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MOLLUSKS OF THE SALT RIVER, KENTUCKY

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An expedition was made by Dr. W. J. Clench and myself during September, 1958, to collect mollusks in the Kentucky and Salt River systems, Kentucky. We left Ann Arbor, Michigan, September 6, 1958, at the close of a most enjoyable meeting of the American Malacological Union. Traveling south through southern Michigan and Ohio, we collected at several stations in the Great Lakes drainage, and upon arriving in Kentucky on September 7, at two localities on the Licking River. Since the water level was somewhat high, we proceeded to the Kentucky River where several stations were made on the main river and its three forks. This was followed by a week-end trip to Cleveland, Tennessee, to visit Herbert Athearn, an ardent collector of fresh-water mollusks. During this side trip, fine collections were made in the Powell and Sequatchie Rivers, Tennessee, in

the Conasauga River of northwest Georgia and in the Green River, Kentucky.

The Salt River drainage system occupies a roughly oval area in north central Kentucky. Along most of its eastern boundary, it is separated from portions of the Kentucky River system by only a few miles. On the south and west, it is bordered by the Green River system. On the north, tributaries of the Salt River extend north of Louisville, Kentucky. It flows into the Ohio River about 20 miles southwest of Louisville almost precisely on the line of 38° N. Latitude. Two major forks, the Rolling Fork and Beech Fork, and the Salt River proper originate fairly close together in Boyle and Casey Counties, Kentucky. The Rolling Fork, the most southern branch, flows in a northwesterly direction to its confluence with the Salt River proper about nine miles southeast of the Ohio River. The Beech Fork flows north, then west to join the Rolling Fork about twelve miles southeast of the confluence of the latter with the Salt River. The Salt River proper parallels the Beech Fork during its initial northerly flow but continues farther north than the latter, then turns west and flows in this direction to its confluence with the Rolling Fork, then northwesterly to the Ohio River. Very approximately, the drainage area of the Salt River system covers 3000 to 4000 square miles. The system occupies a portion of the "Blue Grass" area of Kentucky, a region of limestone eroded to form a generally rolling surface, and is given over in large part to farming. Also this area supports one of Kentucky's outstanding industries, that of the distillation of fine whiskey. One asks himself on picking up a series of especially large *Quadrula quadrula* (Rafinesque), "Could there be some correlation between the large size of these bivalves and the dumping of distillery wastes into streams of this area?"

We based Salt River collecting operations at Bardstown, Nelson Co., Kentucky, and spent four days making ten stations in this river system. We intended to make several additional stations in the Salt and also the lower Kentucky River working our way east (and home). However, a heavy two-inch rain ended the ideal collecting conditions which had existed for nearly two weeks and our last stations could not be made. Consequently, a thorough report on the mollusks of the Kentucky River must be delayed until further collections can be made there. Our

collections from the Salt River were substantial, however, and are therefore reported upon at this time.

Three stations have been made on the Salt River previously that we know of, although other collectors have undoubtedly visited the area. The known visited localities are those of Clench and Okkelberg in 1927, corresponding to the Clench-Rosewater stations 1934 and 1935 plus one which we did not make: Salt River, 4 miles west of Lawrenceburg, Kentucky. An account of the fresh-water mussels collected by Clench and Okkelberg was published by Clench and van der Schalie (1944). No account was given of the gastropods collected.

Ortmann (1926, p. 187) stated that the Salt River system should be expected to have an Ohioan fauna rather than a Cumberlandian one. Clench and van der Schalie showed this to be true and our 1958 collections only reinforce this view. On the basis of the 1958 collections, four species of mussels may be added to the list of Clench and van der Schalie for the Salt River: *Villosa lienosa* (Conrad); *Carunculina parva* (Barnes); *Truncilla donaciformis* (Lea); *Anodonta grandis* Say. On the other hand, three species mentioned in 1944 were missing from those collected in 1958: *Cyprogenia irrorata* (Lea); *Obovaria subrotunda* (Lea); *Anodonta imbecillis* Say.

Goodrich (1939, p. 2 and 1940, p. 13) stated that forms not separable from *Pleurocera acutum* Rafinesque[2] occur in tributaries of the Cumberland and Duck Rivers, Tennessee. This is, apparently, also true of the Beech Fork and the Salt River proper stations (1934,-36, -40, -41) as forms representing and, at present, indistinguishable from *P. acutum* were also found there.

To my knowledge, there is no previous published record of *Pleurocera canaliculatum* (Say) from the Salt River system. We found it, along with *Lithasia obovata* (Say) at station 1939, a locality with a distinctly large river ecology. The *Lithasia* had remarkably complete, pointed spires for this species. The other locality recorded for *P. canaliculatum*, station 1934, yielded only a few dead specimens. For this reason, it is questionable whether the species lives there or was washed down from an area above a partially demolished rock dam where the Beech

[2] Morrison (1954, pp. 359-364) discusses the taxonomy of the subfamily Pleurocerinae in North America and gives reasons for use of different nomenclature than is employed here; also see Hemming (1951, pp. 6-17).

