The Recent Gastropoda of Oklahoma, V. Terrestrial Species, Valloniidae, Achatinidae and Succineidae

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ADDENDA

Since part four of this treatise (Branson, 1962) was sent to press several changes have been made in the knowledge of Oklahoma gastropods which are concentrated and incorporated in this work. Branson, Taylor and Taylor (1962), in discussing a Pleistocene fauna from Caddo and Canadian counties, reported *Ferrissia meekiana* (Stimpson) as a fossil from Oklahoma. A few months later Dr. Lewis Peters (Northern Michigan College) found large numbers of living specimens in Lake Oberlin, Bryan County (Branson and Peters, in press). This species (Fig. 1 a, b) is easily distinguished from the other four ancylid snails known from Oklahoma in possessing a septate shell. Although the septum is sometimes lacking (Basch, 1959) the shell nearly always has a slight indentation on each side. A second ancylid change in the Oklahoma fauna is of a legalistic nature. Basch (1962) has shown that *Ferrissia fusca* should be placed in the genus *Laevapex*.

Several additions and changes in the known land snail fauna also have been made. Hubricht (1962) recently described *Helicodiscus notius*, including Oklahoma in its range (no definite locality was given), but this appears to be a member of the somewhat variable *H. parallelus-H. eigenmanni* complex, which may be a single variable species. This will be discussed in part six of this work. Branson and Peters (in press) reported *Limax maximus* Linnaeus, a large exotic slug from Europe, from Ottawa County, probably an escape from a Miami greenhouse. Branson (in press) recorded *Vaginulus occidentalis* (Guilding), an exotic from Guatemala, Puerto Rico, etc., from a greenhouse in Guthrie and pointed out that the species we have been calling *Limax marginatus* (Müller) is not that species, but *Limax valentianus* Férussac. Both of these last two forms are primarily European. In this same paper *Pallifera wetherbyi ragsdalei* Webb was elevated to full species rank and *P mutabilis* Hubricht synonymized with it; *Pallifera hemphilli marmorea* (Pilsbry) was elevated to full species. These changes bring the number of slugs known from Oklahoma to 12.

INTRODUCTION

This contribution is a continuation of part IV (Branson, 1962) and

treats three terrestrial gastropod families, Valloniidae, Achatinidae, and Succineidae. In this work I have deviated from the pattern set by the first four parts in resorting to characters of the soft anatomy in the family Succineidae, since their shells are nearly useless as specific characters. The terminology utilized in describing the various species of that family is explained and illustrated in the section dealing with them.

FAMILY VALLONIIDAE

Shell small to minute, white to very light tan; discoid-conical; dextral, phaneromphalous; sculpture of moderate to heavy ribs crossed by faint revolving lines; sutures rather deeply incised; peristome widely reflected, thickened or not, nearly to quite continuous; animal nearly white, sometimes transparent; foot very small in comparison to shell size, not tripartite, wrinkled laterally, truncate fore and aft; tentacles short, blunt; eyes intensely black; penis with a long appendix; jaw arched with few low and feebly-developed striations; radular teeth minute, 27 to 30 per transverse row; central tooth high and much smaller than others, unicusped; laterals bicusped, marginals multicusped. One genus in Oklahoma.

Genus Vallonia Risso, 1826

With characters of the family. Although only one species is now extant in Oklahoma, the shells of a second are commonly collected and may be confused with those of the living form. Consequently, both are discussed below.

KEY TO SPECIES OF VALLONIA IN OKLAHOMA

1. a. Diameter less than 2.5 mm; 30 to 38 ribs on last whorl ..... *Vallonia parvula*

   b. Diameter 2.5 mm or more; 45 more ribs on last whorl ..... *Vallonia gracilicosta*

Vallonia parvula Sterki Figure 2

Oklahoma Records: Muskogee County (Pilsbry and Ferriss, 1906); Noble County as *V. costata* (Müller) (Walker, 1915); Muskogee County (Lutz, 1949); Blaine, Kay, Logan, Payne, and Pontotoc counties (Wallen, 1951); Cimarron, Texas, Beaver, Harper, Woods, Grant, Woodward, Garfield, Noble, Dewey, Lincoln, Washita, Greer, Kiowa, Comanche, Tillman and McCurtain counties (Wallen and Dunlap, 1951); Beckham, Cherokee, Ellis, Haskell, Hughes, LeFlore, Osage, Ottawa, Roger Mills and Washington counties (Branson and Wallen, 1958); Pawnee and Johnston counties (Branson 1959 a); Caddo and Canadian counties (Pleistocene fossils, Caddo Local Fauna) (Branson, Taylor and Taylor, 1962). New Records: Custer, Garvin, Murray, Carter and Marshall counties.

Shell 0.7 to 0.9 mm high, diameter 1.5 to 2.1 mm; barely orthostrophic; slightly conical to flattened above; widely phaneromphalous; 3 to 3 1/5 whorls; faint horn, white or transparent; nucleus with very faint revolving lines, rest of whorls with 30 to 40 dense, raised ribs transversely placed on whorls, above and below, crossed by microscopic revolving lines; peristome widely reflected, whitish or pale horn in color, not appreciably thickened within; animal as described above for family.

