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THE WALKER-BEECHER PAPER OF 1876 ON THE  
MOLLUSCA OF THE ANN ARBOR AREA

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Two students of the University of Michigan, Bryant Walker and Charles E. Beecher, made a compilation in 1875 of the names of the mollusks they had observed "within a circuit of four miles about Ann Arbor, Mich." The list was published as part of the Appendix to the *Constitution and By-Laws of the Ann Arbor Scientific Association with Proceedings for the Year Ending May 1, 1876*. Certain alterations in the land surface during the passage of sixty-eight years and the consequent modifications in molluscan habitats, the almost complete hydroelectrification of the Huron River in the Ann Arbor area, a rise in urban population, and a probable decrease in agricultural activities have seemed to warrant a comparison of the Walker-Beecher findings with present-day knowledge of the subject.

Up to 1875 three lists of Mollusca known to occur in Michigan and two lists that can be called regional catalogues had been printed. These started off as early as 1839 with a report by Dr. Abram Sager. Mr. A. C. Currier in 1859 issued a *List of the Shells Collected in the Grand River Valley*. The next year there appeared a second general catalogue as a section of the *Report of the Geological Survey for 1860*, the work of Dr. Manly Miles, state zoologist. Mr. Currier in 1868 some-

what expanded information with a *List of the Shell-Bearing Mollusca of Michigan, Especially of Kent and Adjoining Counties*. In a *Sketch of the Invertebrate Fauna of Lake Superior*, being part of the *Report of the United States Fish Commission for 1872-73*, Sidney J. Smith provided some understanding of mollusks of the Upper Peninsula. In addition to these items were casual or scattered papers dealing with Michigan shells by Thomas Say, Isaac Lea, John G. Anthony, and others.

The Ann Arbor Scientific Association, which printed the Walker-Beecher study, had its first formal lecture on May 1, 1875. Meetings had been held through the month of April to frame a constitution and a set of bylaws. Officers, including a "Board of Censors," had been nominated and elected. It is quite clear that to begin with the association had every faith in its permanency, and, quite as clearly, that people of the community and members of the University were glad to share in the promotion. In the list of members one observes such names as those of President Angell, Professors Silas H. Douglas,<sup>1</sup> A. B. Prescott, J. B. Steere, P. B. Rose, and Dr. Charles Rominger. Apparently, the society represented all interests of Ann Arbor, professional and amateur, which could come under the head of science. In that first and only year of the organization were lectures on geology, zoology, archeology, chemistry, botany, and meteorology. Probably the most ambitious paper of all was one on the flora in and about Ann Arbor, wherein 848 species of plants were recited. Walker and Beecher joined the society at the same time, in June, 1875, although Walker's name by some oversight was left from the membership rolls. Naturally, the short career of the association is a matter to wonder about. It has to be admitted that in America societies of the kind are commonly of few years and full of trouble, and that a certain inanition, if nothing worse, quickly comes upon them. Then, too, the Ann Arbor associ-

<sup>1</sup> The name appears in University of Michigan records as Douglass and Douglas. The latter spelling, Mr. Wilfred B. Shaw informs me, was adopted about 1875.

ation came into being in the midst of the depression that followed the "panic of '73" and might be expected, as a result, to suffer difficulties with membership dues and printing bills. Still, the reason for death in infancy was of more definiteness. Dr. Douglas was an active charter member. Professor Rose was secretary. These two entered upon a controversy which developed aspects of a mountain feud. If, as it is written, the University underwent earthquake-like reactions to the quarrel and the town became filled with highly vocal partisans, it can hardly be thought strange that a germinating scientific society, containing two resolute men at odds with each other, could not sustain the breath of life.

Bryant Walker was in his nineteenth year, in his junior year at the University, when the paper on Ann Arbor Mollusca was accepted. After completion of the literary courses, he returned to the University as a law student and was graduated by the Law School in 1879. His professional practice was maintained without break until about 1930, when his final illness came upon him. Very nearly all of Mr. Walker's leisure was given over to the study of the Mollusca. Next to Dr. A. E. Ortmann, he was the foremost authority on the Unionidae, and no one at any time has made so thorough a research upon the Ancyliidae. He joined with Dr. C. A. Davis and Dr. A. C. Lane in the examination of the shell marls of Michigan, and he drew broad and philosophical conclusions on the faunal repopulation of the glaciated Midwest. He was the second president of the Michigan Academy of Science and, on the basis of scientific work, was given an honorary degree by the University. Dr. Walker died in 1936, thirty-two years after the death of his associate of 1875.

Beecher was born in the same year that Walker was, and was named Charles Emerson. This was at Dunkirk, New York. The family shortly moved to Warren, Pennsylvania, and there Beecher attended primary and secondary schools. His graduation from the University of Michigan was in 1878. The joint paper here under discussion appears to have been the first with which he was concerned, and we know with certainty

