point Clear; Magnolia Spgs. (BW)
Barbour Co.	Elamville (BW)
Bibb Co.	Pratt's Ferry (HCR); Eoline; Woodstock (BW)
Blount Co.	Blount Spgs. (BW); Oneonta (HCR)
Calhoun Co.	Piedmont (BW)
Chambers Co.	Langdale (BW)
Cherokee Co.	Pleasant Gap; 10 mi. S.E. of Centre (BW)
Chilton Co.	Maplesville; Clanton (BW)
Choctaw Co.	Silas (BW)
Clarke Co.	Thomasville; Jackson (BW)
Cleburne Co.	Mt. Cheaha (BW)
Conecuh Co.	Evergreen; Alcos (BW); Jct. of Ala. 3 and U.S. 31 (HCR)
Cullman Co.	Sand Mt.; Cullman (BW)
Dallas Co.	Pleasant Hill (BW); Tyler; 6 mi. W. of Selma (HCR)
DeKalb Co.	Ft. Payne; Valley Head (BW)
Elmore Co.	Wetumpka (BW)
Etowah Co.	Keener (BW)
Fayette Co.	Fayette; Forks of Sipsy River (BW)
Franklin Co.	Burleson; Russellville (BW)
Geneva Co.	High Bluff (BW)
Greene Co.	Boligee (BW); Allison; Tombigbee River, on U.S. 11 (JH)
Houston Co.	Chattahoochee State Park (AFA)
Hale Co.	Havana (HCR)
Jackson Co.	Stevenson; Limrock; Princeton; Woodville (BW)
Jefferson Co.	Valley Creek; Squaw Shoals (BW); Irondale (HCR)
Lauderdale Co.	Florence (BW); Elgin (HCR)
Lee Co.	Auburn (BW)
Macon Co.	Tuskegee (BW)
Madison Co.	Huntsville; Gurley; Monte Sano (BW)

Marengo Co.	Demopolis (BW); 3 mi. E. of Demopolis (HCR)
Marion Co.	Winfield (BW); 2 mi. N. of Winfield (HCR)
Mobile Co.	Mobile; Oak Grove; Magazine Point (BW); Spring Hill (HCR)
Monroe Co.	Monroe; Drewery (BW)
Morgan Co.	Massey (HCR)
Montgomery Co.	Montgomery (BW); Sprague (HCR)
Perry Co.	Uniontown; Mari on (BW)
Pickens Co.	Pickens-Tuscaloosa county line; 4 mi. E. of Reform (HCR)
Randolph Co.	Roanoke; Wadley (BW)
Shelby Co.	Calera (BW)
St. Clair Co.	Whitney (BW); Jefferson-St. Clair county line (HCR)
Sumter Co.	Livingston (BW); Epes (BW;JH)
Talladega Co.	Three Island Shoals (BW); Munford (HCR)
Tallapoosa Co.	Yates (BW)
Tuscaloosa Co.	Tuscaloosa; Vance (BW;HCR); Hagler; Holt; Duncanville; Elrod; Squaw Shoals (BW); Ralph; Peterson; University; Hurricane Creek (HCR)
Wilcox Co.	Gastonburg; Pine Hill; Alberta (BW)

Zonitoides lateumbilicatus (Pilsbry), 1895

Plate VII, figure 2

Gastrodonta lateumbilicata Pilsbry, 1895

Zonitoides lateumbilicata Walker, 1928

Zonitoides lateumbilicatus Pilsbry, 1946

Type locality: Green Falls, near Nat, Jackson County,
Alabama.

The shell is small, very much depressed, and widely umbilicate. The whorls are sculptured with distinct radial striae which pass over the periphery and become weaker on the base. The aperture is rounded, and the columellar margin of the peristome is slightly expanded. The umbilicus measures about one-third of the diameter of the shell. The type measures 1.7 mm. in height and 4.3 mm. in diameter (after Pilsbry, 1946).

According to Pilsbry (1946), lateumbilicatus ranges

from southern Kentucky southward through Tennessee on the Interior Low Plateau and the Cumberland Plateau to northern Alabama. Walker (1928) records this species from two localities in this state. The writer has not collected it, and data concerning its ecology are not available.

Alabama records:

Jackson Co. Green Falls, near Nat; Woodville (BW)
Lauderdale Co. Florence (BW)

Genus STRIATURA Morse

The shell is minute, depressed, thin, and openly umbilicate. The whorls are sculptured with distinct to sub-obsolete rib-striae and fine, microscopic, spiral lines. The aperture is rounded to lunate, and the columellar margin of the peristome is slightly reflected. The umbilicus measures about one-third of the diameter of the shell. The genus is represented in Alabama by a single species.

Striatura meridionalis (Pilsbry and Ferriss), 1906

Plate VII, figure 3

Vitrea milium meridionalis Pilsbry and Ferriss, 1906
Vitrea milium meridionalis Walker, 1928
Vitrea milium Walker, 1928 (nec Morse, 1859)
Striatura meridionalis Pilsbry, 1946

Type locality: Along Guadalupe River, above New Braunfels, Texas.

The shell is minute, thin, depressed, and openly umbilicate. The whorls are sculptured with rather coarse rib-striae and fine, microscopic, spiral lines. The last

whorl is somewhat depressed. The aperture is lunate, and the peristome is slightly reflected at its columellar margin. The umbilicus measures about one-third of the diameter of the shell. The type measures 1.75 mm. in diameter (after Pilsbry, 1946).

According to Pilsbry (1946), meridionalis ranges from Pennsylvania southward to Florida and westward to Mexico and Arizona. Walker (1928) recorded meridionalis and milium, the former as a subspecies of the latter, from a number of localities throughout Alabama. On the basis of records by Pilsbry (1946), the southernmost limit of the range of milium is northern Kentucky, and Walker's records for that species undoubtedly pertain to meridionalis. The writer has not collected this species, and data regarding its habitat are not available.

Alabama records:

Baldwin Co.	Baldwin Co. (BW)
Blount Co.	Blount Spgs. (BW)
Chambers Co.	Langdale (BW)
Choctaw Co.	Silas (BW)
Clarke Co.	Clarke Co. (BW)
Conecuh Co.	Evergreen (BW)
DeKalb Co.	Valley Head; Lookout Mt. (BW)
Elmore Co.	Wetumpka (BW)
Jackson Co.	Stevenson; Woodville (BW)
Jefferson Co.	Squaw Shoals (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Huntsville; Monte Sano (BW)
Mobile Co.	Mobile; Coden (BW)
Randolph Co.	Wadley; Roanoke (BW)
Sumter Co.	Epes (BW)
Tuscaloosa Co.	Hagler; Tuscaloosa (BW)
Walker Co.	Forks of Warrior River (BW)
Wilcox Co.	Alberta (BW)

Family ENDODONTIDAE Pilsbry

The shell varies from minute to large, helicoid to depressed-globose, and perforate to widely umbilicate. The whorls are sculptured with faintly to distinctly developed rib-striae and microscopic spiral lines; reddish brown flammulate spots are frequently present. The last whorl is rounded to angulate or carinate, and often bears internal lamellae or teeth. The aperture is rounded or lunate, and the peristome is not reflected. This family is represented in Alabama by three subfamilies.

Subfamily ENDODONTINAE Pilsbry

The shell varies from large to small, and from depressed-globose to depressed. The whorls are sculptured with distinct, evenly spaced, rib-striae and faintly to distinctly developed, microscopic, spiral lines. Reddish brown flame-like spots are often present over the surface of the shell. The last whorl is rounded to angulate-carinate or bicarinate, and rarely bears a small, tuberculate, columellar tooth within, on the basal wall. The aperture is rounded or lunate, and the peristome is not reflected. There are two genera present in Alabama.

Genus ANGUISPIRA Morse

The shell varies from medium to large, depressed to depressed-globose; and the base is openly umbilicate. The whorls are sculptured with distinct rib-striae and faintly

to distinctly developed, microscopic, spiral lines. The last whorl is rounded, angulate, or carinate, and lacks internal teeth or lamellae. The aperture is rounded or lunate, and the peristome is not reflected. The genus is represented in Alabama by three species.

Anguispira alternata alternata (Say), 1817

Helix alternata Say, 1817

Anguispira alternata palustris Walker, 1928

Anguispira alternata Pilsbry, 1948

Type locality: Philadelphia, Pennsylvania.

The shell is depressed-globose, umbilicate, with a rounded to subangular periphery and a moderately elevated spire. The upper surface is marked with irregular, reddish-brown splotches, and there is a belt of spots just below the periphery. Radial streaks are sometimes present on the base, but often lacking. The whorls are sculptured with rib-striae which are prominent on the upper surface and the periphery, becoming weaker on the base. Parallel to the ribs are minute wrinkles, crossed by very weakly impressed spiral lines. The shell measures 10.5 mm. in height, by 18.0 mm. in diameter (Pilsbry, 1948).

Typical alternata is found only in extreme north Alabama, in the Tennessee Valley, from Lauderdale County to Jackson County, and according to Pilsbry (1948), intergrades along the Tennessee River with Anguispira alternata angulata. Walker (1928) recorded typical alternata under the subspecific name palustris from the Tennessee River

flood plain, giving Princeton, Jackson County, as the type locality. His shells were evidently intergrades between typical alternata and alternata angulata, since his description of alternata palustris agrees with the descriptions of both subspecies.

The writer has not collected the typical species and has not had the opportunity to study shells from the reported localities. On the basis of the existing records, typical alternata is replaced by alternata angulata on the Cumberland Plateau and the Appalachian Ridge and Valley system in Alabama. The ecology of alternata alternata is unknown to the author.

Alabama records:

Jackson Co. Princeton; Pisgah (BW)
Lauderdale Co. Florence (BW)

Anguispira alternata angulata Pilsbry, 1948

Plate VII, figure 4

Helix alternata var. a, carinata Ferussac, 1822.
(Nec Montagu, 1803.)

Anguispira alternata carinata Walker, 1928
Anguispira alternata angulata Pilsbry, 1948

Type locality: Burnside, Pulaski County, Kentucky.

The shell is somewhat depressed, sculptured with rib-striae which are stronger than in alternata and pass over the distinctly angulate periphery onto the base and into the umbilicus. Distinct, close microscopic wrinkles parallel the rib-striae and are crossed by impressed spiral lines. A series of shells from Blount County, Alabama,

averages 10.0 mm. in height and 19.0 mm. in diameter.

Pilsbry's type measured 12.5 mm. in height and 23.0 mm. in diameter.

The average of measurements given by Pilsbry (1948), for shells from Pennsylvania, Kentucky, Virginia, and Tennessee, is 12.1 mm. in height and 21.0 mm. in diameter. On the basis of these figures, angulata decreases in size as it ranges into northern Alabama. Here it replaces typical alternata, intergrading with it along the Tennessee River. In northeast Alabama angulata intergrades with jessica, and below the fall line it is replaced by macneilli.

Angulata is found in mixed hardwood and mixed pine-hardwood associations in Alabama. Its habitat is under deciduous leaf litter and fallen logs, in ravines and gullies. It is found under sandstone ledges, and more abundantly on limestone slopes and bluffs.

Alabama records:

Bibb Co.	Pratt's Ferry (HCR)
Blount Co.	5 mi. S. and N. of Oneonta (HCR)
Cherokee Co.	Poole's Island; 10 mi. S.E. of Centre; Slackland (BW)
Etowah Co.	Gadsden (BW)
Franklin Co.	5 mi. N. of Russellville (HCR)
Jackson Co.	Princeton; Woodville (BW)
Perry Co.	Perry Co. (BW)
Talladega Co.	Near Munford, on road to Mt. Cheaha (HCR)
Tuscaloosa Co.	University; Peterson (HCR); Indian Creek (BW)
Walker Co.	8 mi. S. of Oakmon (HCR)

Anguispira alternata macneilli Walker, 1928

Plate VII, figure 5

Anguispira alternata macneilli Walker, 1928
Anguispira alternata macneilli Pilsbry, 1948

Type locality: Salco, Mobile County, Alabama.

The shell is depressed, smaller than angulata, with a rounded periphery. There are rather strong rib-striae on the upper surface which pass over the periphery and onto the base, where they become weaker. The microsculpture consists of fine striae which parallel the ribs. Walker's type measured 8.3 mm. in height and 15.2 mm. in diameter.

Typical macneilli has a rounded periphery with only a trace of angulation, whereas typical angulata has a periphery which is distinctly angulate. A series of intermediate shells from Tuscaloosa County was referred to macneilli rather than to angulata; they average 8.9 mm. in height and 16.1 mm. in diameter. Although these shells have faint spiral lines, their smaller size and subrounded periphery indicate a closer relationship to macneilli.

Anguispira alternata macneilli is found only in localities south of the fall line, and apparently represents a Coastal Plain subspecies. Its habitat is under the damp leaf litter, and in rotting logs, along streams, and in ravines and gullies in mixed pine-hardwood associations.

Alabama records:

Barbour Co.	Pea River, W. of Elamville (BW)
Choctaw Co.	Silas (BW)
Greene Co.	Boligee (BW)
Mobile Co.	Salco; Mobile (BW)
Sumter Co.	Livingston (BW)
Tuscaloosa Co.	2 mi. N.E. of Bethel Church, on Watermelon Road; University (HCR)

Anguispira alternata jessica Kutchka, 1938

Plate VII, figure 6

Anguispira alternata jessica Kutchka, 1938Anguispira alternata jessica Pilsbry, 1948

Type locality: Stevenson, Jackson County, Alabama.

The shell is slightly elevated, with a low convex spire, and sculptured above with strong rib-striae which pass over the subangulate periphery onto the base, where they become weaker. Paralleling the rib-striae are many coarse and deep intermediate striae, crossed by very faint spiral lines (after Kutchka, in Pilsbry, 1948). Kutchka's type measured 11.0 mm. in height and 20.75 mm. in diameter.

A series of shells from Monte Sano appears to be referable to jessica, although the angulation of the periphery is more pronounced. The coarse intermediate striae are not developed over the last whorl. Pilsbry (1948) records jessica from relict areas in northeastern Alabama, southwestern North Carolina, and from the Great Smoky Mountains in Tennessee. This distribution, coupled with the morphological characters of jessica, seems to indicate that it is a relict population, and intermediate between angulata and alternata. Pilsbry (1948) states that "...in the South it is sometimes difficult to distinguish angulata from jessica." Further study of this subspecies is necessary.

Alabama records:

Jackson Co.	Stevenson (HAP)
Madison Co.	W. Slope of Monte Sano (AFA)

Alternata is a polytypic species, represented by four subspecies in the state which show a typical distribution pattern characteristic of geographical races. Anguispira alternata macneilli is known only from localities south of the fall line, and apparently represents a Coastal Plain subspecies. Further distributional data from the Gulf States will probably show that this subspecies will occur in the neighboring states. In Tuscaloosa County, series collected at University and Bethel Church include representatives of both angulata and macneilli, with some specimens being morphologically intermediate between the two. This tends to support the retention of macneilli as a subspecies.

Anguispira alternata angulata is found in the northern part of the state, usually north of the fall line, extending to the Tennessee River. North of the Tennessee River, the subspecies angulata, alternata, and jessica occur. The specimens of alternata represent the southernmost distribution of this widely spread subspecies in this state. Specimens of jessica are morphologically intermediate between typical alternata and angulata, apparently representing a blend zone. The retention of jessica as a subspecies may be doubtful, but it requires further study.

Anguispira crassa Clapp, 1928

Plate VII, figure 7 A, B

Anguispira alternata crassa Clapp, in Walker, 1928
Anguispira alternata crassa Pilsbry, 1948

Type locality: Wetumpka, Alabama.

The species can be most easily distinguished by the presence of strongly developed rib-striae on the upper surface which pass over the periphery, across the base, and into the umbilicus. Fine striae parallel and lie between the rib-striae. In addition, there is a microsculpture of very fine, irregular, spirally arranged striae. The shell is rather depressed and solid; the whorls are bluntly angular at the periphery, similar to that of angulata but not as strongly developed. Clapp's type measured 10.5 mm. in height and 18.0 mm. in diameter. Two shells from Monroe County measure 9.0 mm. in height and 17.0 mm. in diameter, and one apparently immature shell measures 7.5 mm. in height and 15.5 mm. in diameter.

This species was originally described as a variety of alternata, and Pilsbry (1948) elevated it to subspecific rank. Crassa has been recorded from a wide area in eastern United States, extending from the mountains of Virginia south into northern Florida and west to Oklahoma and Louisiana. The range of distribution is well within the limits of the distribution of alternata and its subspecies. It seems improbably that two subspecies will be sympatric over such a wide area, yet apparently retaining their diagnostic characters. In Alabama, the same situation occurs. Crassa is found throughout the state, with records extending from

the northern border in Lauderdale and Jackson counties, to Mobile and Dale counties in the south. Alternata, with its subspecies, is found within the same geographical limits. On these data, it seems advisable to elevate crassa to specific level, distinct from alternata. Further study throughout its range is needed.

Anguispira crassa is largely found in mixed pine-hardwood associations, under the thick leaf litter in ravines and gullies. Below the fall line crassa is found along streams, in mixed pine-cedar-hardwood associations of the Black Belt, and in hardwood associations, near streams, through the evergreen forest region of the lower Coastal Plain. Most of the known localities for crassa in Alabama are over the limestone soils north of the fall line, below which the recorded localities are scattered and few.

Alabama records:

Baldwin Co.	Hamilton (BW)
Barbour Co.	Elamville (BW)
Bibb Co.	Pratt's Ferry (BW;HCR); Woodstock (BW)
Blount Co.	Blount Spgs. (BW); 4 mi. N. and 5 mi. S. of Oneonta (HCR)
Chambers Co.	Langdale (BW)
Chilton Co.	Maplesville (BW)
Clarke Co.	Jackson; Thomasville (BW)
Clay Co.	Pyriton (BW)
Cleburne Co.	Dugger Mt., north of Piedmont (BW)
Cullman Co.	Wilhite (BW)
Dale Co.	Pinckhard (BW)
Dallas Co.	Selma (BW)
DeKalb Co.	Valley Head; Lookout Mt. (BW); Mentone (AFA); Manitou Cave, Ft. Payne (HCR)
Etowah Co.	Black Creek Gorge; Keener; Gallant (BW); 10 mi. E. of Gadsden (HCR)
Fayette Co.	Fayette; Forks of Sipsey River (BW)
Franklin Co.	Burleson (BW)
Jackson Co.	Princeton (BW)
Jefferson Co.	Warrior; Adger; Squaw Shoals (BW)

Lauderdale Co.	Florence (BW)
Madison Co.	Huntsville (BW); Monte Sano (BW;HCR)
Monroe Co.	Randon's Creek, W. of Frisco City (AFA)
Mobile Co.	Saraland (BW)
Perry Co.	Hamburg (BW)
Pike Co.	Pea River, in S.E. corner of county (BW)
Randolph Co.	Roanoke; Wadley (BW)
St. Clair Co.	Whitney (BW)
Talladega Co.	Lock 4, Coosa River (BW)
Tuscaloosa Co.	Tuscaloosa; Holt; Duncanville (BW); Windham Spgs.; Harris Lake; Bethel Church (HCR)
Walker Co.	Forks of Warrior River (BW); 8 mi. S. of Oakmon, on Ala. 69 (HCR)

Anguispira smithi Walker, 1928

Plate VII, figure 8

Anguispira alternata smithi Walker, 1928
Anguispira alternata smithi Pilsbry, 1948

Type locality: Monte Sano, Madison County, Alabama.

The shell is depressed, with a slightly convex spire. This species is readily distinguished from the subspecies of alternata by the distinct longitudinal furrow below the periphery, parallel to the last whorl, and by the stronger rib-striae on the upper surface. The microsculpture consists of fine striae parallel to the ribs, and crossed by fine spiral lines. The rib-striae are similar to those of crassa, passing over the periphery onto the base and into the umbilicus. The periphery of smithi is subcarinate, whereas that of crassa is angulate.

Both Pilsbry (1948) and Walker (1928) have considered smithi as a subspecies of alternata. Morphologically, it is distinct from, and shows no intergradation with, other members of the genus in Alabama. In addition, it is found

within the distribution of alternata and crassa. Reliable records are from isolated relict areas of the Upper Austral life zone. These two features suggest that smithi is probably deserving of specific rank. Further data are needed on this species. Pilsbry (1948) states, "A specimen which appears to be typical A. a smithi was taken by Carl F. Baker, at Antrim, Lee Co., Ala." Since this locality is in the Piedmont, slightly north of the fall line, a series of specimens from this area is needed for study, in order to accurately determine the validity of the record. The ecology of smithi is unknown to the author. The type locality is an oak-hickory-beech association, as is the area around Stevenson, in Madison County. The Lee County record is just within the Gulf Slope section of the Oak-Pine Forest Region.

Alabama records:

Jackson Co.	Monte Sano (BW); Smithers Mt. (AFA)
Lee Co.	Antrim (HAP)
Madison Co.	Near Stevenson (HAP)

Anguispira cumberlandiana cumberlandiana (Lea), 1840

Plate VII, figure 9

Anguispira cumberlandiana Lea, 1840
Anguispira cumberlandiana Walker, 1928
Anguispira cumberlandiana Pilsbry, 1948
Anguispira cumberlandiana alabama Clapp, 1920
Anguispira cumberlandiana alabama Walker, 1928
Anguispira cumberlandiana alabama Pilsbry, 1948

Type locality: Near Jasper, Marion County, Tennessee.

The shell is lenticular, extremely carinate, and

moderately biconvex. The upper surface is sculptured with distinct, close rib-striae which become enlarged at the carina and diminish again on the base. This species is readily distinguished from all other Alabama land snails by the very acutely carinate and distinctly ribbed shell.

According to Pilsbry (1948), one shell from Woodville, Jackson County, Alabama, measures 7.0 mm. in height and 18.0 mm. in diameter, with $5\frac{1}{2}$ whorls. Pilsbry (1948) gives the measurements of Lea's type as 0.14 inches in height by 0.54 inches in diameter. According to Walker (1928), cumberlandiana measures 5.0 mm. by 15.0 mm. Evidently the original description was based on an immature specimen.

Clapp (1920) described cumberlandiana alabama from Vincent Mountain, Madison County, Alabama, distinguishing this subspecies from typical cumberlandiana by "...its larger size, much finer and flatter ribs and more convex shape...." The measurements of Clapp's specimens were given by Walker (1928) as 9.5 mm. by 21.75 mm., and 10.0 mm. by 21.25 mm., with 6 whorls. Shells taken by the author at Cave Springs Cave, just south of the type locality of alabama, measure 7.0 mm. by 15.5 mm., and 7.0 mm. by 16.0 mm., with $5\frac{1}{2}$ whorls. These shells are referable to either cumberlandiana or alabama.

The similarity of morphological characteristics, and the graded series of sizes appear to represent growth stages of a single species. Walker (1928) records both cumberlandiana and alabama from the type locality of

alabama. The range of alabama is completely overlapped by that of cumberlandiana. For these reasons, the writer considers alabama synonymous with cumberlandiana.

Anguispira cumberlandiana cumberlandiana is found in the Upper Austral life zone in Alabama and Tennessee. The Alabama records represent the southernmost extension of the range of cumberlandiana. Its habitat is in cracks and crevices in limestone slabs and boulders, and under limestone ledges, in mixed hardwood-cedar associations. Specimens taken at Cave Springs Cave were found crawling on limestone slabs at the mouth of the cave, just up from the edge of the stream. Above the cave, on the rocky hillside, cumberlandiana was under slabs of limestone, half buried in the litter and dirt.

Alabama records:

Jackson Co.	Paint Rock; Woodville; Limrock (BW); ledges 3 mi. N.E. of Woodville (AFA)
Madison Co.	Vincent Mt., Gurley; Smithers Mt.; Monte Sano (BW); 6.5 mi. N. of New Hope, at Cave Springs Cave (HCR)

Genus DISCUS Fitzinger

The shell is small, depressed, and widely umbilicate. The whorls are sculptured with distinct rib-striae which pass over the rounded to bi-carinate periphery and into the umbilicus. A small, tuberculate, columellar tooth is frequently present within the last whorl. The aperture is rounded to lunate, and the peristome is not reflected. The umbilicus measures about one-half to one-third of the

diameter of the shell. This genus is represented in Alabama by three species.

Discus patulus (Deshayes), 1830

Plate VII, figure 10

Helix patula Deshayes, 1830

Gonyodiscus perspectivus Walker, 1928 (nec von Muhlfield, 1816)

Gonyodiscus cronkhitei anthonyi Walker, 1928 (nec Pilsbry, 1906)

Discus patulus Pilsbry, 1948

Type locality: New York.

The shell is small, depressed, and widely umbilicate. The whorls are sculptured with distinct rib-striae which pass over the rounded to sub-angulate periphery and become weaker on the base. The last whorl bears a small, tuberculate, columellar tooth within on the basal wall. The aperture is rounded, and the peristome is not reflected. The umbilicus measures about one-half to one-third of the diameter of the shell. Twenty shells average 3.2 mm. in height and 7.8 mm. in diameter.

According to Pilsbry (1946), the range of patulus extends from New York and Indiana southward to northern Florida and western Arkansas. It is generally and rather abundantly distributed throughout Alabama. Discus cronkhitei (Newcomb), which was recorded from Alabama by Walker (1928) as Gonyodiscus cronkhitei anthonyi (Pilsbry), ranges from Alaska and Newfoundland southward to Kentucky and Arizona. On the basis of this distribution, Walker's

record of anthonyi from Alabama is considered doubtful and probably referable to patulus.

The habitat of patulus in Alabama is under leaf litter, rocks, and in and under decaying logs, in mixed hardwood-pine and pine-cedar associations, on calcareous and noncalcareous soils.