These small, beautiful creatures are usually found under dead leaves, logs or rocks along streams or other bodies of water. They are probably mycophagous and are primarily nocturnal. *Vallonia parvula* is the only species of the genus now found living in Oklahoma.

Vallonia gracilicosta Reinhardt Figure 3

Oklahoma Records: Cimarron, Texas, Beaver, Harper, Woods, Woodward, and Washita counties (Wallen and Dunlap, 1953); Harper County (Bar-M Local Fauna, Pleistocene) (Taylor and Hibbard, 1955); Beckham, Haskell, Hughes, Payne and Pottawatomie counties (Branson and Wallen, 1958); Pawnee and Murray counties (Branson, 1959a); Canadian County (Caddo Local Fauna) (Branson, Tayler and Taylor, 1962). New Records: Major County.

Shell about 1.0 mm high, diameter 2.5 to 3.0 mm; barely orthostrophic to nearly flat; widely phaneromphalous; 3 to 3 1/2 whorls; sutures deeply impressed; white to nearly transparent; first 1 1/2 to 2 whorls nearly smooth, others heavily ribbed, 45 to over 50 ribs on the last whorl; peristome widely reflected and usually distinctly thickened. Animal not seen.

This species is now extinct in Oklahoma, having retracted northward with recession of the ice cap. It is a very common fossil and subfossil in the central and western counties.

FAMILY ACHATINIDAE

Shell moderate, nearly white to grayish-white; cylindric-tapering, much taller than wide; dextral, cryptomphalous; 4 to 7 slightly convex whorls in adult (Fig. 5), but 8 or more young ones (Fig. 4) are decollated (lost); apex bluntly truncated; sculpture consists of wrinkles near sutures and very fine revolving lines on whorls crossed by faint to rugose growth stria; aperture nearly vertical and ovate ;outer lip thin and sharp, columellar lip reflected over axial perforation; animal light to dark gray and rather granulose; tentacles blunt and fairly short; jaw arched and faintly striated; central and lateral radular teeth tricusped, marginals bicusped. One exotic species in Oklahoma.

Genus Rumina Risso, 1826

With the characters of the family.

Rumina decollata (Linnaeus) Figures 4, 5

Oklahoma Records: Pontotoc County (Branson, 1959 b).

With the characters of the family.

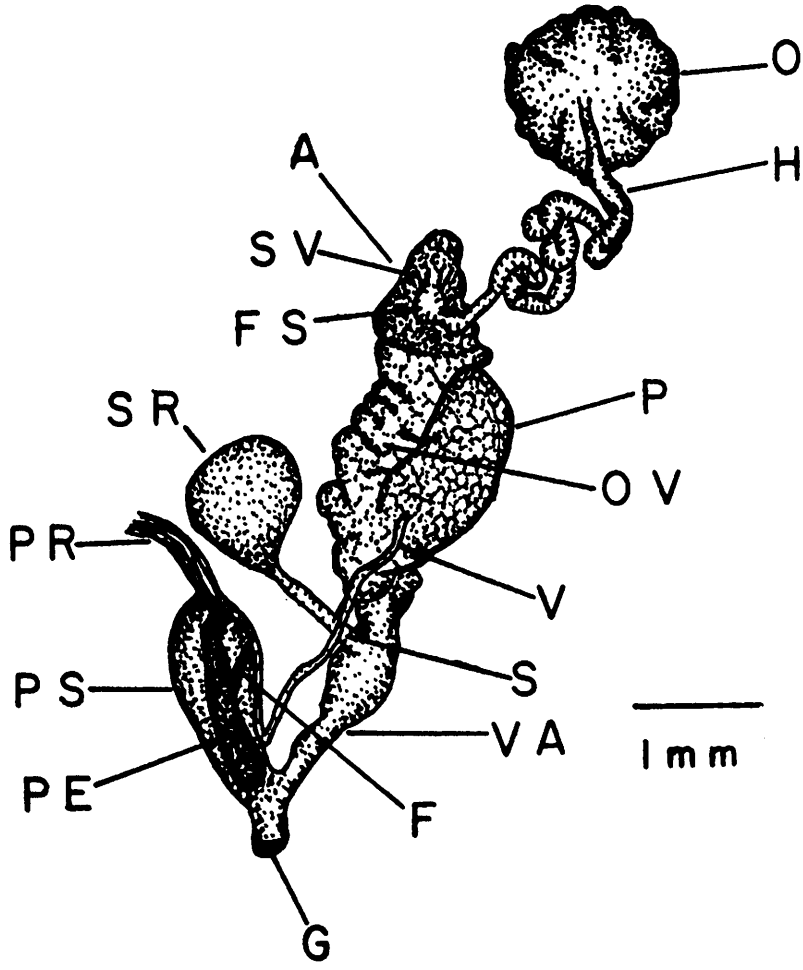
R. decollata is indigenous to the Mediterranean area but has been widely distributed by man's activities (Pilsbry, 1946). The species is a voracious feeder and often becomes very troublesome in greenhouses, gardens, and flower beds. They are omnivorous and will attack and devour all sorts of small animals as well as other snails, sometime shell and all (Pilsbry, 1946). The young are reported to eat the root-hairs from seedlings and adult plants (Lloyd Showers, personal communication).

