

PAST, PRESENT AND FUTURE STATUS
OF THE MOLLUSCA OF THE
UPPER TOMBIGBEE RIVER

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HISTORY:

Studies of the mollusks of Alabama drainages (including rivers such as the Tombigbee flowing through Mississippi) were undertaken at the turn of the century over an extended period by a group of well-known malacologists. Their work was sponsored largely by Dr. Bryant Walker, a wealthy lawyer who developed an international reputation as a malacologist; in the museum built in back of his Detroit home he amassed a collection of about 100,000 lots. With Walker's initiative a "syndicate" was established involving the following investigators and their respective institutions: Bryant Walker, whose work and collections are now a part of the Mollusk Division of the University of Michigan's Museum of Zoology in Ann Arbor; Truman Aldrich, a geologist sponsoring the work and studies at the Alabama Museum in Tuscaloosa; George H. Clapp (founder of the Alcoa Aluminum Company and trustee of the Carnegie Museum in Pittsburg), who was mainly interested in land snails; H. A. Pilsbry, generally recognized as the "dean" of American malacology, who encouraged studies that would benefit the Philadelphia Academy of Natural Sciences; and John B. Henderson, a staff member of the U.S. National Museum. This consortium employed Herbert H. Smith and his wife, Daisy, to make intensive and systematic collections of mollusks throughout Alabama and contiguous drainages. Bryant Walker was primarily responsible for directing their activities as well as for identifying the material. A large volume of personal letters was made available when the Bryant Walker collections and library came to the Mollusk Division of the University of Michigan.

It is possible at present to give no more than a cursory account of what was found in the bulk of the Walker-Smith correspondence. It took about a week to peruse these letters which covered the period from January, 1905, to February, 1915. Actually, H. H. Smith worked continuously and diligently under Walker's sponsorship for some twenty years until his (Smith's) untimely death when he was struck by a train which he did not hear because he was deaf. The information on specific rivers such as the Warrior and the Tombigbee is scattered through an amazing amount of detailed letter writing. A summary account of the pertinent information contained in those letters follows:

January 25, 1905 - Tried to collect on Tombigbee working out of Jackson but it was "too cold and wet for field work."

May 26, 1905 - Sent Box 48 to Walker with "material from flood plain of Tombigbee, 2 miles above Jackson."

October 27, 1908 - Collected at Squaw Shoals on Black Warrior River. Collected 700 to 800 mussels representing 35 to 40 species. Visited Yellow Creek Shoals and Rose Shoals (Lock 15). The weather was "fine" and the river low.

November 14, 1908 - Black Warrior River near Yellow Creek Bar produced about 40 species - "many rare and unique." The river divides Jefferson from Tuscaloosa counties and covers 12 miles of shoals. The mussels here "not same as those down below." Locks 16 and 17 were

being built so collecting was done in vicinity of Lock 15. Describes various shoals on down to where the Mulberry and Locust branches from the Black Warrior River. The Black Rock shoals were very extensive but easy to work and mussels were more abundant than anywhere else. Reported finding about 90 species at upper part of Squaw Shoals.

November 29, 1908 - Collected about 1100 mussels in 5 days of collecting near Forks of Black Warrior River. Many specimens taken from muskrat deposits. These sites provided from 9,000 to 10,000 specimens - mostly small. Found shoals were gone on Mulberry branch but still present in Locust where collecting was "rather poor." The country was rough and it was hard to get to the river.

December 17, 1908 - Stated to Walker that the Showalter Collection "has singularly few of the Black Warrior species." Describes a flood on Black Warrior River after they finished collecting when the river rose 15 feet and most of the boats on the river were carried away! Damage was done to Locks 14 and 15 where work was at that time unfinished. The shoals were flooded and Walker was reminded: "You will have a monopoly of Black Warrior Unionidae."

February 1, 1909 - A long and rambling letter, but mentions getting *Strophitus subvexa*.

February 8, 1909 - Proposes to collect in the Sipsey River and indicates that upper portion is rocky and dries up while the lower is deeper and sandy. He then commented: "All larger streams of the Alabama system have peculiar shells."

February 12, 1909 - Smith was making inquiries about the Tombigbee River which he said was called the "Bigbee" here. Dr. Spillman lived at Columbus and many specimens came from him. Showalter collected lower down in the area of Big Prairie Creek. Gave a sketch of regions Showalter collected.

July 30, 1909 - Collected near Sipsey River about 7 miles north of Fayette, Alabama. The Sipsey was called the "New River" there and it had high clay banks and few shoals. In 4 days they collected 250 mussels and it was hard work since they were digging in mud, sand and gravel. "Quite half are new to me;" and only a few of the Black Warrior species occur. He went up river 17 miles where the railroad crosses and where shells were much more common. Also reported good shoals for mussels about 2 miles above Columbus. Stated that the Columbus area was collected by Spillman and Hinkley. He mentions going both to Buttahatchee and Beaver Creek.