Alabama records:

Baldwin Co.	Week's Bay (BW)
Bibb Co.	Eoline; Woodstock (BW); Pratt's Ferry (BW; HCR)
Blount Co.	Blount Spgs. (BW); 4 mi. N. of Oneonta, on Ala. 32 (HCR)
Chambers Co.	Langdale (BW)
Cherokee Co.	10 mi. S.E. of Centre (BW)
Chilton Co.	Maplesville (BW)
Choctaw Co.	Silas (BW)
Clay Co.	Pyriton (BW)
Clarke Co.	Thomasville (BW)
Cleburne Co.	Mt. Cheaha (AFA)
Conecuh Co.	Evergreen (BW)
Cullman Co.	Wilhites (BW)
Dallas Co.	Selma (BW)
DeKalb Co.	Valley Head (BW)
Etowah Co.	Keener; Gallant (BW)
Elmore Co.	Wetumpka (BW)
Greene Co.	Boligee (BW)
Franklin Co.	Russellville; Burleson (BW); 5 mi. N. of Russellville (HCR)
Jackson Co.	Princeton; Stevenson; Pisgah; Woodville (BW); S. side of Tennessee River, on Ala. 35 (HCR)
Jefferson Co.	Cohort; Valley Creek (BW)
Lauderdale Co.	Florence (BW); Elgin (HCR)
Madison Co.	Huntsville; Monte Sano; Gurley; Vincent Mountain; Normal; Ward's Mountain (BW)
Mobile Co.	Mobile (BW)
Monroe Co.	Monroe; Drewery (BW)
Perry Co.	Marion; Hamburg (BW)
Randolph Co.	Roanoke; Wadley (BW)
Shelby Co.	Calera; Yellowleaf Creek, near Wilsonville (BW)
St. Clair Co.	Greensport (BW)
Sumter Co.	Epes (JH)
Talladega Co.	Three Island Shoals (BW); Munford (HCR)
Tallapoosa Co.	Yates (BW)

Tuscaloosa Co. Tuscaloosa (BW); University; Hurricane
Creek; Windham Springs (HCR)
Walker Co. 8 mi. S. of Oakmon, on Ala. 69 (HCR)
Wilcox Co. Pine Hill; Gastonburg; Alberta (BW)

Discus bryanti (Harper), 1881

Plate VII, figure 11

Patula bryanti Harper, 1881
Discus bryanti Pilsbry, 1948

Type locality: Mitchell County, North Carolina.

The shell is small, depressed, and broadly and perspective-ly umbilicate. The whorls are sculptured with distinct rib-striae which pass to the bi-carinate periphery, become indistinct after passing the upper carina, and then reappear, strongly, on the lower carina and continue into the umbilical region. The aperture is small and rather square in outline, and the peristome is not reflected. The type measures 2.0 mm. in height and 6.5 mm. in diameter (after Harper, 1881).

The range of this species, according to Pilsbry (1946), extends from northeastern Tennessee and northwestern North Carolina southward through the southern Appalachians to northeastern Alabama. In the latter state, bryanti is known only from the Upper Austral of Jackson County.

The writer has not collected this species, but the available information indicates that it is found in and under decaying logs, in mixed hardwood-pine associations, on calcareous soils.

Alabama record:

Jackson Co. Hills around Woodville (HAP)

Discus clappi (Pilsbry), 1924

Plate VII, figure 12

Gonyodiscus clappi Pilsbry, 1924

Gonyodiscus clappi Walker, 1928

Discus clappi Pilsbry, 1948

Type locality: Jasper Point, about 5 miles north to northeast of Gurley, Madison County, Alabama.

The shell is much like that of Discus bryanti (Harper) but the characters are much more strongly marked. Clappi has a much more distinct carina above and below the middle of the last whorl, and the rib-striae do not become as indistinct between the carinae as in bryanti. Pilsbry (1948) states that the concave umbilical region is wider, the basal or lower carina more pinched-out, and the concavity between the carinae deeper. The aperture is similar to that of bryanti, but the upper margin is pinched, because of the more constricted upper carina. Four shells average 2.1 mm. in height and 6.2 mm. in diameter.

This species is known only from the Upper Austral of Madison County, Alabama. The writer has not collected it, but the available information indicates that it is found among limestone rocks, under leaves and stones.

Alabama record:

Madison Co. Jasper Point (BW); Molder (AFA)

Subfamily HELICODISCINAE Pilsbry

The shell varies from small to minute, depressed to depressed-discoidal, and is widely umbilicate. The whorls are sculptured with faintly to distinctly developed microscopic spiral lines or, rarely, with epidermal ridges. The last whorl usually bears from one to three pairs of tuberculate teeth within, on the outer and basal walls. The aperture is lunate, and the peristome is not reflected. This subfamily is represented in Alabama by a single genus and two subgenera.

Genus HELICODISCUS MorseSubgenus HELICODISCUS Morse

The shell is small, depressed-discoidal, and widely umbilicate. The whorls are sculptured with distinct microscopic spiral lines or epidermal ridges. The last whorl bears from one to three pairs of teeth within, on the outer and basal walls. This subgenus is represented in Alabama by two species.

Helicodiscus parallelus (Say), 1821

Plate VII, figure 13

Planorbis parallelus Say, 1821

Helicodiscus parallelus Walker, 1928

Helicodiscus parallelus Pilsbry, 1948

Type locality: Council Bluff, Iowa, by designation of Pilsbry (1948).

The shell is small, depressed-discoidal, and widely umbilicate. The whorls are sculptured with distinctly developed, evenly spaced, microscopic, spiral lines. The last whorl bears from one to three pairs of tuberculate teeth within, on the outer and basal walls. The aperture is lunate, and the peristome is not reflected. Ten shells average 1.2 mm. in height and 3.0 mm. in diameter.

According to Pilsbry (1948), this species ranges from Maine and South Dakota southward to coastal Georgia and eastern Oklahoma. It is generally and rather abundantly distributed throughout Alabama. The habitat of parallelus in this state is under leaf litter, rocks, and decaying logs in mixed hardwood-pine and pine-cedar associations, on calcareous and noncalcareous soils.

Alabama records:

Baldwin Co.	Point Clear; Magnolia Spgs. (BW)
Blount Co.	Blount Spgs. (BW); 5 mi. S. of Oneonta, on Ala. 38 (HCR)
Barbour Co.	Elamville (BW)
Choctaw Co.	Silas (BW)
Clarke Co.	Grove Hill (BW)
Conecuh Co.	Evergreen (BW)
Cullman Co.	Cullman (BW)
Dallas Co.	Pleasant Hill; Selma (BW)
Elmore Co.	Wetumpka (BW)
Fayette Co.	Fayette; Forks of Sipsey River (BW)
Franklin Co.	Russellville; Burleson (BW)
Greene Co.	Boligee (BW)
Hale Co.	Akron; Havana (HCR)
Jackson Co.	Stevenson; Princeton; Woodville (BW)
Jefferson Co.	Squaw Shoals (BW); limestone flats 2 mi. N.E. of Bessemer (AFA)
Lauderdale Co.	Florence (BW)
Lee Co.	Auburn; Jester (BW)
Madison Co.	Smither's Mt.; Gurley; Monte Sano (BW)
Mobile Co.	Mobile; Spring Hill (BW;HCR)
Montgomery Co.	Sprague (HCR)

Monroe Co.	Monroe (BW)
Morgan Co.	Massey (HCR)
Perry Co.	Uniontown (BW)
Randolph Co.	Roanoke (BW)
Shelby Co.	Calera; Weduska Shoals (BW)
St. Clair Co.	Shoal Creek; Whitney (BW)
Sumter Co.	Epes (BW)
Tuscaloosa Co.	Hagler; Holt; Duncanville; Tuscaloosa (BW); University (HCR)
Wilcox Co.	Gastonburg (BW)

Helicodiscus fimbriatus Wetherby, 1881

Plate VII, figure 14

Helicodiscus fimbriatus Wetherby, 1881

Helicodiscus fimbriatus Walker, 1928

Helicodiscus fimbriatus Pilsbry, 1948

Type locality: Gorge of the Tellico River, Tennessee.

The shell is similar to that of parallelus, but it is larger than the latter and the shell is distinctively sculptured with epidermal ridges which give the whorls a fluted appearance. There are two or three of these ridges on the upper surface of the last whorl, and from three to five on the lower surface. The type measures 1.5 mm. in height and 5.0 mm. in diameter (after Pilsbry, 1948).

According to Pilsbry (1948), the range of fimbriatus lies entirely within the Southern Appalachians of eastern Tennessee, southwestern North Carolina, northern Georgia, and northern Alabama. In the latter state fimbriatus is known only from two localities. The writer has not collected this species, and data regarding its habitat in the state are not available; Wetherby (in Pilsbry, 1948) states that fimbriatus lives in crevices in the Ocoee District

slates, in Monroe and Polk counties, Tennessee.

Alabama records:

Cherokee Co. Pleasant Gap (BW)
Walker Co. Lynn's Crossing (HAP)

Subgenus HEBETODISCUS Baker

The shell is small, depressed, and widely umbilicate. The whorls are smooth, rather glossy, and usually sculptured with fine, close, microscopic, spiral lines. There are no teeth present within the last whorl. This subgenus is represented in Alabama by three species.

Helicodiscus singleyanus (Pilsbry), 1890

Plate VII, figure 15

Zonites singleyanus Pilsbry, 1890
Zonitoides singleyanus Walker, 1928
Helicodiscus singleyanus Pilsbry, 1948

Type locality: New Braunfels, Comal County, Texas.

The shell is very small, depressed, translucent, and widely umbilicate. The whorls are rather glossy and weakly sculptured with growth wrinkles; the microsculpture consists of very fine, close, spiral lines. The aperture is lunate, and the peristome is not reflected. The umbilicus measures about one-third of the diameter of the shell. The shell measures 0.9 mm. in height and 2.4 mm. in diameter (after Pilsbry, 1948).

According to Pilsbry (1948), singleyanus is a very widely spread species, ranging from New Jersey and Florida

westward to South Dakota, Colorado, and southwestern Arizona. It is evidently distributed throughout Alabama, although records are lacking from a majority of counties. The writer has not collected it, and data concerning its habitat in this state are not available.

Alabama records:

Elmore Co.	Elmore Co. (HAP)
Jackson Co.	Stevenson; Woodville (BW)
Perry Co.	Hamburg (BW)
Wilcox Co.	Alberta (BW)

Helicodiscus inermis (Baker), 1929

Plate VII, figure 16 A, B

Helicodiscus singleyanus inermis Baker, 1929
Helicodiscus singleyanus inermis Pilsbry, 1948

Type locality: Dove, Marion County, Tennessee.

The shell is very small, depressed, translucent, and widely umbilicate. The whorls are sculptured with weakly developed growth wrinkles; there is no microsculpture of spiral lines as in singleyanus. The aperture is rounded, and the peristome is not reflected. The umbilicus measures about one-third of the diameter of the shell. The type measures 1.24 mm. in height and 2.21 mm. in diameter (after Pilsbry, 1948).

This species, referred to as a subspecies of singleyanus by Baker (1929) and Pilsbry (1948), is distinguished from the latter only by the absence of microscopic spiral lines. The range of inermis, which according to Pilsbry (1948) extends from New Jersey and peninsular Florida west-

ward to eastern Arkansas and Missouri, lies completely within the range of singleyanus. In view of the morphological distinction between inermis and the latter species, and on the basis of their overlapping ranges, it becomes necessary to elevate inermis to specific rank.

In Alabama, this species is known only from Jackson County, in the northeastern part of the state. The writer has not collected it, and data concerning its habitat are not available.

Alabama record:

Jackson Co. Jackson Co. (HAP)

Helicodiscus intermedius Morrison, 1942

Helicodiscus intermedius Morrison, 1942

Helicodiscus intermedius Pilsbry, 1948

Type locality: Bank of the Tennessee River, 14 miles west of Florence, about 1500 feet east of the mouth of Bluff Creek.

The shell is very small, depressed, translucent, and widely umbilicate. The whorls are rather glossy and have a microsculpture of strong, fine, close, spiral lines. The aperture is rounded, and the peristome is not reflected. The umbilicus measures about one-third of the diameter of the shell. The type measures 1.3 mm. in height and 2.5 mm. in diameter (after Morrison, in Pilsbry, 1948).

This species is known only from the type locality. The writer has not collected it, and data concerning its habitat are not available. Further collecting in the Ten-

nessee Valley of northern Alabama is needed to determine the extent of the range of intermedius, and the type of habitat in which it is found.

Alabama record:

Lauderdale Co. 14 mi. W. of Florence, near mouth of Bluff Creek (HAP)

Subfamily PUNCTINAE Morse

The shell is minute, depressed, and perforate to umbilicate. The whorls are sculptured with faintly to distinctly developed radial striae and microscopic spiral lines. The last whorl rarely bears a slender lamella within on the basal wall. The aperture is rounded, and the peristome is not reflected. This subfamily is represented in Alabama by a single genus.

Genus PUNCTUM Morse

The shell is minute, depressed, and openly umbilicate. The whorls are sculptured with faintly to distinctly developed radial striae and microscopic spiral lines. The last whorl rarely bears a slender lamella within on the basal wall. The genus is represented in Alabama by four species.

Punctum minutissimum (Lea), 1841

Plate VII, figure 17 A, B

Helix minutissima Lea, 1841

Punctum pygmaeum Walker, 1928 (nec Draparnaud, 1801)

Punctum minutissimum Pilsbry, 1948

Type locality: Vicinity of Cincinnati, Ohio.

The shell is minute, slightly depressed, and openly umbilicate. The whorls are sculptured with fine, close, radial striae and very fine microscopic spiral lines. The aperture is rounded, and the peristome is not reflected. The umbilicus measures about one-fourth of the diameter of the shell. Three shells average 0.8 mm. in height and 1.2 mm. in diameter.

According to Pilsbry (1948), this widely spread species ranges from Newfoundland to Oregon and southward to New Mexico and peninsular Florida. It is evidently distributed throughout Alabama, records being known from the Upper Austral of the northern part of the state and the Saballian of the southern part.

The known habitat of minutissimum in Alabama is under leaf litter and rocks, in mixed hardwood-cedar associations, on calcareous soils; the records for this species indicate, however, that it is found on noncalcareous soils as well. According to Pilsbry (1948), minutissimum "... lives on damp leaves, around decaying logs, and is chiefly to be obtained by sifting leaves...."

Alabama records:

Baldwin Co.	Foley (BW)
Chambers Co.	Langdale (BW)
Choctaw Co.	Silas (BW)
Cleburne Co.	Dugger Mountain (BW)
Conecuh Co.	Evergreen (BW)
Dallas Co.	Marion Junction (JH)
DeKalb Co.	Valley Head (BW); Manitou Cave, Ft. Payne (HCR)
Elmore Co.	Wetumpka (BW)

Hale Co.	5 mi. N. of U.S. 80, on Ala. 13 (JH)
Jackson Co.	Princeton; Woodville (BW)
Jefferson Co.	Squaw Shoals (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Huntsville; Monte Sano (BW)
Mobile Co.	Mobile (BW)
Montgomery Co.	McGee's Station (BW)
Randolph Co.	Roanoke; Wadley (BW)
Shelby Co.	Calera (BW)
Sumter Co.	Livingston (BW)
Tuscaloosa Co.	Hagler; Tuscaloosa (BW)

Punctum blandianum Pilsbry, 1900

Plate VII, figure 18

Punctum blandianum Pilsbry, 1900

Punctum blandianum Walker, 1928

Punctum blandianum Pilsbry, 1948

Type locality: Cade's Cove, Blount County, Tennessee.

The shell is smaller than that of minutissimum, and the base is more widely umbilicate. The whorls are sculptured with fine radial striae as in minutissimum, but the microscopic spiral lines are nearly obsolete. The umbilicus measures about one-third of the diameter of the shell. The shell measures 0.65 mm. in height and 1.2 mm. in diameter (after Pilsbry, 1948).

According to Pilsbry (1948), this species ranges from western Virginia southwestward through the Appalachians to northern Alabama. In the latter state, blandianum is known from Upper and Lower Austral zones in the northern tier of counties, from Lauderdale to Jackson.

The writer has not collected blandianum, and data concerning its habitat are not available. Further collecting in the Tennessee Valley and in the Appalachian system of

this state is needed to determine the ecological preferences and the extent of the range of this species.

Alabama records:

Jackson Co. Stevenson (BW); Paint Rock (HAP)
Lauderdale Co. Florence (BW)
Madison Co. Huntsville; Monte Sano (BW)

Punctum vitreum Baker, 1930

Plate VII, figure 19

Punctum vitreum Baker, 1930
Punctum vitreum Pilsbry, 1948

Type locality: New Braunfels, Comal County, Texas.

The shell is minute, depressed, translucent, and widely umbilicate. The whorls are sculptured with distinct, evenly-spaced rib-striae, between which are from five to ten minor growth ridges which are crossed by microscopic spiral lines. The aperture is rounded, and the peristome is not reflected. The umbilicus measures about one-third of the diameter of the shell. The type measures 0.8 mm. in height and 1.38 mm. in diameter (after Baker, in Pilsbry, 1948).

According to Pilsbry (1948), this species ranges from the Gulf Coast of Mexico northward and eastward to southern Iowa and New Jersey. In Alabama, vitreum is known only from the Upper Austral of Jackson County. In view of its coastal distribution in Mexico and Texas, it seems likely that vitreum may be found on the Coastal Plain of Alabama. Further collecting in the latter state is needed to deter-

mine the full extent of the range of this species.

The writer has not collected vitreum, and data concerning its habitat in Alabama are not available. Baker (in Pilsbry, 1948) states that vitreum is found on calcareous as well as noncalcareous soils.

Alabama record:

Jackson Co. Near Stevenson; mouth of Widow's Creek
 (HAP)

Punctum smithi Morrison, 1935

Plate VII, figure 20

Punctum smithi Morrison, 1935

Punctum smithi Pilsbry, 1948

Type locality: Near Huntsville, Madison County, Alabama.

The shell is minute, depressed, and widely umbilicate. The whorls are sculptured with distinct growth wrinkles and microscopic spiral lines. The last whorl bears a very small, obliquely placed lamella within on the basal wall. The aperture is rounded, and the peristome is not reflected. The umbilicus measures about one-third of the diameter of the shell. The type measures 0.62 mm. in height and 1.15 mm. in diameter (after Morrison, in Pilsbry, 1948).

According to Pilsbry (1948), the range of smithi extends from northern Kentucky southward to Alabama. In the latter state, smithi is known only from two localities on the Cumberland Plateau and one in the Piedmont Province. The writer has not collected this species, and data concerning its habitat are not available.

Alabama records:

Madison Co. Near Huntsville; Gurley (HAP)
Randolph Co. Wadley (HAP)

Family SUCCINEIDAE Morch

The imperforate shell varies from small to large, and from ovate to elongate-ovate. The spire is usually rather short, rarely high and pointed. There are from two to four convex or flattened, thin and fragile whorls, the last of which is about three times the size of the previous whorl. The sculpturing consists of faintly to distinctly developed growth wrinkles; frequently there is a microsculpture of spiral lines. The aperture varies from rounded to elongate-ovate. The peristome is not reflected. This family is represented in Alabama by a single genus.

Genus SUCCINEA Draparnaud

The imperforate shell varies from small to large, and from ovate to elongate-ovate. The spire is usually rather low, rarely high and pointed. There are from two to four distinctly convex whorls, the last of which is about three times the size of the previous whorl. The sculpturing of the whorls consists of faintly to distinctly developed growth wrinkles; frequently there is a microsculpture of spiral lines. The aperture varies from rounded to elongate-ovate, and the peristome is not reflected. According to Walker (1928) and Pilsbry (1948), this genus is repre-

sented in Alabama by eight species.

Succinea ovalis (Say), 1817

Plate VIII, figure 1

Succinea ovalis Say, 1817
Succinea ovalis Walker, 1928
Succinea ovalis Pilsbry, 1948

Type locality: Philadelphia, Pennsylvania.

"The shell is oval, inflated, thin, translucent, of a greenish yellow tint, the summit paler or reddish; glossy; lightly marked with wrinkles of growth. Whorls $2\frac{1}{2}$, strongly convex, the last inflated, convex throughout. The aperture is ovate, about three-fourths the length of shell." (Pilsbry, 1948)

According to measurements given by Pilsbry (1948) for ovalis, the shell averages 15.6 mm. in height and 10.3 mm. in diameter.

This species, according to Pilsbry (1948), ranges from Newfoundland and North Dakota southward to Alabama. Walker (1928) records ovalis from localities on the Coastal Plain in the latter state. The writer has not seen any shells from Alabama which could be referred to ovalis, and the records cited by Walker (1928) and Pilsbry (1948) need to be verified.

Alabama records:

Baldwin Co.	Point Clear; Magnolia Spgs. (BW); Baldwin Co. (HAP)
Mobile Co.	Mobile (BW); Mobile Co. (HAP)
Perry Co.	Uniontown (BW); Perry Co. (HAP)
Sumter Co.	7 mi. N.E. of Livingston (BW); Sumter Co. (HAP)
Tuscaloosa Co.	Tuscaloosa (BW); Tuscaloosa Co. (HAP)

Succinea aurea Lea, 1846

Plate VIII, figure 2

Succinea aurea Lea, 1846
Succinea aurea Walker, 1928
Succinea aurea Pilsbry, 1948

Type locality: Springfield, Ohio.

"The shell is small, ovate, inflated; yellow, the spire or the apex typically red-gold or salmon tinted (but often the whole shell is pale yellow). Surface glossy, under the microscope showing wrinkles of growth. Whorls 3, very convex, parted by a deep suture. The aperture is oblique, about two-thirds the total length of the shell." (Pilsbry, 1948)

According to measurements given by Pilsbry (1948) for aurea, the shell averages 8.4 mm. in height and 5.6 mm. in diameter.

The range of aurea, according to Pilsbry (1948), extends from Maine and Ontario southward to Indiana and coastal South Carolina. Walker (1928) records this species from coastal Alabama; his localities are about three hundred miles west and south of the southernmost record cited by Pilsbry (1948), and possibly are referable to S. unicolor Tryon. The writer has not seen any shells from Alabama which could be referred to aurea, and the records cited by Walker (1928) need to be verified.

Alabama records:

Baldwin Co. Point Clear (BW)
 Mobile Co. Mobile (BW)

Succinea unicolor Tryon, 1866

Plate VIII, figure 3

Succinea unicolor Tryon, 1866
Succinea campestris unicolor Walker, 1928
Succinea unicolor Pilsbry, 1948
Succinea ovalis Hinton, 1951 (nec Say, 1817)

Type locality: New Orleans, Louisiana.

The shell is small, ovate, very thin and fragile, and transparent. The spire is very low. There are three whorls, each of which is sculptured with fine, close, radial striae. The aperture is ovate, and the peristome is slightly expanded, but not reflected. Three shells average 7.5 mm. in height and 5.2 mm. in diameter. Shells referred to as ovalis by Hinton (1951) are referable to unicolor on the basis of size and sculpture.

According to Pilsbry (1948), unicolor ranges from coastal South Carolina southward to peninsular Florida and westward on the Gulf Coastal Plain to Galveston, Texas. The species is found only on the Coastal Plain, in Alabama, and is evidently not at all abundant. Its habitat in this state is under damp leaf litter and decaying logs in ravines and gullies, in mixed hardwood-pine and hardwood-cedar associations, on calcareous and noncalcareous soils.

Alabama records:

Hale Co.	5 mi. N. of Gallion (JH)
Marengo Co.	Demopolis (JH)
Mobile Co.	Kelly's Pond; Choctaw Point; Toulminville (BW)
Pickens Co.	Pickens-Tuscaloosa county line (HCR)
Sumter Co.	Epes (JH)
Tuscaloosa Co.	Hurricane Creek; Ralph (HCR)

Succinea grosvenori Lea, 1864

Plate VIII, figure 4 A, B

Succinea grosvenori Lea, 1864
Succinea grosvenori Walker, 1928
Succinea grosvenori Pilsbry, 1948

Type locality: Santa Rita Valley, Kansas.

The shell is rather large, oblong-ovate, thin, opaque, and pale yellow. The spire is low. There are from three to three and one-half strongly convex whorls which are sculptured with rather coarse growth wrinkles. Very faint microscopic spiral lines are visible in places on the periphery of the last whorl. The rounded aperture measures about one-half of the height of the shell. The shell averages 12.8 mm. in height and 7.8 mm. in diameter. (After Pilsbry, 1948)

This very widely spread species, according to Pilsbry (1948), ranges from Ontario and Montana southward to Arizona and Florida. It is evidently distributed throughout Alabama, having been recorded from the Upper Coastal Plain by Walker (1923), and from the Upper Austral of northeastern Alabama by Pilsbry (1948). The writer has not seen any shells from Alabama which could be referred to grosvenori, and data concerning its habitat in this state are not available.

Alabama records:

Dallas Co.	Dallas Co. (BW)
Jackson Co.	Woodville (HAP)

Succinea campestris Say, 1817

Plate VIII, figure 5

Succinea campestris Say, 1817
Succinea campestris Walker, 1928
Succinea campestris Pilsbry, 1948

Type locality: Sea Islands of Georgia; Amelia Island,
Nassau County, Florida.

The shell is rather large, ovate, thin, and translucent gray, with a few light streaks. The low spire is rather glassy in appearance. The three to three and one-half strongly convex whorls are sculptured with low growth wrinkles and faintly developed microscopic spiral lines. The aperture is ovate, and measures about three-fourths of the height of the shell. The shell averages 15.9 mm. in height and 10.9 mm. in diameter (after Pilsbry, 1948).

According to Pilsbry (1948), campestris ranges from coastal North Carolina southward to peninsular Florida. Walker (1928) recorded this species from coastal Alabama, about three hundred miles west of the localities cited by Pilsbry (1948). In view of the distribution of campestris on the Atlantic Coastal Plain, its occurrence on the Gulf Coastal Plain is entirely reasonable. Although the author has not seen any shells which could be referred to this species, further collecting below the fall line in Alabama, especially in Mobile and Baldwin counties, will probably verify the record cited by Walker (1928).

Alabama record:

Mobile Co. Nanna Hubbard Bluff, Mobile (BW)

Succinea luteola Gould, 1848

Plate VIII, figure 6

Succinea luteola Gould, 1848

Succinea floridana Walker, 1928

Succinea luteola floridana Pilsbry, 1948 (in part)

Succinea luteola Pilsbry, 1948

Succinea avara Hinton, 1951 (in part)

Type locality: Galveston, Texas.

