

A SURVEY OF LAND AND FRESHWATER SNAILS IN JEFFERSON COUNTY, WEST VIRGINIA

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West Virginia lies near two of the areas of migration for the northern dispersal of the southern snail fauna, viz., the Coastal Plain and the Mississippi Valley (Ortmann, 1913). The boundaries between the southern and northern faunal groups lie within this State (Ortmann, *op. cit.*). Since no detailed studies on snails have been undertaken in Jefferson County, this survey was made to determine their distribution.

General Physical Features

Jefferson County is the easternmost county of West Virginia. It lies within latitudes of $37^{\circ} 7'$ and $39^{\circ} 43'$ and longitudes $79^{\circ} 45'$ and $78^{\circ} 30'$, and comprises an area of 212 square miles. The topography is marked with ridges, valleys, and mountains. The eastern border of the area extending from Harpers Ferry towards the south is formed by the Blue Ridge. The height of the ridge ranges from 1000 to 1100 feet at the north and 1600 to 1700 feet at the south line of the county. From the south mountain in Pennsylvania the Blue Ridge extends south into Virginia. (Price, *et al.*, 1938).

The eastern side of the county is drained by the Shenandoah River. This river enters the Potomac, of which it is the principal tributary, at Harpers Ferry. It has a North Fork and a South Fork which unite at Riverton. The source of the

North Fork is 7 miles north of Harrisonburg, Virginia. The South Fork rises southeast of Greenville in Augusta County, Virginia. The total length of the river is 170 miles. From its source in Augusta County it flows northeast, on the west side of, and parallel to the Blue Ridge.

The chief drainage stream of Jefferson County, however, is the Potomac River. It is formed by the junction of two rivers. The river called the North Branch rises in the western Alleghenies and the South Branch in the central Alleghenies. These branches unite about 15 miles southeast of Cumberland, Maryland. From the junction of these two head streams the river reaches the Chesapeake Bay after a course of 400 miles. Most of the drainage of Jefferson County is through the Potomac River into the Chesapeake Bay and the Atlantic Ocean (Price, *et al.*, *op. cit.*).

The drainage system is arranged like a trellis (Fig. 1). Except in the mountain areas, which have no well-defined stream courses, branches of the smaller streams extend to all parts of the upland. The rivers and their tributaries are admirably suited as accessible routes of migration. Land snails when migrating tend to follow water courses.

Discussion

In this survey 77 species of snails were collected

from 34 collecting stations (Table 1 and Fig. 1). Those found in the largest number of localities were: *Gastrocopta armifera* (Say), 31; *Mesodon thyroidus* (Say), 29; *Helicodiscus parallelus* (Say), 22; *G. contracta* (Say), 21; *Pupoides albilabris* (C. B. Adams) and *Triodopsis juxtidentis* (Pils.), 20; *T. albolabris* (Say), 18; *Hawaiiia minuscula* (Binney), 17; *Ventridens ligerus* (Say), 16; and *G. pentodon* (Say), 15. Localities with the largest number of species were Bloomery with 31; Leetown, 30; Harpers Ferry, 29; and Bolivar, 21. Areas with the smallest number of species were Blair and Mt. Pleasant with five. Species found in a single locality are listed in Table 2.

Some of the mollusks found during this survey have been previously reported from other parts of West Virginia (Pilsbry, 1894; Brooks, 1935; Brooks and Kutchka, 1937; Brooks and Kutchka, 1938). Dr. J. P. E. Morrison of the United States National Museum implied (personal conversation) that the following species he collected in nearby Loudon County, Virginia may also be found living in Jefferson County, West Virginia: *Gastrocopta holzingeri* (Sterki); *Guppya sterkii* (Dall); *Retinella virginica* Morrison; *Strobilops aenea* (Pils.); and *Vertigo clappi* Brooks and Hunt.

Favorable climatic conditions, diversified habitats, available limestone soils, and an abundance of plant foods have made Jefferson County a favorable region for many species of snails.

Summary

Gastropods were collected from 34 localities

in Jefferson County, West Virginia. Seventy-seven species were found and their distributions noted. Localities with the largest number of species were Bloomery with 31; Leetown, 30; Harpers Ferry, 29; and Bolivar, 21.

Acknowledgments

I wish to thank Dr. J. P. E. Morrison, Associate Curator of Mollusks, United States National Museum, for identifying many of the specimens and for indicating changes of nomenclature. I am also grateful to him for including 12 additional Jefferson County records. Acknowledgment is also due Mr. Lewis Goens and Mr. Charles Napper for helping me collect this material.