Fork runs wide and deep. Attempts to collect above the dam failed because of hazardous conditions due to steep and slippery banks at this locality.

I wish to acknowledge the aid of my associates, Richard I. Johnson and Arthur H. Clarke, Jr., in the department of mollusks, Museum of Comparative Zoölogy, in checking identifications of certain mussels. H. B. Herrington identified *Sphaerium striatinum* (Lamarck). Thanks are given to Dr. W. J. Clench for checking the identification of *Physa* and *Campeloma*, for sharing with me his broad knowledge of fresh-water mollusk collecting and for the many valuable experiences we shared in the field. Financial aid for this trip was made possible by the Friends of The Department Of Mollusks Fund, Museum of Comparative Zoölogy.

The following is a list of the collecting stations visited in the Salt River system, Kentucky, in September, 1958. Preceding each station and its description is the station number. This number is repeated in the list of fresh-water mollusks denoting where each species was collected.

1932. Rolling Fork, Salt River, 7 miles southwest of Lebanon, Marion Co., Ky. (Ky. Route 55); September 16, 1958. Ledge rock with gravel-rock overlay; water clear, quite warm; gastropods and bivalves rare, the latter often lying out on substrate, the former crawling on rocks and gravel.

1933. Cartwright Creek, 13 miles southeast of Bardstown, Washington Co., Ky. (U.S. Rt. 150); September 16, 1958. Ledge rock; water very shallow; no bivalves found; *Goniobasis* abundant in pools and on bridge pillars.

1934. Beech Fork, Salt River, 1 mile southwest of Bardstown, Nelson Co., Ky. (U.S. Rt. 31E); September 17, 1958. Gravel, some rock; water low, dammed above bridge; a large sewer pipe entering just below dam; dead bivalves and snails abundant; *Physa* abundant on sewer sludge.

1935. Rolling Fork, Salt River, 1 mile south of New Haven, Nelson Co., Ky. (U.S. Rt. 31E); September 17, 1958. Rocky gravel; water clear in spite of heavy rain, flowing over rapids and shoals; bivalves abundant, pleurocerids fairly so.

1936. Beech Fork, Salt River, about 3 miles south of Bardstown, Nelson Co., Ky. (Ky. Rt. 49); September 18, 1958. Ledge, gravel, stones, sand and some silt; dead bivalves abundant, apparently washed out of substrate by recent freshets; pleurocerids in very great abundance on mud and rocks; viviparids in sand; dead sphaeriids in great abundance on banks.

1937. Rolling Fork, Salt River, Raywick, Marion Co., Ky. (Ky. Rt. 527); September 18, 1958. Gravel bars with some rock; bivalves abundant; *Goniobasis* abundant in drying puddles.

1938. Wilson Creek, about 2 miles northwest of Boston, Nelson Co., Ky. (Ky. Rt. 61); September 19, 1958. Ledge rock; water clear, fairly warm, silt on ledges; no bivalves collected; *Physa* and *Lymnaea* rare; *Goniobasis* very common.

1939. Rolling Fork, Salt River, 1 mile southwest of Lebanon Junction, Bullitt Co., Ky. (Ky. Rt. 434); September 19, 1958. Steep, muddy banks, channel narrow and deep; water roily, rather fast flow; bivalves probably present but impossible to collect; *Lithasia obovata* and *Pleurocera canaliculatum* not uncommon on banks.

1940. Salt River, 3 miles southeast of Mt. Washington, Bullitt Co., Ky. (U.S. Rts. 150 and 31E); September 19, 1958. Gravel-rock bottom, sand and silt; water fairly clear; bivalves very abundant, especially in backwater areas; pleurocerids rather rare.

1941. Salt River, 5 miles west of Taylorsville, Spencer Co., Ky. (gravel road); September 19, 1958. Gravel-rock bar, shoals extending for several hundred feet on either side of bridge; water somewhat murky, a few rapids; large bivalves very abundant above rapids; pleurocerids common on rocks and mud at margins, *Campeloma* very abundant in sandy mud.

MOLLUSKS OF THE SALT RIVER SYSTEM

Station No.:	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941
Viviparidae										
Campeloma ponderosa (Say)	.....	.....	x	.....	x	x	.....	.....	x	x
Lioplax sulculosa (Menke)	.....	.....	x	.....	x	.....	.....	.....	.....	x
Pleuroceridae										
Pleurocera acutum Raf.	.....	.....	x	.....	x	.....	.....	.....	x	x
P. canaliculatum (Say)	.....	.....	x	.....	.....	.....	.....	x	.....	.....
Goniobasis semicarinata (Say)	x	x	x	x	x	x	x	.....	x	x
Lithasia obovata (Say)	.....	.....	.....	.....	.....	.....	.....	x	.....	.....
Physidae										
Physa integra Haldeman	.....	.....	x	.....	x	.....	x	.....	.....	.....
Lymnaeidae										
Lymnaea humilis Say	.....	.....	.....	.....	.....	.....	x	.....	.....	.....
L. columella Say	.....	.....	.....	.....	.....	.....	x	.....	.....	.....
Unionidae										
Fusconaia flava (Raf.)	.....	.....	.....	.....	x	x	.....	.....	.....	x
Crenodonta gigantea (Barnes)	.....	.....	.....	x	x	.....	.....	.....	.....	x
C. costata (Raf.)	.....	.....	.....	x	x	x	.....	.....	x	x