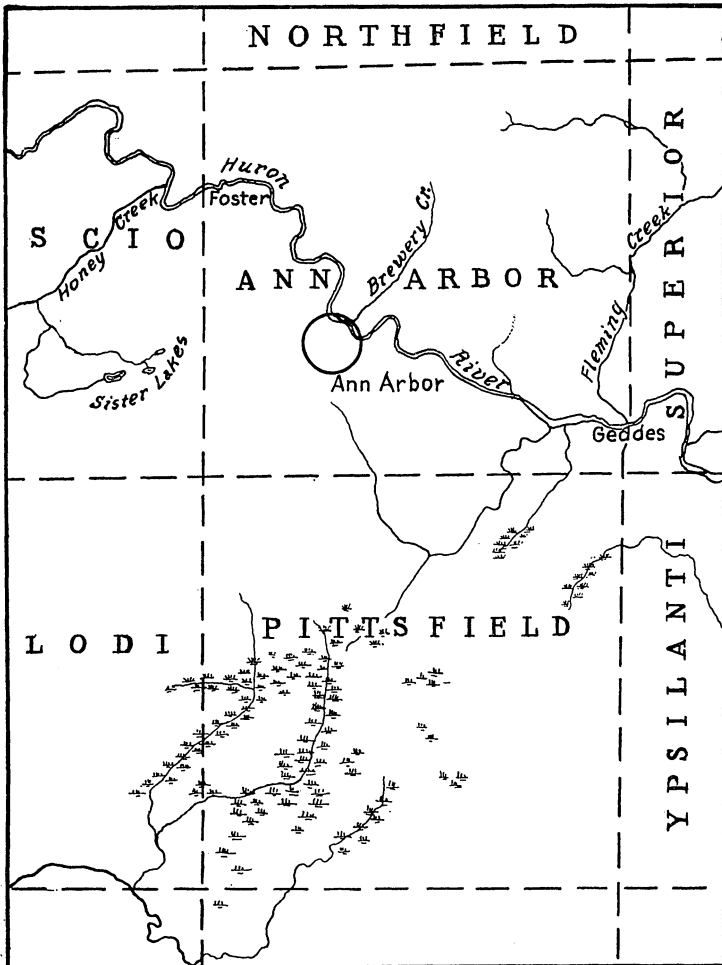
that it was Walker's first adventure with printing. For ten years after leaving Michigan, Beecher worked under the paleontologist Dr. James Hall at Albany. In the late 1880's he was placed in charge of invertebrate fossils of the Peabody Museum, New Haven. After a few years he was made assistant professor of historical geology at the Sheffield School and when in 1894 he became a full professor he was elected to the governing board of that institution. He succeeded Professor O. C. Marsh as curator of the geological collections of Yale University and was named secretary to the board of trustees of the museum. Walker and Beecher were alike in having developed an interest in Mollusca early in life, and in regard to the shells alone both had a strong accumulative instinct. Death came to Beecher in 1904. Dr. W. H. Dall wrote of him that he "was of a kindly and enthusiastic disposition, . . . of a philosophical turn of mind, . . . of a quiet and unassuming nature."

The area in which Walker and Beecher elected to collect was small (Map 1). Weariness would not have been their lot if they had walked from one extreme of the periphery to another.<sup>2</sup> Yet the tract had the advantage of containing a large variety of habitats. Besides a main river and its feeding streams were tamarack swamps and *Typha* marshes, successions to drained swamps and marshes, ditches, woods pools and field ponds, fern meadows, roadsides crowded with undergrowth, and the several communities of willow, aspen, maple, oak-hickory, and grasses. There was even that habitat wherein the ground surface was worn down to gravel and sand by overgrazing and, at least temporarily, contained living mollusks which the winds had rolled to it.

The Huron River comes out of the west and north through gaps in the Defiance moraine of the Huron-Erie ice lobe. The only branches of the river which amount to much, the Little Portage River ignored, are eastern and western hems of the circuit that Walker and Beecher circumscribed. Allen Creek,

<sup>2</sup> For details of the description of the Ann Arbor area of the period under discussion I am indebted to Mr. F. M. Gaige, Director of the Museum of Zoology.

between these two, determined the site for the settlement of Ann Arbor and had perhaps undergone such disturbance and borne such wastes by 1875 as to be useless for the students' purposes. From the headwater of Barton dam, just above



MAP 1. The engraving shows the general features of the Ann Arbor area as they existed when the topographical survey was made in 1901-2. At the time these probably approximated the conditions with which Walker and Beecher were familiar in the 1870's.

Honey Creek discharge, to the tail water of Geddes dam a fall of sixty-seven feet is reckoned, to which can be added a further drop to Fleming Creek sufficient to permit allowance for a fall of about ten feet to the mile within Walker and Beecher's circle. One is to keep in mind that the dams obstructing river flow in the 1870's were low, the extent of their impoundments slight, compared with those of the present dams. In short, here was a very rapid stream, excellent for the propagation of fast-water mussels, inimical to those adapted to slow or still waters. This accounts, for one thing, for the failure of Walker and Beecher to find *Anodonta grandis*, one of the commonest of Michigan naiads and present in hundreds of the state lakes. Pollution in 1875 was little and could have had small effect on the river fauna, hurtful or benign. Immediately about Ann Arbor, the depth of the glacial drift overlying bedrock is reckoned as one hundred and fifty feet plus or minus, and there is no rock exposure in the topographical quadrangle short of Maybee in the extreme southeastern corner. Some of the masses of this drift have been channeled and gullied by postglacial drainage, and it is on the steep wooded slopes of the erosions and the river banks that the larger terrestrial mollusks have succeeded in surviving. Two such ravines, School Girls' Glen and Cascade Glen, were mentioned by Walker and Beecher.

While there are about one hundred and fifty lakes, large and small, within the official Ann Arbor quadrangle, only three in the four-mile circle have more than very shallow depths. They are spoken of now as First, Second, and Third Sister lakes, but to Walker and Beecher they were simply "lakes west" and "small lakes west." Such drainage as they have is to Honey Creek.