This species, like many others, probably because of moisture requirements, is mainly nocturnal and lives on fairly moist soil or sand. It is capable of aestivation, in or above the soil, and forms epiphragms. Six to 10 clutches of globular, tough eggs, with about 7 to 30 eggs per clutch, are deposited in the early fall or late summer (Batts, 1957). The introduction of this species into Oklahoma, if it proves successful, is unfortunate. *Rumina decollata* should be placed on the official quarantine list.

FAMILY SUCCINEIDAE

Shell small to moderate; whitish horn to horn, opaque to nearly trans-

parent; ovate to elongate-ovate; dextral, anomphalous, evolute; very thin, smooth to faintly or coarsely striate with minute revolving lines; sutures moderate to deeply incised; whorls sometimes slightly shouldered; peristome very thin edged, sometimes slightly reflected over columella; aperture ovate to elongate-ovate and capacious; spire very short, 2 to 4 whorls; mantle various, from creamy white through varying shades of tan-or black-mottled to nearly coal black with a few yellowish or whitish spots (these spots sometimes are actually parasites); foot whitish to creamy-



Text Figure 1. *Oxyloma retusa*, genitalia. a, albumen gland; f, flagellum, fs, fertilization sac; g, genital atrium; h, hermaphrodite duct; o, ovotestis; ov, oviduct; p, prostrate gland; pe, penis; pr, retractor muscle of penis; ps, penis sheath; s, duct of seminal receptacle; sr, seminal receptacle; sv, seminal vesicle; v, vas deferens; va, vagina.

white or moderately mottled, indistinctly three-zoned (tripartite); tentacles relatively short and blunt, their pigmented nerves and muscular retractors showing through body wall; jaw ventrally 3-lobed with a peculiar central projection, striated or not; all radular teeth with ectocenes; genitalia as described below. Three genera in the United States, all represented in Oklahoma.

The Succineidae is one of the most difficult terrestrial taxa in the Gastropoda. There is so much similarity between their shells from one species to the next that use of shells as taxonomic characters is very limited. As a result of this, many of the older distribution lists doubtless contain many errors in identification. It has been only within the relatively recent past that American molluscan systematists have turned their attention to the soft anatomy in an attempt to better understand relationships within this exceedingly widespread family. Since many, if not most, of the species can only be determined by characters of the soft parts, I have included a brief discussion at this point to assist the reader before he attempts to utilize the following keys.

It appears, because of the ease with which they may be removed, that the best organs for taxonomic purpose are those of the genital system. The snails may be relaxed by several methods; the simplest is to immerse them for a few seconds in boiling water or to drown them. The foot may then be pinned to wax, previously melted and poured into a watch glass (preferably dark paraffin), and the system dissected by means of sharpened needles mounted in match sticks. A good external landmark, by which to start dissecting, is the genital atrium, opening just behind and below the right eye-bearing tentacle (eye stalk). Once removed and carefully cleaned, the genital system should be stained by a perferred dye, pinned out and slowly dehydrated and mounted in a permanent condition. All pigmented investing membranes should either be depigmented or removed. However, notes on their position and coloration may be useful. Most of the major organs are illustrated in Text Figure 1.

KEY TO GENERA OF SUCCINEIDAE IN OKLAHOMA

1 a. Penis sheath lacking; epiphallus (inflated distal end of vas deferens) feebly developed or lacking; penial appendix moderately to strongly developed (Figs. 17, 19) ..... *Catinella*

b. Penis sheath present; epiphallus moderately to strongly developed; penial appendix present or not 2

2. a. Penis bearing a small, posteriorly-terminal (or nearly so) appendix; appendix and epiphallus partially to completely enclosed in sheath (Text Fig. 1) ..... *Oxyloma*

b. Penis lacking appendix; epiphallus external to sheath (Fig. 21) ..... *Succinea*

Genus Oxyloma Westerlund, 1885

Shell moderately elongate-ovoid, 14.3 to nearly 16.0 mm long, greatest diameter 7.0 to 8.4 mm; glistening chamois to nearly golden; thin but sturdy, rather metallic in appearance; aperture much longer than wide, 65 to 75 per cent of total shell length; peristome thin, columella slightly arcuate; 2 ½ to slightly over 3 rather slab-sided whorls; sutures moderate; animal light gray in summer or dark (Fig. 14) in spring (see also Baker, 1939; Miles, 1958); genitalia (Text Fig. 1): atrium shallow, vagina rather extensive but slender; penis sheath extensive, covering a large, straight or slightly sinuous penis; penis bears somewhat variable appendix near position of epiphallus, the latter also being enclosed by the sheath; moderate-sized,

globular seminal receptacle with a short, slender, parallel-sided duct that inserts at upper end of vagina; prostrate large, granulose and grayish, its duct long and slender; oviduct fairly extensive, wrinkled and grayish-white; albumen gland darker and relatively small (compared to oviduct); ovotestis large, transversely wrinkled; hermaphordite duct fairly long, usually tightly convoluted (teased apart in the drawing, as in the others); fertilization sac and paired seminal vesicles small, situated high on albumen gland. Two species reported from Oklahoma; only one considered as validly occurring here.