The shell is rather large, elongate-ovate, thin, opaque, and flesh-colored, with brownish streaks. The spire is very high and pointed, and the apical whorls are glassy in appearance. There are from three to four rather convex whorls which are sculptured with low growth wrinkles. The ovate aperture measures about one-half of the height of the shell, and usually has a very faint yellow tint within. Fifty shells average 11.8 mm. in height and 5.4 mm. in diameter.

Walker (1928) recorded this species from Alabama as floridana Pilsbry. Pilsbry (1948) refers to floridana as a subspecies of luteola, stating that the former is characterized by being deeply tinted with yellow within the aperture. None of the Alabama shells seen by the writer were referable to floridana. Study of some of the shells labeled S. avara by Hinton (1951) proves them to be luteola.

According to Pilsbry (1948), luteola ranges from Mexico and Arizona eastward to southeastern Louisiana, whereas floridana, with the exception of the Alabama records by Walker (1928), is confined to the southern half of peninsular Florida. The northernmost record for floridana is

about 500 miles southeast of Walker's Alabama records for that subspecies, while the Louisiana record for luteola is only about 180 miles west of Walker's records for floridana. In view of the fact that none of the shells seen by the writer could be referred to floridana, and that the reliable records for that subspecies indicate that it is confined to southern Florida, the Alabama records for floridana cited by Walker (1928) are referred to luteola.

This species is generally distributed on the Coastal Plain of Alabama, where its habitat is among grasses and weeds, and under leaf litter, rocks, and decaying logs. It is found in mixed hardwood-pine and pine-cedar associations on calcareous and noncalcareous soils.

Alabama records:

Baldwin Co.	Point Clear (BW)
Dallas Co.	Dallas Co. (BW); 10 mi. W. of Selma on U.S. 80; Cahaba River on U.S. 80; $\frac{1}{2}$ mi. E. of Safford (HCR)
Hale Co.	Hale-Marengo Co. line; Jct. U.S. 80 and Ala. 13; 5 mi. N. of U.S. 80 (JH); Prairieville (AFA)
Marengo Co.	Demopolis; 7 mi. E. of Demopolis (JH); 2 mi. S. of Demopolis on U.S. 43 (HCR)
Montgomery Co.	Barachias; McGee's Station (BW)
Perry Co.	Hamburg (BW)
Sumter Co.	Epes (BW;JH;HCR); Livingston (BW;JH)
Wilcox Co.	Camden; Alberta; Gastonburg (BW)

Succinea concordialis Gould, 1848

Plate VIII, figure 7

Succinea concordialis Gould, 1848
Succinea concordialis Walker, 1928
Succinea concordialis Pilsbry, 1948

Type locality: Lake Concordia, Concordia Parish, Louisiana.

The shell is rather large, obliquely-ovate, thin, transparent, glossy, and pale yellow in color. The spire is moderately elevated, and the apical whorls are usually reddish-orange in color. There are from three to four moderately convex whorls which are sculptured with coarse growth wrinkles and faintly developed microscopic spiral lines. The ovate aperture measures about three-fourths of the height of the shell. The shell averages 16.4 mm. in height and 8.5 mm. in diameter (after Pilsbry, 1948).

According to Pilsbry (1948), this species ranges from central Texas and peninsular Florida northward through Arkansas and Tennessee to Iowa and Illinois. It was recorded from the Coastal Plain of Alabama by Walker (1928), and from the Tennessee Valley by Pilsbry (1948). In view of these records, and its distribution elsewhere, concordialis is probably distributed throughout Alabama. The writer has not collected this species, and data regarding its habitat in Alabama are not available; Pilsbry (1948) states, however, that concordialis "...lives on the moist earth immediately adjacent to the water's edge, and where found is usually abundant."

Alabama records:

Mobile Co.	Mobile (BW)
Montgomery Co.	Montgomery (BW)
Lauderdale Co.	Florence; Cypress Creek (HAP)

Succinea avara Say, 1824

Plate VIII, figure 8 A, B

Succinea avara Say, 1824
Succinea avara Walker, 1928
Succinea avara Pilsbry, 1948
Succinea avara Hinton, 1951 (in part)

Type locality: "Northwest Territory," Minnesota.

The shell is moderately large, slender, thin, and pale yellow. The spire is usually very high and pointed, and the apical whorls are glossy in appearance. There are about three very strongly convex whorls which are sculptured with rather coarse growth wrinkles. The rounded or slightly ovate aperture measures about one-half to two-thirds of the height of the shell. Fifty shells average 9.6 mm. in height and 6.0 mm. in diameter.

According to Pilsbry (1948), avara ranges from Newfoundland and British Columbia southward to peninsular Florida and Mexico. It is evidently distributed throughout Alabama, although records are lacking from some of the southeastern counties.

The habitat of avara in this state is among grasses and weeds, and under leaf litter, rocks, and decaying logs, in mixed hardwood-pine and pine-cedar associations, on non-calcareous and, more abundantly, on calcareous soils.

Alabama records:

Blount Co.	5 mi. S. of Oneonta on Ala. 38 (HCR)
Conecuh Co.	Evergreen (BW)
Dallas Co.	Cahaba River, on U.S. 80 (HCR)
Elmore Co.	Wetumpka (BW)
Etowah Co.	Atalla (BW)
Franklin Co.	Russellville (BW); 3 mi. S. of Russellville, on U.S. 43 (HCR)
Greene Co.	2 mi. E. of Marion Junction on U.S. 80; 11 mi. N. of Demopolis on U.S. 43; 8 mi. S. of Eutaw on U.S. 43 (JH)

Hale Co.	Jct. of U.S. 80 and Ala. 13; Hale-Marengo county line, on U.S. 80 (JH)
Jackson Co.	Woodville; Stevenson (BW)
Jefferson Co.	Squaw Shoals (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Huntsville; Gurley; Monte Sano (BW)
Marengo Co.	2 mi. S. of Demopolis on U.S. 43 (HCR); 2 mi. W. of Demopolis on U.S. 80; Faunsdale (JH)
Marshall Co.	Columbus (BW)
Mobile Co.	Mobile (BW)
Montgomery Co.	McGee's Station (BW)
Perry Co.	Marion; Uniontown (BW)
St. Clair Co.	Gallant (BW)
Sumter Co.	Epes (BW); 3 mi. N. of Livingston on U.S. 11 (JH)
Tuscaloosa Co.	Duncanville; Hagler; Tuscaloosa; Vance (BW); University (HCR); Rock Mt., near Abernant (AFA)
Wilcox Co.	Alberta (BW)

Family STROBILOPSIDAE Hanna

The shell is very small, depressed to globose-conic, perforate to umbilicate, and reddish-brown in color. The embryonic whorls are smooth and the later whorls are sculptured with distinct, evenly spaced, rib-striae. The aperture is small, lunate, and obstructed by small, thin lamellae which are present within the last whorl, on the basal and parietal walls. The peristome is reflected and somewhat thickened. This family is represented by one genus.

Genus STROBILOPS Pilsbry

The shell is very small, depressed to globose-conic, and perforate to umbilicate. The embryonic whorls are smooth and the later whorls are sculptured with distinct, evenly spaced, rib-striae which pass over the rounded to

angulate periphery and usually become less distinct on the base. The aperture is small, lunate, and obstructed by one or two slender parietal lamellae; deeper within the last whorl are from two to eight small basal lamellae, visible through the shell. This genus is represented in Alabama by two subgenera.

Subgenus STROBILOPS Pilsbry

The shell varies from depressed-globose to globose-conic, and the base is minutely perforate. There are from four to eight basal lamellae, visible through the shell. This subgenus is represented in Alabama by four species.

Strobilops labyrinthica (Say), 1817

Plate VIII, figure 9 A, B

Helix labyrinthica Say, 1817

Strobilops labyrinthica Walker, 1928

Strobilops labyrinthica virgo Walker, 1928

Strobilops labyrinthica parietalis Walker, 1928

Strobilops labyrinthica Pilsbry, 1948

Type locality: Philadelphia, Pennsylvania.

The shell is very small, globose-conic, and minutely perforate. The embryonic whorls are smooth, and the later whorls are sculptured with evenly spaced rib-striae which continue over the rounded periphery and become less distinct on the base. The aperture is small and lunate, and the peristome is reflected and thickened. There are two slender parietal lamellae within the last whorl, the ends of which are visible in the aperture. Between these

lamellae there is usually a very low interparietal lamella which is often discernible only after the base of the shell has been removed. About half a whorl within, on the basal wall, there is a series of from four to six lamellae, or basal folds, which are distinctly unequal in length and arranged in a forwardly curving pattern. Fifty shells average 1.8 mm. in height and 2.1 mm. in diameter.

According to Pilsbry (1948), labyrinthica differs from affinis by being less elevated and by having longer and distinctly unequal basal folds. Two variations of labyrinthica were referred to as the subspecies virgo and parietalis by Walker (1928); the former was characterized by having a lighter colored shell than labyrinthica, whereas parietalis was distinguished by having longer parietal lamellae. Pilsbry (1948) states that neither form is considered a valid subspecies.

The range of parietalis, according to Pilsbry (1948), extends from Pennsylvania and Florida westward to Louisiana; that of virgo extends from Maine and Minnesota to Arkansas; labyrinthica ranges from Maine and Minnesota southward to Florida and Arkansas. The lack of significant differences between the latter and virgo and parietalis, in addition to their completely overlapping ranges, substantiates the view that virgo and parietalis represent variations of, and are not subspecifically distinct from, the typical species.

Labyrinthica is evidently generally distributed

throughout Alabama, although records are lacking from some of the northwestern and southeastern counties. Its habitat in this state is under leaf litter, rocks, and the bark of decaying logs in mixed hardwood-pine and pine-cedar associations, on calcareous and noncalcareous soils. It is most commonly found under the bark of rotting hardwood logs; it has been collected, however, from the bark of decaying pine logs.

Alabama records:

Baldwin Co.	Foley (BW)
Barbour Co.	Elamville (BW)
Bibb Co.	Eoline; Woodstock (BW)
Blount Co.	5 mi. N. and S. of Oneonta, on Ala. 38 (HCR)
Chambers Co.	Langdale (BW)
Choctaw Co.	Silas (BW)
Clarke Co.	Jackson; Thomasville (BW)
Cleburne Co.	Mt. Cheaha (BW)
DeKalb Co.	Manitou Cave, Ft. Payne (HCR)
Elmore Co.	Wetumpka (BW)
Escambia Co.	Foshee (BW)
Jackson Co.	Princeton; Stevenson (BW)
Hale Co.	Newbern (JH)
Jefferson Co.	Adger (BW)
Macon Co.	Tuskegee (BW)
Madison Co.	Huntsville (BW)
Marengo Co.	Rembert (BW)
Mobile Co.	Mobile; Oak Grove (BW)
Perry Co.	Marion; Hamburg; Uniontown (BW)
Pickens Co.	Tuscaloosa-Pickens county line (HCR)
Randolph Co.	Wadley (BW)
Shelby Co.	Calera (BW)
St. Clair Co.	Jefferson Co. line, on U.S. 78 (HCR)
Sumter Co.	Epes; Livingston; York (BW)
Tuscaloosa Co.	Hagler; Duncanville; Holt; Tuscaloosa (BW); Lock 13; Peterson (HCR)

Strobilops texasiana Pilsbry and Ferris, 1906

Plate VIII, figure 10 A, B

Strobilops texasiana Pilsbry and Ferris, 1906

Strobilops texasiana Pilsbry, 1948

Type locality: About 4 miles above New Braunfels, Comal County, Texas.

The shell is very small, globose-conic, and minutely perforate. The embryonic whorls are sculptured with widely spaced rib-striae which pass over the rounded periphery and into the umbilical region. The aperture is small and lunate, and the peristome is reflected and thickened. There are two slender parietal lamellae and a very low, inconspicuous, interparietal lamella, each of which is about three-fourths of a whorl in length. About half a whorl within the aperture there is an obliquely radial series of from three to six unequal basal folds, visible through the base of the shell. Eight shells average 1.9 mm. in height and 2.3 mm. in diameter. The widely spaced rib-striae are diagnostic of this species, readily separating it from all other species of Strobilops.

According to Pilsbry (1948), typical texasiana is distinguished from the eastern subspecies, floridana, by having shorter parietal lamellae. The eight specimens taken by the writer were referred to texasiana, rather than to floridana, although the parietal lamellae in each case were slightly more than three-fourths of a whorl in length. Pilsbry (1948) states that, "...on examining long series I find some examples of floridana in which the parietal lamella is not over three-fourths of a whorl long, so that the distinction between floridana and texasiana is not a com-

plete one...." The fact that the parietal lamellae in the shells collected by the writer measured slightly more than three-fourths of a whorl in length suggests that these shells, while referable to the typical species, show features intermediate between texasiana and floridana. The locality in Mobile County, from which the writer's specimens were taken, has been shown to represent a blend zone area in the case of the subspecies of Polygyra septemvolva. Since floridana ranges southward from coastal Virginia to peninsular Florida and, according to Walker (1928), westward into Alabama, it would be interesting to know the localities from which the specimens mentioned in the quote from Pilsbry (1948) were collected.

The range of texasiana, according to Pilsbry (1948), extends from New Braunfels, Texas, eastward through Oklahoma to Arkansas and Louisiana. In Alabama, this species is known only from Spring Hill, Mobile County. This locality is about 250 miles east of the known range of texasiana, and constitutes a new record for the species. In view of its distribution above the Fall Line in Oklahoma, Texas, and Arkansas, texasiana will probably be found throughout Alabama. Further collecting in this state is necessary to establish this fact. The habitat of texasiana in Alabama is under the bark of decaying oak logs, in an oak-pine-cypress association on sandy, noncalcareous soil.

Alabama record:

Mobile Co. Spring Hill (HCR)

Strobilops texasiana floridana Pilsbry, 1927Strobilops texasiana floridana Pilsbry, 1927Strobilops texasiana floridana Walker, 1928Strobilops texasiana floridana Pilsbry, 1948

Type locality: Miami, Dade County, Florida.

The shell is very small, globose-conic, and minutely perforate. The embryonic whorls are smooth, and the remaining whorls are sculptured with widely spaced rib-striae which continue over the rounded periphery and into the umbilicus. The aperture is small and lunate, and the peristome is thickened and reflected. There are two slender parietal lamellae and a low, inconspicuous, interparietal lamella. The parietal lamellae are fully one whorl in length, thus differing from those of typical texasiana, which are about three-fourths of a whorl in length. About half a whorl within there is an obliquely radial series of from three to six unequal basal folds, visible through the shell (after Pilsbry, 1948).

The range of floridana, according to Pilsbry (1948), extends from coastal Virginia southward to peninsular Florida. Walker (1928) has recorded floridana from numerous localities above and below the Fall Line in Alabama. Pilsbry (1948) did not include Alabama in the range of floridana, and it is obvious that he either regards Walker's records as erroneous, or that he inadvertantly omitted them. The writer has not collected any specimens which could be referred to floridana, but eight shells referable to the typical species were taken in southwestern Alabama. These

shells exhibited features which might be construed as intermediate between texasiana and floridana, and it was suggested in the discussion of the typical species that the locality in which these shells were collected possibly represents a blend zone. Further collecting in southwestern Alabama and through Mississippi is necessary to clarify the relationship between texasiana and floridana, since the separation between the two is, according to Pilsbry (1948), not a complete one. Tentatively then, the writer prefers to retain floridana as a subspecies, although this status seems quite doubtful.

Alabama records:

Baldwin Co.	Point Clear; Magnolia Springs (BW)
Conecuh Co.	Evergreen (BW)
Lauderdale Co.	Florence (BW)
Lee Co.	Auburn (BW)
Mobile Co.	Mobile; Magazine Point (BW)
Montgomery Co.	McGee's Station (BW)
Shelby Co.	Calera (BW)
Sumter Co.	Livingston (BW)
Tuscaloosa Co.	Hagler; Duncanville; Vance (BW)
Wilcox Co.	Gastonburg (BW)

Strobilops affinis Pilsbry, 1893

Plate VIII, figure 11 A, B

Strobilops affinis Pilsbry, 1893
Strobilops affinis Walker, 1928
Strobilops affinis Pilsbry, 1948

Type locality: Upper Red Hook, Dutchess County, New York.

The shell is small, globose-conic, and minutely perforate. The embryonic whorls are smooth, and the remaining whorls are sculptured with evenly spaced rib-striae which

continue over the sub-angulate periphery and become less distinct on the base. There are two slender parietal lamellae which are about one-half a whorl in length; between these is a very low interparietal lamella which is about one-fourth of a whorl in length. About one-third of the way within the last whorl, and visible through the base, there is an obliquely radial series of about eight short, nearly equal, basal folds. The shell measures 2.5 mm. in height and 2.75 mm. in diameter (after Pilsbry, 1948). According to Pilsbry (1948), affinis is larger and distinctly more dome-shaped than labyrinthica, and the basal folds are decidedly more nearly equal in length.

The range of this species, according to Pilsbry (1948), extends from Massachusetts to Minnesota, and southward to northern Alabama and Oklahoma. Walker (1928) recorded affinis from the Upper Austral of northeastern Alabama and from the Coastal Plain. Pilsbry (1948) did not include Walker's records, and it is possible that he either inadvertently omitted them, or that he regarded them as mis-identifications of labyrinthica. In view of the distribution of affinis elsewhere, the Coastal Plain record of this species from Alabama by Walker (1928) is doubtful, and should be verified. The writer has not collected affinis, and data regarding its habitat in this state are not available.

Alabama records:

Jackson Co.	Stevenson (BW)
Perry Co.	Hamburg (BW)

Strobilops aenea Pilsbry, 1926

Plate VIII, figures 12, 14

- Strobilops aenea Pilsbry, 1926
Strobilops aenea spiralis Pilsbry, 1927
Strobilops aenea Walker, 1928
Strobilops aenea micromphala Walker, 1928
Strobilops aenea spiralis Walker, 1928
Strobilops aenea Pilsbry, 1948
Strobilops aenea spiralis Pilsbry, 1948

Type locality: Cazenovia, New York.

The shell is small, depressed-conic, and minutely perforate. The embryonic whorls are smooth, and the remaining whorls are sculptured with close, evenly spaced, rib-striae which usually become rather indistinct below the angulate periphery. There are two slender parietal lamellae and a very weak interparietal lamella, each of which is from half a whorl to three-fourths or more of a whorl in length. One third of a whorl within there is a radial series of from three to four basal folds, visible through the shell; the first fold, next to the columella, and the third fold are short and weak, and the second and fourth are longer and more distinct. Twenty shells average 1.6 mm. in height and 2.5 mm. in diameter. The more depressed form and the distinctly angulate periphery are diagnostic characteristics.

Pilsbry (1948) states that spiralis differs from the typical species by being somewhat less depressed and by having rather distinct rib-striae on the base. Walker (1928) recorded a second subspecies, micromphala, from Alabama, in addition to typical aenea and aenea spiralis. Micromphala, according to Pilsbry (1948), is lighter colored

than the typical species, and is regarded by him as a variation rather than a subspecies. Both spiralis and micromphala have ranges which are completely within that of typical aenea. Specimens referable to spiralis and micromphala were collected along with typical aenea by the writer. In view of these facts, neither spiralis nor micromphala are valid subspecies; furthermore, the differences between aenea, spiralis, and micromphala do not seem sufficiently distinct to warrant elevation of either of the latter two varieties to species level.

According to Pilsbry (1948), aenea ranges from Massachusetts and peninsular Florida westward to Louisiana, Arkansas, and Illinois. Based on records by Walker (1928) and the writer, this species ranges throughout Alabama, from the Upper Austral of Jackson County to the Saballian zone of Baldwin and Mobile counties.

The known habitat of aenea in this state is under the bark of decaying hardwood and pine logs, and in leaf litter and under stones in mixed hardwood-pine and pine-cedar associations, on calcareous and noncalcareous soils.

Alabama records:

Baldwin Co.	Magnolia Spgs. (AFA); Week's Bay; Simpson Island, Mobile River (BW)
Bibb Co.	Pratt's Ferry (HCR)
Blount Co.	Blount Spgs. (BW); 5 mi. N. and S. of Oneonta, on Ala. 38 (HCR)
Conecuh Co.	Evergreen (BW)
Covington Co.	Floralata (HCR)
Clarke Co.	Jackson; Thomasville (BW)
DeKalb Co.	Valley Head (BW)
Dallas Co.	5 mi. E. of Uniontown on U.S. 80 (JH)
Hale Co.	Havana (HCR); Newbern (JH)

Jackson Co.	Woodville; Stevenson; Princeton (BW)
Jefferson Co.	Henry Ellen (BW)
Madison Co.	Gurley; Huntsville (BW)
Marion Co.	Winfield (BW)
Mobile Co.	Mobile (BW); Spring Hill (HCR)
Montgomery Co.	Sprague (HCR)
Morgan Co.	Massey (HCR)
Perry Co.	Hamburg; Marion (BW)
Pickens Co.	4 mi. E. of Reform (HCR)
Randolph Co.	Wadley (BW)
Shelby Co.	Calera (BW); Montevallo (HCR)
St. Clair Co.	Whitney (BW)
Tuscaloosa Co.	Tuscaloosa; Duncanville (BW;HCR); 3 mi. W. of Vance, on U.S. 11; 4 mi. N. of Ralph, on U.S. 11; Lock 13; Hurricane Creek (HCR)
Wilcox Co.	Pine Hill (BW)

Subgenus DISCOSTROBILOPS Pilsbry

The shell is much depressed and openly umbilicate.

The subgenus is represented in Alabama by a single species.

Strobilops hubbardi (Brown), 1861

Plate VIII, figure 13 A, B

Helix hubbardi Brown, 1861

Strobilops hubbardi Walker, 1928

Strobilops hubbardi Pilsbry, 1948

Type locality: Indianola, Calhoun County, Texas.

The shell is small, very depressed, and openly umbilicate. The embryonic whorls are smooth, with traces of microscopic granulation; the remaining whorls are sculptured with unevenly spaced, close rib-striae which become weaker on the base. The aperture is rounded, and the peristome is reflected and thickened. There are two slender parietal lamellae which are about one-third of a whorl in length. About a third of a whorl in from the aperture

there is a radial series of from two to four short basal folds, visible through the shell. The shell averages about 1.3 mm. in height and 2.5 mm. in diameter. The depressed form and open umbilicus are diagnostic.

According to Pilsbry (1948), this species ranges from northeastern Mexico eastward on the Gulf Coastal Plain to Georgia and Florida. It was recorded from coastal Alabama by Walker (1928). The writer has not collected it, and data concerning its habitat in this state are not available.

Alabama records:

Baldwin Co.	Magnolia Spgs. (AFA); Week's Bay (BW)
Mobile Co.	Mobile; Saraland (BW)

Family PUPILLIDAE Pilsbry

The shell varies from small to minute, ovate to cylindrical, and perforate to umbilicate. There are from three to eight closely coiled, convex whorls. The aperture is ovate to round, rarely toothless, typically with from one to nine lamellate or tuberculate teeth or folds. The peristome is usually thin and expanded, rarely thickened and reflected. This family is represented in Alabama by four subfamilies.

Subfamily GASTROCOPTINAE Pilsbry

The shell is minutely perforate to openly umbilicate. The ovate to rounded aperture bears from two to nine teeth, of which the two on the parietal wall are fused, forming a

single, bifurcate denticle. The peristome is thin and distinctly expanded. Only one genus is found in this state.

Genus GASTROCOPTA Wollaston

The shell is minutely perforate. The aperture bears from two to nine teeth; the two parietal teeth are fused, forming a bifurcate denticle. This genus is represented in Alabama by four subgenera.

Subgenus ALBINULA Sterki

The aperture is nearly filled by the large teeth. The palatal teeth, or folds, are supported by a distinct callus ridge. Three species are found in this state.

Gastrocopta armifera (Say), 1821

Plate IX, figure 1

Pupa armifera Say, 1821

Bifidaria clappi Sterki, 1909

Gastrocopta armifera Walker, 1928

Gastrocopta armifera clappi Walker, 1928

Gastrocopta armifera Pilsbry, 1948

Gastrocopta armifera clappi Pilsbry, 1948

Type locality: Germantown, Philadelphia, Pennsylvania, by designation of Pilsbry (1948).

The shell is small, elongate-ovate, and grayish-white. There are about six glossy, convex whorls which are sculptured with irregularly spaced growth wrinkles. The aperture is ovate, and the peristome is greatly expanded. The bifurcate parietal lamella is rather sinuous. There are two strong, lamellate folds, and a small, tuberculate fold,

supported by a distinct callus ridge on the floor of the aperture. The lower half of the sub-vertical columellar lamella bears a horizontal branch which projects toward the aperture. Fifty shells average 4.1 mm. in height and 2.0 mm. in diameter. The large, grayish-white shell and the large teeth are diagnostic features which readily separate this species from all other species of Gastrocopta in Alabama.

A variation of this species, recorded from Alabama as the subspecies clappi (Sterki) by Walker (1928), is referred to as a form of typical armifera by Pilsbry (1948). This variety, according to Pilsbry (1948), differs from the typical species by lacking a horizontal branch on the columellar lamella. In addition, Pilsbry (1948) states that the shell is somewhat smaller, from 3.5 to 4.0 mm. in height, has a more acute apex, and is sculptured with finer striae, than typical armifera.

This species, according to Pilsbry (1948), ranges from Quebec and Alberta southward to northern Florida and western Texas, whereas the variety clappi is known only from eastern Tennessee and northern Alabama. Typical armifera is generally distributed throughout Alabama; clappi (according to Walker (1928), who recorded it, along with armifera, from Monte Sano) is found only in the Upper Austral of the northeast part of the state. The fact that the range of clappi is completely overlapped by that of armifera precludes the retention of subspecific status for the

former. The lack of a horizontal branch on the columellar lamella, which is the only concrete characteristic of clappi, does not seem to offer sufficient basis for elevating this variety to species level.

The habitat of armifera in this state is among weeds and grasses, under leaf litter, rocks, and decaying logs, in mixed hardwood-pine and pine-cedar associations. This species is found on calcareous as well as noncalcareous soils. Hinton (1951) found it to be very common in the Black Belt, and the writer has collected it in abundance in that region and in the limestone areas of the northern part of the state.