August 12, 1909 - Letter written from Hamilton, Alabama, and he collected the Buttahatchee which proved much larger than he supposed. It reminded Smith of the Cahaba. The bed in the shoals is rock, the current swift, and mussels were in deposits of sand and shingle - abundant. In one day they picked up more shells than they could carry. Made an estimate of 15 species; half were like those from the Sipsey. Moccasin snakes much in evidence!

August 18, 1909 - Letter written to Walker by Daisy Smith reporting that her husband was "prostrated by the

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... was in bed. They sent 225 mussels. Although the Chattahoochee was muddy.

September 29, 1909 - Collected near Bear Creek in Baldwin County. They went to Vina on Illinois Central railroad where they found 20 species of mussels.

September 22, 1911 - Charles T. Simpson (of U. S. National Museum) visited them for 3 days. They visited the North River which they found rather inaccessible. They also went to the Sipsy River at Elrod. In 1909 that river was too high but now they obtained several hundred mussels - about 25 species which were different from those collected higher up from forks.

October 8, 1911 - Smith made several excursions to the Sipsey and found it one of the richest in Alabama; it was very different from other rivers he explored. Found river mostly "dead water" but now and then there were gravel shoals with strong current over a gravel layer a foot thick. Found great numbers of mussels "under cemented portion of rock." From Elrod and above they got 2,000 mussels - mostly alive. He corresponded with A. E. Ortmann and was "picking up alcoholic specimens for him."

October 18, 1911 - Reported sending "45 *Unio* numbers principally from the Sipsey" and prefers to get "authoritative labels from you." He asked for names of 9 specimens from the Sipsey River.

November 24, 1911 - Smith suggested going to the Sipsey a day or two at a time suggesting that: "We can get one Alabama river thoroughly worked up from its source to its mouth." Mentions that Truman Aldrich became post master at Birmingham.

October 28, 1912 - Found Valley Creek at Toadvine (Black Warrior drainage) very rich and in 2 hours collected 22 species of Unionidae. Both Lost and Wolf creeks in Walker County were good collecting. Reported that a dam will flood Valley Creek. The Warrior shells were small while those from Valley Creek were large.

December 22, 1914 - Letter sent to Walker contains a list of 9 species of mussels from "Forks of the Warrior."

January 14, 1915 - Smith hired girls to clean Warrior mussels since they were harder to clean than most Alabama Unionidae. Mussels need cleaning to discover their identities. Smith collected 9,000 mussels from the Warrior in 1908 and "probably 7,000, at least, are *Pleurobemas*."

January 17, 1915 - Observed that the Tombigbee and Alabama mussels are quite similar but comparisons show in many cases that the Tombigbee forms vary considerably from those of the Alabama system. The rivers join far to the south in Alabama so that the flood plains probably had brackish water to prevent passage of species between drainages. It would be interesting to work out the relationships of the two systems. Gives a list of the mussels dredged at McIntosh on Tombigbee near its junction with the Alabama. (A dozen species listed using the older names).

January 21, 1915 - Walker agreed to send mussels back to Alabama for cleaning by the girls hired there. The 1914 catch had 137 lots and the *Pleurobema* gave trouble in identification.

January 29, 1915 - Smith became interested in faunal relations and stated in this letter to Walker that: "Many of the Tombigbee species and those of the lower Cahaba (Pratt's Ferry) are a comparatively recent migration from the mouth of the Tombigbee." He observed that the relationship of the two drainage areas is one of those questions that have to do with geology as well as zoology. Smith talked the matter over several times with the State Geologist, Dr. Eugene A. Smith, who recommended a careful assessment of the faunal elements so as to have the zoogeography align with geological records. Then, Smith

added: "I must do all I can in the Tombigbee drainage...I must take up that river again, as well as Coalfire, Lubbu, Bear and Jacannochee creeks, all quite accessible from here."

In this same period at the turn of this century, Anson A. Hinkley collected extensively in Mississippi and Alabama. His work was reported in an article appearing in *The Nautilus* (20: 34-36; 52-55, 1906) and as indicated by van der Schalie (1939:4), the collections from the Tombigbee came largely from the vicinity of Columbus, Mississippi, where he cited 39 species of mussels in the drainage at that time. As was the custom at that time, Hinkley traveled by train to reach stations on rivers otherwise inaccessible. "The streams along the Illinois Central railroad where the stops were made, have sandy beds and not favorable for molluscan life,..."

