reached the stage of the fully developed pluteus. Later stages of young echinoderms were obtained in tows. The eggs of *Turritopsis* developed through the planula stage. Eggs of *Chætopterus* and *Thalassema* were artificially fertilized.

Mr. George W. Corner, 3d, medical student at the Johns Hopkins University, Baltimore, Md., spent the months of July and August collecting and studying the invertebrates.

HENRY D. ALLER,
Director

SPECIAL ARTICLES

PRELIMINARY NOTE ON THE LIFE OF GLACIAL LAKE CHICAGO

EXCAVATIONS made for the new sanitary canal, which will extend from Willmette to the North Branch of the Chicago River at Bowmanville, have disclosed a series of beds filled with organic remains which reveal very fully the characteristic faunas of the several stages of glacial Lake Chicago. The cut at the Bowmanville end of the canal is a mile long; the depth is about twenty-five feet, fifteen of which are in boulder clay (glacial till) undisturbed by water action. The upper ten feet are composed of alternate layers of sand, clay, peaty material and shell beds. These strata quite fully portray the biologic history of the lake.

The area through which the canal is cut lies behind (west of) the Rose Hill bar and the strata exihibited in section were successively the bed or floor of Lake Chicago. These strata may be described as follows: Above the till there is a bed of sand from two to twelve inches in thickness. This doubtless represents the Glenwood stage and, as would be expected, no life is present. Above the sand is a bed ten to eighteen inches thick, composed of clay mixed with peaty matter, logs of wood and leaves of trees (oak and spruce). Molluscan shells of the genera *Planorbis, Physa, Lymnæa, Ancylus, Sphærium, Pisidium* and *Amnicola* abound. The presence of this extensive deposit, which can be traced the entire length of the canal, beneath deposits unquestionably of Calumet time, strongly supports, if indeed it does not prove, the early contention made by Dr. Andrews of a post-Glenwood low-water stage. The species of mollusks are mostly those found in swamps or along the edges of shallow bays or lakes.

Above the clay is a deposit of sand and gravel, two to nineteen inches in thickness, on the surface of which is one of the thickest beds of naiades the writer has ever seen. There are upwards of a dozen species, including *Unio gibbosus, U. crassidens, Quadrula undulata, Q. rubiginosa, Q. trigona, Q. verrucosa* and *Q. pustulosa.* With these are associated *Campeloma, Sphærium* and *Goniobasis.* The shells are species which frequent large streams of more or less rapidly flowing water, as the Illinois and Mississippi rivers, which fact, together with the unassorted character of the sand and gravel, shows that there was a rapid flow of water from the lake to the Desplaines outlet behind the Rose Hill bar. This deposit is believed to represent the Calumet stage. The presence of *Unio crassidens* is of great interest, as this species is not now found north of La Salle County in Illinois.

Above the Naiad deposits there are alternate beds of clay and sand, with occasional pockets of shells, the aggregate thickness being about thirty-two inches. The presence of peaty matter and wood afford evidence of a second low-water stage. In one of these deposits the humerus of a small bird was found as well as several fish spines.

Above this deposit there is a bed of molluscan shells forming a compact mass from one and one half to five inches in thickness. These are of swamp or bay species of the genera *Lymnæa, Planorbis, Physa, Valvata, Campeloma, Amnicola, Sphærium, Pisidium,* etc. Naiades are uniformly absent. This deposit was formed during the early portion of the Toleston stage, when the area behind the Rose Hill bar formed a reed-bordered bay. Above the shell bed is a deposit of clay seven to twelve inches in thickness, and above this, a typical peat deposit three and one half to eight inches in thickness. This deposit was formed in a small lake or pond, as it is of small extent. The region at this time was of

a swampy nature and contained numerous summer-dry ponds, similar to those found in the Skokie Marsh area. Above the peat deposit the surface soil is about two feet in thickness.

It has been stated by Goldthwait[1] and others[2] that there are no certain traces of life in the lake during the Glenwood and Calumet stages. It may be true that life was not abundant during the early part of the Glenwood stage, but the evidence afforded by the deposits discussed above conclusively prove that life was abundant during late Glenwood time, very abundant during Calumet time and has continued to be so to the present time, for the Chicago River as well as the smaller streams and summer-dry ponds in this area now teem with molluscan life.

The presence of a species of spruce (*Picea evanstoni*) as well as an oak (*Quercus marceyana*) has led to the belief that a climate similar to that of Alaska prevailed during the early part of the period (Glenwood) during which Lake Chicago was forming. The presence of *Unio crassidens,* essentially a southern species, in the Calumet deposit, indicates, apparently, a period of higher temperature during this later time. That this species had a much more northern distribution during early postglacial time is evidenced by its presence in a deposit at Green Bay, Wisconsin.[3]

The northern records of *crassidens* may be tabulated as follows:

	South of Green Bay Record
Wisconsin, between Prairie du Chien and De Soto[4]	80 miles.
Minnesota, not recorded.	
Iowa, Lansing[5]	80 miles.
Michigan, not recorded.	
Illinois, Utica, La Salle Co.[6]	220 miles.
Ohio, Scioto River[7]	260 miles.
Indiana, Tippecanoe River[8]	230 miles.