Three times the authors gave "south" as sources of their findings. To judge by the material they obtained in that direction they no more than touched the edges of Pittsfield Township on the north and did not get to where stream flow was toward the River Raisin. Most surely they did not discover the rich molluscan population that occupied the borders of

Steere's swamp, for it was of a kind most impressive to any student of invertebrates and bound to provoke comment if not extensive description. At least in recent years, there has been only one other spot in southeastern Michigan wherein land snails lived in such large numbers. In parts of the swamp which had been cleared of larger growths, Dr. Franklin A. Shull (1907) studied the habits of the short-tailed shrew, which lived upon snails and experienced no want of provisions. "According to old settlers," he wrote, "the region was formerly occupied by tamaracks, black ash, and willows. Since it was cleared a few years ago [that is, before 1907] nettles, goldenrod, and sumac, with here and there a thicket of black ash, willow, elders and raspberry, have taken the swamp." In ditching the area, workmen came upon a deposit of white marl overlaid by five feet of peat. Of the shells found in the marl, Mr. Walker recognized thirteen species of land mollusks and twelve fresh-water forms. The topographical map, the first edition of which was issued in 1904, shows extensive areas of swamp in Pittsfield Township, and it is very likely that these tracts, like Steere's swamp, represented steps in a natural progress from lakes to dry land. Steere's swamp has been transformed from wild and forbidding tamarack wastes into a municipal water works pumping station and an almost lawn-like airport. Not even in Ann Arbor has there been a more profound change in the local topography.

A locality mentioned in the Walker-Beecher paper is "North-east swamp, on the River." This would seem to be a swamp, remembered by citizens now in middle life, that bordered the left bank of the Huron just above the Geddes Avenue bridge. It became a part of the impounded stretch back of the Geddes dam, which is about a mile and a half below the crossing.

Another probable collecting locality for Walker and Beecher was on and around the limestone erratics which were strewn over the countryside. These acquire molluscan populations not simply for the lime that is made available for shell material, directly or indirectly, but also for growths of algae, which can serve as food. Professor Alexander Winchell (1881) said that some of the boulders were of such large size that they were

mistaken for genuine outcrops of formations in place, "and quarries have been opened and limekilns built in the faith of a permanent supply of the rock. In some cases, hundreds of bushels of lime have been burned from them. . . . Many years ago a limekiln just east of the city limits of Ann Arbor was long maintained from one of these masses."

The muck soil of elevated marshes on both sides of the river below the city seems to have escaped the eyes of the two students. The spots mark spring seepages from the surrounding hills, and where a few continue to exist above Delhi are thick patches of *Typha*. The soil is of interest because it is thickly strewn with land shells and a few species of small water-living gastropods. It is possible that in 1875 the places were hidden by tree growth.

The so-called "Cat Hole," which caught the northward drainage of the University campus, was deserving of even more formal designation in 1875. It contained sufficient water at a later time to bring about the drowning of a young man. No doubt, Walker and Beecher found a few lymnaeids and physas in it. Today, it is filled in. It hides certain terrestrial snails, among them two species of alien origin.

Satirical comment might be made upon the changes in biological nomenclature revealed in the following discussion. Remarks upon them, if made, will seem to be the more pointed to anyone who recalls that the system was partly promoted with the argument that scientific names, unlike vernacular ones, would be fixed, immutable. About all that can be said in defence of the deviations and innovations is that scientific technology has proved to be subject to fluctuations, impermanent views and practices, the same as everything else of human invention.

In the text, modern names are given first and those used by Walker and Beecher follow within quotation marks, together with such other data as they offered.

#### Family Melaniidae

*Goniobasis livescens* (Menke). "*Goniobasis Milesii* Lea, and *Goniobasis Levesens* Mke., Huron River." The variability of



this operculate water gastropod may be understood from the fact that in 1892-93 Walker made eight species of it; in 1911, four. It is still common in the faster parts of the Huron River and has small, struggling colonies in impounded parts. It continues to live in Honey Creek, but search for it in Fleming Creek in 1937 and 1938 failed to reveal it.

#### Family Valvatidae

*Valvata tricarinata* Say. "Valvata tricarinata, Say, Huron River." It persists as small colonies in the river and its larger tributaries, being adaptable to both fast flowing and still waters and tolerant to some extent of domestic sewage. The species is thought to have re-entered the glaciated region quite early. It was among the shells found in the deposit of marl of Steere's swamp.

#### Family Viviparidae

*Campeloma integrum* (Say). "Melanthis integra, Say, still water, Huron River." The Huron River form of *Campeloma* has at different times been termed *C. integrum*, *decisum*, and *rufum*, and as little is now known as to what properly should be the name as was known in 1875. A ventricose, shouldered shell of the area has been called *C. integrum obesum* ("Lewis," Tryon). Senility would seem to explain the erratic shape in the case of some individuals, trematode infestation that of others. It can hardly be termed a true race inasmuch as more normal forms of *Campeloma* have succeeded it where once it occurred.

#### Family Amnicolidae

This was family Rissoidae to Walker and Beecher.

*Amnicola limosa* Say. "Amnicola porata, Say, Huron River." Still common in the Huron River and its branches.

*Amnicola lustrica* Pilsbry. "Amnicola lustrica, Say, Huron River." Say's *lustrica* is based on young of the genus *Pomatiopsis* and is a synonym. In 1900 Dr. H. A. Pilsbry described *A. lustrica*, and this is the mollusk which Walker and Beecher

collected. It has apparently not been seen since 1875 in the Huron River nearer than Hudson's Mills above Dexter.

*Pomatiopsis lapidaria* (Say). "Pomatiopsis Cincinnatensis, Anth., river banks." Of irregular occurrence in the area, but can be found by searching under logs and among grass roots near bodies of water.

#### Family Polygyridae

At the time the Walker and Beecher compilation was made, it was still customary to place the bulk of terrestrial Mollusca in the family Helicidae and the genus *Helix*. Twenty-two species and what were termed varieties were so classified in the Ann Arbor list. At the present time, these twenty-two are allocated to four different families and nine different genera. *Helix* remains in use now only for certain introduced shells, so far as America is concerned. Members of the Polygyridae are dealt with here a little out of the order in which they were treated in 1875.

