REPRINTS FROM AMU NEWS BULLETIN AND ANNUAL REPORT

DISTRIBUTION OF MOLLUSKS IN A BASIC BOG LAKE AND ITS MARGINS. -- BY RALPH W. DEXTER
(Reprinted from American Malacological Union News Bulletin and Annual Report, 1948, pp. 4-5).

Over a period of ten years, mollusks were collected from a small bog lake located on the divide between Lake Erie drainage and Ohio River drainage at Twin Lakes, Ohio. This glacial lake has an area of about 6 acres, with a maximum depth of 23 feet. It is circular in outline with concentric zones of submerged, floating, and emergent vegetation. On one side is a bog shelf of sphagnum moss with leatherleaf, poison sumac, huckleberry bushes, and tamarack trees. On the other is a swamp-type shelf with cattails, buttonbush, alder, willows and on the upland hardwood forest. The temperature range is from 0°C. to 28°C. The range of hydrogen ion concentration is from pH 6.7 to pH 8.6. Curves were presented to show the monthly fluctuation of temperature and hydrogen ion concentration at depths of two-feet intervals for two and one-half years. There is a complete "overturn" in the spring and fall, resulting in uniform conditions from top to bottom, with stratification of temperature and pH during the summer and winter seasons. The water is usually alkaline which explains the presence of such a rich molluscan population in a lake which is otherwise largely glacial bog in character. Nineteen species of gastropods and three genera of sphaeriids have been found, each one confined to a rather narrow margin in the water or shoreline zones. Details on the distribution of each species were given.

This paper was greatly enhanced by colored slides of the lake studied by Dr. Dexter, so that the audience obtained a graphic view of the habitats. Dr. Jennings asked if the soil substrate of the lake had been tested for percentage of hydrogen ion concentration, and Dr. Dexter replied that though this examination was beset with technical difficulties, such tests as he had made indicated it is slightly acid. At Presque Isle in Lake Erie, Dr. Jennings noted, the sandy peninsula at the east end is continually added to by sand bars; at each successive addition, a freshwater pond is formed behind the marginal dune. The ponds are of increasing age as one proceeds westward, the oldest dating back to perhaps forty years ago. The younger ponds are alkaline, but older ones are acid, and have a thin layer of acid soil over a deeper substrate which is alkaline. Dr. Dexter replied that he did not know the depth of the bottom ooze material in the lake which he studied; the organic nature of this material is probably the cause of (page 4) the acid condition, while photosynthesis of the phytoplankton and vascular aquatic plants probably push the pH balance toward the alkaline side. Dr. van der Schalie noted that silting would be a drain of the available supply of dissolved oxygen, and thus perhaps a primary factor in explaining the absence of mollusca in certain areas of the lake, as well as being important in the pH balance. He further inquired about the finding of larger land snails in the oak zone, noting that in his experience oak woods have been unproductive of larger snail forms. Dr. Dexter replied that the wooded area consists of a rather narrow strip on the edge of the bog, with no transitional zone of vegetation; this area of hardwood trees is never flooded, and consists of red and white oak, as well as elm, maple and others. Some trees are large enough to suggest that they are of the original forest.

AUTHOR'S NOTE: This paper was published in full in Nautilus 64 (1): 19-26, 1950. R.W.D.

REPRINTS FROM AMU NEWS BULLETIN AND ANNUAL REPORT

COMPARISON OF THE MOLLUSKS IN ADJACENT OHIO RIVER AND LAKE ERIE DRAINAGE SYSTEMS. -- BY R. W. DEXTER, L. H. SWART, and A. F. DAVIS. Kent State University, Kent, Ohio. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1951, pp. 2-3).

An ecological survey of the mollusks inhabiting adjacent watersheds was made by two graduate students working under the direction of the senior writer. Swart collected between August 1939 and August 1940 from 11 stations in the West Branch of the Mahoning River, some 30 miles long with a 300 ft. gradient and which empties into the Mahoning of the Ohio River (page 3) system. Specimens were identified by W. J. Clench and Calvin Goodrich. Additional collections were made by Dexter and Swart in August of 1951. Davis collected from 43 stations in the Cuyahoga River drainage from June to December, 1950. This watershed is over 80 miles long with a gradient of 727 ft. and flows into Lake Erie. Specimens were identified by H. van der Schalie. Pollution is more serious in the Cuyahoga River, especially in the lower half of the stream, but otherwise the habitats of the two are comparable. Seven habitats were investigated – rock, rubble, gravel, sand, mud, submerged and floating vegetation, and emergent vegetation.

In both drainage systems 11 spp. of gastropods, 2 spp. of river clams, and the three genera of finger-nail clams were found as follows: Physa gyrina, P. integra, Amnicola integra, Goniobasis livescens, Ferrissia parallela, Helisoma trivolvis, H. anceps, Gyraulus parvus, Valvata tricarinata, Campeloma integrum, Succinea retussa; Anodontoides ferussacianus, Anodonata grandis; Sphaerium, Pisidium, and Musculium. For the most part these were the abundant and widely distributed spp. of the two rivers and their tributaries.

The West Branch of the Mahoning had in addition one common snail, Lymnaea humilis modicella on mud banks, and two of local distribution, Ferrissia diaphana at one station on rubble and Gyraulus cristus at one station on vegetation. Four bivalves, two of them common and widely distributed (Lampsilis siliquoidea and Obovaria subrotunda), and two less common spp. (Quadrula undulata and Proptera alata), were also collected only from this stream. The greater degree of pollution in the Cuyahoga River is probably responsible for the dearth of unionids in that stream. It was also noted that the bivalves that were present there were less abundant in comparison with the Mahoning.

In the Cuyahoga River 10 spp. of gastropods and 1 clam were found that were not collected from the West Branch of the Mahoning. However, only three of these were common. Lymnaea obrussa, abundant and widely distributed, took the place on mud banks in the Cuyahoga River of L. h. modicella found in the West Branch of the Mahoning. Amnicola limosa and Pseudosuccinea columella were also common in the Cuyahoga but not found in the other drainage. In addition the following six spp. were rarely found, some of them but once: Gyraulus hirsutum, G. deflectus, Planorbula armigera, Menetus exacuous, Amnicola lustrica, and Campeloma decisum. Viviparus malleatus has been introduced into one short section of the Cuyahoga and a single specimen of the clam Alasmidonta calceolus has been collected there.