Present Status of Mussel Fauna in Tombigbee Drainage

In the thirties a number of extensive expeditions were undertaken, mainly by Calvin Goodrich, William J. Clench and Henry van der Schalie. These collections in Alabama, Georgia, Kentucky, Tennessee, Mississippi, etc. - mainly southern states - were often combined with visits and collaboration with the Alabama Museum at University, Alabama. Much interest was expressed and encouragement provided by the State Geologist at that time, Walter Jones, and the curator in charge of the collections, Miss Winnie McGlamery. The information bearing on the mollusk fauna of the Tombigbee and the other important rivers in the Alabama River drainage was published mainly in three papers, all of which allude to the importance of ecology and distribution of the mollusks as these considerations relate to the geology and physiography of the region.

The first of these as they appeared chronologically was a report with the title: *The Naiades (Fresh-Water Mussels) of the Cahaba River in Northern Alabama* by Henry van der Schalie (Occ. Pap. Mus. Zool., Univ. Mich., 392: 1-29, 1938). The mussels gathered were shown as they occurred in the several portions of the Cahaba drainage system so that it was possible to draw the following important conclusions based on a study of the ecology and distribution of the 48 species collected there:

"It seems necessary to conclude that in geologically recent time tributaries of the headwaters of the Alabama drainage were connected with tributaries of the Tennessee drainage. This confluence permitted the three creek species known to belong to the Tennessee drainage to enter the headwaters of the Alabama drainage.

The seven representative species which entered the Alabama system from the north by way of the Tennessee drainage indicate that streams somewhat larger than creeks were connected. Since these forms are at present more or less differentiated in the two river systems, sufficient time must have elapsed to permit differentiating evolutionary tendencies. Thus, the connection of the larger streams must have preceded that of the creeks."

In 1939 the only published paper to give a list of the species that occupy the Tombigbee River appeared with the title: *Medionidus mcglameriae, A New Naiad from the Tombigbee River, with Notes on Other Naiads of That Drainage*, by Henry van der Schalie (Occ. Pap. Mus. Zool., Univ. Mich., 407: 1-6, 1 plate). The new species was actually collected by the late Winnie McGlamery at Epes,

Sumter County, Alabama. With the information then available, it was possible to make comparative lists (p. 4) showing the species collected by Hinkley (1906), Goodrich and van der Schalie (1931), Clench and van der Schalie (1933), and McGlamery (1935). With the use of the H. H. Smith letters, tributary species were given for: Sipsey River at Elrod; Lubbub Creek at Reform; and Coalfire Creek at Coalfire. With the exception of the new species found by Miss McGlamery, this faunal list probably contains a fairly accurate account of the mussels in that drainage at that time.

Another publication too often overlooked since it has a bearing on the fauna of the Tombigbee and Black Warrior rivers appeared in 1941 entitled: *Distribution of the Gastropods of the Cahaba River, Alabama*, by Calvin Goodrich (Occ. Pap. Mus. Zool., Univ. Mich., 428: 1-30). In the introduction to this paper he stated:

"A fact well recognized is that the molluscan fauna of a river alters as the stream itself alters in its course from headwaters to its mouth. The alteration may be restricted to that of the shell configuration within a given species, as in members of the *Lampsilis* group of Naiades of the larger Great Lakes affluents, or to the development of conspicuous sculpture, a striking illustration of which is *Io* of the Tennessee River system."

In this study, Goodrich finds that the Pleurocerid snails occupy three zones or sections in their distribution pattern. His studies reveal clines developed in relation to the up or down river position they occupy in the river and perhaps as shown by the distribution of the mussels in that same river (van der Schalie, 1938: 17-23) where the three major zones are correlated as verified by Dr. Walter B. Jones of the Alabama Geological Survey with the geology and physiography of the region.

In summary, the work of H. H. Smith as sponsored by the "syndicate" and the surveys made in the thirties of the rivers in the Alabama drainage system does reveal essentially the rich assemblages of mollusks in the system as a whole. The Tombigbee and the Black Warrior have not been studied so far as publications reveal in the present period of rapid economic development. Consequently, it was of considerable interest to find the First Supplemental Environmental Report of the Tennessee-Tombigbee Waterway for Alabama and Mississippi with an article (Volume IX, Appendix F) by Paul Yokley listing the mussels he found recently at several stations between Aberdeen, Mississippi and Gainesville, Alabama. From this account Yokley and Gooch collected 40 mussels (species and forms) in the Tombigbee in 1974. The comparison (Table 1) made with the collections of Hinkley as reported in 1906 and van der Schalie published in 1939 shows a surprisingly rich fauna which differs not so much in its overall species assemblages as it does in composition from place to place. It is just this vital matter of analyzing which species occupy the various portions of the stream (creeks, small river, medium sized bodies or the larger stream); their relation to bottom conditions; nature of flow to determine the effects of current or need for sluggish conditions; the pressures placed on the benthic faunal assemblages by sewage, industrial wastes, heated effluents from steam plants or reactors, etc., etc. - all of which could indicate what prospects there are to find sites that could be set aside as reserves or preserves in view of alterations that must come about with the completion of the new seaway.