Alabama records:

Blount Co.	5 mi. S. of Oneonta, on Ala. 38 (HCR)
Choctaw Co.	Black Bluff; Moscow Bluff (BW)
Clarke Co.	Thomasville (BW)
Colbert Co.	Tuscumbia (BW)
Dallas Co.	Pleasant Hill (BW); 10 mi. W. of Selma (HCR); 2 mi. E. of Marion Junction (JH)
DeKalb Co.	Fort Payne (BW;HCR); Valley Head (HCR)
Elmore Co.	Wetumpka (BW)
Franklin Co.	Russellville (BW;HCR); Burleson (BW); 3 mi. W. of Newburg (HCR)
Greene Co.	Boligee (BW;HCR;JH); 8 mi. S. of Eutaw, on U.S. 43 (JH)
Hale Co.	Hale-Marengo county line; 5 mi. N. of U.S. 80, on Ala. 13; Newbern (JH)
Jackson Co.	Stevenson; Woodville (BW)
Jefferson Co.	2 mi. N.E. of Bessemer (AFA)
Lauderdale Co.	Florence (BW); Elgin (HCR)
Madison Co.	Huntsville; Gurley; Monte Sano (BW)
Marengo Co.	Demopolis (BW;HCR); 4 mi. W. of Demopolis on U.S. 80 (HCR)
Marshall Co.	3 mi. N. of Guntersville (HCR)
Mobile Co.	Mobile; Alabama Port (BW); Spring Hill (HCR)
Montgomery Co.	McGee's Station (BW)
Perry Co.	Hamburg (BW); Uniontown (JH)
Shelby Co.	Calera (BW); Montevallo (HCR)
Sumter Co.	Livingston (BW); Epes (BW;JH;HCR)
Wilcox Co.	Gastonburg (BW)

Gastrocopta contracta (Say), 1822

Plate IX, figure 2

Pupa contracta Say, 1822

Gastrocopta contracta Walker, 1928

Gastrocopta contracta Pilsbry, 1948

Type locality: Occoquan, Virginia.

The shell is small, ovate-conic, and bluish-white. There are about five glossy, convex whorls which are sculptured with fine growth wrinkles. The columellar and palatal walls of the last half of the last whorl are flattened, and the basal wall is distinctly angulate and ridge-like. The aperture is sub-triangulate, and the thin, expanded peristome is continuous over the parietal wall. The large bifurcate parietal lamella, which is joined to the parietal margin of the peristome, turns about ninety degrees to the right in its last half, and then about ninety degrees to the left in its last quarter; the second angle is visible only after the basal wall is removed. There is a small, tuberculate, upper palatal fold connected by a low callus ridge to a larger, lamellate, lower palatal fold. The upper end of the large, thin, subvertical columellar lamella turns toward the aperture. The shell averages 2.4 mm. in height and 1.4 mm. in diameter (after Pilsbry, 1948).

The range of contracta, according to Pilsbry (1948), extends from Maine, Ontario, and Manitoba, southward to Miami, Florida, and Vera Cruz, Mexico. The writer has not collected this species in Alabama, but on the basis of records by Walker (1928), it is generally distributed

throughout the state. Hinton (1951) recorded contracta from the Black Belt of Alabama, but study of his shell proves it to be climeana (Vanatta).

Alabama records:

Baldwin Co.	Magnolia Springs (BW)
Barbour Co.	Elamville (BW)
Blount Co.	Blount Springs (BW)
Chambers Co.	Langdale (BW)
Clarke Co.	Jackson (BW)
Conecuh Co.	Evergreen (BW)
Dallas Co.	Pleasant Hill (BW)
Franklin Co.	Russellville (BW)
Greene Co.	Boligee (BW)
Jackson Co.	Princeton; Stevenson; Pisgah; Woodville (BW)
Jefferson Co.	Squaw Shoals (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Huntsville; Gurley; Monte Sano (BW)
Mobile Co.	Mobile (BW)
Montgomery Co.	Montgomery (BW)
Perry Co.	Hamburg (BW)
Randolph Co.	Roanoke; Wadley (BW)
Sumter Co.	Livingston (BW)
Tuscaloosa Co.	Hagler; Duncanville (BW)
Walker Co.	Forks of Warrior River (BW)
Washington Co.	Twenty Mile Bluff (BW)
Wilcox Co.	Pine Hill; Gastonburg (BW)

Gastrocopta climeana (Vannata), 1911

Plate IX, figure 3

Bifidaria contracta climeana Vanatta, 1911

Gastrocopta contracta climeana Walker, 1928

Gastrocopta contracta climeana Pilsbry, 1948

Type locality: Near Anderson Landing, on the Sunflower River, near its confluence with the Yazoo River, in Yazoo County, Mississippi.

The shell is small, ovate-conic, and grayish-white.

There are about six glossy, convex whorls which are sculptured with weakly developed, unevenly spaced, growth wrinkles. The columellar and palatal walls of the last half

of the last whorl are flattened, as in contracta, and the basal wall is ridge-like. The aperture is subtriangulate, and the thin, expanded peristome is continuous over the parietal wall. The large, bifurcate, parietal lamella, which is joined to the parietal edge of the peristome, turns about ninety degrees to the right in its last third. Within the aperture, on the palatal wall, is a small, tuberculate, upper palatal fold which is joined by a low callus ridge to a larger, more deeply placed, lamellate, lower palatal fold. The upper end of the large, thin, subvertical, columellar lamella is slightly directed toward the aperture. Two shells average 2.1 mm. in height and 1.2 mm. in diameter. Climeana differs from contracta by being smaller, with weaker sculpture, and by having an L-shaped parietal lamella.

Walker (1928) and Pilsbry (1948) record climeana as a subspecies of contracta. The range of climeana, which according to Pilsbry (1948) extends from Alabama westward on the Gulf Coastal Plain to southern Texas, is completely within that of typical contracta. In view of this fact, climeana is not considered to be a subspecies of the latter. On the basis of its smaller size and weaker sculpture, in addition to the distinctly L-shaped parietal lamella, climeana is regarded as sufficiently distinct from contracta to be elevated to species level.

In Alabama, this species is found on the Coastal Plain, and Walker (1928) records it from one locality above

the Fall Line. In view of the coastal distribution of climeana elsewhere, Walker's record is doubtful and should be verified.

The habitat of this species in Alabama is under leaf litter in mixed hardwood-pine and pine-cedar associations, on calcareous and noncalcareous soils.

Alabama records:

Baldwin Co.	Blakely; Simpson Island (HAP)
Elmore Co.	Wetumpka (BW)
Lowndes Co.	3 mi. W. of junction of U.S. 80 and Ala. 11 near Lowndesboro (HCR)
Shelby Co.	Calera (BW)
Sumter Co.	Epes (JH)

Subgenus VERTIGOPSIS Sterki

The parietal lamellae are almost completely fused, forming a low, small, indistinctly bifurcate lamella. From five to nine palatal folds are present, supported by a low callus ridge. The strong columellar lamella is subhorizontal. This subgenus is represented in Alabama by a single species.

Gastrocopta pentodon (Say), 1821

Plate IX, figures 4 A, B, and 5

Vertigo pentodon Say, 1821
Pupa curvidens Gould, 1841
Pupa tappaniana Adams, 1842
Gastrocopta pentodon Walker, 1928
Gastrocopta pentodon gracilis Walker, 1928
Gastrocopta tappaniana Walker, 1928
Gastrocopta pentodon Pilsbry, 1948
Gastrocopta tappaniana Pilsbry, 1948

Type locality: Pennsylvania.

The shell is small, ovate-conic, and bluish-white. There are about five smooth, convex whorls, the last of which bears a weakly to strongly developed, radial crest behind the peristome. The aperture is rounded, and the peristome is thin and unexpanded. The parietal lamellae are almost completely fused, forming a low, small, indistinctly bifurcate lamella. There are from five to nine small palatal folds, which are supported by a low callus ridge. The strong columellar lamella is subhorizontal. Ten shells average 1.7 mm. in height and 1.1 mm. in diameter. The size and color of the shell, in addition to the seemingly simple parietal lamella, characterize this species.

The nomenclature of this species has been in a confused state since Gould (1841) described Pupa curvidens, and Adams (1842) described Pupa taopaniana. For a long time, according to Pilsbry (1948), pentodon was known as curvidens, and taopaniana as pentodon. Pilsbry (1948) states that curvidens (Gould) differed from Say's type of pentodon by having nine teeth, whereas the latter had only five teeth. According to Pilsbry (1948), there is no distinction between typical pentodon and curvidens, the number of teeth varying from five to nine in adult shells from any one locality. Pilsbry (1948) retains taopaniana as a separate species, stating that it differs from pentodon by being larger, and by having a smaller lower palatal fold; measurements given for shells of the former species average

1.8 mm. in height and 1.1 mm. in diameter. There does not seem to be any concrete difference between tappaniana and pentodon; in support of this view is the statement by Pilsbry (1948) that, "...occasional individuals are intermediate between tappaniana and pentodon...." Further support is offered in the statement by Pilsbry (1948) that figures representing tappaniana and pentodon are united under the latter name in publications by W. G. Binney. Reference to Binney and Bland (1869), and to Binney (1885), confirms the latter statement. In view of the available evidence therefore, tappaniana is considered synonymous with pentodon.

The range of pentodon, according to Pilsbry (1948), extends from Prince Edward and Magdalen Islands westward to Alberta, and southward through the eastern two-thirds of the United States to peninsular Florida and eastern Mexico and Guatemala. Pentodon is generally and rather abundantly distributed throughout Alabama, although records are lacking from some of the southeastern counties.

The habitat of pentodon in Alabama is among weeds and grasses and under leaf litter, rocks, and decaying logs, in mixed hardwood-pine and pine-cedar associations, on calcareous and noncalcareous soils.

Alabama records:

Baldwin Co.	Magnolia Spgs.; Week's Bay (BW)
Blount Co.	Blount Spgs. (BW)
Chambers Co.	Langdale (BW)
Choctaw Co.	Silas (BW)
Clarke Co.	Thomasville; Jackson (BW)
Conecuh Co.	Evergreen (BW)
DeKalb Co.	Valley Head (BW); Fort Payne (HCR)

Elmore Co.	Wetumpka (BW)
Fayette Co.	Forks of Sipsey River (BW)
Greene Co.	Allison (JH)
Hale Co.	Hale-Marengo county line (JH)
Jackson Co.	Stevenson; Woodville; Princeton; Paint Rock; Cumberland Plateau (BW)
Jefferson Co.	Henry Ellen; Squaw Shoals (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Huntsville; Monte Sano; Gurley (BW)
Marengo Co.	Demopolis (BW;JH)
Marshall Co.	Guntersville (HCR)
Mobile Co.	Mobile; Oak Grove (BW)
Montgomery Co.	McGee's Station (BW)
Perry Co.	Hamburg; Uniontown; Marion (BW)
Shelby Co.	Calera (BW)
Sumter Co.	Epes; Livingston (BW)
Tuscaloosa Co.	Hagler; Duncanville (BW); University; Tuscaloosa (BW;AFA)
Walker Co.	Forks of Warrior River (BW)
Washington Co.	Twenty Mile Bluff (BW)
Wilcox Co.	Pine Hill; Alberta; Gastonburg (BW)

Subgenus PRIVATULA Sterki

The parietal lamellae are almost completely fused, forming a low, small, bilobed lamella. There are no palatal folds. The columellar lamella is very small and tuberculate. This subgenus is represented by a single species.

Gastrocopta corticaria (Say), 1817

Plate IX, figure 8

Odostomia corticaria Say, 1817
Gastrocopta corticaria Walker, 1928
Gastrocopta corticaria Pilsbry, 1948

Type locality: Philadelphia, Pennsylvania, by designation of Pilsbry (1948).

The shell is small, elongate-cylindrical, and translucent-white. There are about six smooth, convex, whorls which are sculptured with faintly developed growth wrinkles.

The aperture is ovate, and the peristome is thin and expanded. The parietal lamellae are almost completely fused, forming a low, small, bilobed lamella. There are no palatal folds. The small, tuberculate, columellar lamella is subvertical, and bears a minute tubercle on the anterior face of the lower end. The shell measures about 2.5 mm. in height and 1.0 mm. in diameter (after Pilsbry, 1948).

This distinctive species, according to Pilsbry (1948), ranges from Maine and Minnesota southward to Coastal Georgia, northern Florida, and eastern Louisiana. On the basis of records by Walker (1928), corticaria is evidently distributed throughout Alabama. The writer has not collected it, and data regarding its habitat in this state are not available. Pilsbry (1948) states that corticaria is often found on the trunks of trees, and rarely occurs in abundance.

Alabama records:

Blount Co.	Blount Spgs. (BW)
Clarke Co.	Thomasville (BW)
DeKalb Co.	Valley Head (BW)
Franklin Co.	Russellville (BW)
Greene Co.	Boligee (BW)
Jackson Co.	Stevenson; Princeton ; Woodville (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Huntsville; Gurley; Monte Sano (BW)
Mobile Co.	Mobile; Whistlet (BW)
Randolph Co.	Roanoke (BW)
Sumter Co.	Epes (BW)

Subgenus GASTROCOPTA Wollaston

The parietal lamellae are almost fused, forming a bifurcate lamella. The two palatal folds are not supported

by a callus ridge. The columellar lamella is horizontal and short. This subgenus is represented in Alabama by three species.

Gastrocopta rupicola (Say), 1821

Plate IX, figure 6 A, B

Pupa rupicola Say, 1821

Gastrocopta rupicola Walker, 1928

Gastrocopta rupicola Pilsbry, 1948

Type locality: Ruins of Old Fort Picolata, St. Johns River, Florida.

The shell is small, elongate-cylindrical, and pale brown. There are about five convex whorls which are sculptured with unevenly spaced, fine striae. The last whorl bears a low crest behind the peristome. The aperture is ovate, and the peristome is expanded and conspicuously thickened on its inner margin. The parietal lamellae are fused, forming a slightly bifurcate lamella. There is a small, tuberculate, upper palatal fold near the thickened peristome; below it, and somewhat deeper within the aperture is a larger, lamellate, lower palatal fold. There usually is a low baso-columellar fold situated between the lower palatal fold and the horizontal columellar lamella. The shell measures 2.5 mm. in height and 1.1 mm. in diameter (after Pilsbry, 1948).

According to Pilsbry (1948), rupicola ranges from South Carolina to the Florida Keys, and westward on the Gulf Coastal Plain to Galveston, Texas. Walker (1928)

shells average 2.6 mm. in height and 1.2 mm. in diameter.

The form referred to as the subspecies riparia by Walker (1928) lacks the tubercle below the columellar lamella; it is regarded by Pilsbry (1948) as a variation of typical procera, and not deserving of subspecific rank.

According to Pilsbry (1948), typical procera ranges from Maryland and eastern Kansas southward to Alabama and eastern Texas. It is generally distributed throughout Alabama, although records are lacking from some of the southeastern counties.

The habitat of procera in this state is among weeds and grasses, and under leaf litter, rocks, and decaying logs in mixed hardwood-pine and pine-cedar associations, on calcareous and noncalcareous soils.

Alabama records:

Dallas Co.	2 mi. E. of Marion Junction on U.S. 80 (JH); Cahaba River, on U.S. 80 (HCR)
DeKalb Co.	Valley Head (BW)
Elmore Co.	Wetumpka (BW)
Greene Co.	Boligee (BW)
Hale Co.	Junction of U.S. 80 and Ala. 13 (JH)
Lauderdale Co.	Florence (BW)
Madison Co.	Huntsville; Monte Sano (BW)
Marengo Co.	Demopolis (BW;HCR;JH)
Mobile Co.	Mobile; Oak Grove (BW)
Montgomery Co.	Barachias; Montgomery (BW)
Perry Co.	Marion; Hamburg (BW); Uniontown (BW;JH)
Shelby Co.	Calera (BW)
Sumter Co.	Livingston; York (BW); Epes (BW;HCR;JH)
St. Clair Co.	Whitney (BW)
Tuscaloosa Co.	Tuscaloosa (BW:AFA)
Wilcox Co.	Gastonburg (BW)

Gastrocopta pellucida (Pfeiffer), 1841

Pupa pellucida Pfeiffer, 1841

Gastrocopta pellucida Walker, 1928

Type locality: Cuba.

The shell is small, elongate-cylindrical, glossy, translucent, and pale yellow. There are $5\frac{1}{2}$ rather convex whorls which are sculptured with minute striae. The last whorl is strongly flattened over the lower palatal fold, and there is no trace of a crest or ridge behind the peristome. The aperture is ovate, and the peristome is slightly thickened and expanded. The parietal lamellae are fused, forming an inconspicuously bifid lamella. The lower palatal fold is larger than the upper fold, and more deeply situated within the aperture. A short basal fold is present between the lower palatal fold and the strong, horizontal, columellar lamella. The latter bears a small tuberculate callus below the inner termination. The shell measures about 1.7 mm. in height and 0.8 mm. in diameter (after Pilsbry, 1948).

According to Pilsbry (1948), this species is confined to the West Indies. Walker (1928) records it from Mobile, in southwestern Alabama, where it possibly was introduced by commerce and has managed to become established. The writer has not seen specimens referable to pellucida. Further collecting in the vicinity of Mobile is needed to validate the existing record.

Alabama record:

Mobile Co. Mobile (BW)

Gastrocopta pellucida hordeacella (Pilsbry), 1890

Plate IX, figure 9

Pupa hordeacella Pilsbry, 1890

Gastrocopta pellucida hordeacella Walker, 1928

Gastrocopta pellucida hordeacella Pilsbry, 1948

Type locality: New Braunfels, Comal County, Texas.

The shell is small, elongate-cylindrical, and pale brown. There are from five to six strongly convex whorls which are sculptured with unevenly spaced, fine, striae. The last whorl is strongly flattened and impressed over the lower palatal fold, and there is a weakly developed crest behind the peristome. The aperture is ovate, and the peristome is thin and expanded. The parietal lamellae are fused, forming a bilobed lamella. The upper palatal fold is small and situated near the margin of the peristome; the lower palatal fold is larger and more deeply placed within the aperture. A small, tuberculate, basal fold is usually present between the lower palatal fold and the strong, horizontal, columellar lamella. The shell measures about 2.0 mm. in height and 0.8 mm. in diameter (after Pilsbry, 1948).

This subspecies, according to Pilsbry (1948), ranges from coastal New Jersey to Peninsular Florida and the Keys, and westward to southeastern Colorado, Arizona, and Tampico, Mexico. Hordeacella is known in Alabama only from

the coastal portion in the southwestern part of the state, but in view of its distribution in northern and western states, will probably be found throughout this state. The writer has not collected this subspecies, and data concerning its habitat in Alabama are not available.

Alabama records:

Baldwin Co. Point Clear; Week's Bay (BW)
Mobile Co. Mobile (BW)

Subfamily PUPILLINAE Pilsbry

The shell is small, elongate-cylindrical, and has a bluntly to acutely contoured apex. There are from five to seven convex whorls which are sculptured with faintly to distinctly developed growth striae or with distinct rib-striae. The ovate aperture bears from one to three tuberculate or lamellate teeth. The peristome is thickened, expanded, and rather flatly reflected. This subfamily is represented in Alabama by a single genus.

Genus PUPOIDES Pfeiffer

The shell is small, elongate-cylindrical, tapering to an acute apex. There are from five to six convex whorls which are sculptured with faintly to distinctly developed growth striae, or with rib-striae. The ovate aperture usually bears a low, tuberculate, denticle on the parietal wall, at the insertion of the thickened and flattened peristome. Only one species is found in this state.

Pupoides albilabris (Adams), 1841

Plate X, figure 1

Cyclostoma marginata Say, 1821 (nec Fischer, 1807)Pupa albilabris Adams, 1841Pupoides marginatus Walker, 1928 (nec Fischer, 1807)Pupoides modicus Walker, 1928 (nec Gould, 1848)Pupoides albilabris Pilsbry, 1948Pupoides albilabris Hinton, 1951

Type locality: Upper Missouri.

The shell is small, elongate-cylindrical, tapering to an acute apex. There are from five to six convex whorls which are sculptured with faintly developed growth striae. The ovate aperture bears a low, tuberculate denticle on the parietal wall, at the upper insertion of the thickened and flattened peristome. Twenty shells average 4.9 mm. in height and 1.8 mm. in diameter. The slender shell, tapering to the apex, the flattened and thickened peristome, and the low, tuberculate denticle characterize this species. Pilsbry (1948) states that toothless specimens of albilabris resemble modicus (Gould). The latter species was recorded from Alabama without locality by Walker (1928). According to Pilsbry (1948), it ranges from the offshore islands of Georgia to the Florida Keys, and is not considered to be in Alabama.

The range of albilabris, as given by Pilsbry (1948), extends from Ontario and Maine westward to the Dakotas and southward to Cuba, Haiti, and Tampico, Mexico. This species is generally and rather abundantly distributed throughout Alabama. Its habitat in this state is among grasses and weeds, and under leaf litter, rocks, and decaying logs in

mixed hardwood-pine and pine-cedar associations, on calcareous and noncalcareous soils. Hinton (1951) found albibris in abundance on the chalky soils of the Black Belt, and the writer has collected large series of this species on rocks and trunks of cedar trees, on limestone flats in northern Alabama.

Alabama records:

Blount Co.	Blount Spgs. (BW); 5 mi. S. of Oneonta (HCR)
Choctaw Co.	Black Bluff (BW)
Colbert Co.	Tuscumbia (BW;HCR)
Conecuh Co.	Evergreen (BW)
Dallas Co.	10 mi. W. of Selma; Cahaba River (HCR); 2 mi. E. of Marion Junction (JH)
DeKalb Co.	Fort Payne (BW;HCR); Valley Head (BW)
Elmore Co.	Wetumpka (BW)
Franklin Co.	Russellville (BW;HCR); 3 mi. W. of Newburg (HCR)
Greene Co.	Boligee (BW;JH); Allison (JH)
Hale Co.	Newbern; Hale-Marengo county line (JH)
Jackson Co.	Stevenson (BW)
Lauderdale Co.	Florence (BW); Elgin (HCR)
Lowndes Co.	Tallahassee Creek (HCR)
Madison Co.	Huntsville; Gurley; Monte Sano (BW); 6.5 mi. N. of New Hope (HCR)
Marengo Co.	Demopolis (BW;JH)
Marshall Co.	Guntersville (HCR)
Mobile Co.	Oak Grove; Calvert; Mobile (BW)
Montgomery Co.	Barachias; Montgomery; McGee's Station (BW)
Perry Co.	Uniontown (BW;JH); Hamburg (BW)
Shelby Co.	Calera (BW)
St. Clair Co.	Whitney (BW)
Sumter Co.	York; Livingston (BW); Epes (JH;HCR)
Tuscaloosa Co.	Tuscaloosa (BW)
Walker Co.	Forks of Warrior River (BW)
Wilcox Co.	Camden; Gastonburg (BW)

Subfamily VERTIGININAE Pilsbry

The shell is minute, ovate or cylindrical, and varies from pale to dark brown. There are from four to eight convex whorls which are sculptured with faintly to distinctly developed growth striae. The ovate aperture, which is

rarely toothless, typically bears six teeth; those on the parietal wall are not fused as in the Gastrocoptinae. The peristome is thin and somewhat expanded. This subfamily is represented in Alabama by two genera.

Genus VERTIGO Muller

The shell is minute, ovate, and brown. There are from four to six convex whorls which are sculptured with faintly to distinctly developed growth striae. The ovate aperture bears from three to six teeth, none of which are fused. The peristome is thin and somewhat expanded. This genus is represented in Alabama by three subgenera.

Subgenus ANGUSTULA Sterki

The parietal lamellae are strongly developed. The palatal folds are long and well developed. The columellar lamella is crescent-shaped. Only one species is found in this state.

Vertigo milium (Gould), 1840

Plate X, figure 2 A, B

Pupa milium Gould, 1840

Vertigo milium Walker, 1928

Vertigo milium Pilsbry, 1948

Vertigo milium Hinton, 1951

Type locality: Oak Island, Chelsea, Massachusetts.

The shell is minute, ovate, and pale brown. There are from four to five glossy convex whorls which are sculptured

with very faintly developed growth striae. There are two well developed parietal lamellae, two long slender palatal folds, a short basal fold, and a distinctly crescent-shaped columellar lamella within the aperture. Two shells average 1.6 mm. in height and 1.0 mm. in diameter. The shape of the columellar lamella is diagnostic of this species.

Pilsbry (1948) states that milium ranges from Maine and South Dakota southward to the Florida Keys and Tampico, Mexico. Walker (1928) records this species from localities in northern and southern Alabama, indicating that it is probably generally distributed throughout the state.

Hinton (1951) records milium from a cedar glade in the Black Belt; the writer has collected only one shell of this species, which was found under leaf litter in a mixed hardwood-pine association, on calcareous soil. On the basis of records by Walker (1928), milium is found on calcareous and noncalcareous soils alike, and probably inhabits leaf litter and surface debris in mixed hardwood-pine and cedar associations.

Alabama records:

Baldwin Co.	Magnolia Springs (BW)
Choctaw Co.	Silas (BW)
Clarke Co.	Jackson (BW)
DeKalb Co.	Valley Head (BW)
Elmore Co.	Wetumpka (BW)
Jackson Co.	Princeton; Stevenson (BW)
Madison Co.	Monte Sano (BW)
Marengo Co.	Demopolis (JH)
Montgomery Co.	Sprague (HCR)
Shelby Co.	Calera (BW)
Wilcox Co.	Gastonburg (BW)

Subgenus VERTILLARIA Pilsbry

There is only one lamella on the parietal wall. The palatal folds are very weakly developed and frequently are not discernible. The basal fold is absent, and the columellar lamella is in the form of a vertical plate. Only one species is found in this state.

Vertigo oscariana Sterki, 1890

Plate X, figure 3

Vertigo oscariana Sterki, 1890
Vertigo oscariana Walker, 1928
Vertigo oscariana Pilsbry, 1948

Type locality: Mosquito Island, Volusia County, Florida.