In general the common and widely distributed spp. were the same in both drainage systems. Pollution has apparently extirpated some mollusks, especially bivalves. Further collecting may possibly prove that most of the spp. inhabit both rivers. Deevey (Bull. Geol. Soc. Amer. 60: 1393. 1949) has pointed out that the fauna of the Great Lakes was derived from the Mississippi waterways. There is also some evidence (personal communication of C. N. Savage, Dept. of Geog. and Geol.,

Kent State Univ.) that possibly an ice lobe had caused a cross-over between the Cuyahoga and West Branch of the Mahoning Rivers before the retreat of the late Wisconsin glacier. Thus the similarity of the molluscan fauna of the now separate drainage systems would be expected.

Dr. Dexter illustrated his remarks with a map of the area under discussion, and with a list of the molluscan fauna from both sources. As he concluded, Dr. Paul Bartsch reminded him that molluscan distribution is not always due to water connections, and that birds are often instrumental in transplanting small mollusks.

COMPARISON OF THE GASTROPOD FAUNA IN THE DRAINAGE SYSTEMS OF CHAMPAIGN COUNTY, ILLINOIS. - - BY RALPH W. DEXTER, Kent State University, Kent, Ohio. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1954, pp. 1-2).

Champaign County in east-central Illinois is a nearly level upland plain which contains exclusively the headwaters of six streams — the Salt Fork and Middle Fork of the Big Vermilion River, the Sangamon, Kaskaskia, Embarrass, and Little Vermilion Rivers. White the headwaters are in close juxtaposition, the mouths of these rivers are widely separated. Gastropods were collected in the fall of 1934, spring of 1935, spring of 1945 and 1946, fall of 1951, spring of 1952 and 1953. Identifications of early collections were made by Frank Collins Baker and N. T. Mattox. Twelve species (page 2) were collected as follows: Physa gyrina, P. anatina, Fossaria humilis modicella, Ferrissia tarda, Helisoma trivolvis, Goniobasis livescens, Lymnaea obrussa, Campeloma rufum, Pleurocera acuta, Amnicola limosa, Gyraulus parvus, Pseudosuccinea columella. The common species were widely distributed and for the most part found in all drainages. The only notable exception was P. anatina, identified by W. J. Clench, which had presumably been introduced into the drainage of a sewage disposal plant. Dispersal factors other than stream connections, which are far apart in this case, are possible aquatic birds and mammals.

Slides which accompanied Dr. Dexter's paper presented maps of the area under discussion. Pilsbry: "I think that you would have found greater differences in distribution if the Unionidae had been considered; the gastropods are always more widely dispersed." Jacobson: "You mention Campeloma rufum; is that not now considered to be C. decisum?" Morrison: "Those species are entirely distinct; they both live in the James River and cannot interbreed since all of both species are parthenogenic females. However, I question that C. rufum lives in the Illinois area." Dexter: "F. C. Baker and others at the University of Illinois collected extensively there and he was firmly convinced that all of them were C. rufum."

AUTHOR'S NOTE. This paper was published in full in American Midland Naturalist 55 (2): 363-368. 1956. R. W. D.

FOREIGN MOLLUSKS IN ARIZONA. — BY ALBERT R. MEAD, University of Arizona. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1952, p. 30).

Helix aspersa and Limax flavus have been found in many gardens in Tucson, Arizona, and were undoubtedly initially introduced more than ten years ago on infected nursery stock from California. H. aspersa has also established new records in Roswell and Las Cruces, New Mexico. Rumina decollata has recently been discovered in Mesa, Arizona. This record represents a considerable stride in the western march of this European species. It is felt that other foreign mollusks have become established in Arizona; but as in some other areas, these invaders have been overlooked because: there is a paucity of local malacologists; visiting malacologists invariably confine their activities to the wild areas rather than city gardens and nurseries; the snails and slugs are nocturnal in their habits which incidentally permits them to survive in areas where diurnal conditions are unfavorable; and damage to garden plants is often not recognized, or if so, it is associated with insects. Especially through the aid of infected nursery stock, these and other foreign mollusks will continue to spread. In most cases, once they become established, they will not be eradicated in spite of successful localized control programs. It is fortunate that most introduced snails in this country have been able to provide only a harassing effect to gardening and truck crops; this would not be the case for some foreign mollusks not yet introduced into this country.

ADDITIONAL INTRODUCTIONS OF FOREIGN SNAILS INTO ARIZONA. — By ALBERT R. MEAD. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1953, pp. 11-12).

The previously reported Helix aspersa is extending its range in the Tucson area to gardens of ranches in outlying districts. Rumina decollata, earlier reported from Mesa, has recently been found established in Phoenix. Limax flavus still continues to be the most commonly encountered foreign mollusk in Arizona. One collection of several dozen slugs in a Tucson garden yielded two specimens of Limax poirieri Mabille (=L. marginatus auct.). Also found in Tucson was a thriving population of the pale, buff-tan form of Deroceras laeve introduced on nursery stock from the San Francisco Bay area. This is in contrast to the endemic gray-black form in the Arizona mountains.

A Tucson high school teacher brought in a large snail which had been found "on a bunch of bananas from South America" in July 1952 in Greeley, Colorado. A few weeks later it was taken to Tucson and kept alive as a pet until May 1953. It was identified as Porphyrobaphe (Or- (page 11) thalicinae). Dr. Bequaert further identified it as P. iostoma Sowerby, endemic in the tropical lowlands of Ecuador and Peru.

These records have been encountered only incidentally. Others will be found. In spite of the extremes in temperature, areas under cultivation in Arizona afford a surprisingly suitable environment for introduced gastropods.

As he completed his remarks, Dr. Mead displayed the shell of Porphyrobaphe iostoma Sow. of which he had just spoken. Leonard: "Many of the local cellars are walled with imported limestone; we are constantly getting specimens of Limax maximus and L. flavus for identification." Mead: "L. maximus has not as yet turned up in Arizona; it is not difficult to predict that it will be found there before long."