*Triodopsis albolabris* (Say). "Helix albolabris, Say, common." This is widely distributed in the area, but its colonies have dwindled in size. The invasion of fields, fence corners, and other more or less open situations, from deep forests has been by adaptive individuals who have not yet proved to be normally reproductive. "Helix albolabris var. dentata, occasional," of the list is probably merely a reversion to a "toothed" phase.

*Triodopsis fraudulentula vulgata* Pilsbry. "Helix fallax, Say, common." Still a common snail, and living in deep woods, open woods, sides of ravines, and on hill slopes that in midsummer are dry and baked.

*Triodopsis multilineata* (Say). "Helix multilineata, Say, common." Now rare in the circle. Its natural habitats of wet woods and marsh borders have become exceedingly restricted. "Helix multilineata var. albina, common," of Walker and Beecher is a form in which the typical pigmented bands are absent. In a second form, the pigmentation involves the whole shell. It has been called variety *rubra*. Both are individual variants.

*Triodopsis notata* (Deshayes). "Helix palliata, Say, uncommon." The only examples found in the area of late were secured by William Trow in the Barton Hills section.

*Triodopsis tridentata* (Say). "Helix tridentata, Say, common." Except for Walker's "Ann Arbor" shells, the records show the occurrence of this species in only three localities of Washtenaw County. Two are upland localities, one is a Pleistocene deposit.

*Mesodon elevatus* (Say). "Helix elevata, Say, dead specimens in recent deposits." These deposits were never precisely located. The species lives in the extreme southeastern and the extreme southwestern parts of Michigan. The Walker collection contains no shells of the Ann Arbor area. The present belief is that the mollusks so credited were misidentified.

*Mesodon zaleta* (Binney). "Helix exoleta, Binn., Cascade Glen." The commonest of the large Polygyridae along the banks of Huron River.

*Mesodon thyroidus* (Say). "Helix thyroides, Say, common." This continues to be the most common large snail of the region. The fact that it lives upon mildews of various sorts possibly accounts for its persistence against adverse conditions. Besides woods, it has been seen in fields and in thick weed growths.

*Stenotrema hirsutum* (Say). "Helix hirsuta, Say, common." The species still lives on banks of the Huron River and in a few upland situations. It is frequent among the shells of the old forest soil. Probably it ceased to be common some time ago as a living mollusk.

*Stenotrema monodon* (Rackett). "Helix monodon, Rack., common." Fairly common in lowlands still. The "var. Leaii" of the list is now considered a synonym.

*Stenotrema fraternum* (Say). "Helix monodon, var. Fraterna, common." An inhabitant of upland woods and the drier parts of the Huron River banks. As drainage has been extended more and more through the area, *S. fraternum* appears to have become much more common than is *S. monodon*.

*Allogona profunda* (Say). "Helix profunda, Say, Cas-

cade Glen." Still living on the river banks both upstream and downstream, though in diminishing numbers. It is not adaptable to conditions brought about by deforestation and farming.

#### Family Haplotrematidae

*Haplotrema concavum* (Say). "Macrocyclus concava, Say, School Girls' Glen." Found occasionally on wooded banks of the Huron River and in upland forest which has been left unpastured. The mollusk preys on other snails, although possibly not exclusively, and its colonies tend to be restricted to spots harboring Mollusca in general. Walker and Beecher made this a member of the Helicidae.

#### Family Limacidae

*Deroceras gracile* Rafinesque. "Limax campestris, Binney, common under dead wood." Classified with the Helicidae in 1875. A slug of woods, trash piles, gardens, vacant lots, and the edges of cement sidewalks. The indications are that it has become far more common than it was.

#### Family Endodontidae

*Anguispira alternata* (Say). "Helix alternata, Say, common." The snail flourishes on almost any kind of low vegetation and is not above eating animal materials. Found in almost all kinds of habitats.

*Anguispira kochi* (Pfeiffer). "Helix solitaria, Say, dead, live specimens found up the River by Dr. A. B. Lyons, Detroit." The mollusk proved to be common in Steere's swamp, and colonies of living snails have been observed near the city limits of Ann Arbor on the north side of the Huron River and just below town on the south side. It appears frequently in old forest soil as a subfossil. The species is nearing extinction in southern Michigan.

*Helicodiscus parallelus* (Say). "Helix lineata, Say, not abundant." A very small snail which is easily overlooked. Known from several places in the area.

*Discus patulus* (Deshayes). "Helix perspectiva, Say, south and west, uncommon." Two localities within the four-mile

circle are Cascade Glen and woods near the Stone schoolhouse on Packard Street.

*Discus cronkhitei anthonyi* (Pilsbry). "Helix striatella, Anth., common." Still common.

#### Family Strobilopsidae

*Strobilops labyrinthica* (Say). "Helix labyrinthica, Say, common." Probably less common now. The nearest known colonies are at Geddes and on the shore of Third Sister Lake.

#### Family Valloniidae

*Vallonia pulchella* (Müller). "Helix pulchella, Mull., common." A snail of singular adaptiveness, found living in the area in vacant lots, in gardens, in lawns, and at edges of sidewalks. It was seen in thousands on a driveway in the east part of the city a few years ago, and it must have experienced enormous mortality under the wheels of automobiles.

#### Family Cochlicopidae

*Cochlicopa lubrica* (Müller). "Cionella subcylindrica, Leach, common." In certain years the species could be spoken of as exceedingly abundant. It occurs in all parts of the area. Listed with the Helicidae in the 1875 list.