Future Status:

The proposed seaway as planned for the Tennessee and Tombigbee rivers will bring about enormous changes with profound impact on the biota of the region. Mussels are animals that can serve as monitors for assessing the changes. They should be studied both *before* and *after* the drainage alterations are made. It has been shown that some knowledge exists for the "before" aspects as briefly recorded in the foregoing history section. Several studies were reviewed to show the value of mussels in tracing stream confluence. Consequently, it is strongly recommended that these animals be used for intensive studies as a part of the work involved in feasibility for some of the work contemplated.

If mussels are to be used, a far more comprehensive program will need to be developed than is now being conducted by Dr. Paul Yokley. It has been well established that mussels are quite specific in their ecology and distribution so that it is urgent that the species living in the Tombigbee and Black Warrior drainages be carefully mapped and localized as to their ecology. If this information is known there will be better assessment as to whether species eliminated in some part of a drainage might still be preserved in another part of the system. That work cannot be done without proper equipment which would include proper boats, crawfoot bars, scuba diving, etc. Visiting the caches at muskrat feeding places is helpful but certainly not sufficient for the kind of assessment required.

It is recommended that a preliminary survey be made and, with consultation with the proper authorities, an intensive mussel survey be instituted as soon as possible before too many changes are made in the drainage pattern. The data gathered could then be integrated with what is available at centers where the historic material is stored (University of Michigan, The Alabama Museum, etc.).

References:

- In addition to the wealth of information contained in the H. H. Smith letters to Bryant Walker, there are only a few mollusk papers that have special bearing on the studies of the mollusks of the Tombigbee drainage. They are, as follows:
- Goodrich, Calvin. 1941. *Distribution of the gastropods of the Cahaba River, Alabama*. Occ. Pap. Mus. Zool., Univ. Mich., 428: 1-30.
- Hinkley, A. A. 1906. *Some shells of Mississippi and Alabama*. The Nautilus, 20: 34-36; 52-55.
- Neel, Joe K. 1941. *A taxonomic study of *Quadrula quadrula* (Rafinesque)*. Occ. Pap. Mus. Zool., Univ. Mich., 448: 1-8, 1 plate.
- van der Schalie, Henry. 1938. *The Naiades (fresh-water mussels) of the Cahaba River in Northern Alabama*. Occ. Pap. Mus. Zool., Univ. Mich., 392: 1-29.
- _____. 1939. *Medionidus mcglameriae*, a new naiad from the Tombigbee River, with notes on other naiads of that drainage. Occ. Pap. Mus. Zool., Univ. Mich., 407: 1-6, 1 plate.

For a more comprehensive understanding of the many interesting aspects of the biology of the mussel and snail fauna of the Alabama drainage and its relation to the Tennessee system to which it will be connected, there would be a host of important studies to which reference should be made. Some of these are:

- Hayes, C. W. and M. R. Campbell. 1900. *The relation of biology to physiography*. Science, 12(291): 131-133.

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- van der Schalie, Henry. 1938. The naiad fauna of the Huron River, in Southeastern Michigan. *Misc. Pub., Mus. Zool., Univ. Mich.*, 40: 1-83; 12 plates, 1 map.
- _____. 1939. Additional notes on the Naiades (freshwater mussels) of the Lower Tennessee River. *Amer. Midl. Nat.*, 22: 452-457.
- _____. 1940. The naiad fauna of the Chipola River, in Northwestern Florida. *Lloydia*, 3: 191-205, 3 plates.
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- _____. 1951. Arnold Edward Ortmann as revealed by his letters. *Nautilus*, 65: 134-141; 23-26.
- _____. 1952. An old problem in naiad nomenclature. *Nautilus*, 65: 93-99.
- _____. 1969. Two unusual unionid hermaphrodites. *Science*, 163: 1333-34.
- _____. 1970. Hermaphroditism among North American freshwater mussels. *Malacologia*, 10: 93-112.
- _____. 1973. The mollusks of the Duck River drainage in Central Tennessee. *Sterkiana*, 52: 45-55.
- _____. 1975. An ecological approach to rare and endangered species in the Great Lakes region. *Mich. Acad. Sci. Arts and Letters*, 8: 7-22, 5 plates.
- van der Schalie, H. and Guy C. Robson. 1963. Bivalve. *Encyclopedia Britannica*, 1963: 8 pages.