MOLLUSKS AND MEDICINE IN WORLD WAR II. — BY R. TUCKER ABBOTT. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1948, pp. 16-17).

A brief account was presented of the part played by mollusks and malacologists mainly in the Pacific theatre of operations. The snail-carried disease, schistosomiasis or blood fluke, was contracted by over 1700 army and 17 navy men on Leyte Island in the Philippines. An extensive educational campaign was put into operation by the medical corps to prevent our men from swimming in infected waters. The Army sent out to the Philippines, and later Japan, the Commission on Schistosomiasis, headed by Dr. Ernest Carroll Faust and later under the direction of Dr. Willard H. Wright, chief of the Division of Tropical Diseases at the National Institute of Health. From Commodore Thomas Rivers' unit on Guam, the navy dispatched two doctors and a malacologist. The use of the latter, a mollusk man, represented the first time a military organization had employed a malacologist for snail research.

The habits and distribution of the intermediate snail host, Oncomelania quadrasi, was discussed in short. Recognizing the guilty species of snail was done not only by studying the shell, but principally by observing the features of the living animal. Oncomelania snails were found to possess a combination of animal characters not present in any other Philippine or Oriental snail — two delicate gray tentacles at the bases of which is a small black eye surmounted by a bright lunar splotch of yellow color granules. This last distinctive feature was referred to for convenient identification purposes among medical men as "yellow eyebrows."

Locating small endemic areas of Schistosomiasis was made difficult by the migration of thousands of people during and after the war. Tracking down colonies of infected snails was supplemented by trapping and inspecting wild rats which serve as blind reservoir hosts for the blood fluke.

In connection with chemical control experiments, the life history of the Oncomelania snail was worked out in detail. The most difficult task was in finally locating the small, single eggs of the snail which the female lays on moist wood and covers with a tiny sand jacket.

Other trematode diseases of man were discussed in brief with a short account of their life histories and intermediate snail hosts. So far as is known there were no records of fatal cone shell bites among our troops in the Pacific. This article (15 pages and 6 illustrations) will appear in the next issue of the Appendix to the Smithsonian Institution Annual Report.

This splendid paper stimulated several to inquire about the intended place of publication, and Mr. Abbott replied that it would be in the appendix of the Annual Report of the Smithsonian Institution. His paper received very favorable comment in the local press next day.

AUTHOR'S NOTE. The full version of this paper, as mentioned above, appeared in Smithsonian Institution Annual Report for 1947 (1948), pp. 325-338, 3 pls.

NEW PUBLICATIONS.

BRANSON, Branley A. (1962) The Slugs (Gastropoda: Pulmonata) of Oklahoma and Kansas with new records. - - Kansas Acad. Sci., Trans., vol. 65, no. 2, pp. 110-119.

THE MICHIGAN PEARL BUTTON INDUSTRY. -- BY HENRY VAN DER SCHALIE. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1947, p. 8).

The Grand River in Michigan has always been one of the largest single sources for pearl buttons in this state. Prior to the war a special survey, as well as reports from clammers, indicated that the mussels in this river were greatly depleted. During the war few people had time to gather shells for commercial purposes. Approximately five years for repopulation resulted in a substantial increase in the fauna. A measure of this recovery was obtained by travelling about sixty-five miles of the river in a John-boat, making sample hauls at forty-five stations on productive mussel producing beds. A discussion of the methods employed for determining yield, as well as some general remarks on the present and future status of the pearl button industry were included in this report which will appear in print later as a contribution of the Michigan Department of Conservation.

THE LAND AND FRESH-WATER MOLLUSKS OF PUERTO RICO. -- BY HENRY VAN DER SCHALIE. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1947, p. 18).

At present there are approximately one hundred and fourteen species of land shells and about twenty fresh-water species inhabiting Puerto Rico. Although the fauna is not as rich, nor as strikingly endemic as that of Cuba, there are many opportunities for study of this relatively rich mollusk fauna. All of the reported species have been listed and some information bearing on ecology and distribution is included. Detailed information on the mollusks of this island when considered with similar information about the fauna of neighboring islands, may aid considerably in solutions of zoogeographical problems.

THE FRESHWATER MUSSELS OF THE MISSISSIPPI RIVER FROM ST. PAUL TO THE MOUTH OF THE MISSISSIPPI RIVER. -- BY HENRY VAN DER SCHALIE. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1948, p. 16).

Collecting in large rivers is difficult unless one has dredging equipment and motor boats. This report is based on collections made by Dr. M. M. Ellis who made collections and observations at 254 stations in the Mississippi River. The work was done during two summers, 1930 and 1931. The fauna consists of twenty-five genera and thirty-nine species of mussels. The distribution of each species in the 659 miles of river covered was shown graphically by means of a faunal distribution chart. The fauna throughout this extensive portion of the main river is surprisingly uniform.

Dr. Bartsch recalled that in 1907 Congress directed the Federal Bureau of Fisheries to investigate the mussel resources of the Mississippi and Ohio Rivers, and that he was directed to make the survey; because of subsequent matters of pressing importance, he has never published any but the preliminary report of this survey; the material is still stored in the National Museum, and would make a splendid addition to the present study. Dr. Morrison recalled another large series of material from Fairport, Iowa, at the same institution. Dr. van der Schalie cited the value of independent work in the same field, as valuable in substantiating conclusions, and expressed the hope that others might undertake the study of the materials mentioned.

BIOGRAPHIC NOTES ON ARNOLD EDWARD ORTMANN AS REVEALED BY SOME OF HIS LETTERS.--BY HENRY VAN DER SCHALIE. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1948, pp. 11-12).

Arnold Edward Ortmann was curator of Recent Invertebrates in the Carnegie Museum for almost a quarter century (1903-1927). His distinguished service in this institution is in itself ample reason for brief mention of some of his contributions to malacology. In fact, since 1907, when Ortmann shifted his main interest from studies of the decapod crustaceans to fresh-water mussels, the Carnegie Museum published many of his mollusk papers.