The shell is minute, oblong-ovate, and light tan. There are from four to five rather convex whorls which are sculptured with fine, distinctly developed growth striae. There is a single low parietal lamella, a rather deeply immersed short palatal fold, and a blunt, vertical, columellar lamella within the ovate aperture. One shell measures 1.5 mm. in height and 1.0 mm. in diameter.

The range of oscariana, as given by Pilsbry (1948), extends from southern West Virginia southward to Miami, Florida, and westward to Comal County, Texas. The distribution of this species in Alabama, on the basis of records by Walker (1928), is statewide. The writer has collected only one shell, from leaf litter in a mixed hardwood-pine association, on noncalcareous soil. Further collecting in the state is needed to verify the apparent distribution of

oscariana, and to establish its habitat.

Alabama records:

Baldwin Co.	Week's Bay (BW)
Chambers Co.	Langdale (BW)
Conecuh Co.	Evergreen (BW)
Elmore Co.	Wetumpka (BW)
Jackson Co.	Stevenson (BW)
Jefferson Co.	Squaw Shoals (BW)
Pickens Co.	4 mi. E. of Reform, on U.S. 82 (HCR)

Subgenus VERTIGO Muller

There are from four to nine moderately to well developed teeth within the ovate aperture; one of the two parietal lamellae, and the basal fold, are rarely absent. The strongly developed columellar lamella is subhorizontal. Six species are found in this state.

Vertigo rugosula Sterki, 1890

Plate X, figure 4 A, B

Vertigo rugosula Sterki, 1890
Vertigo rugosula Walker, 1928
Vertigo rugosula Pilsbry, 1948
Vertigo rugosula Hinton, 1951

Type locality: Sullivan's Island, South Carolina.

The shell is minute, ovate-cylindrical, and dark brown. There are from four to five convex whorls which are sculptured with distinct growth striae. The last whorl is deeply impressed on the palatal wall, behind the peristome. There are two strongly developed parietal lamellae, two equally strong palatal folds, a low, short, basal fold, and a strong subhorizontal columellar lamella. Four shells

average 1.7 mm. in height and 1.1 mm. in diameter.

According to Pilsbry (1948), rugosula ranges from Coastal South Carolina southward and westward through Tennessee, Alabama, Louisiana, and Oklahoma, to eastern Texas. Walker (1928) records this species from localities in northern and southern Alabama, indicating that it is probably generally distributed throughout the state.

Hinton (1951) collected rugosula among grasses and weeds, in a cedar glade in the Black Belt. The writer has not collected this species, and additional information concerning its ecological preferences in this state is not available.

Alabama records:

Choctaw Co.	Silas (BW)
DeKalb Co.	Valley Head (BW)
Madison Co.	Monte Sano (BW)
Shelby Co.	Calera (BW)
Sumter Co.	Livingston; York (BW); Epes (BW;JH)

Vertigo oralis Sterki, 1890

Plate X, figure 5

Vertigo rugosula var. ovulum Sterki, 1890 (nec
Pfeiffer, 1841)

Vertigo rugosula oralis Pilsbry, 1898

Vertigo oralis Walker, 1928

Vertigo rugosula oralis Pilsbry, 1948

Type locality: Volusia County, Florida.

The shell is minute, ovate, and dark brown. There are from four to five glossy convex whorls which are sculptured with faintly developed growth striae. The last whorl is impressed on the palatal wall, and often bears a light

colored crest behind the peristome. There are two well developed parietal lamellae and two equally well developed palatal folds; a low, short, basal fold and a strong, sub-horizontal, columellar lamella are rather deeply placed within the aperture. The shell averages 1.8 mm. in height and 1.1 mm. in diameter (after Pilsbry, 1948).

This species, formerly regarded as a variation of rugosula, differs from the latter by being more glossy and much less distinctly striated, by having a crest on the last whorl, and by having a more deeply placed columellar lamella and basal fold. Walker (1928) records oralis as a species, distinct from rugosula, whereas Pilsbry (1948) retains it as a subspecies of the latter, stating that, "This may be a distinct species, as Dr. Sterki ultimately concluded."

As given by Pilsbry (1948) the range of oralis extends from northern Alabama to southern Florida; the northern half of this range is completely within that of typical rugosula. Walker (1928) records oralis and rugosula from the same localities in northern and southern Alabama, and Pilsbry (1948) states that oralis is generally distributed in this state. Intergradation between oralis and rugosula in Alabama has not been demonstrated, and it seems improbable that two non-intergrading subspecies would be found over such a wide area. For these reasons it seems advisable to elevate oralis to specific level.

The writer has not collected this species, and data concerning its habitat in Alabama are not available.

Alabama records:

Elmore Co.	Wetumpka (BW)
Madison Co.	Huntsville (BW)
Mobile Co.	Mobile (BW)
Shelby Co.	Calera (BW)
Sumter Co.	York (BW)
Wilcox Co.	Gastonburg (BW)

Vertigo alabamensis Clapp, 1915

Plate X, figure 6 A, B

Vertigo alabamensis Clapp, 1915

Vertigo alabamensis conecuhensis Clapp, 1915

Vertigo alabamensis Walker, 1928

Vertigo alabamensis conecuhensis Walker, 1928

Vertigo alabamensis Pilsbry, 1948

Vertigo alabamensis conecuhensis Pilsbry, 1948

Type locality: Ravine near junction of North and Black Rivers, Tuscaloosa County, Alabama.

The shell is minute, ovate-cylindrical, and light brown. There are from five to six rather convex whorls, the last of which is deeply immersed on the palatal wall. The innermost parietal lamella, next to the columella, is rather long and erect; the outer lamella is short and low. The two palatal folds are strongly developed. The basal fold is usually very low, and is often entirely absent. The subhorizontal columellar lamella is usually well developed. The shell averages 1.7 mm. in height and 1.1 mm. in diameter (after Pilsbry, 1948).

The form of alabamensis referred to as the subspecies conecuhensis by Clapp (1915), Walker (1928), and Pilsbry

(1948), differs from the typical species in being somewhat shorter, more globose, and by having less strongly developed teeth, according to Pilsbry (1948). On the basis of measurements given by Pilsbry (1948), however, shells of conecuhensis average 1.6 mm. in height and 1.0 mm. in diameter. The size of the shell, therefore, does not tend to be diagnostic of conecuhensis. The writer has not collected this form, but comparison of figures of typical alabamensis and conecuhensis in Walker (1928) and Pilsbry (1948) does not show the teeth of the latter to be significantly smaller than those of the former. The measurements given above, in addition to the lack of sufficiently diagnostic characters, indicate that conecuhensis represents a variation of typical alabamensis and should not be retained as a subspecies.

Alabamensis is known only from the type locality; the form known as conecuhensis has been found only at Evergreen, in Conecuh County, about 150 miles south of Tuscaloosa. Further collecting throughout the state is needed to establish the distribution of this species.

According to Pilsbry (1948), the habitat of alabamensis is among rotting leaves in a ravine near the junction of North and Black Warrior Rivers. This locality is in a mixed hardwood-pine association, on noncalcareous soils of the Pottsville Formation. The Conecuh County locality is on sandy calcareous soils characterized by chalky Ocala limestone which is exposed only locally. These data indi-

its smaller size, lack of an outer parietal lamella, and fewer teeth, was recorded from Alabama by Walker (1928), who gave no locality. This species, according to Pilsbry (1948), ranges from Prince Edward Island and Michigan southward to New York, Ohio, and Missouri, and is not considered to be in Alabama.

According to Pilsbry (1948), ovata is the most widely distributed species of the genus, ranging from Prince Edward Island and Labrador southward to the Florida Keys and the West Indies, and westward to the offshore islands of Alaska and to Arizona and Texas. Records cited by Walker (1928) indicate that ovata is generally distributed throughout Alabama. The writer has not collected this species, and data regarding its habitat in this state are not available.

Alabama records:

Baldwin Co.	Magnolia Spgs.; Fairhope (BW)
Clarke Co.	Jackson (BW)
Conecuh Co.	Evergreen (BW)
DeKalb Co.	Valley Head; Big Wills Valley (BW)
Elmore Co.	Wetumpka (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Gurley; Monte Sano (BW)
Mobile Co.	Mobile; Toulminville; Saraland (BW)
Randolph Co.	Wadley; Roanoke (BW)
Sumter Co.	York (BW)
Tuscaloosa Co.	Duncanville (BW)
Washington Co.	Washington Co. (BW)
Wilcox Co.	Pine Hill (BW)

Vertigo gouldii (Binney), 1843

Plate X, figure 8

Pupa gouldii Binney, 1843
Vertigo gouldii Walker, 1928
Vertigo bollesiana Walker, 1928 (nec Morse, 1865)
Vertigo gouldii Pilsbry, 1948

Type locality: Brookline, Massachusetts.

The shell is minute, ovate-cylindrical, and light brown. There are from four to five rather convex whorls which are sculptured with very distinct growth striae. The last whorl is moderately impressed on the palatal wall, and bears a low crest behind the peristome. Within the ovate aperture there is a single, strongly developed, parietal lamella, two well developed palatal folds, a small tuberculate basal fold, and a strongly developed, subhorizontal, columellar lamella. Two shells average 1.6 mm. in height and 1.0 mm. in diameter. The strong striation is diagnostic of this species.

Vertigo bollesiana (Morse), recorded from Alabama by Walker (1928), differs from gouldii in being smaller, lighter-colored, and less distinctly striated, according to Pilsbry (1948). The range of bollesiana, as given by Pilsbry (1948), extends from southern Ontario southward through Maine, New Hampshire, and Massachusetts to New York; this species has been reported from Indiana, Michigan, Virginia, and eastern Tennessee, but Pilsbry (1948) states that these records have not been verified. The marked similarity in shell characters between gouldii and bollesiana suggests that the latter may possibly be a variation of the former, rather than a distinct species. Whatever the true status

of bollesiana may be, the Alabama record cited by Walker (1928) is about 800 miles south of the southernmost verified record, and may be considered to be an erroneous identification of gouldii.

According to Pilsbry (1948), gouldii ranges from Prince Edward and Magdalen Islands westward through Quebec and Ontario to northern Missouri, and southward through Kentucky and Tennessee to northern Alabama. In the latter state, Walker (1928) records gouldii from localities on the Cumberland Plateau and in the Appalachian Ridge and Valley system.

The habitat of this species in Alabama is under leaf litter, rocks, and decaying logs in mixed hardwood-cedar associations, on calcareous soils.

Alabama records:

DeKalb Co.	Manitou Cave, Ft. Payne (HCR)
Franklin Co.	Russellville (BW)
Jackson Co.	Woodville (BW)
Madison Co.	Monte Sano (BW)

Vertigo wheeleri Pilsbry, 1928

Plate X, figure 9

Vertigo wheeleri Pilsbry, 1928

Vertigo wheeleri Walker, 1928

Vertigo wheeleri Pilsbry, 1948

Type locality: Monte Sano, Madison County, Alabama.

The shell is minute, ovate, and cinnamon-brown, with a pale brown apex. There are four and one-half convex whorls which are sculptured with very fine, close, striae.

The last whorl is somewhat flattened over the palatal wall, and bears a weakly developed crest behind the peristome. Within the ovate aperture there are two rather low parietal lamellae, two short palatal folds, and a short, horizontal, columellar lamella. The shell measures 1.6 mm. in height and 1.05 mm. in diameter (after Pilsbry, 1948).

According to Walker (1928) and Pilsbry (1948), this species is known only from the type locality. The latter is in the Upper Austral life zone of northeastern Alabama, and further collecting is needed to determine whether or not wheeleri is confined to Upper Austral regions or ranges throughout the Cumberland Plateau in this state.

The writer has not collected this species, and no data concerning its habitat are available.

Alabama record:

Madison Co. Monte Sano (BW)

Genus COLUMELLA Westerlund

The shell is minute, cylindrical, and brown. There are from five to nine convex whorls which are sculptured with faintly developed growth striae. The ovate aperture is toothless. Only one species is found in Alabama.

Columella edentula (Draparnaud), 1805

Plate X, figure 10

Pupa edentula Draparnaud, 1805
Columella edentula Walker, 1928
Columella edentula Pilsbry, 1948

Type locality: France.

The shell is minute, cylindrical, slightly tapered to the apex, and dark brown. There are between five and seven glossy, convex, whorls which are sculptured with very faint growth striae. The obliquely ovate aperture is toothless, and the columellar margin of the peristome is slightly reflected. The shell measures 2.1 mm. in height and 1.3 mm. in diameter.

According to Pilsbry (1948), this circumpolar species ranges from Labrador to the Aleutians, throughout northern United States, and as far south as Alabama. In this state, edentula has been recorded by Walker (1928) from the Gulf Coastal Plain, and the writer has collected a single shell from a locality in the Appalachian Ridge and Valley system. On the basis of these records, edentula is probably generally distributed throughout the state.

The known habitat of this species in Alabama is under leaf litter among limestone rocks, in a mixed hardwood-cedar association. The one shell was found by sifting leaf litter.

Alabama records:

DeKalb Co.	Manitou Cave, Ft. Payne (HCR)
Chambers Co.	Langdale (BW)
Conecuh Co.	Evergreen (BW)

Subfamily NESOPUPINAE Steenberg

The shell is minute, ovate to globose-conic, rarely cylindrical, and perforate or imperforate. There are from three to six convex whorls which are sculptured with growth wrinkles or rib-striae and have a microsculpture of spiral lines, pits, or granules. The ovate aperture often bears tuberculate or lamellate teeth. The peristome is thin and unreflected. Only one genus is represented in Alabama.

Genus PUPISOMA Stoliczka

The shell is minute, ovate or globose-conic, and usually perforate. There are from three to six convex whorls which are sculptured with growth wrinkles and microscopic granules or spiral lines. The aperture is toothless, and the columellar margin of the peristome is very slightly expanded. This genus is represented in Alabama by one species.

Pupisoma macneilli (Clapp), 1918

Plate X, figure 11 A, B

Thysanophora macneilli Clapp, 1918

Pupisoma macneilli Walker, 1928

Pupisoma macneilli Pilsbry, 1948

Type locality: Magazine Point, Mobile County, Alabama.

The shell is minute, globose-conic, perforate, and reddish-brown. There are from three to four very convex whorls which are sculptured with faintly developed growth striae and microscopic granules. The aperture is ovate.

The columellar margin of the peristome is slightly expanded. The shell measures 0.9 mm. in height and 1.0 mm. in diameter. According to Clapp (1918), the type measured 1.5 mm. in height and 1.38 mm. in diameter.

This very distinctive species is known only from Alabama, according to Pilsbry (1948). It has been recorded from localities on the Coastal Plain by Walker (1928), and from the Appalachian system of northeastern Alabama by the writer.

The known habitat of macnelli is in leaf litter among limestone rocks in a mixed hardwood-cedar association. The one shell found by the writer is evidently an immature specimen, since its measurements are somewhat less than those of the type specimen. The former was collected, along with Columella edentula, by sifting leaf litter. The known records for both species indicate that they occur in the same localities in the state, and that where one is found the other will likely be found also.

Alabama records:

DeKalb Co.	Manitou Cave, Ft. Payne (HCR)
Conecuh Co.	Evergreen (BW)
Mobile Co.	Magazine Point (BW)

Family VALLONIIDAE Pilsbry

The shell is very small, depressed, and perforate or umbilicate. There are from three to five tubular whorls which are either smooth or sculptured with riblets. The aperture is ovate to rounded, and the peristome is usually

expanded and reflected. This family is represented in Alabama by one genus.

Genus VALLONIA Risso

The shell is very small, depressed, and openly umbilicate. There are from three to five tubular whorls which are either smooth or sculptured with evenly spaced riblets. The aperture is rounded, and the peristome is usually flattened and reflected. The umbilicus measures about one-fourth of the diameter of the shell. According to Walker (1928), there are two species found in this state.

Vallonia pulchella (Muller), 1774

Plate X, figure 12 A, B

Helix pulchella Muller, 1774
Vallonia pulchella Walker, 1928
Vallonia pulchella Pilsbry, 1948

Type locality: Denmark.

The shell is very small, depressed, openly umbilicate, and creamy-white. There are from three to three and one-half smooth, tubular whorls which are sculptured with very faintly developed growth wrinkles. The aperture is round, and the peristome is flattened and reflected. The umbilicus measures about one-fourth of the diameter of the shell. Ten shells average 1.3 mm. in height and 2.6 mm. in diameter. This description is based on specimens collected in Pennsylvania, by the writer.

This circumpolar species, according to Pilsbry (1948),

ranges from Nova Scotia and Manitoba southward to southern Missouri, southeastern Kentucky, and the District of Columbia. Walker (1928) lists Alabama as a doubtful record for pulchella, and Pilsbry (1948) states that no definite localities in this state are known. The writer has not collected this species in Alabama, and on the basis of the doubtfulness with which Walker (1928) and Pilsbry (1948) view the "Alabama" record, pulchella is not considered to be in this state.

Vallonia perspectiva Sterki, 1893

Plate X, figure 13 A, B, C

Vallonia perspectiva Sterki, 1893
Vallonia perspectiva Walker, 1928
Vallonia perspectiva Pilsbry, 1948

Type locality: Woodville, Jackson County, Alabama.

The shell is very small, depressed, openly umbilicate, and pale tan to colorless and translucent. There are about three and one-half tubular whorls which are sculptured with evenly spaced rib-striae. The aperture is rounded, and the expanded and reflected peristome is continuous over the parietal wall. The umbilicus measures between one-fourth and one-third of the diameter of the shell. The shell is 0.7 mm. in height and 2.0 mm. in diameter (after Sterki, in Pilsbry, 1948).

According to Pilsbry (1948), this species ranges from New Jersey and southern North Dakota southwestward to northeastern Alabama, central Texas, and Arizona. Walker

(1928) records perspectiva only from the type locality, in the Upper Austral of northeastern Alabama. The writer has not collected this species, and data concerning its habitat in this state are not available.

Alabama record:

Jackson Co. Woodville (BW)

Family CIONELLIDAE Kobelt

The shell is small, imperforate, and oblong-conic, tapering toward a blunt apex. The whorls are transparent, smooth, and highly polished. The aperture is ovate, and the peristome is unreflected. The columella is truncate at the base. One genus is found in Alabama.

Genus CIONELLA Jeffreys

The shell is small, imperforate, and oblong-conic, tapering to the bluntly rounded apex. There are from five to seven slightly convex, glossy, transparent whorls. The aperture is ovate, and the peristome is not reflected. The columella is truncate at the base of the shell. A subspecies of the single American species is found in this state.

Cionella lubrica morseana Doherty, 1878

Plate X, figure 14

Cionella morseana Doherty, 1878

Cochlicopa lubrica appalachicola Pilsbry, 1908

Cochlicopa lubrica appalachicola Walker, 1928

Cionella lubrica morseana Pilsbry, 1948

Type locality: Kenton County, Kentucky.

The shell is small, imperforate, and oblong-conic, tapering to the bluntly rounded apex. The slightly convex, glossy, transparent whorls have a faintly greenish-brown tint, and are sculptured with faintly developed growth lines. The aperture is ovate, and the peristome is not reflected. The columella is concave and truncate at the base. Two shells average 6.8 mm. in height and 1.5 mm. in diameter.

According to Doherty (in Pilsbry, 1948), morseana differs from typical lubrica in being longer and more slender, and in having flatter whorls and a more obtuse apex. Pilsbry (1948) states that the form referred to as the subspecies appalachicola, recorded from northeastern Alabama by Walker (1928), is not separable from morseana, and that the former name is considered a synonym of the latter.

The range of morseana, as given by Pilsbry (1948), extends from Michigan and New York southward through the Appalachians and the Interior Low Plateau to northern Alabama.

Walker (1928) records this subspecies from localities above the Fall Line in Alabama. The writer has not collected it in this state, and the only ecological data available is the statement by H. H. Smith (in Pilsbry, 1948) that morseana inhabits damp shady crevices among rocks, where the leaf litter is not exposed to the sun.

Alabama records:

Jackson Co.	Woodville (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Gurley (BW)
Randolph Co.	Roanoke (BW)

Order BASOMMATOPHORA

The shells of snails belonging to this order are very small and elongate, tapering to a rather acute apex. There are from four to six translucent-white whorls. The ovate aperture has a flattened, thickened, and reflected peristome. There are two low lamellae on the columellar and parietal walls of the aperture. The snails of this order are unique in having sessile eyes which are situated at the bases of the contractile, or superior, tentacles. The order is represented in this country by a single family.

Family CARYCHIIDAE Pilsbry

The shell is very small and elongate, and tapers to an acute apex. There are from four to six translucent-whitish whorls. The ovate aperture has a flattened, thickened, and reflected peristome. There are two low and often indistinct lamellae on the columellar and parietal walls of the aperture; these lamellae are continuous within the last whorl as spirally arranged plates which are visible through the shell. Only one genus is found in this country.

Genus CARYCHIUM Muller

Carychium exiguum (Say), 1822

Plate X, figure 15

Pupa exigua Say, 1822

Carychium exiguum Walker, 1928

Carychium exiguum Pilsbry, 1948

Type locality: Philadelphia, Pennsylvania.

The shell is very small, elongate, tapered, and has an acute apex. There are from four to five glossy, white, translucent whorls which are weakly sculptured with radial striae. The aperture is ovate and the peristome is flatly reflected and thickened. On the parietal wall, near the columella, there is a low, subhorizontal, lamella which widens into a spirally arranged plate within the last whorl. On the baso-columellar margin there is a very low lamella which rises in a spiral about the columella, somewhat parallel to the larger extension of the parietal lamella. Ten shells average 1.5 mm. in height and 0.8 mm. in diameter.

The range of exiguum, according to Pilsbry (1948), extends from Newfoundland westward to Colorado and New Mexico and southward to Alabama. Exiguum is evidently generally distributed throughout the latter state. Walker (1928) records it from localities in the Appalachian and Piedmont regions of the northern half of the state, and from the Lower Coastal Plain. The writer has collected it on the Cumberland Plateau in north-central Alabama, and in Hale

County, just below the Fall Line.

This species is found in densely wooded, humid ravines under the bark of decaying hardwood logs, and in leaf litter and under rocks and stones. On the basis of the known localities for exiguum in Alabama, it is to be found in mixed hardwood-pine associations, on calcareous and noncalcareous soils. The paucity of localities for the species in this state is very likely due to the minute size of the shells.

Alabama records:

Blount Co.	5 mi. S. of Oneonta on Ala. 38 (HCR)
Clarke Co.	Thomasville (BW)
DeKalb Co.	Valley Head (BW)
Elmore Co.	Wetumpka (BW)
Hale Co.	Havana (HCR)
Madison Co.	Monte Sano (BW)
Randolph Co.	Roanoke (BW)

Carychium exile Lea, 1842

Plate X, figure 16

Carychium exile Lea, 1842
Carychium exile Walker, 1928
Carychium exile Pilsbry, 1948

Type locality: Wissahickon Creek, Philadelphia, Pennsylvania.

The shell is very small, elongate, slender, tapered, and the apex is acute. There are from five to six translucent-white whorls; the last two are sculptured with distinct, evenly and closely spaced striae. The aperture is ovate and the peristome is flatly reflected and quite thickened. There is a small horizontal lamella on the

parietal wall, near the columella; this lamella widens into a steep spiral plate within the last whorl. A low and somewhat indistinct lamella on the baso-columellar margin is continued within the last whorl, parallel to the parietal lamella. Six shells average 1.7 mm. in height and 0.6 mm. in diameter. This species is readily distinguished from exiguum by being more slender and by having more distinct striae.

According to Pilsbry (1948), exile ranges from Maine and Ontario southward to Alabama and westward to Michigan, Arkansas, and Texas. On the basis of collections made by the writer, and the records cited by Walker (1928), exile is generally distributed throughout Alabama.

This species is commonly found in mixed hardwood-pine associations, under the bark of decaying logs, under rocks, and clinging to the undersides of damp leaf litter. The known records for exile indicate that it is to be found on calcareous and noncalcareous soils.

Alabama records:

Blount Co.	5 mi. S. of Oneonta on Ala. 38 (HCR)
Cherokee Co.	Dugger Mt., Piedmont (BW)
Choctaw Co.	Silas (BW)
Conecuh Co.	Evergreen (BW)
DeKalb Co.	Fort Payne; Valley Head (BW); Manitou Cave, in Fort Payne (HCR)
Franklin Co.	Burleson; Russellville; Forks of Sipsey River (BW)
Jackson Co.	Princeton; Woodville; Paint Rock (BW)
Jefferson Co.	Squaw Shoals (BW)
Lauderdale Co.	Florence (BW); Elgin (HCR)
Madison Co.	Monte Sano; Huntsville; Gurley (BW)
Mobile Co.	Mobile (BW)
Montgomery Co.	McGee's Station (BW); Sprague (HCR)
Randolph Co.	Roanoke; Wadley (BW)

Sumter Co. Epes; Livingston (BW)
 Tuscaloosa Co. Holt; Duncanville; Hagler; Tuscaloosa (BW)
 Walker Co. Forks of Warrior River (BW)

Carychium nannodes Clapp, 1905

Carychium nannodes Clapp, 1905
Carychium nannodes Walker, 1928
Carychium nannodes Pilsbry, 1948

Type locality: Monte Sano, Madison County, Alabama.

According to Clapp (1905), the shell of this species closely resembles that of exile in being long and slender, but differs from the latter in lacking any trace of striation. Clapp (1905) states that the shell measures 1.4 mm. in height and 0.5 mm. in diameter. These measurements are comparable to those of exile, the shells of which are only slightly larger. The gross features of the shells of nannodes, as figured by Pilsbry (1948), are entirely similar to those of exile, hence no figure of the former has been included in this paper. There do not seem to be any shell characters which are distinctly diagnostic of nannodes, since varying degrees of sculpturing, from distinct to sub-obsolete, are found on shells of exile.

The above facts suggest that nannodes may not be a valid species, a view which is somewhat borne out by the nature of its known distribution. Pilsbry (1948) states that localities for this species are known from northern Alabama and from West Virginia. Oughton (1950) records nannodes from Ontario, about 1900 miles north of the type locality of the species.