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NOTE. Tables referred to in the text will be found after page 43. Editor.

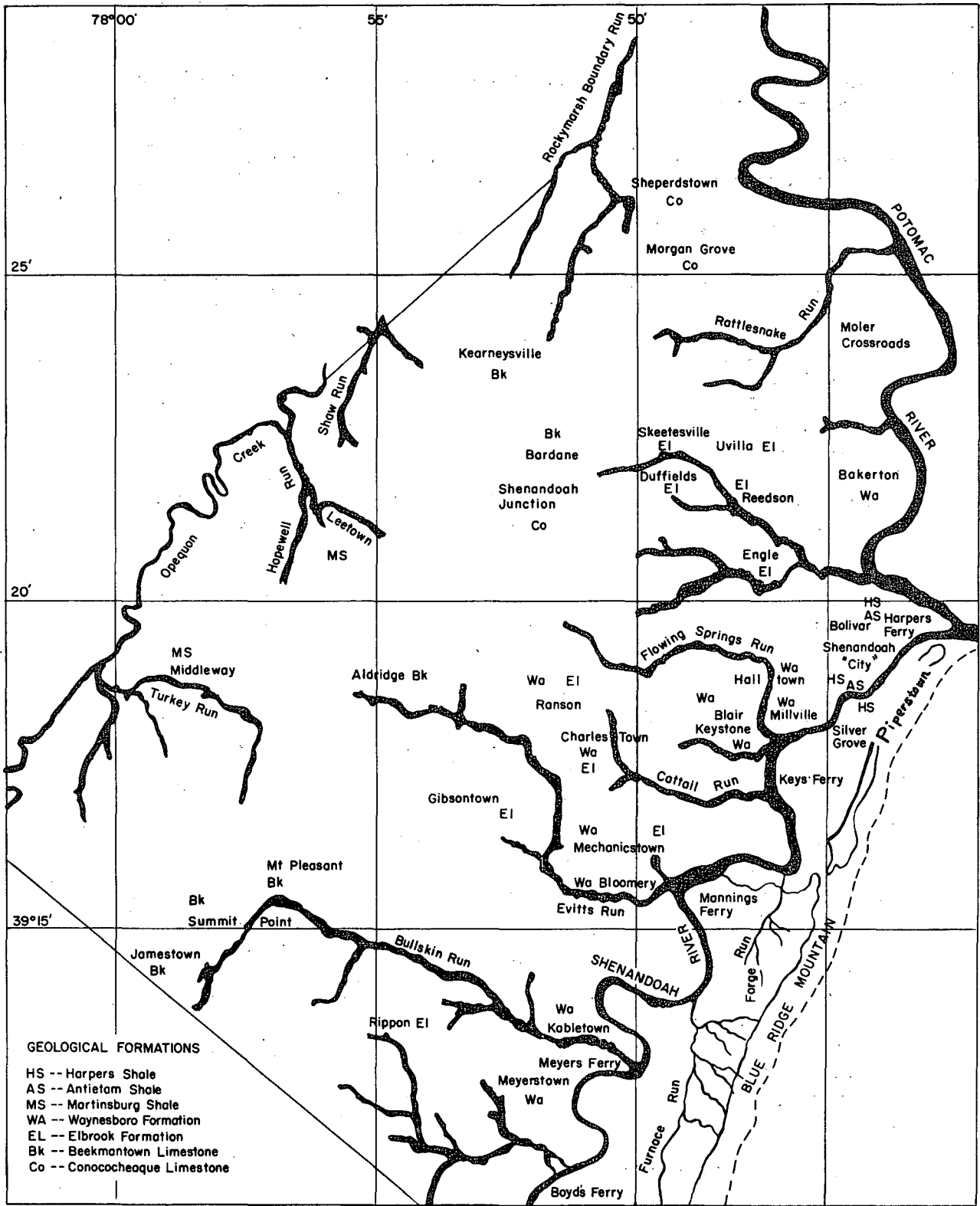


FIG. 1

A MAP DIAGRAM OF JEFFERSON CO. W. VA. TO SHOW LOCATION OF COLLECTING STATIONS

Table 1. Snails of Jefferson County, West Virginia. ° Collected by Dr. J. P. E. Morrison (USNM)