Quadrula pustulosa (Lea)	.....	.....	.....	.....	x	.....	.....	.....	.....
Q. quadrula (Raf.)	.....	.....	x	x	x	x	.....	.....	x
Tritogonia verrucosa (Raf.)	.....	.....	.....	x	.....	x	.....	.....	.....
Elliptio dilatatus (Raf.)	.....	.....	.....	x	x	x	.....	.....	.....
Lasmigona costata (Raf.)	.....	.....	.....	x	x	.....	.....	.....	.....
L. complanata (Barnes)	.....	.....	x	x	.....	.....	.....	.....	x
Anodonta grandis Say	.....	.....	x	x	x	.....	.....	.....	x
Alasmidonta calceolus (Lea)	x	.....	.....	.....	.....	.....	.....	.....	.....
Strophitus rugosus (Swainson)	.....	.....	.....	.....	x	.....	.....	.....	.....
Ptychobranchus fasciolaris (Raf.)	.....	.....	.....	x	x	x	.....	.....	.....
Obliquaria reflexa Raf.	.....	.....	.....	.....	x	.....	.....	.....	.....
Actinonaias carinata (Barnes)	x	.....	.....	x	.....	x	.....	.....	x
Leptodea fragilis (Raf.)	x	.....	x	x	x	x	.....	.....	x
Proptera alata (Say)	.....	.....	.....	x	x	x	.....	.....	x
Carunculina parva (Barnes)	.....	.....	.....	.....	.....	.....	.....	.....	.....
Villosa lienosa (Conrad)	.....	.....	.....	.....	.....	x	.....	.....	.....
Lampsilis anodontoides (Lea)	.....	.....	x	x	x	.....	.....	.....	x
L. radiata siliquoidea (Barnes) [8]	.....	.....	.....	x	x	.....	.....	.....	x
L. ovata ventricosa (Barnes)	x	.....	x	x	x	x	.....	.....	.....
Truncilla donaciformis (Lea)	.....	.....	.....	.....	x	.....	.....	.....	.....
T. truncata Raf.	.....	.....	.....	.....	x	.....	.....	.....	.....
Dysnomia triquetra (Raf.)	.....	.....	.....	.....	.....	x	.....	.....	.....
Sphaeriidae									
Sphaerium striatinum (Lamarck)	.....	.....	.....	x	x	.....	.....	.....	.....

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[8] Clarke (1958, pp. 15, 16) has shown that reproductive isolation is lacking between *L. radiata* (Gmelin) and *L. siliquoidea* (Barnes) and that the latter may be considered a subspecies of the former.

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ON THE GREEN LAND MOLLUSK FROM NEW GUINEA

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Some time ago, I received a letter from a fellow conchologist, who called to my attention an article by Dr. Clench, in Breviora, 1957, no. 76. In this paper, a curious green land-shell was described; it was said to be from New Guinea, but without exact locality or collector. The species was received from Mr. Poling, who bought it from a dealer, and presented it to the Museum of Comparative Zoölogy, at Harvard University. My American friend, who knew that I had brought together a very large collection of land-snails during the years I stayed in Dutch New Guinea, suggested that this green snail probably would be represented in my cabinet. Indeed, since I had received a copy of the publication from him and had read Dr. Clench's paper carefully, I recognized the shell at once, and had it from several, widely separated localities in northwest New Guinea. The shell was considered by Dr. Clench as a member of the subfamily Chloritinae, and a new subgenus *Verdichloritis* was created for it. The photo in the article, enlarged 4 times, is rather bad. The name of the species finally was given as *Eustomopsis* (*Verdichloritis*) *polingi* Clench.

All the specimens in my collection agree so completely, in dimensions and in all other characters, with the description of Dr. Clench, that I do not hesitate to accept them as belonging to his species. However, I have a different opinion in regard to the correct genus to accept for this species, because all my examples, which are adult or were taken alive, have a very striking character. Just behind the reflexed peristome, the body whorl has a very curious gibbous crest, which is separated from the peristome by a shallow sulcus, that runs downwards to the open umbilicus. This character does not occur in the genus *Chloritis,* but is present in all species of the subgenus *Cristigibba* Tapparone-Canefri, which was established for those species of the genus *Planispira* that have such a gibbous crest. This sub-