Dr. Ortmann was an unusually industrious man as is well attested by the numerous long and informative letters he carefully penned to his friends and colleagues. Through these letters many of his creative concepts are clearly indicated. His attitude toward his colleagues was unusually constructive and wholesome and his willingness to cooperate with those who asked for aid was usually far beyond what would ordinarily be expected. In systematic work he combined a keen sense for evaluating species and genera with great diligence (p. 12) and fairness in arriving at sound solutions for systematic differences. These qualities are especially noticeable in his contribution towards clarifying certain names proposed by Rafinesque. Throughout all of his work Ortmann showed an intense interest in zoogeography. His contributions in this field are both highly scientific as well as unusually extensive. Some may differ with his conclusions but his work was so thorough and scientifically sound that the facts he submitted will forever stand as a monument to this eminent scholar.

Dr. Pilsbry commented on Dr. Ortmann's extraordinary ability to concentrate all of his mental powers on the immediate problem with which he was concerned. He lived in his work. In the field, he was of indefatigable endurance, and, said Dr. Pilsbry, he carried this to extremes, tiring out all of his companions, including Dr. Pilsbry. Mr. MacMillan regretted that Dr. Ortmann had limited himself to the study of so few groups of animals, and that he had not collected more land shells; he further reminisced that he had attended a lecture by Dr. Ortmann on metrology, when he was a freshman in college; that was shortly before the close of Dr. Ortmann's life. Dr. Jennings also recalled his intimate acquaintance with Dr. Ortmann, and obliged us with a few intimate details of his life: he had been pro-German during the first World War, though an American Citizen; he was a chain smoker of cigars; Mrs. Ortmann often wore, on formal occasions, a long, double string of pearls by which Dr. Ortmann had come in his studies of the Unionidae.

AN OLD PROBLEM IN NAIAD NOMENCLATURE. -- BY HENRY VAN DER SCHALIE. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1951, pp. 4-5).

In 1922 a special effort was made by A. E. Ortmann and Bryant Walker to clarify the status of a number of mussel names which could not be generally accepted until the descriptions given to them by Rafinesque in 1920 and 1931 were reevaluated. L. S. Frierson was invited to collaborate but he preferred to act as a champion for Rafinesque and as a consequence Frierson's own version of what names had validity appeared as a private publication five years later (1927). The latter book makes no direct reference to the work of Ortmann and Walker so that at present there are two systems of names which can be used in referring to many species of mussels. The work of Ortmann and Walker was of an unusually scholarly nature and all of the (page 5) cases in which they failed to find agreement were submitted to Dr. Pilsbry who acted as a judge, weighed the arguments and ruled on them.

Although authors are free to use any system they wish, an appeal is made to encourage a more careful appraisal of the relative merits of these papers in an effort to get more uniformity in the names applied to mussels.

Discussion: Dr. Henry Pilsbry: "I agree that the problems we meet in our present study of fresh water mollusca are more important than the old ones of nomenclature. Unraveling the problems left by Rafinesque intrigues some people; he presents one problem after another!" Dr. van der Schalie: "Rafinesque had the ardor of the explorer without the patience of the investigator. Then too, Modell created a problem which must someday be unscrambled." Dr. Haas: "I am very much interested in Modell since I have been asked to write an article for a treatise on Paleontology and I am following the same system (the Frierson system) he used. He calls his system a natural one, but we know first of all that such a thing as a natural system does not exist." Dr. Morrison: "I'm going to stick my neck out here and suggest that in the three sub-families of the Unionidae, you have a natural classification based on three kinds of sexual dimorphism." Dr. Haas: "Modell could not use those characteristics because he worked mainly with fossils. He used apical sculpture and called it a natural system." Dr. Morrison: "Isn't there a duplication of apical sculpture?" Dr. Haas: Yes, there is.

THE ECOLOGY AND DISTRIBUTION OF LYMNAEA (BULIMNEA) MEGASOMA IN MICHIGAN. -- BY HENRY VAN DER SCHALIE. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1952, p. 14).

In 1948 some mastodon bones were found in a peat bog near Berrien Springs in southwestern Michigan. Among the shells which were taken at this site there was one specimen of Lymnaea megasoma. As early as 1908 the late Bryant Walker referred to this interesting Lymnaeid as a species with a decidedly boreal range in Michigan. In this recent excellent monograph, Bengt Hubendick, relying on records in the literature, indicated a more southern range for L. megasoma. As recent as 1935, John A. Thompson (see Goodrich, Nautilus, 54: 6-10, 1940) found a colony living in the Mahoning River at Alliance, Ohio. However, in spite of the evidence that Lymnaea megasoma was perhaps a common form in southern Michigan at a time contemporaneous with the Mastodon, its ecology and distribution at present is such that it must be considered a boreal form inhabiting only northern Michigan. Its habitat is generally in bayou-like situations adjoining lakes or rivers.

It was observed that there are two records of this species having been found in fossil form in southeastern California, and two more in Oklahoma. Dr. van der Schalie explained that he did not list the Lake Champlain record of Frank Collins Baker, since no late collection substantiates the record. He added that he should be most interested in seeing shells from there.

NOTES ON THE GENUS MONADENIA OF THE COASTAL SECTIONS. -- BY E. P. CHACE. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1949, p. 20).

A colony by colony discussion of the Monadenias of the coastal regions of California, Oregon and Washington, showing the smooth transition from typical infumata Gld. of the San Francisco Bay area to the form called subcarinata by Hemphill. It is suggested that perhaps subcarinata Hemphill should be called a variety of infumata Gld. rather than of fidelis Gray. The change from subcarinata, to true fidelis (in the region around Eureka) on the other hand is an explosion of characters. Certain colonies contain some specimens definitely fidelis in appearance, others just as definitely subcarinata, the rest with a confusing mixture of characters. My conclusion is that here we deal with hybrids. North of Orick, California, in the true fidelis territory, some colonies appear to be made up of representatives of 2 or even 3 named subspecies which were described from fairly homogeneous colonies some distance away. This variability, within a colony, lessens along the coast north of the Umpqua River in Oregon, and almost disappears east of the Coast Range.

LAND SNAILS OF THE NORTH CAROLINA PIEDMONT. -- BY CHARLOTTE DAWLEY. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1951, p. 9).