Such a wide distribution in itself is not contradictory, but the fact that nannodes has only been reported from two widely separated localities in this country does inject the possibility that it represents a variation of exile. This is substantiated by the occurrence of nearly smooth shells in series of exile (Pilsbry, 1948, and MacMillan, 1949). The possibility also presents itself that nannodes represents a formerly widely distributed species whose distribution has become markedly discontinuous. The fact that the localities for the species are known from the Upper Austral, Transition, and Canadian zones tends to support the latter view.

Walker (1928) recorded nannodes from localities on the Cumberland Plateau of Alabama. According to Smith (in Walker, 1928), this species is abundant in leaves in damp woods, at an elevation of about 1600 feet, on Monte Sano. The writer has not collected it.

Alabama records:

Jefferson Co.	Squaw Shoals; Cohort; Princeton (BW)
Lauderdale Co.	Florence (BW)
Madison Co.	Monte Sano; Gurley (BW)

Subclass PROSOBRANCHIA

Order ARCHEOGASTROPODA

The shells of snails belonging to this order vary from depressed-globose to globose-conic, and measure between 2.0 mm. and 10.0 mm. in diameter. There are from three to five whorls, the last of which may be rounded or subangulate on

the periphery. The ovate to lunate aperture is closed by an operculum in living specimens. The snails have sessile eyes which are located at the bases of the single pair of tentacles. Only one family is found in this country.

Family HELICINIDAE Gray

The shell is small, and depressed-globose or globose-conic. There are from three to five whorls, the last of which may be rounded or subangulate. The umbilical region is covered by a heavy callus pad. This family is represented in Alabama by a single genus.

Genus HELICINA Lamarck

The shell is small and globose-conic. There are from four to five weakly convex whorls. The aperture is lunate, and the peristome is thickened. One species is found in Alabama.

Helicina orbiculata (Say), 1818

Plate X, figure 17 A, B

Olygyra orbiculata Say, 1818
Helicina orbiculata Walker, 1928
Helicina orbiculata Pilsbry, 1948
Helicina orbiculata Hinton, 1951

Type locality: Mouth of the St. John's River, Duval County, Florida.

The shell is small, imperforate, and globose-conic. There are from four to five smooth, weakly convex whorls. Weakly developed, widely spaced spiral lines are often

visible on the upper surface of the shell. The aperture is lunate, and there is a very small tuberculate projection on the outer margin of the peristome at its columellar insertion. Seventy shells average 6.0 mm. in height and 6.6 mm. in diameter.

According to Pilsbry (1948), orbiculata ranges from eastern Oklahoma and Arkansas eastward to coastal Georgia and southward to Louisiana and peninsular Florida. On the basis of records by Walker (1928), Hinton (1951), and collections by the writer and others, the distribution of this species in Alabama is statewide.

Helicina orbiculata is one of the more common land snails to be found in Alabama. It is found in a variety of habitats in mixed hardwood-pine and pine-cedar associations on calcareous and noncalcareous soils. It is commonly found in leaf litter and under rocks and decaying logs. In northern Alabama, following heavy rains, the writer has collected orbiculata which were crawling on the trunks of cedar trees and on grasses and weeds. Hinton (1951) states that the species is found in abundance on treeless calcareous areas, and in cedar groves, in the Black Belt. Large series of shells have been collected in the latter region by the writer.

Alabama records:

Baldwin Co.	Week's Bay; Point Clear (BW); Bear Point (AFA)
Barbour Co.	Elambille (BW)
Bibb Co.	Pratt's Ferry (HCR;BW)

Blount Co.	Blount Sogs. (BW); 5 mi. N. of Oneonta, on Ala. 38 (HCR)
Chambers Co.	Langdale (BW)
Cherokee Co.	10 mi. S.E. of Centre (BW)
Clarke Co.	Thomasville; Suggsville; Jackson (BW); 4.5 mi. S. of Thomasville (AFA)
Conecuh Co.	Evergreen (BW)
Cullman Co.	Cullman (BW)
Dale Co.	Pinckard (BW)
Dallas Co.	Pleasant Hill; Selma (BW); 10 mi. W. of Selma; Cahaba River, on U.S. 80 (HCR)
DeKalb Co.	Valley Head; Fort Payne (BW); Manitou Cave, in Fort Payne (HCR)
Elmore Co.	Wetumpka; Noble's Ferry (BW)
Etowah Co.	Keener (BW)
Franklin Co.	Burleson; Russellville (BW); 5 mi. N. of Russellville; 2 mi. W. of Newburg (HCR)
Geneva Co.	High Bluff (BW)
Greene Co.	Boligee (BW;JH); Allison; 8 mi. S. of Eutaw; 11 mi. N. of Demopolis (JH)
Hale Co.	7 mi. W. of Greensboro (HCR); Newbern; 5 mi. N. of U.S. 80; Hale-Marengo county line (JH)
Jackson Co.	Woodville; Stevenson; Princeton; Pisgah; Bridgeport (BW)
Jefferson Co.	Squaw Shoals; Hamilton (BW)
Lamar Co.	Buttahatchee Swamp (HCR)
Lauderdale Co.	Florence (BW)
Lowndes Co.	Tallahassee Creek, on U.S. 80 (HCR)
Madison Co.	Gurley; Huntsville; Monte Sano (BW); Cave Springs Cave, 6 mi. N. of New Hope (HCR)
Marengo Co.	4 mi. N.W. of Demopolis; 2 mi. S. of Demopolis (HCR); Demopolis (JH)
Marshall Co.	3 mi. N. of Guntersville (HCR)
Mobile Co.	Mobile (BW)
Monroe Co.	Claiborne; Monroe (BW); Randon's Creek, 4.5 mi. W. of Frisco City (AFA)
Montgomery Co.	McGee's Station (BW)
Perry Co.	Hamburg (BW)
Randolph Co.	Roanoke; Wadley (BW)
Shelby Co.	Montevallo (HCR)
St. Clair Co.	Whitney (BW)
Sumter Co.	Epes (BW;JH;HCR); Livingston; Moscow Bluff (BW); 3 mi. N. of Livingston (JH)
Talladega Co.	Three Island Shoals; Ft. William Shoals (BW)
Tuscaloosa Co.	Indian Creek; Hagler; Tuscaloosa (BW); Hurricane Creek (HCR)
Walker Co.	Forks of Warrior River (BW)
Wilcox Co.	Pine Hill; Camden; Gastonburg (BW); 3 mi. N. of Oak Hill (HCR)
Winston Co.	King Cove, in S.W. quarter of county (HCR)

CONCLUSIONS

1. A study was made of the land snails of Alabama, and notes were taken concerning their ecology and distribution in the state.
2. On the basis of this study 147 species and subspecies, representing 37 genera, 14 families, and 3 orders, comprise the land snail fauna of Alabama. Polygyra texasiana, Strobilops texasiana texasiana, and Megomphix andrewsae andrewsae are included as new state records.
3. A Blue Ridge Province is included in the physiographic divisions of Alabama.
4. An attempt was made to correlate the distribution of Alabama land snails with ecological factors. The following results were obtained:
 - (a) Domestic situations, so far as is known, provide a suitable environment for only 7 species, 2 of which are tentatively regarded as being limited to such habitats.
 - (b) Hardwood-pine forest associations harbor the greatest number of species of land snails in Alabama, whereas other types of forest associations are inhabited by relatively few species.
 - (c) The calcium content of the soil is significant only in the case of 19 species of our land snails; 13 are restricted to calcareous areas, and 6 are limited to noncalcareous regions.

- (d) The distribution of 21 species is restricted to regions above the Fall Line; 13 of these occur only in the Upper Austral zone, and are presumably limited to such regions because of the cooler climate.
- (e) Nineteen species and subspecies are found only on the Coastal Plain; 12 of these occur only in the Saballean zone, and are presumably restricted to this region because of higher minimum temperatures and annual rainfall.

A KEY TO FAMILIES AND GENERA OF ALABAMA LAND SNAILS

1. Shell minute, grayish-white, elongate; peristome reflected; one or two low lamellae on columellar wall (Order BASOMMATOPHORA).....
Family Carychiidae , Genus Carychium.
 Shell small, globose; peristome reflected; aperture closed by an operculum (Order ARCHEOGASTROPODA).....
Family Helicinidae, Genus Helicina.
 Shell with neither of the above combinations (Order STYLOMMATOPHORA).....2
2. Globose-conic to elongate-tapered shells with an H/D index of more than 1.5.....3
 Depressed to globose-conic shells with an H/D index of less than 1.5.....13
3. Height less than 6.0 mm. (Family Pupillidae).....4
 Height more than 6.0 mm.....8
4. Peristome reflected.....Genus Pupoides.
 Peristome not reflected.....5
5. Aperture obstructed by two or more teeth.....6
 Aperture toothless.....7
6. Parietal teeth fused, forming a bifurcate lamella.....
Genus Gastrocopta.
 Parietal teeth simple, not fused.....Genus Vertigo.
7. Shell composed of 6-7 whorls.....Genus Columella.
 Shell composed of 3-4 whorls.....Genus Pupisoma.

8. Shell imperforate.....9
 Shell perforate.....11
9. Apex of shell bluntly rounded.....10
 Apex acute.....Family Succineidae , Genus Succinea.
10. Shell small, fragile, translucent.....
Family Cionellidae , Genus Cionella.
 Shell large, heavy.....
Family Oleacinidae, Genus Euglandina.
11. Shell globose-conic, white or streaked with white.....
Family Bulimulidae, Genus Bulimulus.
 Shell elongate-cylindrical, tapering toward the apex..
12
12. Height about 7.0 mm.; shell thin and fragile.....
Family Achatinidae, Genus Lamellaxis.
 Height about 30.0 mm.; shell thick and strong; apical
 whorls broken away in adult shells.....
Family Achatinidae, Genus Rumina.
13. Peristome reflected.....14
 Peristome simple, not reflected.....28
14. Diameter of shell less than 3.0 mm.....15
 Diameter of shell more than 3.0 mm.....
Family Polygyridae.....16
15. Whorls sculptured with rib-striae; series of thin la-
 mellae within last whorl.....
Family Strobilopsidae, Genus Strobilops.
 Whorls sculptured with faint growth wrinkles.....
Family Valloniidae, Genus Vallonia.

16. Shell depressed; aperture reniform or auriform.....
Family Polygyridae, Genus Polygyra.
 Shell depressed to globose-conic; aperture basal or
 peripheral.....Family Polygyridae.....17
17. Aperture basal, obstructed by a radially situated
 parietal lamella.....Genus Stenotrema.
 Aperture peripheral, with or without parietal lamella
18
18. Diameter of shell 8.0 mm. or less.Genus Praticolella.
 Diameter of shell more than 8.0 mm.....19
19. Shell widely umbilicate; inner margin of basal peri-
 stome bears a low convexity near columellar inser-
 tion; no parietal lamella.....Genus Allogona.
 Shell umbilicate or imperforate; inner margin of peri-
 stome with or without teeth; parietal lamella pres-
 ent or absent.....20
20. Shell depressed.....21
 Shell depressed-globose to very globose.....24
21. Shell openly umbilicate; aperture obstructed by teeth
 on inner margin of peristome.....
Genus Triodopsis, Subgenus Triodopsis.
 Shell imperforate; aperture obstructed by lip teeth or
 by blade-like callus on inner margin of basal peri-
 stome.....22
22. Aperture obstructed by lip teeth; shell hirsute.....
 Genus Mesodon, Subgenus Inflectarius.
 Aperture obstructed by blade-like callus.....23

23. Strongly developed tooth in outer arc of peristome...
Genus Triodopsis, Subgenus Xolotrema.
 No tooth present on outer peristome.....
Genus Mesodon, Subgenus Patera.
24. Shell depressed-globose or globose-conic.....25
 Shell extremely globose.....27
25. Umbilicus partially covered; parietal wall bears a
 small tooth.....Genus Mesodon, Subgenus Mesodon.
 Umbilicus wholly covered.....26
26. Strongly developed parietal tooth present.....
Genus Mesodon, Subgenus Mesodon.
 No parietal tooth present.....27
27. Shell thin and fragile.....Subgenus Mesodon.
 Shell thick and strong.....
Genus Triodopsis, Subgenus Neohelix.
28. Whorls sculptured with distinct rib-striae.....29
 Whorls smooth, or sculptured with thread-like striae,
 growth wrinkles, granules, or radial grooves.....33
29. Rib-striae terminate abruptly at periphery of shell;
 diameter of shell about 7.0 mm.; 1-3 pairs of tuber-
 culate teeth within last whorl.....
Family Zonitidae, Genus Gastrodonta.
 Rib-striae continue over periphery; diameter of shell
 1-20 mm.....30
30. Diameter of shell 6-20 mm., Family Endodontidae....31
 Diameter of shell 1-5 mm.....32

31. Diameter of shell 9-20 mm.; whorls marked with reddish
 blotches.....Genus Anguispira.
 Diameter of shell 6-9 mm.; no color pattern.....
Genus Discus.
32. Diameter of shell 1-1½ mm.; umbilicus about one-third
 the diameter of shell.....
Family Endodontidae, Genus Striatura.
 Diameter of shell 2-2½ mm.; umbilicus about one-half
 the diameter of shell.....
Family Zonitidae, Genus Hawaila.
33. Whorls sculptured with impressed radial grooves....34
 Whorls smooth and glossy, or sculptured with thread-
 like striae, granules, or growth wrinkles.....36
34. Shell depressed-helicoid; whorls sculptured with ra-
 dial grooves and microscopic spiral striae; 4 evenly
 spaced tuberculate teeth within last whorl.....
Genus Clappiella.
 Shell depressed but not helicoid; whorls sculptured
 with radial grooves, and with or without microscopic
 spiral striae.....35
35. Microscopic spiral striae present....Genus Retinella.
 Microscopic spiral striae absent....Genus Paravitrea.
36. Shell very depressed, yellowish-white, glossy; micro-
 sculpture lacking; diameter 15-20 mm.; umbilicus
 about one-third that of shell.....
Family Haplotrematidae, Genus Haplotrema.
 Shell depressed to depressed-globose or globose-conic;

- whorls sculptured with radial striae, granules, or microscopic spiral striae...Family Zonitidae.....37
37. Depressed-globose or globose-conic shells with diameter of 3 mm. or less; imperforate or minutely perforate.....38
- Diameter of shell more than 3 mm.....39
38. Depressed-globose, imperforate shells, with diameter of 1-1½ mm.....Genus Guppya.
Globose-conic, minutely perforate shells, with diameter of 2-3 mm.....Genus Euconulus.
39. Diameter of shell less than 6 mm.; diameter of umbilicus about one-third that of shell; whorls polished, transparent, and sculptured with weakly developed radial striae and microscopic spiral lines.....
.....Genus Zonitoides.
Diameter of shell more than 6 mm.; umbilicus less than one-eighth the diameter of shell; whorls sculptured with distinct growth wrinkles, and often granulate; rarely lacking sculpture.....40
40. Shell rarely smooth and polished, but usually sculptured with radial striae and growth wrinkles, with microsculpture of radially and spirally arranged granules; diameter 10-26 mm.....Genus Mesomphix.
Growth wrinkles present; microscopic granules absent; diameter 7-16 mm.; basal callus or lamellae within last whorl.....Genus Ventridens.

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EXPLANATION TO PLATE I

- Figure 1 A, B: Polygyra septemvolva volvoxis. X 4.5
Figure 2 A--C: Polygyra septemvolva febigeri. X 2
Figure 3 A, B: Polygyra auriformis. X 4.5
Figure 4 A, B: Polygyra pustula. X 4
Figure 5 A, B: Polygyra pustuloides. X 4
Figure 6 A--C: Polygyra leporina. X 4
Figure 7 A, B: Polygyra texasiana. X 3.5
Figure 8 A--E: Polygyra plicata. X 4.5
Figure 9 A--C: Polygyra troostiana. X 4.5
Figure 10 A,B: Stenotrema spinosum. X 2
Figure 11 A,B: Stenotrema barbigerum. X 4
Figure 12 A,B: Stenotrema stenotrema. X 2
Figure 13 A-C: Stenotrema hirsutum. X 4
Figure 14: Stenotrema barbatum. X 4
Figure 15 A,B: Stenotrema exodon. X 4
Figure 16: Stenotrema exodon, var. turbinella. X 4

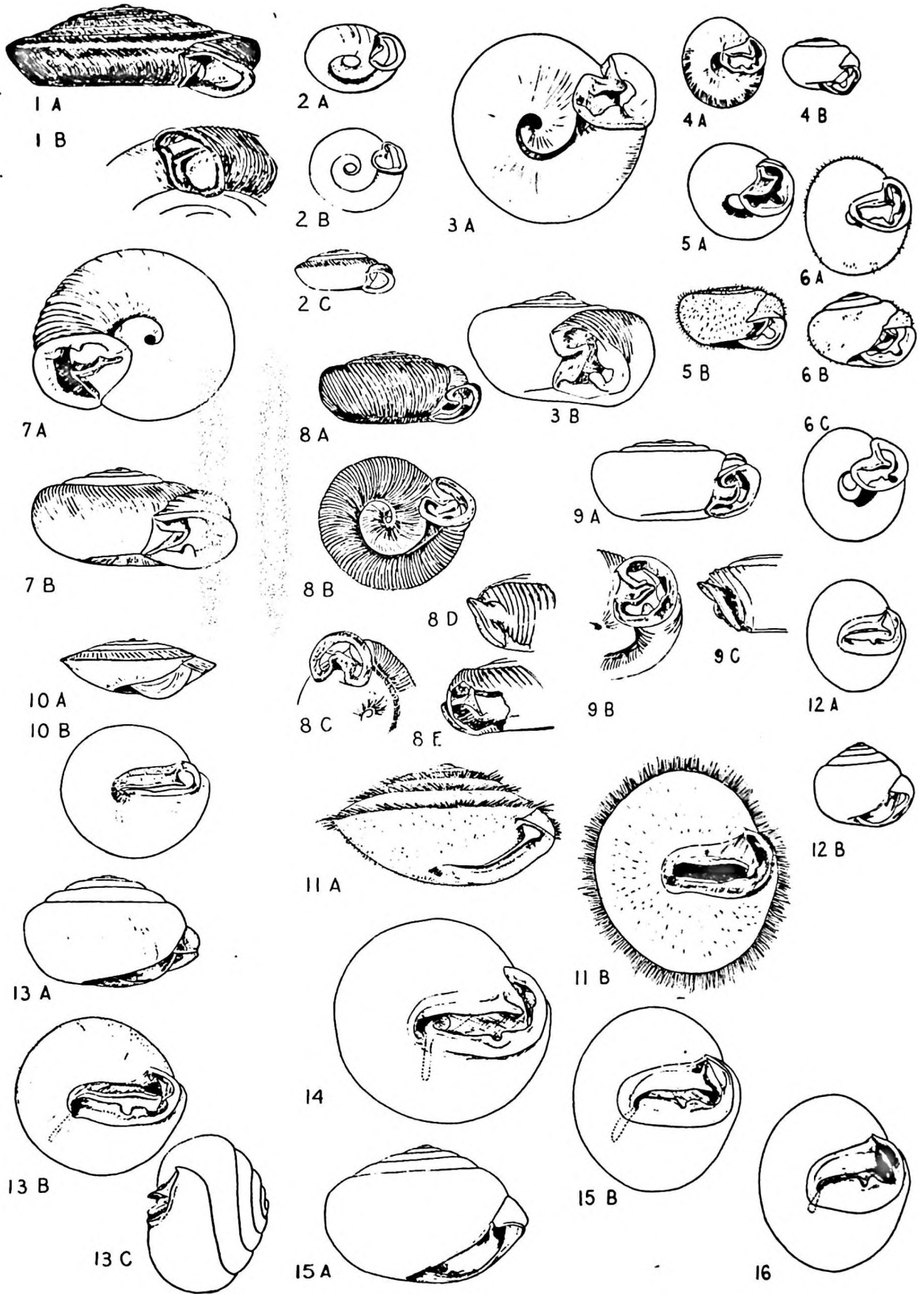


PLATE I

EXPLANATION TO PLATE II

- Figure 1 A--C: Stenotrema deceptum. X 3.5
Figure 2: Stenotrema brevipila. X 3.5
Figure 3 A--C: Stenotrema maxillatum. X 4
Figure 4 A--C: Stenotrema leai aliciae. X 1.5
Figure 5 A, B: Praticolella lawae. X 3
Figure 6 A, B: Praticolella mobilia. X 3
Figure 7: Mesodon thyroidus. X 2.5
Figure 8 A, B: Mesodon clausus. X 1.5
Figure 9 A, B: Mesodon sanus. X 2
Figure 10 A-C: Mesodon downieanus. X 1
Figure 11: Mesodon andrewsae normalis. X 1
Figure 12: Mesodon zaletus. X 1.5
Figure 13 A,B: Mesodon apressus. X 2
Figure 14: Mesodon elevatus. X 2
Figure 15 A-C: Mesodon christyi. X 1.5 (No. Carolina)
Figure 16 A,B: Mesodon wheatleyi. X 1.5 (No. Carolina)
Figure 17 A,B: Mesodon perigraptus. X 2
Figure 18 A,B: Mesodon sargentianus. X 1.5

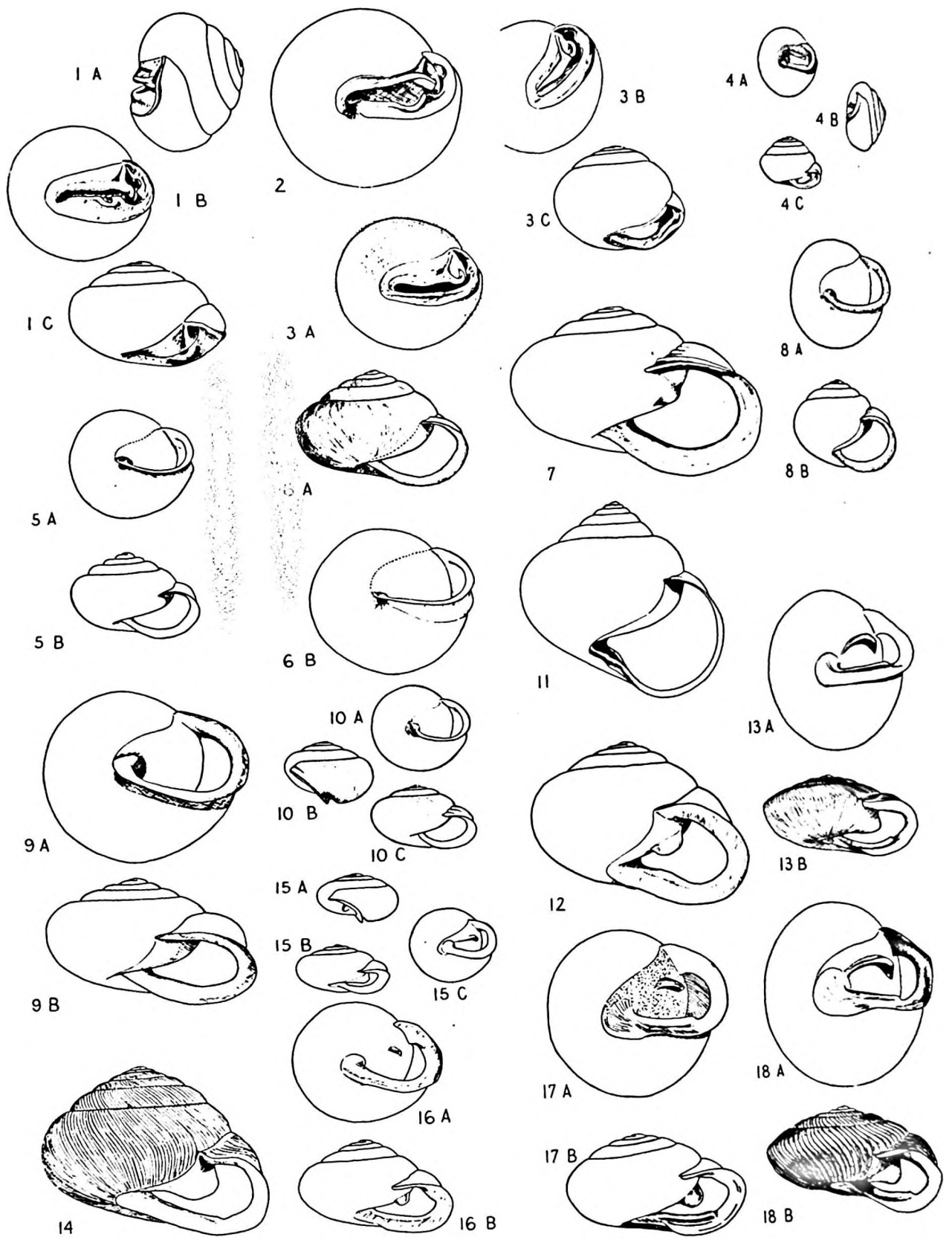


PLATE II

EXPLANATION TO PLATE III

- Figure 1 A--C: Mesodon rugeli. X 1.5
- Figure 2 A, B: Mesodon smithi. X 1.5
- Figure 3 A--C: Mesodon inflectus inflectus. X 1.5
- Figure 4 A, B: Mesodon approximans. X 1.5
- Figure 5 A--C: Mesodon inflectus mobilensis. X 1.5
- Figure 6 A, B: Triodopsis tridentata. X 1.5
- Figure 7: Triodopsis tridentata. X 1.5
- Figure 8 A, B: Triodopsis fraudulenta vulgata. X 1.5
- Figure 9 A--C: Triodopsis hopetonensis. X 1.5
- Figure 10 A-D: Triodopsis vannostrandii. X 1.5
- Figure 11 A-C: Triodopsis vannostrandii. X 1.5
- Figure 12 A,B: Triodopsis obstricta. X 2
- Figure 13 A,B: Triodopsis obstricta. X 1.5
- Figure 14: Triodopsis albolabris. X 1.5
- Figure 15: Triodopsis albolabris major. X 1.5
- Figure 16 A,B: Allogona profunda. X 1.5 (Michigan)