Oxyloma retusa (Lea) Text Figure 1; Figures 6, 14

Oklahoma Records: Cleveland County (Lutz, 1949); Alfalfa, Beaver, Garfield, Johnston, Logan, Major, Noble and Woodward counties (as *O. decampi gouldi)* (Wallen and Dunlap, 1953); Caddo County (Caddo Local Fauna) (Branson, Taylor and Taylor, 1962). New Records: Johnston and Craig counties.

Taylor (1954) and Taylor and Hibbard (1955) reported *Oxyloma haydeni*, a pleistocene fossil, from Beaver and Harper counties respectively, pointing out, however, that since there is so much insecurity in diagnoses made from shells alone, that this might be some other species.

This is a highly amphibious species, sometimes entering the water. I have not been able to verify Wallen and Dunlap's records for *O. decampi* and have listed them above with the records for *O. retusa*. Since there is a tendency for some workers to confuse certain populations of *Succinea ovalis* Say for *O. retusa*. I have compared the former's jaw with that of *Succinea concordialis* (Fig. 16). The morphology of this structure will immediately differentiate *S. ovalis* from any succineid known from Oklahoma.

Genus Catinella Pease, 1871

Shell small to moderate, globose-ovoid to elongate-ovoid; tan, brownish, olive or yellowish-horn to bright golden; very thin and fragile to sturdy; aperture ovoid or elongate-ovoid, peristome thin; columella arcuate, nearly straight or slightly twisted, glistening to dull matt, fine to fairly coarse growth and revolving striae; 2 1/2 to about 3 2/3 whorls, the apical one sometimes reddish-brown; animal creamy to chamois with flecks of brownish, black or reddish-black; edge of foot rusty or grayish with dashes of black or brown to nearly immaculate; penis sheath lacking; epiphallus and appendix usually strongly developed, blunt and arising near middle of penis; vagina exceedingly short.

The genus *Catinella* has been in a most confused state for years, several of the Oklahoma succineids being involved. Webb (1953 a) indicated that some sort of taxonomic difficulty existed in this group and that it was probably futile to attempt identification of them without dissection. In reviewing several related congeners, Odhner (1950) erected a new succineid subfamily to include Pilsbry's (1948 subgenus *Mediappendix,* with a very strongly appendiculated penis, the subgenus *Quickella* Boettger, 1939 (Grimm, 1960), having only a slightly knobbed appendix, and *Catinella* s. s. (with priority), which lacks an appendix. Since the species known from Oklahoma have a very stongly appendixed penis they are in *Catinella,* subgenus *Mediappendix*. This is only part of the systematic difficulty.

The species which we have been calling *Succinea avara* (Say) was found by Hubricht (1958) to be a *Quickella*. Hubricht dissected specimens from the type locality of *Succinea vermeta* Say, a putative synonym of *Succinea avara* Say (Pilsbry, 1948) and compared the holotype shells

of *avara* with those of *vermeta* and found them to be identical (immatures). He concluded that the two were probably synonyms and until *S. avara* could be definitely identified, that this form should be called *Quickella vermeta*. Both epithets were published in 1824, so it appears that we must follow the rule of the first reviser. Grimm (1960) further pointed out that this species does not have a penis like that of *Quickella* but like that of *Mediappendix*. Some other problems will be alluded to below.

KEY TO SPECIES OF CATINELLA IN OKLAHOMA

1 a. Penial appendix equal to or only slightly longer than penis, somewhat truncated distally ..... *Catinella vagans*

b. Penial appendix much longer than penis, usually tapered or only moderately truncated distally ..... *Catinella vermeta*

Catinella vagans (Pilsbry) Figures 7, 16

Oklahoma Records: Cleveland, Choctaw and McCurtain counties (Webb, 1953 a); Pushmataha County (type locality for *Quickella oklahomarum,* Webb, 1953 b).

Shell 6.8 to nearly 9.0 mm long, greatest diameter 5.3 to 7.0 mm; ovoid to globose-ovoid; little over 2 to nearly 3 convex whorls; sutures impressed; matt to slightly glossy, drab olive to yellowish or greenish horn, opaque; nucleus faintly striate, other whorls nearly smooth to coarsely wrinkled; aperture ovoid to elongate-ovoid; peristome thin and simple, a faint reflected and adhered columellar fold; mantle grayish to white with scattered melanophores over lung and a few gray or black streaks; edge of foot punctate or faintly dorsoventrally streaked or bluish-gray; several dark streaks on head at base of eye stalks; sheathless penis varies from slightly attenuate to blunt; appendix large and variable, usually blunt, often slightly longer than penis; prostrate ovoid to elongate-ovoid; retractor invests the reduced epiphallus.