The piedmont region of North Carolina between the coastal plain and the Blue Ridge mountains occupies about half of the state. It is a region of rolling hills intersected by small streams and is covered in part by mixed pine and hardwood forests. Very little collecting of mollusks has been done here. This paper reported on the mollusks collected from Davidson County in the spring of 1951 by Mrs. Margaret Teskey and from Guilford County over a period of several years by the author. Twenty-six species were reported, three of which Polygyra pustuloides (Bland), Mesodon appressus (Say), and Discus cronkhitei (Newcomb) have not been reported in North Carolina before.

Dr. Henry Pilsbry: "This report covers a section of the country in which too little work has been done; such contributions are most welcome." Dr. Henry van der Schalie: "Lake Waccamaw in North Carolina has been partially worked over, but some interesting investigation remains to be done there."

THE MOLLUSKS INHABITING SOME TEMPORARY POOLS AND PONDS IN ILLINOIS AND OHIO. -- BY RALPH W. DEXTER. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1950, pp. 11-12).

Mollusks were collected from temporary pools and ponds in East Central Illinois and Northeastern Ohio between 1935-50. A total of 208 vernal ponds were examined, 23 in Illinois and 185 in Ohio. Altogether, 137 of these, 67% of the total, were found to contain mollusks. Observations were made during the dry seasons at certain stations, but most of the collecting was carried out in the spring months. Pools of very diverse size, depth, and type of habitat were examined over varying lengths of time. Seventeen species of gastropods and 3 genera of sphaeriids were collected. Mollusks were not usually abundant in these temporary bodies of water with a few exceptions. As many as 8 species have been collected from one pond although seldom were all present at any one collection.

The dry seasons are apparently spent under cover where the soil is kept moist, or they burrow into the ground.

Dr. Dexter's paper was illustrated by color slides picturing various ponds during several seasons. He gave a list of species found with degree of abund- (page 12) ance and explained that taking the mollusks was incidental to his real purpose, that of collecting Fairy Shrimp. Dr. Pilsbry asked if any observations were made as to the length of time the mollusks lived after the pool dried up, having found that adult snails tend to bury themselves in mud and come up when it rains. Dr. Dexter replied that he visits some ponds each month the year round, making it a practice to visit them all in the month of March. Some dry up for 4 months each summer, but how deep the mollusks go he was unable to say; they always are on hand the following spring. Dr. Van Cleave said that repopulation of pools has been thoroughly studied and reported on.

SHELLS AND MASTODON. -- BY GORDON K. MacMILLAN. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1948, p. 18.

The first report of the discovery of the remains of a Mastodon in this country occurred in 1705 at Claverack, Columbia County, New York, was contained in a letter received by Cotton Mather from Gov. Joseph Dudley and an item published in the Boston News Letter on July 30, 1705. Since that time remains of this Proboscidean have been discovered in nearly every state of the Union, and in many cases associated with land and fresh water mollusca. In the early part of February, 1948, there was unearthed a few bones of a Mastodon during the process of the removal of a seam of coal by the strip mining method in Bridgeville, a small community about 10 miles southeast of Pittsburgh, Pennsylvania. Associated with these remains in a grayish clay some 5-10 feet above the coal were 14 species of land and fresh water mollusca. This is the first occurrence in Pennsylvania of the association of a Mastodon with shells. Since this clay, in which the bones of this animal reposed, indicates deposition in a pond or lake, the freshwater forms predominate. The four species of land snails occurring in the balsam forest surrounding the lake indicates that the climate around Bridgeville was not only cold but also damp. The presence of these snails and the balsam trees indicates also that the climate was cooler than at present, not arctic, but more of a cold temperate one. The species of mollusca associated with the Mastodon at Bridgeville are Valvata tricarinata (Say), Helisoma anceps (Menke), Helisoma anceps striatum (FCB), Gyraulus deflectus (Say), Amnicola limosa (Say), Ferrissia rivularis (Say), Ferrissia sp.?, Lasmigona viridis (Raf.)?, Sphaerium simile (Say), Sphaerium simile planatum Sterki, Discus cronkhitei (Newc.), Discus patulus (Desh.), Gastrocopta armifera near variety similis, and Pomatiopsis lapidaria (Say).

(ACCOUNT OF THE 1948 FIELD TRIP). -- BY GORDON K. MacMILLAN. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1948, p. 19).

The field trip scheduled for Ohiopyle, Fayette County, Pennsylvania, for August 27th was cancelled because there were not enough autos for transportation. Instead, a collecting trip was made to Sandy Creek Valley, formed by Sandy Creek running in a northwesterly direction from the small village of Sandy Creek to empty into the Allegheny River nine-tenths of a mile away. This village lies about 6 miles in a northeasterly direction from Pittsburgh.

Dr. J. P. E. Morrison and Dr. E. L. Palmer furnished their cars for transportation, taking with them Frank L. Jeffries, E. Sidney Marks, Mrs. Margaret Teare, Mrs. Margaret Teskey, Gertrude M. Weber, James M. Ross, Eugene H. Schmeck, Dorothea Franzen, Mrs. E. L. Palmer and Gordon K. MacMillan.

The party left the entrance to the Carnegie Museum about 10 o'clock in the morning. Collecting during that part of the day was made along the northeastern flats and hillsides of Sandy Creek just below the village of Sandy Creek. That area was not too overgrown with hardwoods and shrubs, mostly second and third growths. In the more open spaces were many herbs, flowers, and weeds. Lunch was eaten at Futules Cafe in Verona, a borough along the Allegheny River about a mile and a half north of the entrance of Sandy Creek into the Allegheny River. After lunch collecting was continued on a rather steep hillside covered with moderate growths of trees and shrubs. This locality was situated on the southwestern side of Sandy Creek Valley. This place constituted a significant collecting locality as quite a number of specimens of Hendersonia occulta (Say) were found here. This species has a very sporadic distribution throughout the northeastern section of the United States, and this find at Sandy Creek constitutes the fourth locality record for Allegheny County since Jacob Green reported it first in 1832 at Helicina rubella. In the morning, among the loose rocks and stones on the flats of Sandy Creek were gathered specimens of Oxychilus draparnaldi (Beck). Most of the other species of larger and commoner forms found throughout the northeastern section of the United States were collected here by the party.