#### Family Pupillidae

*Gastrocopta armifera* (Say). "Pupa armifera, Say, common." Well distributed in the area as small colonies. This and other Pupillidae were listed as Helicidae by Walker and Beecher.

*Gastrocopta contracta* (Say). "Pupa contracta, Say, common." Occurs in all parts of the area and frequently is to be found under bricks, stones, and boards of gardens.

*Gastrocopta pentodon* (Say). "Pupa pentodon, Say, South." Apparently a rarity. The only records subsequent to Walker and Beecher are Steere's swamp and woods one and a half miles east of Ann Arbor.

*Pupoidea marginatus* (Say). "Pupa fallax, Say, river banks, rare." Still rare. Observed in recent years in Ann Arbor and at Geddes.

*Vertigo milium* (Gould). "Vertigo milium, Gld., common." Rare today, not simply in the Ann Arbor area, but also throughout the county.

*Vertigo ovata* Say. "Vertigo ovata, Say, common." Found more often than is *V. milium* and yet can hardly be said to be common.

#### Family Succineidae

*Succinea avara* Say. "Succinea avara, Say, common." Seen in woods, on banks of streams, in marshes and swamps, and occasionally under sticks or boards in fields. Placed with the Helicidae in the 1875 list.

*Succinea ovalis* Say. "Succinea obliqua, Say, uncommon." Still occurring in small numbers in woods of the area.

*Succinea retusa* Lea. "Succinea ovalis, Gld., not Say, uncommon." Especially common now at margins of impounded waters of the Huron River. It can be found in similar situations nearly everywhere within the four-mile circle. *Succinea Peoriensis* Wolf, mentioned as common by Walker and Beecher, differs only slightly from *S. retusa*.

#### Family Zonitidae

*Zonitoides arboreus* (Say). "Zonites arborea, Say, common." This is still the commonest of terrestrial Mollusca locally. With seven other species of their list, Walker and Beecher placed *Z. arboreus* in the family Arionidae. A slight rearrangement of their order has been made.

*Zonitoides nitidus* (Müller). "Zonites nitida, Mull., common." Fairly common under sticks and other debris near bodies of water.

*Zonitoides ligerus* (Say). "Zonites ligera Say, common." Present in the area, but in diminishing numbers. Four colonies within the city limits of Ann Arbor have been seen in recent years.

*Mesomphix cupreus* (Rafinesque). "Zonites fuliginosa, Griff., Cascade Glen." A recent search for the species in the locality failed to reveal it. It has been found, however, by William Trow in the Barton Hills section across the river from Cascade Glen. Records of findings are from thirteen localities of Washtenaw County, and three of these are within the present corporation lines of Ann Arbor. The mollusk is inadapative and disappears as damp woods are cleared away.

*Retinella indentata* (Say). "Zonites indentata, Say, Common." Well distributed in the area, but it can scarcely be considered common at this day.

*Retinella electrina* (Gould) or *R. hammonis* (Ström). "Zonites viridula, Mke., common." In nearly all sections of the area, but it is not nearly as common as is *Z. arboreus*, with which it is often confounded.

*Euconulus fulvus* (Müller). "Zonites fulva, Drap., common." No longer common in the area.

*Hawaiiia minuscula* (Binney). "Zonites minuscula, Binney, South." It may be rated as common today under sticks, logs, and in the trash of vacant lots, but it is seldom that more than five or six individuals are found together.

#### Family Philomycidae

*Philomycus carolinianus* (Bosc). "Tebennophorus Carolinensis, Bosc, not abundant." This is a large mottled slug which sometimes reaches a length of four inches. Its habitat, damp and shady woods, is becoming more and more circumscribed. Walker and Beecher placed it in the Arionidae.

#### Family Ellobiidae

*Carychium exiguum* (Say). "Carychium exiguum, Say, common." The species continues a fairly common one in the area. It lives under wet logs for the most part. The family name for this genus in the 1870's was Auriculidae.

#### Family Lymnaeidae

Twenty species, counting one subspecies, were grouped in the 1875 list under the family Limnaeidae. This has since

been made four families of which the Lymnaeidae (a restored spelling) is one. Walker and Beecher used six generic names. These are eight in modern conservative practice and ten in less conservative. Two of the generic names of 1875 have passed out of American nomenclature, and there have been overturns among species.

*Lymnaea columella* Say. "Limnaea columella, Say, rare." Fairly distributed in small colonies over the Lower Peninsula of Michigan, but the only definite record for the Ann Arbor area is Steere's swamp.

*Lymnaea humilis modicella* (Say). "Limnaea humilis, Say, common." It may be seen, especially in spring, on mud flats of ponds, lakes, rivers, creeks, and brooks. There is no reason to believe it less common now than it was in 1876.

*Lymnaea stagnalis appressa* (Say). "Limnaea stagnalis, Linn., rare, lakes west and Huron River." Still living in Third Sister Lake, but unknown at present from any other near-by locality. The mollusk is clearly in course of extinction in southern Michigan.

*Lymnaea palustris* (Müller). "Limnaea palustris, Mull., swamp north-east." Still to be observed in brooks, ditches, and ponds of the area, but tending to disappear as drainage is carried on more extensively.

*Lymnaea obrussa* Say. "Limnaea desidiosa, Say, common." Another of the small species of the family. It continues to be common.

#### Family Physidae

*Physa gyrina* Say. "Physa gyrina, Say, common." The drainage of swamps and pools has reduced the number of colonies of the species, although locally it remains the commonest of the Physidae.

*Physa gyrina hildrethiana* (Lea). "Physa gyrina var. hildrethiana, common." A race having elongate shells and living in slow-moving streams. Taken in recent years at two localities in Ann Arbor. It is rare rather than common.