This variable species is usually found under dead wood, decaying leaves and other bits of debris at the edges of streams, ponds or other bodies of water. Webb's (1953 b) *Quickella oklahomarum* is, as its genital and conchological characters lie well within the variability of *vagans,* considered at this time to be a synonym of *C. vagans.*

Catinella vermeta (Say) Figures 8, 9, 17, 18

Oklahoma Records: In the following, if not further explained, it will be understood that these records were originally reported as *Succinea avara.* Craig, Atoka and LeFlore counties (Pilsbry and Ferriss, 1906); Payne County (Gregor, 1915); Payne, Cleveland and Tulsa counties (Lutz, 1949); Blaine, Cherokee, Johnston, Kay, LeFlore, McClain, Murray, Muskogee, Pontotoc and Pushmataha counties (Wallen, 1951); Alfalfa, Beaver, Canadian, Comanche, Garfield, Grady, Greer, Harmon, Harper, Jackson, Kiowa, Lincoln, McCurtain, Noble, Texas, Washita, Woods and Woodward counties (Wallen and Dunlap, 1953); Harper County (Bar-M Local Fauna) (Taylor and Hibbard, 1955); Adair, Bryan, Creek, Ellis, Haskell, Hughes, Osage, Ottawa, Pittsburg, Pottwatomie and Roger Mills counties (Branson and Wallen, 1958); Payne County (Branson, 1959 c); Cimarron, Washington, Nowata, Pawnee and Caddo counties (Branson, 1959 a); Canadian and Caddo counties (Caddo Local Fauna, as *C. vermeta;* Branson, Taylor and Taylor, 1962). New Records: Carter and Marshall counties.

Since there is a great deal of confusion in the identification of succineids by shell characters alone, many of the above records may be based upon erroneous determinations. However, these are listed for the sake of completeness.

Shell 6.5 to 9.2 mm long, diameter 3.8 to 5.4 mm; elongate-ovoid to nearly parallel-sided; 2 1/4 to little over 3 whorls; sutures impressed and distinct; greenish-yellow to nearly golden; opaque to nearly transparent (usually caked with mud); nearly smooth to rugose; distinct minute spiral sculpture; nucleus often tan or ruddy; aperture ovate to elongate-ovate; peristome thin, reflected and adnate over columella; animal light (probably dark in the spring) with streaks and flecks of reddish-brown or dark brown on mantle; edge of foot watery gray, sole streaked with black; prostate elongate-ovoid, yellowish; retractor muscle attached to penis rather than epiphallus; appendix considerably longer than penis, the latter attenuated. The genitalia are variable from one area to another, a great deal of anatomic comparison being needed in this species. Webb's (1953 a) *Quickella wandae* (type locality near Alma, Kansas) is considered to be conspecific with *C. vemeta*. This conclusion is based upon comparisons made with water-borne preparations from the type locality and with those from several localities in Oklahoma.

This form is nearly always found in moist areas, sometimes actively entering the water (Branson, 1959 a). Its food consists primarily of algae, fungi and molds of various types.

Genus Succinea Draparnaud, 1801

Shell, with little or no difference, as in *Catinella;* external soft parts, with specific differences, like those of family and *Catinella;* generic characters, as indicated in key; penis sheathed; epiphallus nearly or completely external to sheath; appendix lacking. Five species have been reported from Oklahoma (six, including *S. avara,* discussed above), but all of the records made for *Succinea grosvenori* Lea are considered to be based upon some other species, most likely *S. concordialis* or a *Catinella.*

KEY TO SPECIES OF SUCCINEA IN OKLAHOMA

1 a. Vagina twisted or lobed ..... *Succinea vaginacontorta*

b. Vagina not twisted or lobed 2

2 a. Penis sheath very large, as wide as or wider than oviduct; retractor attached to or near epiphallus at vas deferens end; shell pale yellow within ..... *Succinea Luteola*

b. Penis sheath less capacious; penial retractor attached either to penis or penial end of epiphallus; shell not yellowish within 3

3 a. Mantle intensely black; penial retractor attached to penis sheath and epiphallus; vas deferens wide, sometimes flattened ..... *Succinea concordialis*

b. Mantle never nearly completely black; penial retractor attached to epiphallus at its penis end; vas deferens narrow, not flattened ..... *Succinea pseudavara*

Succinea vaginacontorta Lee Figures 10, 19

Oklahoma Records: Cleveland County (Webb, 1953 b). New Record: Marshall County.

Shell 7.3 to nearly 10.0 mm tall, greatest diameter 4.3 to 6.1 mm; 2 1/2 to little over 3 moderately inflated whorls; sutures moderately incised; greenish-yellow, horn to dark-honey yellow; apex ruddy, yellowish or eroded (Lee, 1951); growth striations distinct, sometimes coarse; opaque; aperture ovate; peristome thin, reflected and adnate over columella; columella slightly sinuous; upper whorls nearly white; mantle faintly punctate with a network of spiral, ragged-edged black or brownish-black markings and finer longitudinal ones of the same color, its lower edge bearing wide to moderate dark dashes with vermiculations between them; color on edge of foot grayish or white, foot watery; tentacles slightly tapered, lighter distally and darkened basally; prostate faintly reticulated and small; vagina moderately elongate, about 2/3 length of penis (Lee, 1951), swollen and twisted or lobed proximally; penis thin proximally, slightly thicker distally (similar to *S. luteola),* its sheath thick; epiphallus looped; penis retractor inserted near base of epiphallus.

This interesting species is usually found near stream margins or in areas where water is conserved. Its distribution is poorly known, but its range should be fully determined in Oklahoma, Texas and adjacent parts of Missouri and Arkansas.

Succinea luteola Gould Figures 11, 20

Oklahoma Records: Washington, Cleveland and Beckham counties (Lutz, 1949); Kay County (Wallen, 1951). New Records: Murray, Carter, Johnston, Marshall and Bryan counties.