[1] Bull. Ill. Geol. Surv., No. 7, p. 63, 1908.

[2] Alden, "Geol. Atlas of U. S.," Chicago Folio, No. 81, p. 11, 1902.

[3] Wagner, *Nautilus,* XVIII., pp. 97–100, 1905. This specimen has been personally examined.

[4] Chadwick, *Bull. Wis. Nat. Hist. Soc.,* IV., p. 95, 1906.

The most northern extension of this species at the present time is in the Mississippi River, where it has been collected as far north as Prairie du Chien and probably lives as far north as De Soto. In Illinois and Indiana the northern range is 150 miles farther south. *Crassidens* is essentially a southern species, abundant in the southeastern part of the United States where its center of distribution is in the neighborhood of Tennessee. Its northern extension indicates a more genial climate than that which now prevails in the northern states. The route of migration to Green Bay is difficult to predict with certainty. The Lake Chicago fauna undoubtedly migrated up the Mississippi-Illinois-Desplaines Rivers. It is interesting to note that the species associated with *crassidens* are typical of a temperate climate and are, for the most part, living in this region at the present time.

It is very important that records of *crassidens,* both fossil and recent, be secured in Wisconsin, Michigan and northern Illinois, Indiana and Ohio. It is possible that the bed of glacial Lake Maumee would reveal strata similar to those observed in Lake Chicago, and as *crassidens* is found in the Wabash River, it may have migrated into Lake Maumee.

Studies on this subject are not now far enough advanced to warrant generalizations. A report illustrated by photographs and stratigraphical sections, and with tables of the species, together with their geographic distribution, past and present, is in preparation. The writer would solicit authentic northern records of *crassidens* for the purpose of establishing the present geographic distribution of this species. It would also be of great value if *crassidens* could be discovered in postglacial deposits in Wisconsin and Michigan, as well as in northern Ohio and Indiana. Full credit

[5] Museum record.

[6] Baker, Bull. Ill. State Lab. N. H., VII., p. 77, 1906.

[7] Sterki, *Proc. Ohio Acad. Sci.,* IV., p. 392, 1907.

[8] Daniels, 27th An. Rep. Dept. Geol. Ind., p. 650, 1902.

will be given in the final report for any assistance of this character, should such be submitted to the writer.

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COLLETOTRICHUM FALCATUM IN THE UNITED STATES

DURING the past two years, while studying the diseases of sugar-cane, careful search has been made for those which are troublesome in other countries but which are not known to occur in the United States. During the past year one of these has been found in Louisiana, and from material received from another state, this may be more widely distributed than was at first thought. This disease is one which is caused by the fungus *Colletotrichum falcatum* Went. This has been reported previously in nearly every sugar raising country in the world, in some places doing a large amount of damage. According to Butler[1] this fungus sometimes causes an immense loss in Bengal. Several common names have been applied to this disease, but the one in most common use in English-speaking countries is the red-rot disease.

The first specimen of this disease was found on a plantation in Orleans parish, Louisiana, in September, 1909. One cane was found which had a lesion about two centimeters in diameter which was covered with the fruiting pustules of this fungus. No other diseased stalk was found in the field. I was not willing to make a positive identification at the time because the causative fungus is very similar to *Colletotrichum lineola* Cda., which occurs very abundantly on Johnson Grass in this region, and it was barely possible that this latter fungus had gained an entrance into a wound in the cane. But since other material has been received there seems little doubt but what this was the true red-rot fungus.

[1] Butler, E. J., "Fungus Diseases of the Sugar-cane in Bengal," *Memoirs Dept. Agr. in India*, Botanical Series, Vol. I., No. 3, Pusa, 1906.

During the fall and winter of 1909 and 1910, a planter in Georgia, Mr. W. B. Roddenbery, of Cairo, who has had considerable trouble with a disease in his cane wrote to the sugar station at New Orleans and also sent specimens. This material was resent to me and I have since made a careful study of the trouble. There is no doubt but that it is the red-rot disease in a very serious form. He estimates that one third of the cane which he wished to use for planting was diseased.

As this disease is generally confined to the inside of the stalk, an examination of the external part usually shows but very little of the trouble. Unless the cane is severely affected the disease would ordinarily be overlooked, unless it was examined very carefully or unless the stalks were split. However, when the cane is severely affected, the rind covering the nodes, and even strips on the internodes, become dark brown in color, and the eyes are usually dead. If the stalks are split, the nodal region will be found to be badly decayed, with strips of red and brown extending out into the internodes. One of the distinguishing characters of the disease is the presence of light-colored spots surrounded by red or brown tissue. These were fairly abundant in the Georgia material. These have not been satisfactorily explained but it appears as if they are points where the fungus is present, it generally not being present in the red and brown surrounding tissue.

The fungus was found fruiting in some large internodal lesions on some soft top joints of one stalk, on the brownish colored nodes of two stalks, and also fruited on a split stalk that was kept moist. In the latter case, the fruiting postules developed directly from the diseased center of the node. A microscopical examination of the diseased tissue of the cane showed the presence of the typical mycelium and many of the so-called "appressoria" in the host cells.

This fungus is very similar, if not identical from a morphological standpoint, to *Colletotrichum lineola* Cda., mentioned above. The latter fungus has also been studied and inocu-