*Physa sayii* Tappan. "Physa Sayii, Tappan, small lakes



west." It continues to exist in Third Sister Lake. Except in lakes, it is unknown in Washtenaw County.

*Physa heterostropha* Say. "Physa heterostropha, Say, common." An eastern American species rarely appearing in the Middle West. Ann Arbor mollusks to which the name has been given were probably misidentified.

*Aplexa hypnorum* (Linnaeus). "Bulinus hypnorum, Linn., northeast, common early in June." Especially common in woods pools, where for more or less long periods it undergoes aestivation and hibernation. Sometimes seen in great numbers in very small streams.

#### Family Planorbidae

*Helisoma campanulatum* (Say). "Planorbis campanulatus, Say, rare." Probably rarer now than in 1875. Known within the four-mile circle only from Third Sister Lake.

*Helisoma trivolvis* (Say). "*Planorbis trivolvis*, Say, common." As the species will occupy almost any body of water, and breed there, even in farmyard troughs and small reservoirs, it will doubtless continue to be common.

*Helisoma antrosom* (Conrad). "Planorbis bicarinatus, Say, common." Like *H. trivolvis*, this species is adaptive to several kinds of habitat and is tolerant of pollution. It is still common in the area. On the strength of an engraved figure without description, it has lately been proposed to make the name *H. anceps* (Menke).

*Menetus exacuus* (Say). "Planorbis exacutus, Say, common." Not found in recent times nearer than the Huron River at Scio and, as a subfossil, in the marl deposit of Steere's swamp.

*Gyraulus hirsutus* (Gould). "Planorbis albus, Mull., rare." Marl of Steere's swamp is the only spot within the circuit where it has been seen in the last twenty-five or thirty years.

*Gyraulus parvus* (Say). "Planorbis parvus, Say, common." Very common still, especially on stems and leaves of water plants.

*Gyraulus deflectus* (Say). "Planorbis deflectus, Say, not abundant." Not seen in the area in recent years.

*Planorbula armigera* (Say). "Segmentina armigera, Say, common." A common mollusk of woods pools, ponds, and the reedy parts of lakes.

#### Family Ancyliidae

*Ferrissia tarda* (Say). "Ancylyus tardus, Say, common." In 1914, Walker made *Ferrissia* a genus, and to this all the Ancyliidae of Michigan belong. *F. tarda* was probably observed by Walker and Beecher in the Huron River. The nearest present known location for it is Mill Creek, Scio Township, which is outside the four-mile circle.

*Ferrissia parallela* (Haldeman). "Ancylyus parallelus, Hald. (?), uncommon." Rarely seen, probably because of its small size and not on account of actual infrequency.

#### Family Unionidae

Nine species were brought under this heading in the 1875 list. At the time that Walker and Beecher made their examination of the area, there were more dams on the Huron River than there are now, but they impounded a great deal less water. The polluted section was that immediately at Ann Arbor, and the pollution was little, consisting of such things as sawdust and gas house wastes, with perhaps some flour mill chaff and husks. No gravel washers were on the river, washings from fields were small. Three huge dams are now within the four-mile circle and backwaters of a fourth. Sewage sludges occupy the bottom of much of the stream down-river, and up-river silt is accumulating—conditions inimical to mussels. It is possible that the lower end of Brewery Creek was more polluted in 1875 than it is now. It is known that three dams were once on Fleming Creek as against the present one. They must seriously have interfered with the movements of gloecidia-bearing fish. Honey Creek would appear to have been little altered in sixty-seven years. Virtually the only habitable parts of the Huron River for clams at the present day, meaning within the four-mile circuit, are those just below the Barton Dam, the weir and runoff of the Argo Dam and the freely running reaches from about the Main Street crossing to the

former discharges of the Ann Arbor sewers. Dr. van der Schalie (1938), who made a detailed study of the Unionidae of the Huron River, has written that "few of the Naiades that once occurred here [Ann Arbor] still remain." No attempt can be made beyond this to compare sizes of populations.

*Lampsilis fasciola* Rafinesque. "Unio multiradiatus, Lea, common."

*Elliptio dilatatus* (Rafinesque). "Unio gibbosus, Barnes, common."

*Lampsilis siliquioidea* (Barnes). "Unio luteolus, Lam., rare."

*Cyclonaias tuberculata* (Rafinesque). "Unio verrucosus, Barnes, common."

*Lasmigona compressa* (Lea). "Unio pressus, Lea, common." This species occurs in Brewery Creek, and it is probable that Walker and Beecher obtained their specimens in this or some other of the small streams. It is not a river shell.

*Micromya iris* (Lea). "Unio novi-eboraci, Lea, abundant." The opinion may be ventured that this species has survived in greater numbers than any other mussel.

*Alasmidonta marginata* (Say). "Margaritana marginata, Say, abundant."

*Alasmidonta calceolus* (Lea). "Margaritana deltoidea, Lea, not abundant." Possibly the examples seen in 1875 were from small streams.

*Strophitus rugosus* (Swainson). "Anodonta edentula, Say, common."

#### Family Sphaeriidae

The family Corbiculidae, to which Walker and Beecher accredited nine species, has been dismembered since 1875, Sphaeriidae being one of the cleavages. Further, two of the species that the two students placed under *Sphaerium* are now recognized as belonging to *Musculium*.

*Sphaerium sulcatum* (Lamarck). "Sphaerium sulcatum, Lam., common." This is a species of cold clear streams of upper Michigan rather than of the southern counties, and that it was common in the 1870's is indicative of another local

alteration in the fauna. The only two extant records are "Ann Arbor," without further particulars.