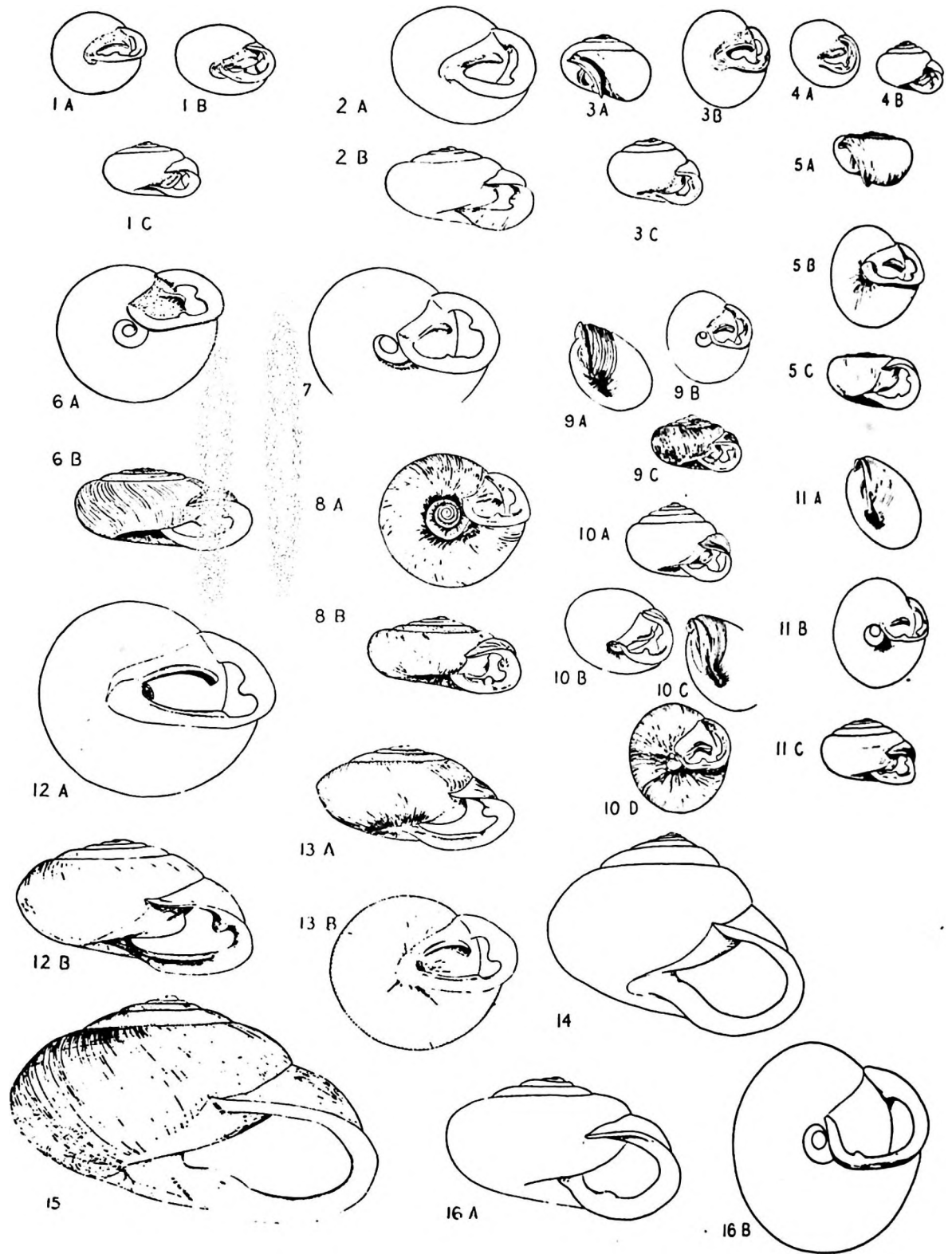


PLATE III

EXPLANATION TO PLATE IV

- Figure 1: Bulimulus dealbatus, var. jonesi. X 1.5
- Figure 2: Bulimulus dealbatus dealbatus. X 1.5
- Figure 3: Rumina decollata. X 2
- Figure 4: Lamellaxis gracilis. X 3.5
- Figure 5: Euglandina rosea. Natural size.
- Figure 6 A, B: Haplotrema concavum. X 1.5
- Figure 7 A, B: Euconulus chersinus. X 8
- Figure 8 A--C: Guppya sterkii. X 16
- Figure 9: Retinella cumberlandiana. X 2.5 (after Clapp, in Pilsbry, 1946)
- Figure 10 A,B: Retinella circumstriata. X 10
- Figure 11 A,B: Retinella wheatleyi. X 9
- Figure 12: Retinella lewisiana. X 3 (after Clapp, in Pilsbry, 1946)
- Figure 13: Retinella indentata paucilirata. X 8
- Figure 14: Retinella carolinensis. X 4
- Figure 15: Retinella cryptomphala. X 7
- Figure 16: Retinella praecox. X 2 (after Baker, in Pilsbry, 1946)
- Figure 17: Retinella sculptilis. X 3

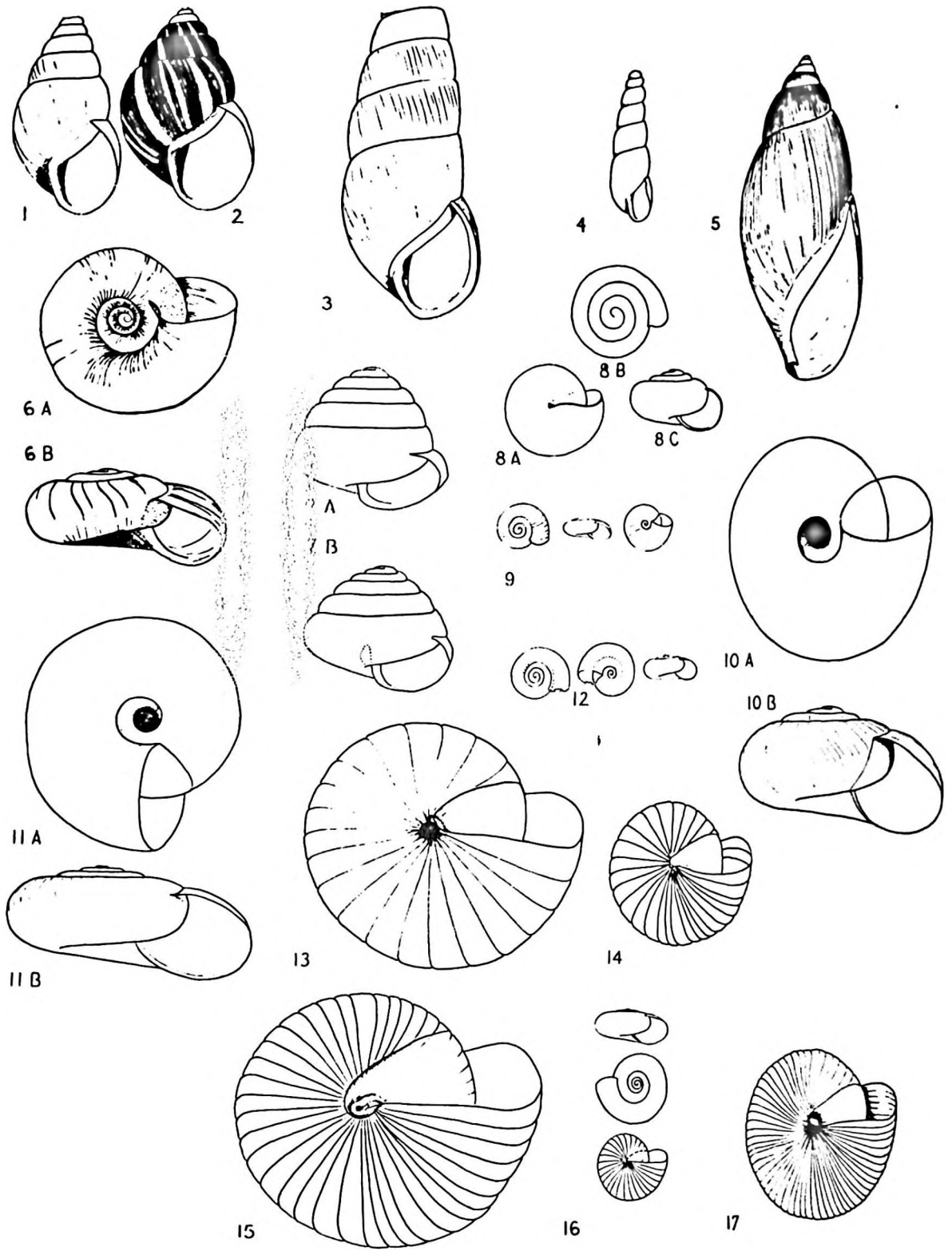


PLATE IV

EXPLANATION TO PLATE V

- Figure 1 A, B: Mesomphix andrewsae. X 4
- Figure 2 A, B: Mesomphix latior. X 1.7
- Figure 3 A, B: Mesomphix vulgatus. X 2
- Figure 4 A, B: Mesomphix cupreus kopnodes. X 2
- Figure 5 A, B: Mesomphix pilsbryi. X 1.7
- Figure 6 A, B: Paravitrea multidentata. X 13 (after
Pilsbry, 1946)
- Figure 7 A, B: Paravitrea capsella. X 9
- Figure 8 A, B: Paravitrea capsella, var. lacteodens X 9
(after Pilsbry, 1946)
- Figure 9 A, B: Paravitrea conecuhensis. X 7

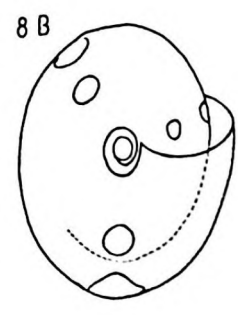
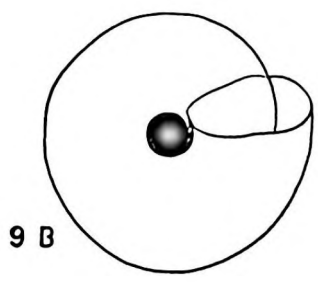
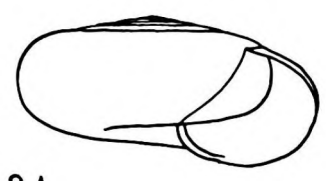
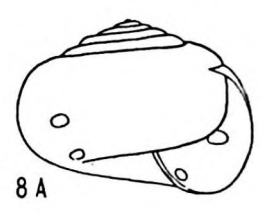
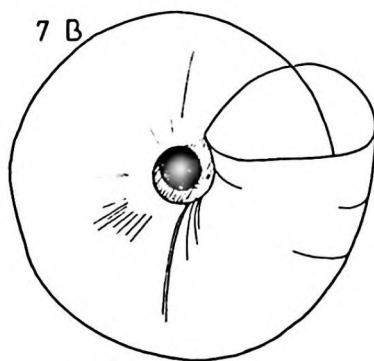
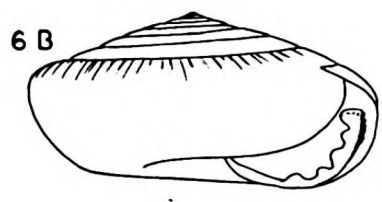
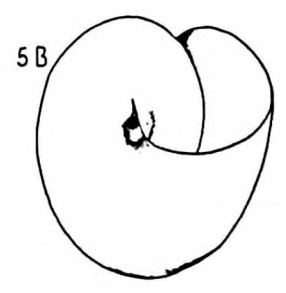
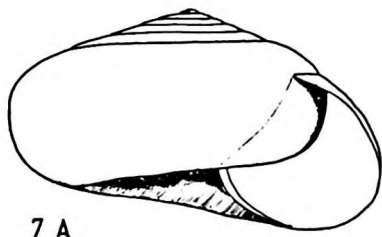
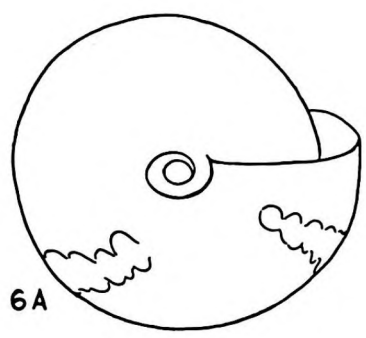
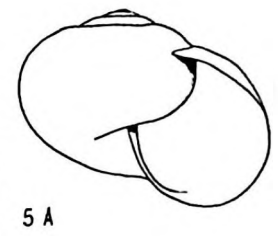
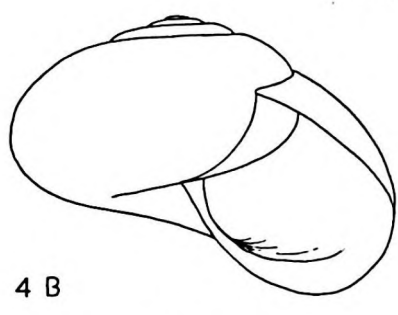
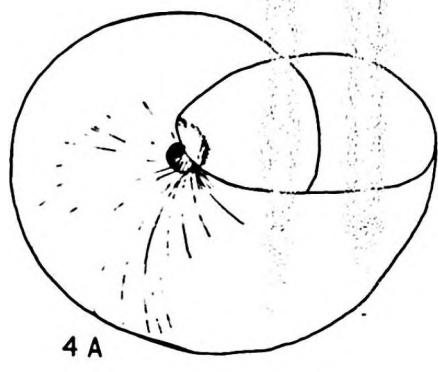
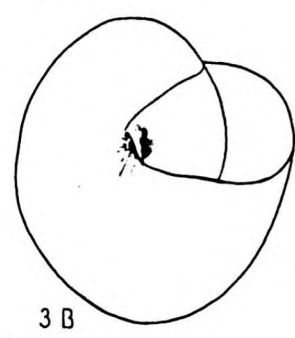
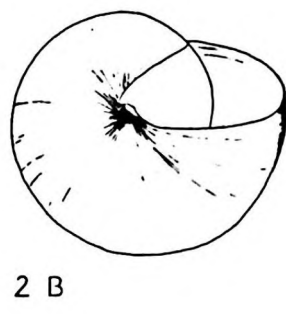
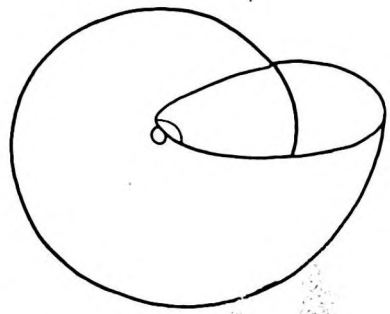
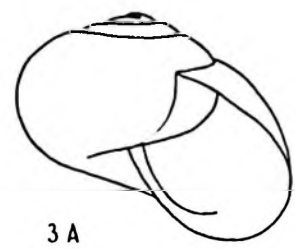
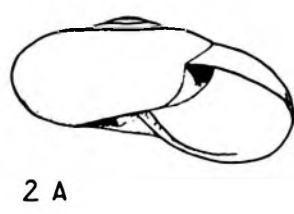


PLATE V

EXPLANATION TO PLATE VI

- Figure 1: Paravitrea calcicola. X 2.4 (after Pilsbry, 1946)
- Figure 2: Paravitrea pilsbryana. X 2 (after Pilsbry, 1946)
- Figure 3: Paravitrea smithi. X 1.7 (after Walker, 1928)
- Figure 4: Hawailia minuscula. X 10
- Figure 5 A,B: Gastrodonta interna. X 3.5
- Figure 6: Clappiella aldrichiana. X 5.5 (after Pilsbry, 1946)
- Figure 7 A,B: Ventridens suppressus magnidens. X 3.5
- Figure 8 A-C: Ventridens gularis. X 3.5 (A: immature; B, C: adult)
- Figure 9 A,B: Ventridens theloides. X 3.5
- Figure 10: Ventridens collisella. X 1.5 (after Pilsbry, 1946)
- Figure 11 A,B: Ventridens cerinoideus. X 4
- Figure 12 A,B: Ventridens lawae. X 3.5
- Figure 13: Ventridens lasmodon. X 1.7 (after Pilsbry, 1946)
- Figure 14 A,B: Ventridens demissus. X 3
- Figure 15 A,B: Ventridens acerra. X 2
- Figure 16 A-C: Ventridens ligera. X 4 (A:immature; B, C:adult)
- Figure 17 A,B: Ventridens intertextus. X 1.5
- Figure 18: Ventridens elliotii. X 1.5 (after Pilsbry, 1946)

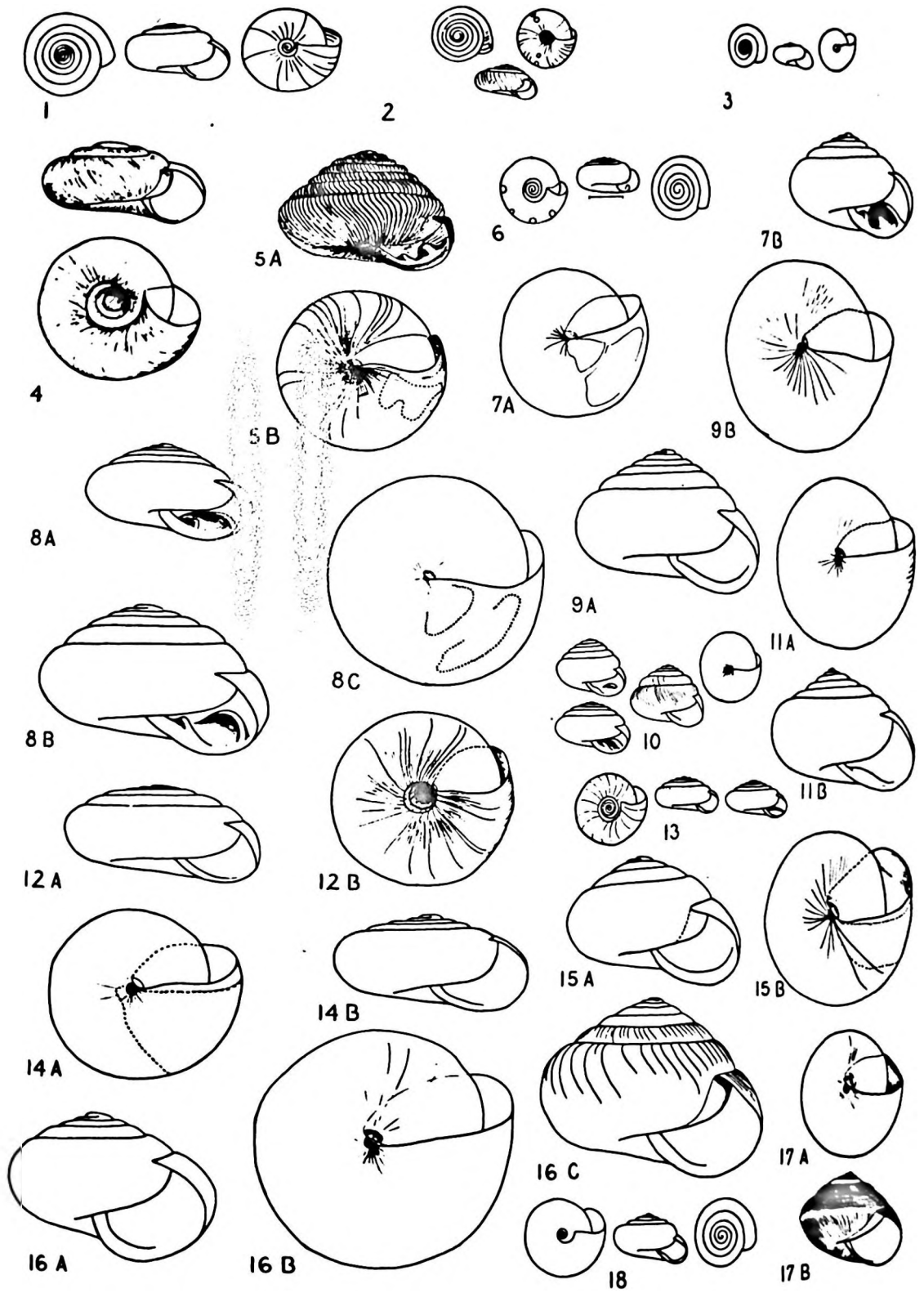


PLATE VI

EXPLANATION TO PLATE VII

- Figure 1 A, B: Zonitoides arboreus. X 4.5
- Figure 2: Zonitoides lateumbilicatus. X 3.2
(after Pilsbry, 1946)
- Figure 3: Striatura meridionalis. X 8 (after Pilsbry, 1946)
- Figure 4: Anguispira alternata angulata. X 1.7
- Figure 5: Anguispira alternata macneilli. X 2.3
- Figure 6: Anguispira alternata jessica. X 2.3
- Figure 7 A, B: Anguispira crassa. X 2
- Figure 8: Anguispira smithi. X 2.3
- Figure 9: Anguispira cumberlandiana. X 2.3
- Figure 10: Discus patulus. X 4.5
- Figure 11: Discus bryanti. X 3 (after Pilsbry, 1948)
- Figure 12: Discus clappi. X 6
- Figure 13: Helicodiscus parallelus. X 15
- Figure 14: Helicodiscus fimbriatus. X 4 (after Pilsbry, 1948)
- Figure 15: Helicodiscus singleyanus. X 5 (after Pilsbry, 1948)
- Figure 16 A, B: Helicodiscus inermis. X 10
- Figure 17 A, B: Punctum minutissimum. X 1.7
- Figure 18: Punctum blandianum. X 1.7
- Figure 19: Punctum vitreum. X 10 (after Pilsbry, 1948)
- Figure 20: Punctum smithi. X 1.5

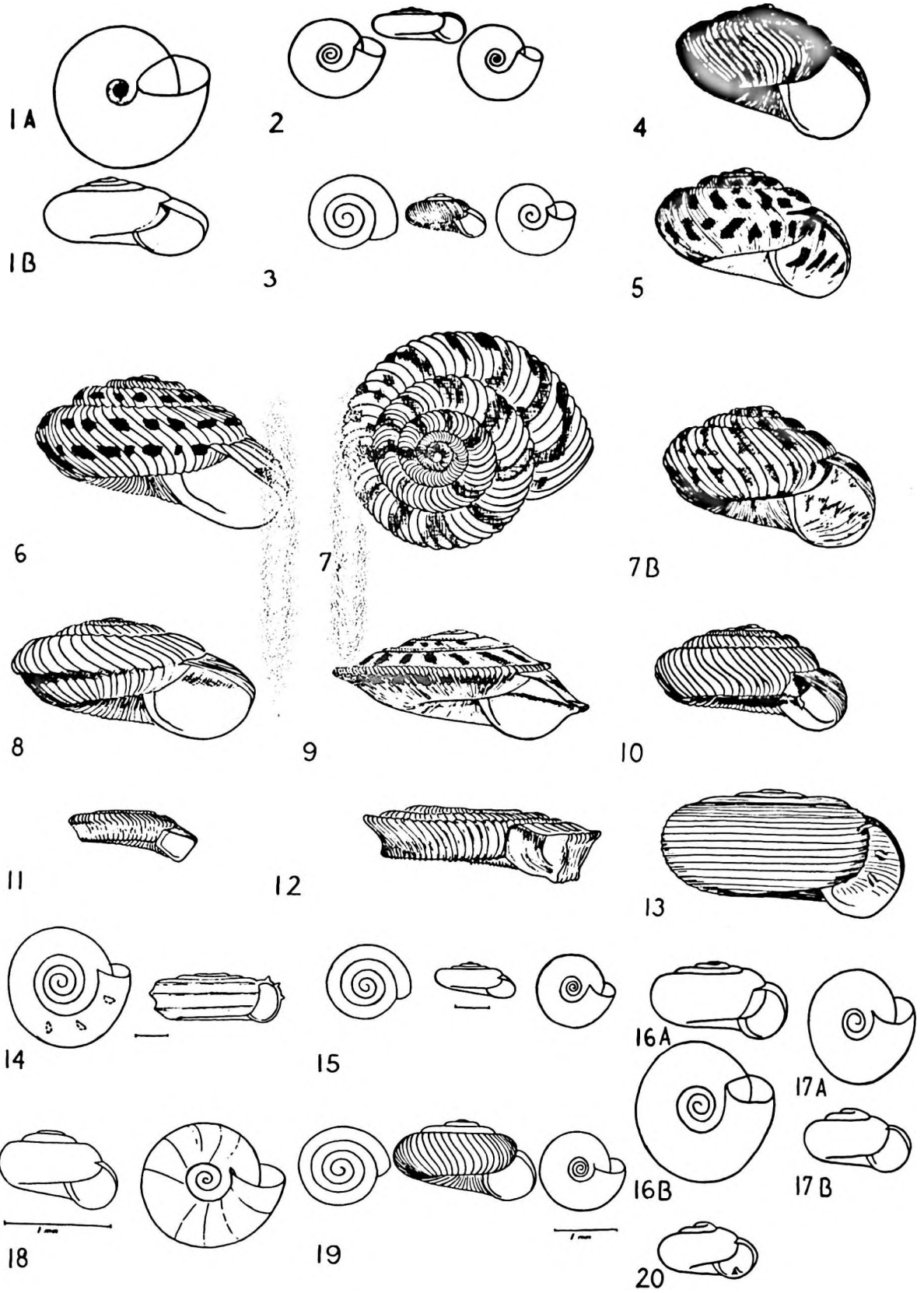


PLATE VII

EXPLANATION TO PLATE VIII

- Figure 1: Succinea ovalis. X 2 (after Pilsbry, 1948)
- Figure 2: Succinea aurea. X 6 (after Pilsbry, 1948)
- Figure 3: Succinea unicolor. X 4.5
- Figure 4 A, B: Succinea grosvenori. X 2 (after Pilsbry, 1948)
- Figure 5: Succinea campestris. X 3 (Florida)
- Figure 6: Succinea luteola. X 4.5
- Figure 7: Succinea concordialis. X 3 (after Pilsbry, 1948)
- Figure 8 A, B: Succinea avara. X 5
- Figure 9 A, B: Strobilops labyrinthica. X 20
- Figure 10 A,B: Strobilops texasiana. X 20
- Figure 11 A,B: Strobilops affinis. X 5 (after Pilsbry, 1948)
- Figure 12: Strobilops aenea. X 20
- Figure 13 A, B: Strobilops hubbardi. X 20
- Figure 14: Strobilops aenea. X 20