Species	Localities:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	*
<i>Amnicola limosa</i> Say		X	.	.	.	.	.	.
<i>Anguispira alternata mordax</i> (Shut.)		.	X	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	X
<i>Carychium exiguum</i> (Say)		X
<i>Carychium exile</i> Lea		X	.	.	.	.	.	.	.	.	.	.	.	.
<i>Cionella lubrica</i> (Müll.)		X	.	.	.	.	.	.	.	.	.	.	.
° <i>Cionella morseana</i> Doherty	
° <i>Clappia pennsylvanica</i> (Walker)		X	.	.	.	.	.	.	X	.	.	.	.	.	.
<i>Columella edentula</i> (Drap.)	
<i>Discus cronkhitei anthonyi</i> Pils.		.	X	.	.	.	.	X	X	.	.	.	.	.	.	.	.	.	.
<i>Euconulus dentatus</i> (Sterki)		X	X	.	.	.	.	.	.	.	.	.	.	.	.
<i>Euconulus polygyratus</i> (Pils.)		X	X	.	.	.	.	.	.	.	.	.	.	.	.
<i>Fossaria dalli</i> (F. C. Baker)		X
<i>Fossaria modicella</i> (Say)		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
<i>Fossaria obrussa</i> (Say)		X	.	.	.	.	.	.	.	.	.	.	X
<i>Fossaria parva</i> (Lea)		X	.	.	.	.	.	.	.	.	.	.	.
<i>Fossaria rustica</i> (Lea)		X
<i>Gastrocopta armifera</i> (Say)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>Gastrocopta contracta</i> (Say)		X	.	X	.	X	X	.	X	.	.	X	X	X	X	.	X	X	X
<i>Gastrocopta corticaria</i> (Say)		X	.	.	.	.	.	.	.	X	.	X	.	.	.	.	.	.	.
<i>Gastrocopta pentodon</i> (Say)		X	.	X	.	X	X	X	.	.	X	.	X	.	.	X	X	X	X
<i>Gastrocopta pentodon gracilis</i> (Say)		X
<i>Gastrocopta tappaniana</i> (C. B. Adams)		X	.	X	.	.	X	.	.	.	X	.	.	.	X
<i>Gastrocopta procera</i> (Gould)		X	.	X	.	X	X	.	.	.	.	.	.	.	X	X	X	X	X
<i>Gillia altilis</i> (Lea)		X	.	.	.	.	.	.
<i>Gyraulus circumstriatus</i> (Tryon)		X	X	.	.	.	.	.	.	.	.	.	X
<i>Gyraulus parvus</i> (Say)		X	X	.	.	.	.	.	.
<i>Haplotrema concavum</i> (Say)		.	.	X	.	.	X	.	.	.	.	.	X	.	.	.	.	.	.
<i>Hawaila minuscula</i> (Binney)		.	X	.	.	X	X	X	.	X	X	X	X	X	.	.	.	.	X
<i>Helicodiscus parallelus</i> (Say)		X	X	X	X	X	X	.	X	X	X	X	X	X	X	X	X	.	X
<i>Helisoma trivolvis</i> (Say)		X	.	.	.	.	X	.	.	.	.	.	.
° <i>Hendersonia occulta</i> (Say)	
<i>Lioplax subcarinata</i> (Say)		X	.	.	.	.	.	.
<i>Menetus dilatatus</i> (Gould)		X	.	.	.	.	.	.	.	.	.	.	.	.	.
° <i>Menetus dilatatus buchansensis</i> (Lea)		.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Mesodon thyroidus</i> (Say)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>Mesodon thyroidus bucculenta</i> (Gould)		.	.	X	.	X	.	.	X	.	.	X	.	.	X	X	.	.	X
<i>Mudalia carinata</i> (Brug.)		X	.	.	.	.	.	.
<i>Oxychilus lucidum</i> (Drap.)		X	X	.	.	.	.	.	.	X	.	.	.	.	.

* For list of locality numbers, see page 48.