*Sphaerium occidentale* Prime. "Sphaerium occidentale, Prime, Northeast swamp, common." A small, apparently depauperate form now to be found mostly in ditches. Colonies have been observed under wet logs.

*Sphaerium striatinum* (Lamarck). "Sphaerium striatinum, Lam., Huron River, common." It can still be called common.

*Musculium partumeium* (Say). "Sphaerium partumeium, Say, Huron River." The species lives in rivers, lakes, and bogs. It has not been seen in the Ann Arbor area of recent years, but was strained from the mud of a field pool in the western part of Washtenaw County in 1942.

*Musculium securis* (Prime). "Sphaerium secure, Prime, Northeast swamp, on the River." Especially common in woods pools of the area. The form has been variously identified as *M. securis* (Prime), *M. truncatum* (Linsley), and *M. rosaceum* (Prime). Whether these are specifically identical or distinct cannot be said.

*Pisidium virginicum* (Gmelin). "Pisidium virginicum, Bourg., River, common." Collected only at Ann Arbor, and no longer common.

*Pisidium variabile* Prime. "Pisidium variabile, Prime, Huron River." Material from Ann Arbor and from lakes of the northern part of the county was identified by Dr. Victor Sterki as this species. It has not been seen recently.

*Pisidium compressum* Prime. "Pisidium compressum, Prime, Huron River." One of the few well-marked species of the genus. It inhabits not only the Huron River, but most of its local tributaries, large and small.

*Pisidium abditum* Haldeman. "Pisidium abditum, Hald., Huron River." Locally, it is commonest in Fleming and Honey creeks.

About sixty names can be added to the local list made by Walker and Beecher. Superficially, the additions seem to point to a want of observing power on the part of the two students. Yet for the most part these mollusks are seen to fall

into the categories of extreme rarity, extreme inconspicuousness, refinements of classification more or less worthy, and introductions, some of which are unquestionably evanescent. In brief, Walker and Beecher did a rather thoroughgoing task, and that is the more to be respected because it was performed in hours seized from classes and studies. The catalogue of newer species and subspecies follows.

#### Family Polygyridae

*Mesodon inflectus* (Say). Of occasional occurrence on the banks of the Huron River. Two of the localities, the "Cat Hole" and the Nichols Arboretum, represent marked changes in environment in the course of sixty-eight years.

#### Family Zonitidae

*Retinella wheatleyi* (Bland). A single specimen accredited to Ann Arbor is in the Walker collection.

*Euconulus chersinus polygyratus* (Pilsbry). Found near Geddes and in the marl bed of Steere's swamp.

*Striatura milium* (Morse). Pittsfield Township and drift of Huron River at Geddes. Specimens of *S. exigua* (Stimpson) have been seen among subfossils of what is known as the "Old Forest Bed" near Ypsilanti, and it seems likely that it will some day be observed within the four-mile circle.

*Zonitoides suppressus* (Say). Woods near Travers Road on the north side of the Huron.

*Oxychilus cellarium* (Müller). An introduced species now thriving in wastes of the "Cat Hole," and probably in other parts of Ann Arbor.

#### Family Endodontidae

*Punctum pygmaeum* (Draparnaud). Living in woods of Pittsfield Township and occurring in drift of Huron River at Geddes.

#### Family Pupillidae

*Gastrocopta tappaniana* (C. B. Adams). Ann Arbor, Pittsfield Township, and river drift at Geddes. Probably confused with *G. pentodon* by Walker and Beecher.

*Vertigo morsei* Sterki. In plant trash at Ann Arbor.

*Vertigo ventricosa* (Say). A single record for Ann Arbor.

*Vertigo tridentata* Wolf. Observed in Ann Arbor only once.

*Columella edentula* (Draparnaud). A small circumboreal species which locally has been collected at Foster on the Huron River above Ann Arbor.

#### Family Strobilopsidae

*Strobilops affinis* Pilsbry. Observed at Geddes, Steere's swamp, and in School Girls' Glen. Walker and Beecher probably considered it identical with *S. labyrinthica*.

#### Family Valloniidae

*Vallonia excentrica* Sterki. This is differentiated from *V. pulchella* mainly in the matter of shape. It has been found in a few spots in the area and is rare.

*Vallonia costata* (Müller). Supposed to occupy drier habitats than *V. pulchella*, but the two are frequently found together. It has become exceedingly common in Ann Arbor, living in grass and under boards and stones.

#### Family Succineidae

*Succinea retusa magister* Pilsbry and *S. retusa decampi* Tryon. The first is larger than the typical form, the other is elongate and compressed. They occur in the marshy borders of the Huron River.

#### Family Philomycidae

*Pallifera dorsalis* (Binney). Inhabits woods near Ann Arbor, and unlike the other native slug, *Deroceras gracile*, it has not become "urban." Now and then slugs of Old World origin are found in the area, but it is not certain that any of them have established permanent colonies. Also slugs of the West Indies and of Central America are imported from time to time in bunches of bananas. They are to be rated simply as curiosities.

## Family Ellobiidae

*Carychium exile* H. C. Lea. Found in Geddes dam overflow.

## Family Lymnaeidae

*Lymnaea kirklandiana* Lea. An inhabitant of flood-plain pools, swamps, and springs. Known from Chelsea only, but very likely is also within the four-mile circle.

*Lymnaea caperata* Say. Found in the Huron River, an unusual habitat for the species, which commonly lives in ditches, ponds, woods pools, and the like. Rare in Washtenaw County.

*Lymnaea humilis rustica* (Lea). Honey Creek.

*Lymnaea obrussa exigua* (Lea). There exists an old record, "Ann Arbor," without further detail.