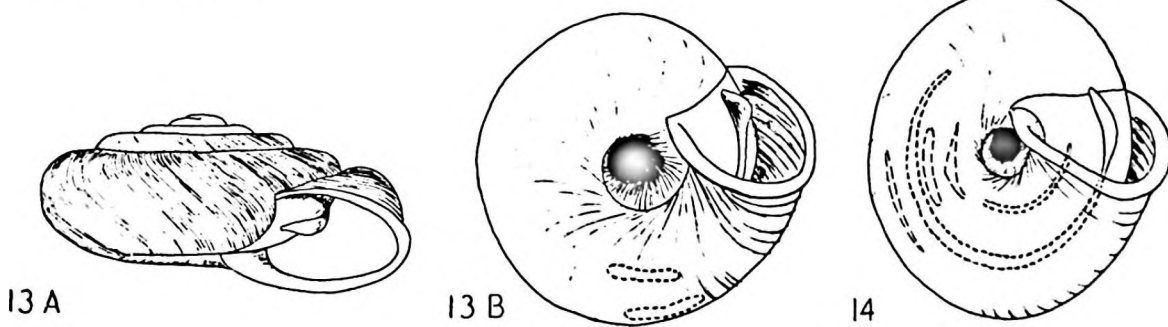
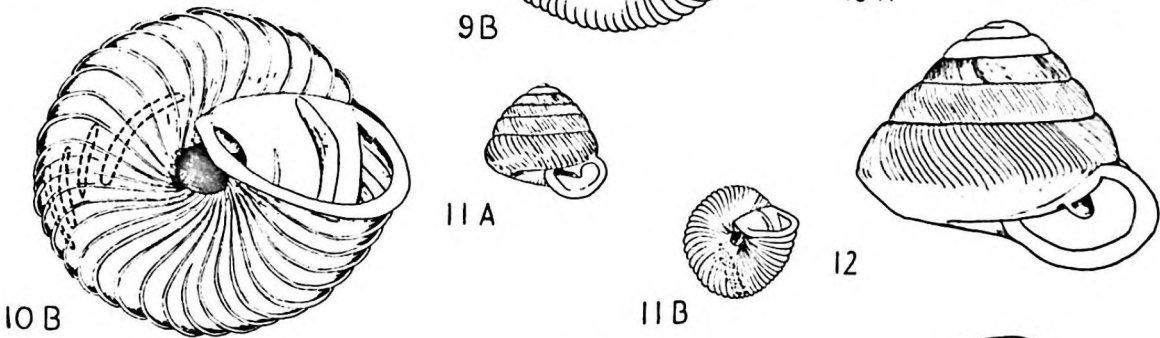
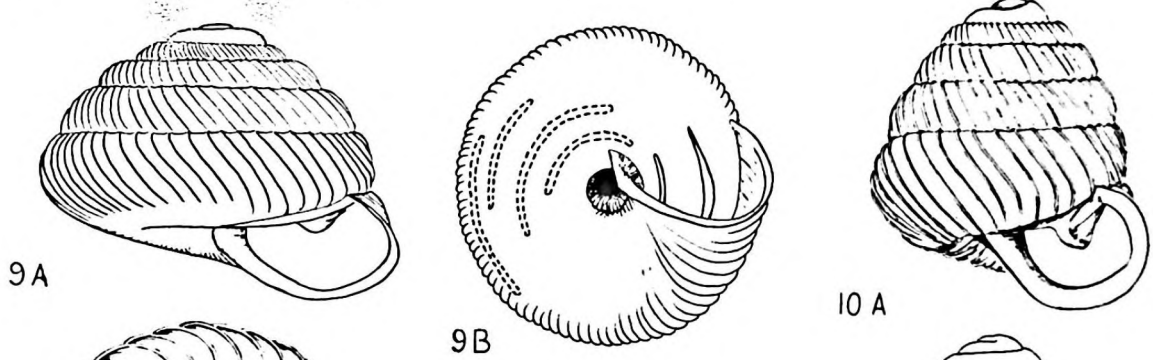
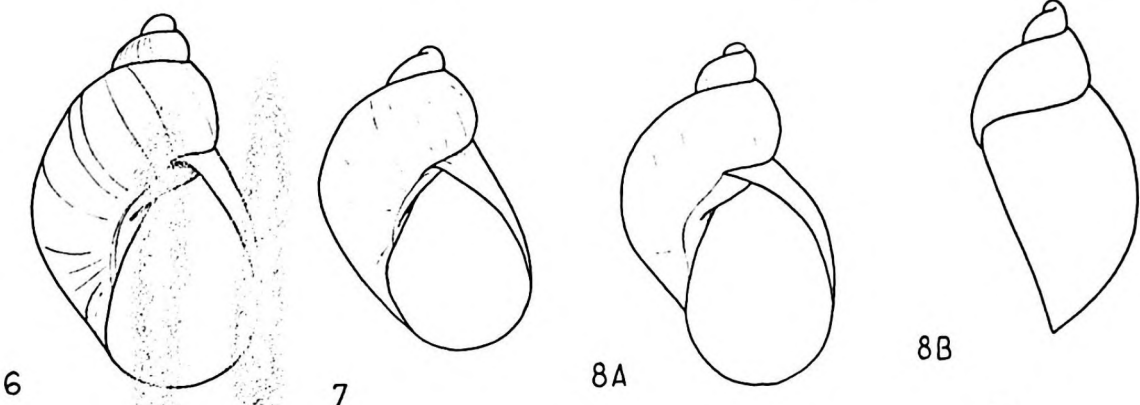
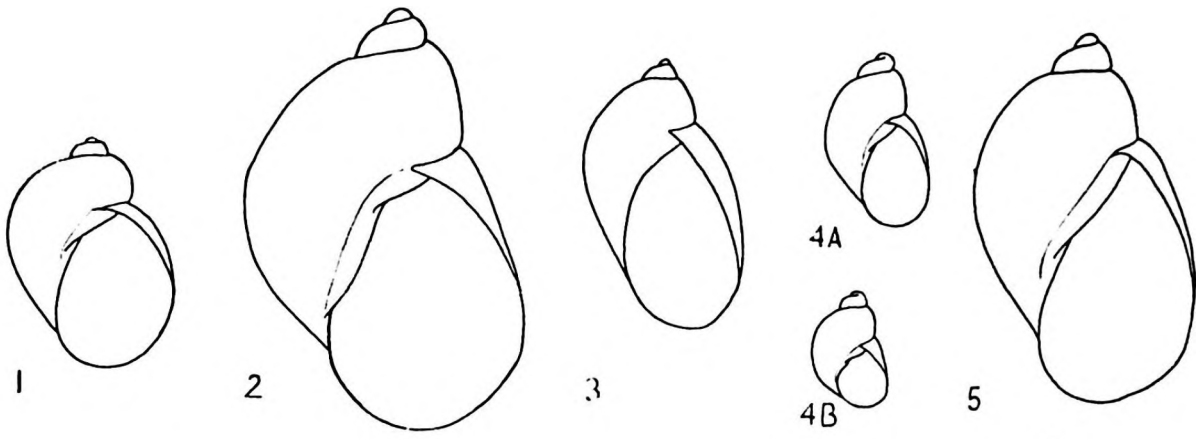


PLATE VIII

EXPLANATION TO PLATE IX

- Figure 1: Gastrocopta armifera. X 1.7
- Figure 2: Gastrocopta contracta. X 3 (after Pilsbry, 1948)
- Figure 3: Gastrocopta climeana. X 2
- Figure 4 A, B: Gastrocopta pentodon. X 2
- Figure 5: Gastrocopta pentodon. X 2
- Figure 6 A, B: Gastrocopta rupicola. X 7 (after Pilsbry, 1948)
- Figure 7 A, B: Gastrocopta procera. X 2
- Figure 8: Gastrocopta corticaria. X 10 (after Pilsbry, 1948)
- Figure 9: Gastrocopta pellucida hordeacella. X 45
(after Pilsbry, 1948)

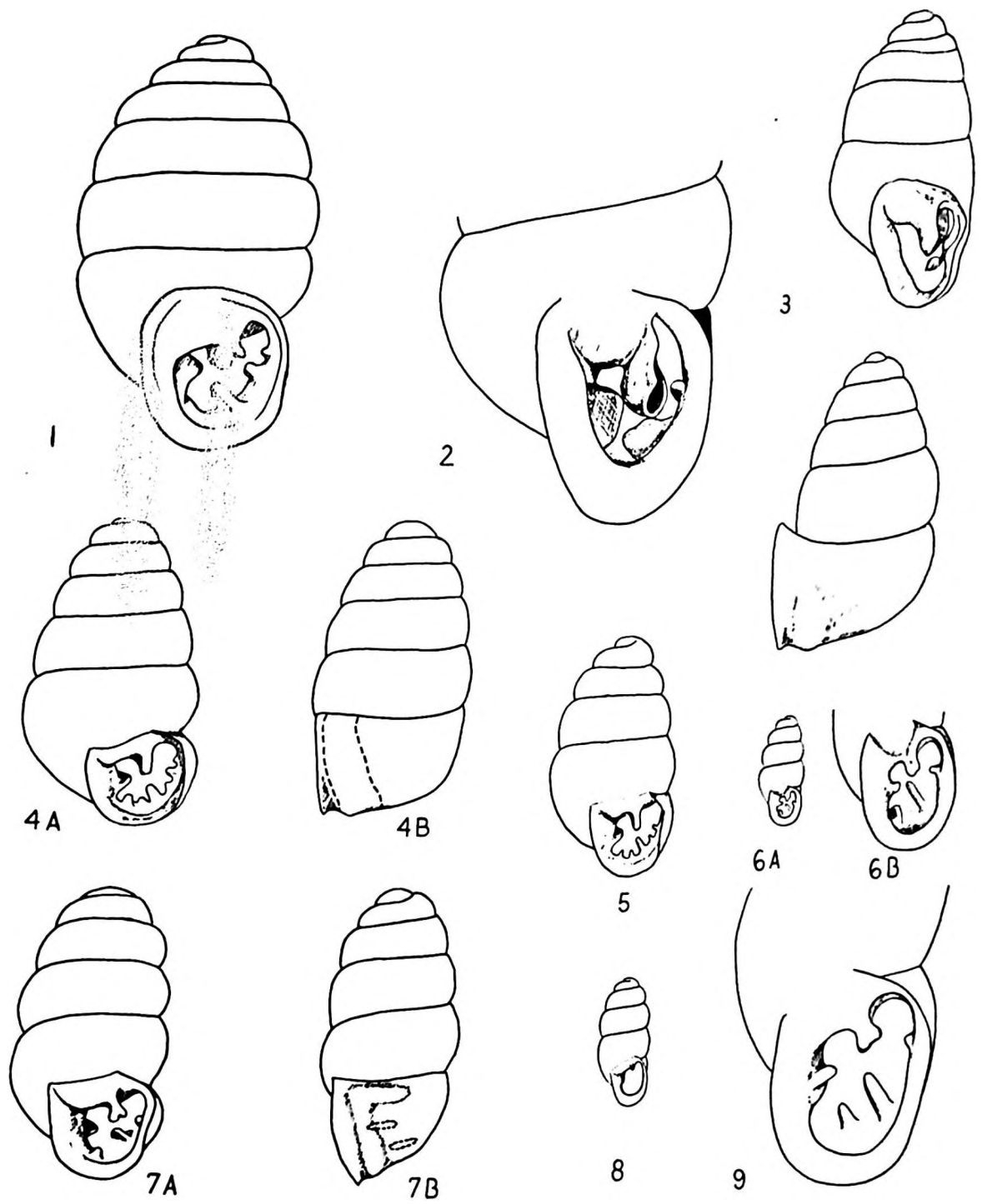


PLATE IX

EXPLANATION TO PLATE X

- Figure 1: Pupoides albilabris. X 10
- Figure 2 A, B: Vertigo milium. X 14
- Figure 3: Vertigo oscariana. X 14
- Figure 4 A, B: Vertigo rugosula. X 14
- Figure 5: Vertigo oralis. X 7 (after Pilsbry, 1948)
- Figure 6 A, B: Vertigo alabamensis. X 7 (after Pilsbry, 1948)
- Figure 7 A, B: Vertigo ovata. X 14
- Figure 8: Vertigo gouldii. X 14
- Figure 9: Vertigo wheeleri. X 7 (after Pilsbry, 1948)
- Figure 10: Columella edentula. X 10
- Figure 11 A, B: Pupisoma macneilli. X 14
- Figure 12 A, B: Vallonia pulchella. X 10 (Pennsylvania)
- Figure 13 A--C: Vallonia perspectiva. X 5.5 (after Pilsbry, 1948)
- Figure 14: Cionella lubrica morseana. X 7 (Georgia)
- Figure 15: Carychium exiguum. X 14
- Figure 16: Carychium exile. X 14
- Figure 17 A, B: Helicina orbiculata. X 4

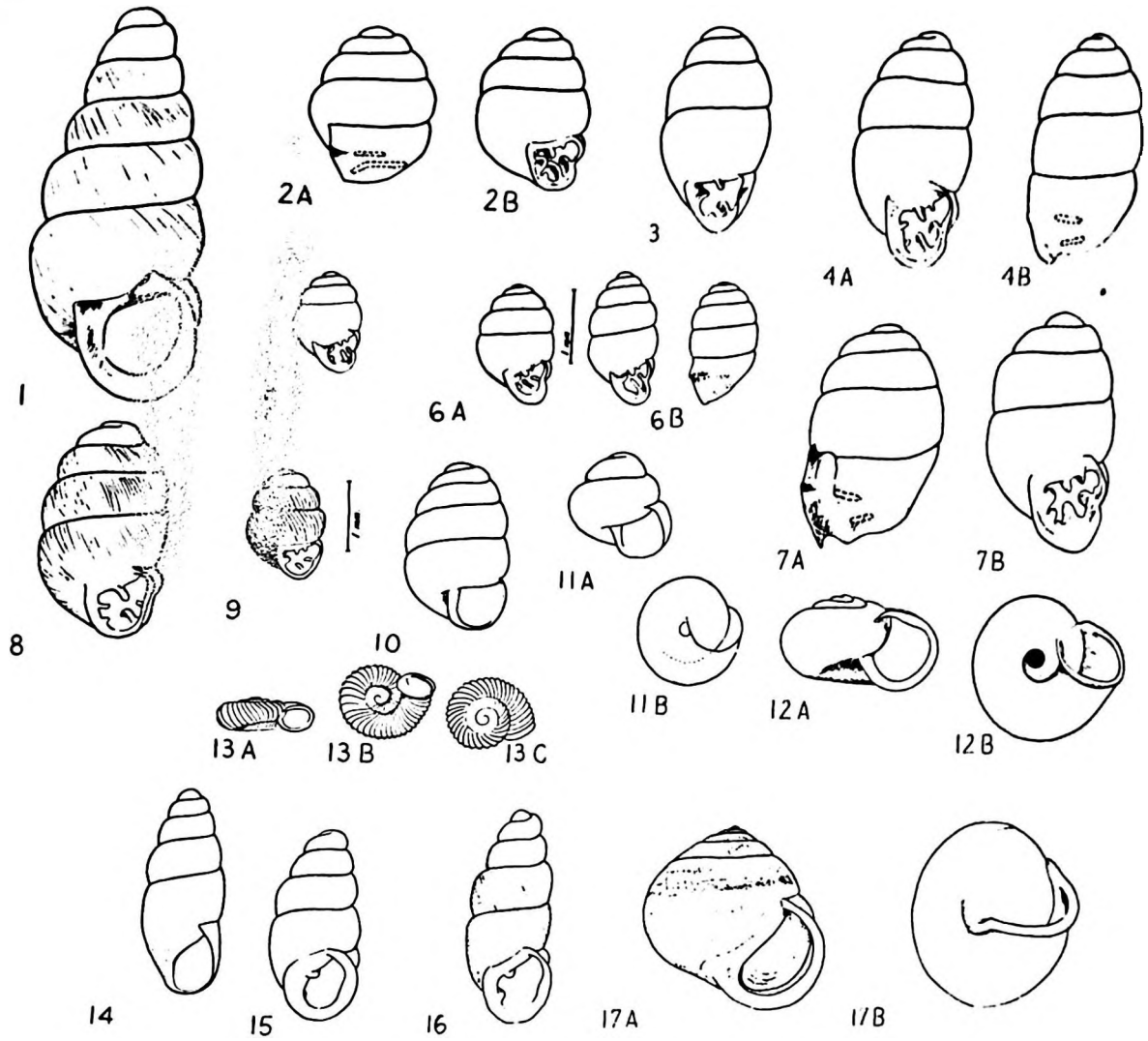
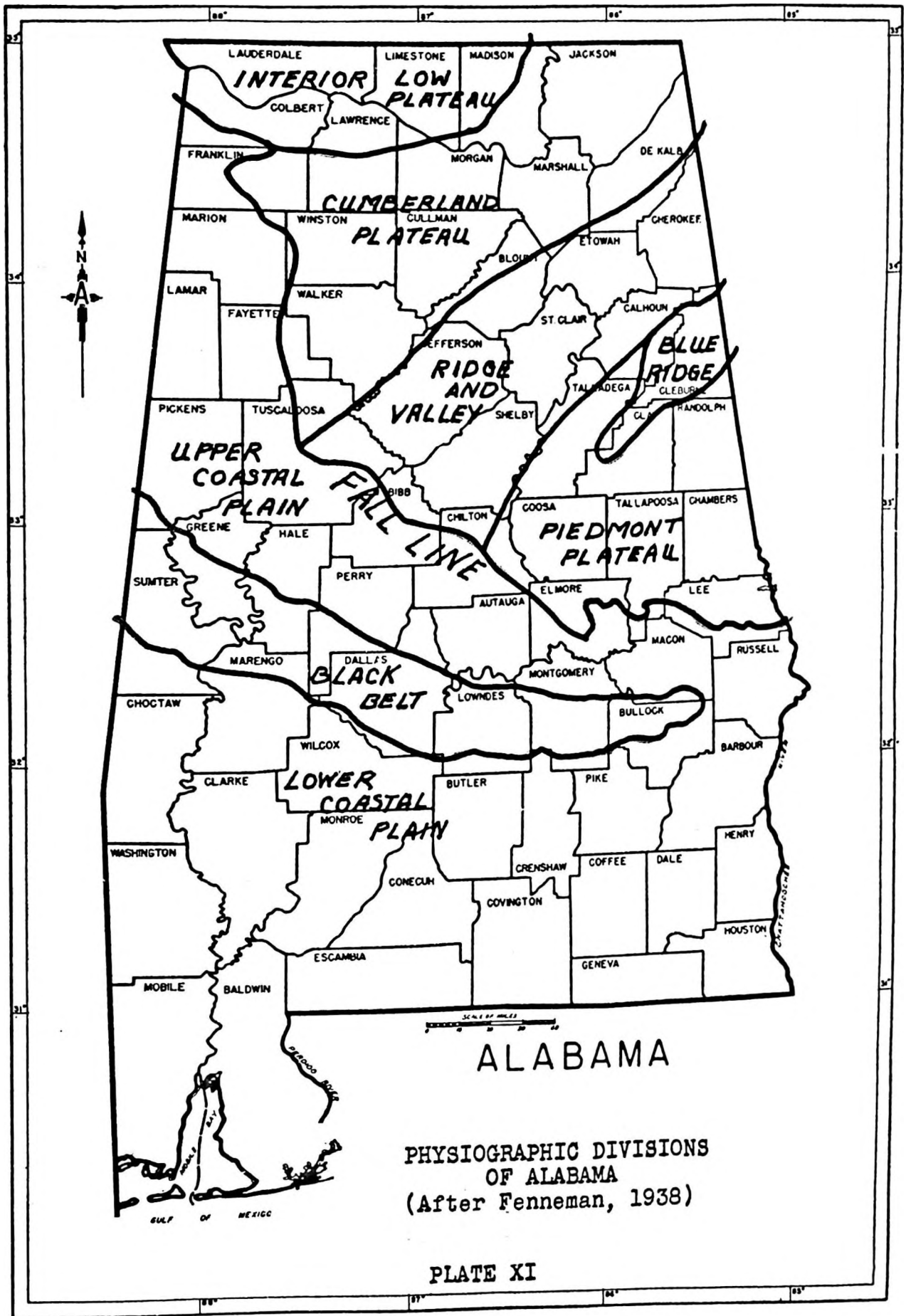
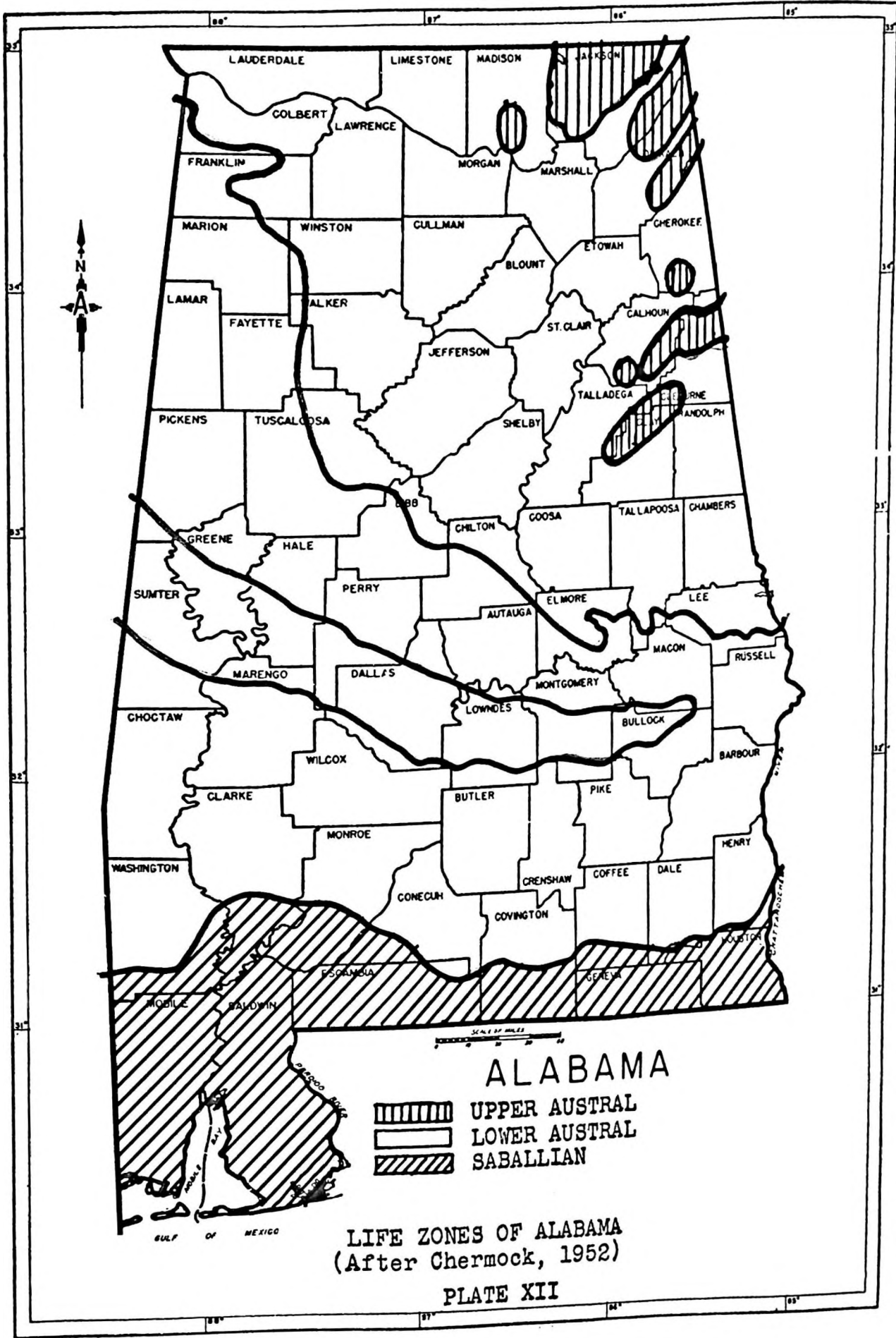


PLATE X





ALABAMA

▤▤▤▤▤	UPPER AUSTRAL
▬▬▬▬▬	LOWER AUSTRAL
▨▨▨▨▨	SABALLIAN

LIFE ZONES OF ALABAMA
(After Chermock, 1952)

PLATE XII



GEOLOGICAL SURVEY OF ALABAMA
EUGENE ALLEN SMITH, STATE GEOLOGIST

A GEOLOGICAL MAP
OF
ALABAMA
BY
EUGENE ALLEN SMITH
1920

LEGEND

GEOLOGICAL FORMATIONS

POST EOCENE

Sands, Clays, Fullers Earth and Gravel

Building Stone and Cement Rock

St. Stephens Limestone

Shell Marls
Claborna and Buhrstone
Lignitic and Shell Marls
Lignitic and Midway

CRETACEOUS

Ripley and Blue Marl
Limestones and Clay for Portland Cement
Selma Chalk
Artesian Water Sands
Eulaw
Pottery Clays, Oolite, Artesian Water, Sand and Gravel
Tuscaloosa

CARBONIFEROUS

Coal, Shales and Sandstone
Coal Measures
Limestones for Lime-burning, Furnace Flux, and Cement
Lower Carboniferous

DEVONIAN, SILURIAN AND CAMBRIAN

Iron Ores, Bauxite, and Limestones for lime-burning, Furnace Flux, and Cement

IGNEOUS AND METAMORPHIC ROCKS

Granite, Gold, Copper ore, Pyrite, Mica and Graphite

NOTE: Detailed mapping of the crystalline rocks has not yet progressed far enough to warrant subdividing them here. Some lower Paleozoic subdivisions which can be easily recognized in the field cannot be shown on a map of this size. The Ripley in the eastern half of the state is now believed to be partly contemporaneous with the Selma Chalk, but is separated on lithological grounds. There are several additional subdivisions of the Eocene too small to be shown, as are also the faulted anticlines at Lower Peach Tree and Jackson. The boundary between the Eocene and Post-Eocene is still ill-defined in the eastern half of the state.

PLATE XIII

GULF OF MEXICO

A. Hoen & Co., Inc.