Since the area around Sandy Creek is within the industrial region of Pittsburgh, the members of the collecting party became quite dirty by the end of the days activities from contact with the smoky and sooty underbrush, leaves and logs. The heat of the day, the thermometer standing at 98 degrees, was another factor contributing towards this condition. In spite of the dirt and heat, I believe that this collecting trip was very successful, as attested by the large number of specimens collected by all participating in this event.

THE OCCURRENCE OF HENDERSONIA OCCULTA (Say) IN PENNSYLVANIA. -- BY GORDON K. MacMILLAN. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1949, pp. 4-5).

During his sojourn in New Harmony, Indiana, Thomas Say discovered a new species of land snail in the ragged and abrupt "bluffs" along the Wabash River one half mile below the town. This shell he described in 1831 as Helicina occulta. One year later, Jacob Green, at that time the first Professor of Chemistry in Jefferson Medical College at Canonsburg, Pennsylvania, found the first living specimens of Hendersonia occulta in the rambling hills of Crafton not far from the mouth of Chartiers Creek. Jacob Green called his species Helicina rubella. At present Hendersonia occulta occurs at only eight localities in southwestern Pennsylvania in Allegheny, Greene, and Washington Counties. This species pre- (page 5) fers a limestone region as made by my observations and attested by those of Prof. B. Shimek, Dr. H. B. Baker, Dr. J. P. E. Morrison, and Dr. H. A. Pilsbry. As also with the observations made by Prof. Shimek, Hendersonia occulta is closely associated with some stream. All of the localities in southwestern Pennsylvania fall within the drainage systems of the Allegheny, Monongahela, and Ohio Rivers, and occur along these rivers or some tributaries of them.

HELICOID SNAILS OF THE DESERT REGIONS OF CALIFORNIA. -- BY WENDELL O. GREGG. -- (Reprinted from American Malacological Union News Bulletin and Annual Report, 1947, p. 4)

The speaker described the distribution and some of the peculiar habits of these snails which belong to four genera, Helminthoglypta, Micrarionta, Sonorelix, and Sonorella and include 41 species and subspecies. The detailed discussions of generic and specific characters as well as the account of the distribution of these interesting snails will be published shortly in the Minutes of the Conchological Club of Southern California.

THE TERRESTRIAL GASTROPOD FAUNA OF LOS ANGELES COUNTY, CALIFORNIA (EXCLUSIVE OF SANTA CATALINA AND SAN CLEMENTE ISLANDS). -- BY WENDELL O. GREGG. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1949, p. 24).

Although Los Angeles and vicinity has long been the home of many conchologists, interest has generally been in marine mollusca rather than in the nonmarine groups. The aquatic species are unattractive and many of the land forms are small and inconspicuous. Most of our land snails are hard to find. During the time generally required to collect a few land snails of a single species, one can readily go to the sea-shore and collect a score or more of the larger conspicuous forms. Notwithstanding, considerable work has been done on our local land snail fauna.

From the area under consideration has come type material for the following eight species and subspecies: Helminthoglypta traski (Newcomb), 1861; Punctum conspectum pasadenae Pilsbry, 1896; Helminthoglypta petricola sangabrielis (Berry), 1920; Helminthoglypta fontiphila Gregg, 1931; Helminthoglypta traski pacoimensis Gregg, 1931; Helminthoglypta tudiculata imperforata Pilsbry, 1939; Glyptostoma gabrielense Pilsbry, 1939; and Sonorelix (Herpeteros) angelus Gregg, 1949.

From the mainland portion of Los Angeles County 44 species and subspecies of land gastropods are known. Of these 33 are endemic and 11 are introduced. We have 35 species and subspecies of land snails, 29 endemic and 6 introduced. There are 9 species of slugs, 4 endemic and 5 introduced. Of the endemic forms, 9 families and 20 genera are represented.

In Dr. Pilsbry's monograph, Land Mollusca of North America, Los Angeles County records are listed for 27 species and subspecies. In addition, the following 17 forms have been found: Sonorelix angelus Gregg, Euconulus fulvus alaskensis (Pilsbry), Oxychilus cellarius (Müller), Oxychilus draparnaldi (Beck), Oxychilus alliarius (Miller), Pristiloma chersinella (Dall), Hawaiia minuscula neomexicana (Ckll. & Pls.), Deroceras laeve (Müller), Discus cronkhitei (Newcomb), Oxyloma sillimani (Bland), Succinea avara Say, Quickella rehderi Pilsbry, Vertigo californica (Rowell), Vertigo californica trinotata (Sterki), Vertigo rowelli (Newcomb), and Sterkia hemphilli (Sterki).

COLLECTING LAND SNAILS IN SOUTHEASTERN ARIZONA. -- BY W. O. GREGG. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1950, pp. 24-25).

The topography of southern Arizona is particularly marked by parallel mountain ranges separated by intervening arid mesas. These ranges lie in a general north and south trend. The intervening arid mesas serve as absolute barriers to the large land snails. This isolation is said to have been initiated during the Pliocene. Thus isolated, each mountain range usually has its own particular molluscan fauna.

The mountains of the southeastern portion of Arizona, particularly the Huachucas and the Chiricahuas, are especially rich in species. In many cases a species is confined to a single canyon and its tributaries. In one instance each slope of a canyon has its own fauna with three distinct forms not found elsewhere. Outstanding genera are Sonorella, Oreohelix, Ashmunella, and Holospira. While Sonorella extends as far north as the Grand Canyon and westward nearly to the Colorado River, it has its greatest concentration of species in the southeastern part of the state. Oreohelix s. s. extends south to the Huachucas and Chiricahuas and a short distance below the Mexican boundary. Radiocentrum, a subgenus of Oreohelix which is also found in southern New Mexico and northern Mexico, extends to the northwest as far as the Chiricahua Mts. where two species and two subspecies are found. Ashmunella, with the same general distribution, extends further west and is found in the Huachucas while Holospira is found as far west as the Santa Cruz River. In addition to these larger land snails there is a large number of minute forms of the genera Thysanophora, Microphysula, Euconulus, Retinella, Zonitoides, Striatura, Vitrina, Discus, Helicodiscus, Radiodiscus, Gastrocopta, Chaenaxis, Vertigo, and others.