Shell 8.4 to at least 15.0 mm long, diameter 4.4 to 7.6 mm; very elongate-ovoid (nearly parallel-sided) to ovoid; 3 1/2 to over 4 slightly shouldered whorls, the second much deeper than third and fourth combined; and often deeply marked by lines; opaque whitish-horn or brownish-white; aperture ovoid to moderately elongate oval, usually little over 1/2 shell length, yellowish or whitish-yellow within; peristome thin; columella nearly straight to slightly flexed; mantle grayish with considerable punctulations and longitudinal and spiral markings ;edge of foot dusty-gray or white; prostate usually equal to or considerably smaller than seminal receptacle, occasionally large; seminal vesicles narrowly elongate and nearly colorless; narrow epiphallus appears looped, penial retractor attached to or near its vas deferens end; penis sheath massive, as wide as or wider than the oviduct.

Although *S. luteola* is most often found under moist objects near water's edge, it is sometimes found in upland situations that are relatively dry. This species is apparently not abundant in Oklahoma, but becomes progressively more so in the southern part of the state and is one of the most common species in southern Texas. Its range is gradually dissipated somewhere in northern Oklahoma or southern Kansas, although it apparently has not been reported from the latter state.

Succinea concordialis Gould Figures 12, 16, 21, 22

Oklahoma Records: In the following, if not otherwise indicated, the original records were for *S. grosvenori* Lee. Muskogee County (Stimpson, 1888); Payne County (Gregor, 1915; Woods County (Walker, 1915); Woodward, Grady, McClain and Cleveland counties (Lutz, 1949); Johnston County (Wallen, 1951); Cleveland County (Webb, 1953 b); Alfalfa, Beaver, Canadian, Comanche, Garfield, Grady, Greer, Harman, Harper, Jackson, Kiowa, Lincoln, McCurtain, Noble, Texas, Washita, Woods and Woodward counties (Wallen and Dunlap, 1953); Beaver County (Berends Local Fauna) (Taylor, 1954); Murray and Hughes counties (Dundee, 1955); Harper County (Bar M. Local Fauna) (Taylor and Hibbard, 1955); Adair, Beckham, LeFlore, Osage,

Ottawa, Pittsburg and Pottawatomie counties (Branson and Wallen, 1958); Nowata and Craig counties (Branson, 1959 a); Canadian County (Caddo Local Fauna, Branson, Taylor and Taylor, 1962 as *S. concordialis)*. Verified Records: Woodward, Greer, Johnston and Craig counties, author); Marshall County (Webb, 1953).

Although many of the records listed above were reported as *S. grosvenori,* several other species may actually be involved. The reason for listing them at this point is that all of the shells, previously reported as *grosvenori,* observed by me seem to be more like *S. concordialis* than any other species.

Shell 9.6 to 16.1 mm long, greatest diameter 5.0 to 11.0 mm; elongate ovoid; 2 ½ to 3 ¾ whorls, only moderately convex; sutures moderately impressed; yellowish horn to golden-yellow, apex ruddy; transparent; growth striae faint but sometimes coarse; aperture elongated, about 2/3 total shell length, or elongate-ovoid; peristome thin, flexed above, adnate over parietal columella; columella regularly arched but sometimes slightly twisted; mantle and upper soft whorls intensely blackened; edges of foot sooty; sole streaked and flecked with black; tentacles gray; penis retractor fairly copious, attached to penis sheath or to penis end of epiphallus or to both; vas deferens short and wide, often flattened; penis moderate, enclosed in a thick, but relatively small, sheath.

Succinea concordialis is doubtless widespread in Oklahoma. It is nearly always found near waterways or ponds. However, Miles (1958) found it in dry areas in Kansas. It is easily recognized by its dark mantle when alive, but the shell is not completely reliable, although more so than many other Oklahoma succineids.

Succinea pseudavara Webb Fegures 13, 23

Oklahoma Records: Cleveland County (Webb, 1953 b); Marshall County (type locality) (Webb, 1954). New Records: Bryan County.

Shell 6.1 to nearly 9.0 mm long, diameter 3.9 to 5.0 mm; globose-ovoid to moderately elongate-ovoid; sutures rather deeply impressed, whorls below them slightly shouldered; amber to brownish-horn, apex ruddy to crystal orange or yellow; fine revolving lines and slightly coarser growth striae; aperture relatively short and ovoid; peristome thin, regularly arched; mantle reticulated with grayish or black with marginal blotches, its ground-color grayish-white; foot narrow, laterally sprinkled with gray anteriad, whitish-gray posteriad, sole immaculate; penis fairly large (like *S. concordialis,* to which it is related), enclosed in a copious sheath; epiphallus not looped; vas deferens thin, tubular and moderately long.

This species, like *S. concordialis,* is found most often near bodies of water. It is now known only from Oklahoma and Kansas, but can be expected at least in Texas, Arkansas, Missouri and Louisiana.

As indicated earlier, the next paper in this series will treat the terrestrial families Endodontidae and Zonitidae. The final paper will attempt to cover the slug families and to summarize the gastropods of Oklahoma as regards their origins, affinities and overall implications in the fauna of the state.