*Lymnaea obrussa decampi* (Streng). Marl deposit of Steere's swamp. It lives in four lakes of Washtenaw County outside of the four-mile circle.

*Lymnaea parva* Lea. Like other small lymnaeids, this species is of irregular distribution and seasonal in appearance. It has been seen in Lodi Township and may very well be also in the Ann Arbor area.

*Lymnaea dalli* F. C. Baker. Found in Ann Arbor and is doubtless in ditches and pools of near-by rural sections.

## Family Planorbidae

*Helisoma pseudotrivolvis* F. C. Baker. Named and described for a flat form of what hitherto had been considered *H. trivolvis*. If ultimately recognized, it is a fairly common mollusk of the Ann Arbor area.

*Gyraulus circumstriatus* (Tryon) and *G. circumstriatus walkeri* (Vanatta). Possibly merely phases of *G. parvus*. Both have been found in White's Woods on the western edge of Ann Arbor.

*Gyraulus cristus* (Linnaeus). Fairly common in ponds and woods pools near Ann Arbor. Local examples were named *Planorbis costatus* by DeTarr and Beecher. Later, the view

was expressed that it was *P. nautilus* Linnaeus. Present opinion is that the shell is of circumboreal distribution and properly to be called *G. cristus*. Marks upon the shell indicate long rest periods and that these periods are the winter seasons.

*Gyraulus umbilicatellus* (Cockerell). Known to occur in Independence Lake, Webster Township, and may be in this area also.

#### Family Physidae

*Physa elliptica* Lea or *P. gyrina elliptica* (Lea). This is named in the list of shells from the marl deposit of Steere's swamp. It occurs living here and there in the Ann Arbor area. Possibly, it is this form which Walker and Beecher called *P. heterostropha*.

*Physa integra* Haldeman. Huron River, Fleming Creek and "brook, Ann Arbor."

*Physa michiganensis* Clench. Streams near Geddes of intermittent flow, one of which is the type locality.

#### Family Ancyliidae

*Ferrissia rivularis* (Say). Small stream near Geddes. In the county, but outside the circle of four miles have been collected *F. fusca* (C. B. Adams), *kirklandi* (Walker), and *shimekii* (Pilsbry).

#### Family Valvatidae

*Valvata sincera* Say. Marl deposit of Steere's swamp.

*Valvata tricarinata perconfusa* Walker. Marl bed of Steere's swamp.

#### Family Amnicolidae

*Amnicola integra* (Say) (having precedence over *A. cincinnatiensis* Anthony) and *A. walkeri* Pilsbry are known from up-river parts of the Huron River and may also be in the Ann Arbor area.

*Pyrgulopsis letsoni* (Walker). Found living by Dr. Elmer Berry in honeycombed lime deposits on stones of the Huron River just above the western corporation line of Ann Arbor.



## Family Pleuroceridae

*Pleurocera acuta* Rafinesque. A species commonly inhabiting quiet waters and found in this area as drift. Colonies of living gastropods may occur in the river near or at Ann Arbor.

## Family Unionidae

*Anodonta grandis* Say. "Sparsely represented in the river between Base Line Lake and Ann Arbor" (van der Schalie, 1938). Three records exist of occurrence at Ann Arbor.

*Anodontooides ferussacianus* (Lea). Very common in Fleming Creek.

*Ptychobranthus fasciolaris* (Rafinesque). Huron River at Ann Arbor. It is suspected that Walker and Beecher saw local specimens, but failed to record them.

*Lasmigona costata* (Rafinesque). Found in Huron River at Ann Arbor only once. It has been seen in several places both in upstream and downstream parts of the river.

*Lampsilis ventricosa* (Barnes). Observed in recent years in the Huron River within the four-mile circle. As it is a common naiad its absence from the Walker-Beecher list was probably an oversight.

## Family Sphaeriidae

In America only one person has given serious attention to this family in the last half century. This was Dr. Victor Sterki. He made very minute differentiations and multiplied species. No one at present appears to feel competent to verify them. Until that is done, the Sterki names have to be accepted on faith, more or less. Shells of this area which passed through his hands and received his identifications are:

<i>Sphaerium bakeri</i> Sterki. Fleming Creek	<i>Pisidium noveboracense</i> Prime. Ann Arbor
<i>Sphaerium solidulum</i> (Prime). Fleming Creek	<i>Pisidium pauperculum</i> Sterki. Swamp near Ann Arbor
<i>Sphaerium stamineum</i> (Conrad). Huron River, Island Park, Ann Arbor	<i>Pisidium rotundatum</i> Sterki. Ann Arbor
<i>Pisidium fallax</i> Sterki. Huron River, Island Park, Ann Arbor	

In the Walker collection are lots bearing data which may have included Ann Arbor, namely:

- Pisidium concinnulum* Sterki. "7 localities of Washtenaw County."  
*Pisidium neglectum* Sterki. "2 localities of Washtenaw County."

Certain Sphaeriidae that were collected by Professor C. A. Davis in Independence Lake and Arnold's Lake, Washtenaw County, were studied and named by Sterki. Some or all the species, if substantiated, may be found eventually in the Ann Arbor area. The designations provided by Sterki were:

<i>Pisidium compressum laevigatum</i> Sterki	<i>Pisidium sargenti</i> Sterki
<i>Pisidium mainense</i> Sterki	<i>Pisidium scutellatum</i> Sterki
<i>Pisidium politum decorum</i> Sterki	<i>Pisidium splendidulum</i> Sterki
<i>Pisidium roperi</i> Sterki	<i>Pisidium subrotundum</i> Sterki
	<i>Pisidium tenuissimum</i> Sterki

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