Table 1. Snails of Jefferson County, West Virginia. *Collected by Dr. J. P. E. Morrison (USNM)

Species	Localities	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
<i>Amnicola limosa</i> Say	
<i>Anguispira alternata</i> mordax (Shut.)		.	.	x	x	.	.	.	.	.	.	x	.	.	x	.	.	.
<i>Carychium exiguum</i> (Say)	
<i>Carychium exile</i> Lea		.	.	.	x	.	.	.	.	.	.	x	.	.	.	.	.	.
<i>Cionella lubrica</i> (Müll.)		x	.	.	.	.	.	.	.	.
* <i>Cionella morseana</i> Doherty		x	.	.	.	.	.	.	.	.	.	.
* <i>Clappia pennsylvanica</i> (Walker)	
<i>Columella edentula</i> (Drap.)		x	.	.	.	.	.	.	.	.
<i>Discus cronkhitei</i> anthonyi Pils.		x	.	.	.	.	.
<i>Euconulus dentatus</i> (Sterki)	
<i>Euconulus polygyratus</i> (Pils.)		x	.	.	.	.	.	.	.	.
<i>Fossaria dalli</i> (F. C. Baker)	
<i>Fossaria modicella</i> (Say)		.	x	x	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Fossaria obrussa</i> (Say)	
<i>Fossaria parva</i> (Lea)	
<i>Fossaria rustica</i> (Lea)	
<i>Gastrocopta armifera</i> (Say)		x	x	x	x	x	x	x	x	.	x	.	x	x	x	x	x	.
<i>Gastrocopta contracta</i> (Say)		.	x	x	x	x	.	.	.	x	.	x	.	x	.	x	x	x
<i>Gastrocopta corticaria</i> (Say)		.	.	.	x	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Gastrocopta pentodon</i> (Say)		.	x	.	.	.	.	.	x	x	.	.	.	x	.	.	.	.
<i>Gastrocopta pentodon gracilis</i> (Say)	
<i>Gastrocopta tappaniana</i> (C. B. Adams)		.	.	.	x	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Gastrocopta procera</i> (Gould)		x	x	x	x	x	.	.	.	.	.	x	.	.	.	.	.	x
<i>Gillia altilis</i> (Lea)	
<i>Gyraulus circumstriatus</i> (Tryon)		.	.	x	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Gyraulus parvus</i> (Say)		.	x	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Haplotrema concavum</i> (Say)		x	.	x	.	.	.	.	.	.
<i>Hawaila minuscula</i> (Binney)		x	.	.	.	.	.	.	x	.	x	.	.	x	.	.	.	x
<i>Helicodiscus parallelus</i> (Say)		x	.	x	.	.	.	.	.	.	.	x	x	x	.	x	.	x
<i>Helisoma trivolvis</i> (Say)	
* <i>Hendersonia occulta</i> (Say)		x	.	.	.
<i>Lioplax subcarinata</i> (Say)	
<i>Menetus dilatatus</i> (Gould)	
* <i>Menetus dilatatus buchanensis</i> (Lea)	
<i>Mesodon thyroidus</i> (Say)		.	.	x	x	x	x	.	x	x	x	x	x	x	x	x	x	x
<i>Mesodon thyroidus bucculenta</i> (Gould)		.	.	x	.	.	.	.	x	.	.	.	.	.	.	.	x	x
<i>Mudalia carinata</i> (Brug.)	
<i>Oxychilus lucidum</i> (Drap.)		x	.	.	.	.	.	.	.	.	.

* For list of locality numbers, see page 48.

Table 1. Snails of Jefferson County, West Virginia. * Collected by Dr. J. P. E. Morrison (USNM)