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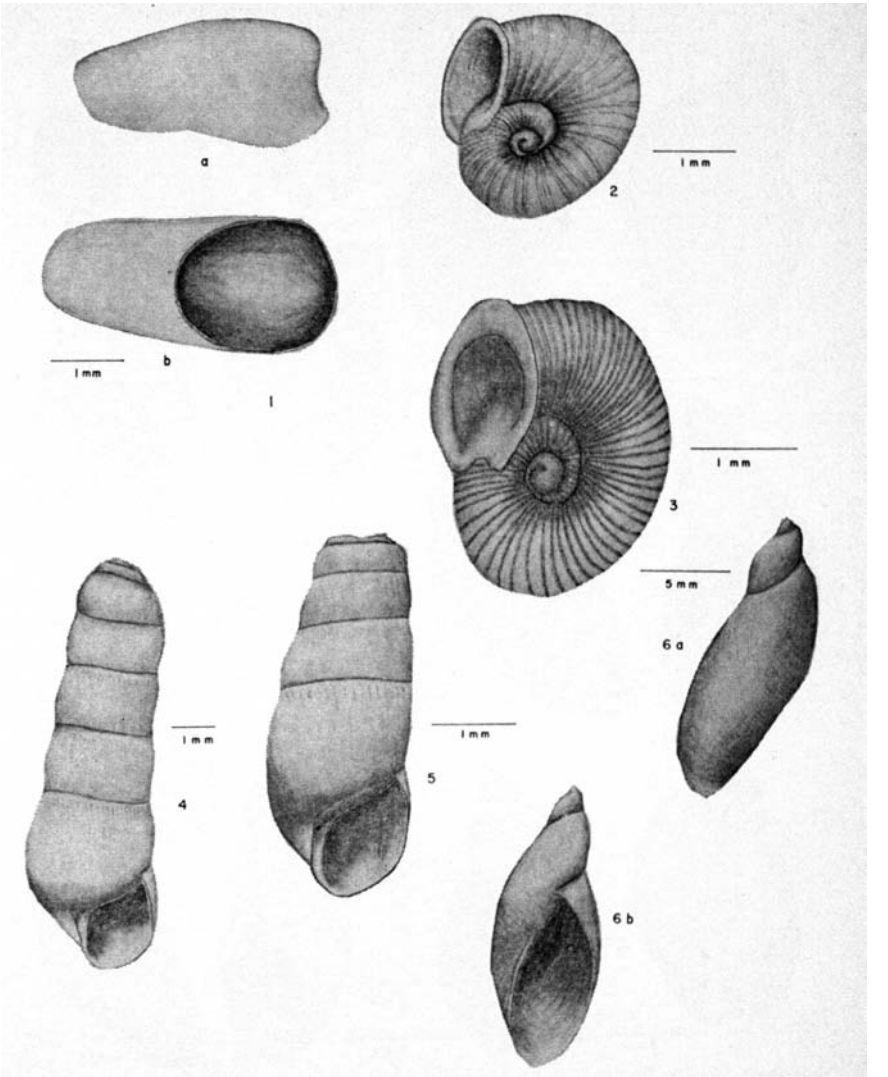


Figure

1, *Ferrissia meekiana.* a, left lateral view; b, ventral view. Lake Oberlin, Bryan County, Oklahoma.

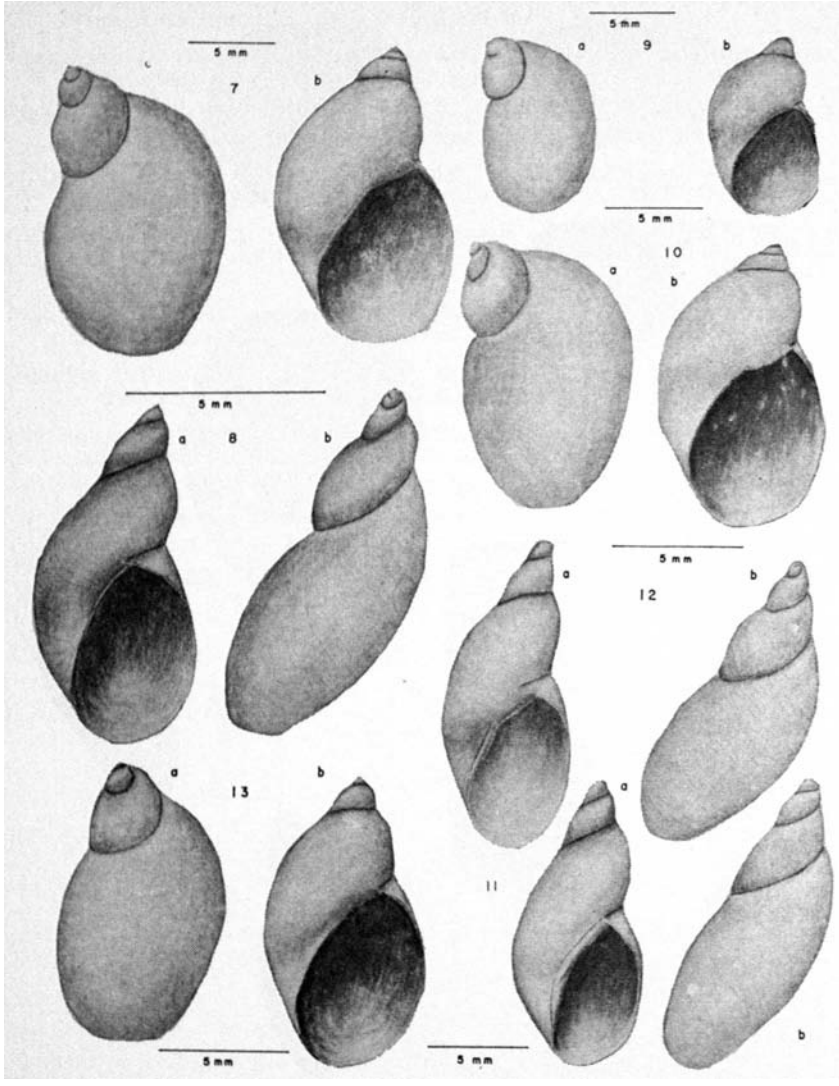
2, *Vallonia parvula.* Woodward County.