Before the researches of Ferris, Pilsbry, Daniels and others which began in 1902, this snail fauna was practically unknown. At that time there were no topographic maps of this area. Travel was often slow and difficult.

During the past two years three trips to this area have been made by Mr. M. L. Walton and myself. Excellent topographic maps are now available. We found good roads where once collectors had been forced to travel on foot. In locating type localities, we were frequently annoyed by finding earlier roads and even town sites which had been long abandoned. This is particularly true* in the mining districts. We have found the latter part of March and early October the best times of the year for trips to this part of Arizona. New roads are being built and most of the older ones are being constantly improved. In addition to the numerous published collecting localities, there is still plenty of new territory left to be explored.

* End of page 24 and beginning of page 25.

CALIFORNIA LAND SNAILS AND HOW SOME OF THEM LIVE. -- BY E. P. CHACE. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1951, pp. 7-8).

The speaker started at the southern end of a large map of California and enumerated the species found in various localities, together with some remarks on their habits and peculiarities. Around San Diego are found the following: Micrarionta stearnsiana (Gabb), near Point Loma, under rocks and also in sand; M. kelletti (Forbes) on the Channel Islands and one colony on the mainland, possibly introduced from the islands. Glyptostoma newberryanum (W. G. Binney) occurs under rocks in San Diego County and also buried in the ground under decaying cacti. It is also found in the mountains back of Pasadena. Helminthoglypta traski (Newcomb) and its varieties are found in the southern half of California. It lives in cactus patches but also one colony was found at high tide line and another in sand dunes. Helminthoglypta tudiculata (Binney) is found in the southern part of the State and north to Santa Barbara County. It occurs almost anywhere, under logs and in rock piles, in lumber and trash piles, and even in wood rats' nests. The sand dunes near Surf and Morro Bay harbor Helminthoglypta walkeriana (Hemphill), a very papillose species. A smooth form is found at San Luis Obispo. Helminthoglypta umbilicata (Pilsbry) is also found near San Luis Obispo, in a trickle of water with sycamores; it is abundant under aster bushes at Cayucos. In the Monterey Peninsula are found Helminthoglypta dupetithouarsi (Deshayes) in pine woods around Pacific Grove. It requires (page 8) moist conditions. With it are found Vertigo cupressicola (Sterki) under twigs and pine needles at Cypress Point, which is the type locality for both species. Helminthoglypta umbilicata is also found 8 miles up Carmel Valley; H. dupetithouarsi consors (Berry) in the San Juan Valley, in stream beds at Felton Grove; H. exarata (Pfeiffer) and H. nickliniana (Lea) have been recorded for the same place.

Near San Francisco the first Monadenias appear on the coast; they are also found in the country back of Fresno. M. infumata (Gould) is found from here northward to Scotia. At Cape Mendocino, M. infumata gives way to M. fidelis subcarinata (Hemphill) which ranges north to Trinidad. From Trinidad northward are found true hybrids between M. subcarinata and M. fidelis. M. fidelis (Gray) makes its first appearance near Crescent City and has a somewhat different cycle of life. In winter no live shells are found or else they are very scarce. In spring they are active but in summer they go up into trees 10 or 11 feet or even 20 feet up, or as far up in the brush as they can go. They are partial to wild cucumber and often aestivate in these or in the brush which the wild cucumber covers. During the fall rains they are active again, but after these they dig into the soil again for the winter. Ground aestivation permits them to escape brush fires. The habit of aerial aestivation is confined to northern California and a small section of Oregon adjoining. At Point St. George, in the rocky, moist habitats with Mesembryanthemum and other seashore plants, there is a stunted form of M. fidelis which has been called variety pronotis (Berry); it digs under plantains. It may be only a depauperate form. Other species of Monadenia also have depauperate forms which develop under unfavorable conditions. Lack of time did not permit discussion of the land snails of the interior of California, much to the regret of all present.

GENETIC ANALYSIS OF WILD POPULATIONS OF THE LAND SNAIL, CERION. COLONIAL INHERITANCE OF THE MULTIPLE FACTOR FOR SHELL LENGTH. -- BY R. TUCKER ABBOTT. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1951, pp. 10-11).

A preliminary biometric study was made of over 500 colonial samples of the land snail, Cerion, housed in the Museum of Comparative Zoölogy, Harvard College. 50 colonies were measured in detail. Of these, 20 were used in histogram form and shown on lantern slides. From the material presented, there appears to be a multiple factor for shell length which appears at random in colonies and sets a mean for the size of individuals of a colony. The variation in size of the mean length of a colony is inherited without change unless hybridization with another colony takes place or unless there is a genetic drift within the colony.

In hybridization between two colonies the mean may be unchanged because of the dominance of the multiple factors of one or the other of the orig- (page 11) inal colonies; or an intermediate mean may be expressed in some cases.

Possible "genetic drift" in which the mean length of a colony changes over a period of several or many generations occurs exclusive of hybridization, and is probably brought about by intra-colonial segregation during migration or by partial elimination of individuals by adverse ecological conditions.

Mr. Abbott's paper was illustrated with numerous charts. Discussion: Dr. Morrison: "Was this drift in size by units?" Abbott: "Yes, by genetic colonies." Dr. Bartsch: "This ties in with the intensive studies I have made of the Cerionidae. I discovered that my experimental plantings took three years to mature. Where colonies were isolated, environment such as grass, coral, etc., brought about no material change. But in one batch, Cerion incanum had mixed in, bringing about extreme and sometimes grotesque hybridization. I was able to make intensive anatomical studies. And again the birds played their part when the sparrow hawks at Dry Tortugas mixed up my plantings!"

COLLECTING IN CAPE BRETON. -- BY GORDON K. MacMILLAN. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1951, p. 13).

It had been my ambition for quite a number of years to conduct a collecting trip to Cape Breton, the northernmost section of the Province of Nova Scotia, Canada. The purpose of this expedition was to study the effects of isolation upon the speciation of the land and freshwater snails, and also to tie up the results of this study with those obtained by Dr. S. T. Brooks, former Curator of Invertebrates at the Carnegie Museum, with a similar project in Newfoundland. Cape Breton Island had been separated from the mainland by the flooding of the St. Lawrence Valley some 25,000 years ago. The Strait of Canso, parting Cape Breton from the remainder of Nova Scotia, is one-quarter to one mile in width, thus creating a formidable barrier to the migration and distribution of animal life.