Species	Localities	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Oxytrema virginica</i> (Gmelin)		X	.	.	.	.	.
* <i>Paravitrea multidentata</i> (Binney)	
<i>Physa gyrina</i> Say		.	X	.	.	.	.	X	.	.	.	.	X	.	.	.	.	.
<i>Physa heterostropha</i> (Say)		.	X	.	.	.	.	.	X	.	.	.	.	.	.	.	.	X
<i>Physa integra</i> Haldeman		X	.	.	.	.	.
<i>Pomatiopsis lapidaria</i> (Say)		X	.	.	.	.	.	.	.	.	.	.	.	.
<i>Punctum minutissimum</i> (Lea)		X	.	.	.	.	.	.	.	.	.	.	.
* <i>Punctum vitreum</i> H. B. Baker		X	.	.	.	.	.	.	.	.	.	.	.	.
<i>Pupoides albilabris</i> (C. B. Adams)		X	X	X	.	X	.	X	.	X	X	X	X	X	X	X	X	X
* <i>Retinella burringtoni</i> (Pils.)	
<i>Retinella indentata</i> (Say)		.	X	.	.	.	X	X	.	.	.	.	.	.	X	.	.	.
* <i>Retinella lewisiana</i> nr <i>raderi</i> (Dall)		X	.	.	.	.	.	.	.	.	.	.	.	.
* <i>Retinella rhoadsi</i> (Pils.)		X	.	.	.	.	.	.	X	.	.	.	.	.
<i>Stagnicola palustris elodes</i> (Say)		X
<i>Stenotrema hirsutum</i> (Say)		X	.	.	.	.	.
* <i>Striatura meridionalis</i> (Pils. & Ferriss)	
<i>Striatura milium</i> (Morse)	
<i>Strobilops labyrinthica</i> (Say)		X	.	.	.	.	.	.	.	.	.	.	.	.
<i>Succinea avara</i> Say		X	.	.	.	.	.	.	.	X
<i>Succinea ovalis</i> Say		X
<i>Triodopsis albolabris</i> (Say)		X	.	X	X	.	X	.	.	X	.	X	X	X	.	X	.	.
<i>Triodopsis fallax</i> (Say)		X	.	.	.	.	.	.	X	.	.	.	.	.
<i>Triodopsis fraudulenta</i> Pils.		.	X	.	.	X	.	.	.	.	.	.	X	X	.	.	.	.
<i>Triodopsis juxtidentis</i> (Pils.)		X	.	.	X	X	X	X	X	.	X	.	X	X	.	.	X	.
<i>Triodopsis tridentata</i> (Say)		.	X	.	.	.	.	.	.	.	.	X	.	.	X	.	.	.
<i>Vallonia costata</i> (Müll.)		.	X	.	.	.	.	.	.	X	X	X	X	.	.	.	.	X
<i>Vallonia excentrica</i> (Sterki)		X	.	.	.	.	.	.	.	.
<i>Vallonia pulchella</i> (Müll.)		.	X	.	.	.	X	X	.	X	X	.	X	.	.	.	.	X
<i>Ventridens ligerus</i> (Say)		X	.	X	.	X	X	X	X	.	X	.	X	X
<i>Ventridens suppressus</i> (Say)		X	X	.	.	X	.	.	X	X	.	.	.	.
* <i>Ventridens virginica</i> (Vanatta)		X	.	.	.	X	.	.	.	.	X	.	.	X	.	.	.	.
<i>Vertigo elatior</i> Sterki		X
<i>Vertigo gouldii</i> (Binney)		X	.	.	.	.	.	.	X	.	.	.	.	X
<i>Vertigo milium</i> (Gould)		X	.	.	.	.	.	.	.	.	.	.	.	.
<i>Vertigo morsei</i> Sterki		X	.	.	.	.	.	.	.	.	.	.	.	X
<i>Vertigo ovata</i> Say		X
* <i>Vertigo pygmaea</i> (Drap.)		X	.	.	.	.	.	.	.	.	.	.	.	.
<i>Vertigo tridentata</i> Wolf		X	.	.	.	.	.	.	.	.	.	.	.	.
<i>Zonitoides arboreus</i> (Say)		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X

* For list of locality numbers, see page 48.

Table 1. Snails of Jefferson County, West Virginia. *Collected by Dr. J. P. E. Morrison (USNM)