3, *Vallonia gracilocosta.* Cimarron County.

4, *Rumina decollata.* Immature, Pontotoc County.

5, *Rumina decollata.* Adult, Pontotoc County.

6, *Oxyloma retusa.* a, dorsal; b, apertural (all shells illustrated below are oriented in this manner). Alfalfa County.



7, *Catinella vagans*. Cleveland County.

8, *Catinella vermeta* (=*Succinea avara*). Payne County.

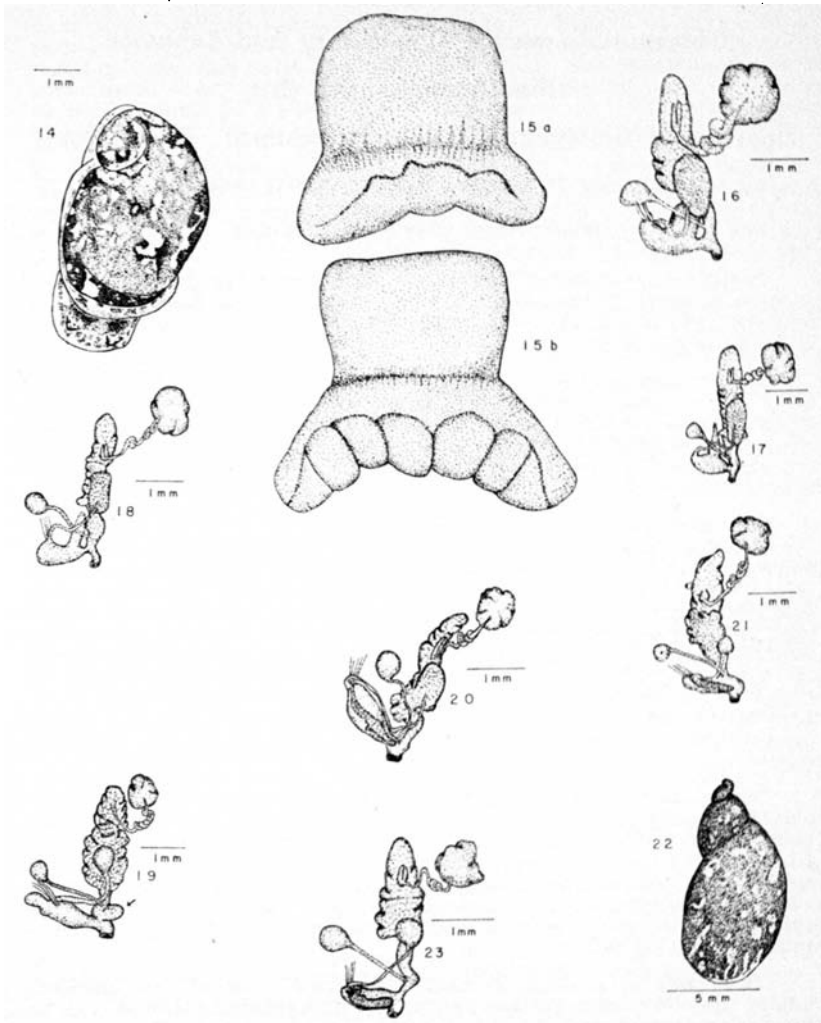
9, *Catinella vermeta* (=*C. wandae*). Topotype.

10, *Succinea vaginacontorta*. Marshall County.

11, *Succinea luteola*. Carter County.

12, *Succinea concordialis*. Marshall County.

13, *Succinea pseudavara*. Bryan County.



14, *Oxyloma retusa,* spring-form mantle markings and body pigmentation. Ottawa County.

15, Succineid Jaws. a, *Succinea concordialis,* Marshall County; b, *Succinea ovalis,* Ann Arbor, Michigan.

16, *Catinella vagans.* Cleveland County.

17, *Catinella vermeta* (=*C. wandae).* Topotype.

18, *Catinella vermeta* (=*S. avara).* Payne County.

19, *Succinea vaginacontorta.* Marshall County.

20, *Succinea luteola.* Carter County.

21, *Succinea concordialis.* Marshall County.

22, *Succinea concordialis,* mantle markings. Marshall County.

23, *Succinea pseudavara.* Bryan County.