Last summer this aspiration of mine was fulfilled when I was able to spend the month of August in Cape Breton collecting land and freshwater mollusca and other natural history objects in and around Sydney, Baddeck, Baddeck Bay, and Whycocomagh. However, before reaching my destination I stopped at the Royal Ontario Museum, Toronto, the Canadian National Museum, Ottawa, the Peter Redpath Museum, Montreal, and the Provincial Museum of Quebec, Quebec City. Locality lists of the land and freshwater snails from the collections of these institutions were made not only from Cape Breton, but also from Prince Edward Island, Magdalen and Anticosti Islands.

This informal talk was illustrated with numerous Kodachrome transparencies showing the Museums visited in eastern Canada and the varied ecological situations from which the natural history specimens had been obtained.

SOME NEW RECORDS OF NAIADES FROM EASTERN NORTH AMERICA. -- BY HERBERT D. ATHEARN. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1952, pp. 8-9).

Much work is still to be done in the collecting and study of the distribution of naiades in our extensive river drainages. I wish to include here, a few of the most interesting discoveries that I have come across during recent years.

The Petitcodiac River system of Westmoreland County, New Brunswick, has yielded two outstanding species, uncommon throughout the extent of their range. Alasmidonta marginata varicosa Lamarck is fairly common just above Salisbury. Length of specimens run up to 79 mm. The North River, a branch of the Petitcodiac, contains the species Alasmidonta heterodon Lea. This should be an important record to add to the few existing records of the species. Additional records for this species which I believe to be new were found in the Scantic River in Hartford County, Connecticut and Hampden County, Massachusetts.

Very few stations for Margaritana margaritifera Linne have been reported from Massachusetts and Connecticut. To this short list I can add Salmon Brook, Hartford County, Connecticut and Scantic River, Hampden County, Massachusetts.

In pursuit of the species Anodonta implicata Say, I have found that it is very common near the mouth of the Aroostook River, Victoria County, New Brunswick. This station is fully 150 miles from the sea. Other stations taken in the St. John River system, New Brunswick are St. John River, York County; Canaan River, Queens County; and Kennebecasis River, Kings County. Northern records which may be new are McIntyre Lake and Grand Mira River, Cape Breton Island, Nova Scotia.

A survey of the St. Lawrence River drainage for east coast species and eastern records of Great Lakes species has brought about several interesting results. Very definite records of Lampsilis cariosa Say have been taken from the Grass River, St. Lawrence County, New York; Madawaska River, Renfrew County, Ontario (a tributary of the Ottawa River); St. Francis River, Yamaska County, Quebec and the Nicolet River, Nicolet and Yamaska Counties, Quebec.

Some extreme eastern records for Great Lakes fauna were taken from the Nicolet and St. Francis Rivers, Yamaska County, Quebec. From the South (page 9) Branch of the Nicolet River were taken Lasmigona costata Rafinesque, Ligumia recta latissima Rafinesque and Alasmidonta marginata Say; while from the St. Francis a very brief survey under difficult collecting conditions brought in Lasmigona compressa Lea and Obovaria olivaria Rafinesque.

Some recent work done in Adams County, Pennsylvania has established some new records not recorded by Dr. Ortmann in his work of 1919. From Marsh Creek were taken Elliptio productus Conrad, Elliptio fisherianus Lea and Lasmigona subviridis Conrad. In the same county, large specimens of Elliptio fisherianus Lea and Lampsilis ovata Say were taken in Rock Creek.

Following Mr. Athearn's paper, observation was made from the floor that Margaritana margaritifera Linne is known to have a long life, sometimes as long as 80 or 90 years. Also, that where extensive mussel surveys have been made, the water in which this species occurs is predominately soft, quite the contrary to that of the Connecticut River, listed as a record by this paper. A single Michigan locality is known for Alasmidonta marginata varicosa Lamarck, that of the Ocqueoc River in the lower peninsula.

A VARIATION OF ELLIPTIO COMPLANATUS SOLANDER. -- BY HERBERT D. ATHEARN. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1954, pp. 13-14).

During the last century, Isaac Lea gave specific recognition to a large number of variations of Elliptio complanatus. Among these were Elliptio roanokensis and Elliptio northamptonensis. These titles are synonymous. This variant differs from the typical complanatus in that it is larger, more elongated, subrhomboid rather than rhomboid, more compressed and usually exhibits a shallow radial depression in front of the posterior ridge.

The form is sometimes found in the generally shallow sections of streams where the water is flowing fairly rapidly over a packed sand and gravel bottom. Records range from the Michipicoten River near Lake Superior in Ontario to Lime Kiln Creek in Coweta County, Georgia, where the waters flow into the Gulf of Mexico by way of the Apalachicola River system.

A. E. Ortmann, in his A MONOGRAPH OF THE NAIADES OF PENNSYLVANIA, using the title violaceus in place of the now recognized title of complanatus states, "The ability of Elliptio violaceus to live everywhere under a great variety of environmental conditions undoubtedly accounts for its great variability, as well as its tendency to develop many different phases, which may turn up anywhere under proper conditions, but which do not lead to the development of geographical races, at least in our territory." In large streams where habitats such as long sandbars form an abrupt line of demarcation between them and an adjacent, perhaps somewhat deeper mud or clay bottom, the variants within the species are usually quite distinct. In smaller streams where there is an equal contrast in habitat, although on a smaller scale, the variants within the species will merge with one another. Where a stream is found containing a consistent environment, one will find Elliptio complanatus to be quite unvarying in shape, excepting of course, where mechanical obstructions have distorted the shell. (page 14)

When such individual environments become permanently separated by topographic or climatologic changes, the species seems particularly adaptable to transform itself into various constant forms which must be identified as subspecies and in more advanced cases, as species. This is the case with our Floridian Elliptios.

Such permanent changes of environmental conditions have not taken place where the variant roanokensis or northamptonensis exists in the St. Lawrence River and the Atlantic Coastal Plain systems. In this instance therefore, there appears to be no scientific purpose in giving this variant specific or sub-specific rank.