Species	Localities	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	
<i>Oxytrema virginica</i> (Gmelin)		x	.	.	.	.
* <i>Paravitrea multidentata</i> (Binney)		x	.	.	.	.	.	.	.	.	.	.	.
<i>Physa gyrina</i> Say	
<i>Physa heterostropha</i> (Say)		.	x	.	.	.	.	.	.	.	.	x	.	.	.	.	.	.	.
<i>Physa integra</i> Haldeman		.	.	x	.	.	.	.	.	.	.	x	.	.	.	.	.	.	.
<i>Pomatiopsis lapidaria</i> (Say)	
<i>Punctum minutissimum</i> (Lea)	
* <i>Punctum vitreum</i> H. B. Baker		x	.	.	.	.	.	.	.	.	.	.	.
<i>Pupoides albilabris</i> (C. B. Adams)		x	.	x	.	x	.	.	.	.	x	.	.	x	.	.	.	x	.
* <i>Retinella burringtoni</i> (Pils.)		x	.	x	.	.	.	.	x	.	.	.	.
<i>Retinella indentata</i> (Say)		x	.	.	.	.	.	.	.	.
* <i>Retinella lewisiana</i> nr <i>raderi</i> (Dall)	
* <i>Retinella rhoadsi</i> (Pils.)	
<i>Stagnicola palustris elodes</i> (Say)	
<i>Stenotrema hirsutum</i> (Say)	
* <i>Striatura meridionalis</i> (Pils. & Ferriss)		x	.	.	.
<i>Striatura milium</i> (Morse)		x	.	x	.	.	.	.	.	.	.	.	.
<i>Strobilops labyrinthica</i> (Say)		.	.	.	x	.	.	.	.	.	.	.	.	.	x	.	.	.	.
<i>Succinea avara</i> Say	
<i>Succinea ovalis</i> Say	
<i>Triodopsis albolabris</i> (Say)		.	.	.	x	x	x	.	.	x	x	.	x	.	x	.	x	x	.
<i>Triodopsis fallax</i> (Say)		x	.	.	.	.	.	.	.	.	.	.	x	.
<i>Triodopsis fraudulenta</i> Pils.		.	.	x	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Triodopsis juxtidentis</i> (Pils.)		x	.	.	x	x	x	.	.	.	x	x	x	x	.	x	.	x	.
<i>Triodopsis tridentata</i> (Say)		x	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Vallonia costata</i> (Müll.)		.	x	x	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Vallonia excentrica</i> (Sterki)		x	.	.	.	.	x	.	.	.
<i>Vallonia pulchella</i> (Müll.)	
<i>Ventridens ligerus</i> (Say)		.	.	x	.	x	.	.	x	x	.	x	.	x	.	.	.	x	.
<i>Ventridens suppressus</i> (Say)		x	.	.	x	.	.	.	.	x	.	.	.	x	.	.	.	.	.
* <i>Ventridens virginica</i> (Vanatta)		x	.	.	.	.	.	.	.	x	.	.	.
<i>Vertigo elatior</i> Sterki		x	.	.	.	.	.	.	.
<i>Vertigo gouldii</i> (Binney)		x	.	.	.	.	.	.	.	.	.	.	.
<i>Vertigo milium</i> (Gould)	
<i>Vertigo morsei</i> Sterki	
<i>Vertigo ovata</i> Say	
* <i>Vertigo pygmaea</i> (Drap.)	
<i>Vertigo tridentata</i> Wolf		x	.	.	.	x	.	x	.	.	.
<i>Zonitoides arboreus</i> (Say)		.	x	.	.	x	.	.	.	x	.	.	x	.	.	.	.	.	.

* For list of locality numbers, see page 48.

Table 1. Snails of Jefferson County, West Virginia. Explanation of locality numbers. (pp. 44-47)

1. Aldridge	12. Harpers Ferry	23. Mt. Pleasant
2. Bakerton	13. Jamestown	24. Piperstown
3. Bardane	14. Kabletown	25. Ranson
4. Blair	15. Kearneysville	26. Reedson
5. Bloomery	16. Keystone	27. Rippon
6. Bolivar	17. Leetown	28. Shenandoah "City"
7. Charles Town	18. Mechanicstown	29. Shenandoah Junction
8. Duffields	19. Meyerstown	30. Sheperdstown
9. Engle	20. Middleway	31. Silver Grove
10. Gibsontown	21. Millville	32. Skeetersville
11. Halltown	22. Morgan Grove	33. Summit Point
		34. Uvilla

Table 2. -- Species found in a single locality

BLOOMERY	LEETOWN
<i>Menetus dilatatus buchanaensis</i>	<i>Carychium exiguum</i>
<i>Pomatiopsis lapidaria</i>	<i>Fossaria dalli</i>
<i>Retinella lewisiana</i>	<i>Gastrocopta pentodon gracilis</i>
<i>Vertigo pygmaea</i>	<i>Stagnicola palustris elodes</i>
	<i>Succinea ovalis</i>
BOLIVAR	<i>Vertigo ovata</i>
<i>Menetus dilatatus</i>	
<i>Punctum minutissimum</i>	
CHARLES TOWN	PIPERSTOWN
<i>Fossaria parva</i>	<i>Cionella morseana</i>
	<i>Paravitrea multidentata</i>
HARPERS FERRY	
<i>Amnicola limosa</i>	REEDSON
<i>Gillia altilis</i>	<i>Columella edentula</i>
<i>Lioplax subcarinata</i>	
<i>Mudalia carinata</i>	SILVER GROVE
<i>Stenotrema hirsutum</i>	<i>Striatura meridionalis</i>