

SOME FRESH WATER SPONGES OF OKLAHOMA

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By

MARY LOUISE RAINBOLT

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APPROVED BY:

William H. Lewis
Chairman, Thesis Committee

Geo. A. Moore
Member of the Thesis Committee

R. O. Whitton
Head of the Department

D. G. McIntosh
Dean of the Graduate School

283425

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INTRODUCTION

This article is concerned with fresh water sponges of Oklahoma and includes descriptions and some distribution of those species which have been found in the State. It does not constitute an extensive survey of the entire State. Fresh water sponges have been reported from most parts of the United States. However, the author has found little literature dealing with the sponges of Oklahoma. H. N. Wickham (1922) reported the occurrence of fresh water sponges in Schuler's Lake, Durant, Bryan County. He collected a dozen or more from the underside of water-logged timber. The material was prepared for the Saint Louis Biological Laboratory, but was lost and subsequent searches of the lake revealed no other specimens. However, Wickham tentatively identified them as Spongilla fragilis Leidy.

The current literature concerning fresh water sponges has been incomplete in taxonomic descriptions. Old, Neidhoefer, Jewell and Annandale have dealt mostly with distribution and ecology. Potts (1918) has, perhaps the most complete survey and detailed descriptions of North American sponges to date. Gee (1927, 1931, 1934) has contributed much in compiling available knowledge of fresh water sponges over the world in general. But complete descriptions are still lacking, especially for the rarer sponges.

Most of the specimens herein described have been collected by Dr. W. H. Irwin, Department of Zoology, Oklahoma A. & M. College, who referred them to the author for description and identification. These are Spongilla lacustris (Linnaeus), Spongilla fragilis Leidy, Ephydatia subdivisa (Potts), Ephydatia crateriformis (Potts), Trochospongilla leidyi (Bowerbank), and one unidentified species of Asteromyenia (^{Annandale}~~Weltner~~). The author collected additional specimens of Spongilla fragilis and Spongilla aspinosa Potts.

PROCEDURE

In slide preparation of the gemmules and spicules, small portions of the sponge were placed in a small petri dish and covered with concentrated HNO_3 . A drop or two of 95 per cent alcohol was added which heated the mixture to boiling temperature. After the sponge mass had disintegrated, water was added and the spicules allowed to settle. The fluid was then drawn off with a pipette after which the vessel was again filled with water, and shaken gently. This process was repeated a second time. After the fluid was withdrawn the third time, the spicules and gemmules were covered with 96 per cent alcohol. A drop of this alcoholic mixture was placed on a cover slip and ignited. When the liquid vanished, a drop or two of Clarite mounting medium was added and the slip with spicules and gemmules inverted on a slide.

SPONGES FOUND IN OKLAHOMA

The following four genera and seven species were collected in Oklahoma.

Genus Spongilla Lamarck

Three species of the genus Spongilla have been collected. This genus is characterized by those sponges possessing long spindle-shaped skeletal spicules with pointed or rounded ends and often minute simple flesh spicules. The gemmules are naked or with an external cell layer containing rod-like spicules.

Spongilla aspinosa (Potts)

(Pl. I, Fig. 1-10)

Spongilla aspinosa was found October, 1947, near Stillwater, below the dam of Boomer Lake (T. 19 N., R. 2 E., S. 13), Payne County. This specimen was small, approximately one inch in diameter and one-fourth inch thick. The skeletal spicules are long smooth acerate, abruptly pointed at both ends (Fig. 1-3). Malformations of the skeletal spicules are frequent (Fig. 4-6). Among the most frequent are globular swellings at the center or lateral processes near the end.

Old (1932) describes the gemmule spicules as resembling skeletal spicules. Neither Neidhoefer (1940) or Potts (1918) mentions gemmule spicules, and they were not in this specimen collected by the author. Dermal spicules are small, slender, smooth acerates (Fig. 7-10).

Spongilla lacustris (Linnaeus)
(Pl. II, Fig. 1-8)

Spongilla lacustris was collected October 15, 1942, encrusted on sticks in shallow water at the north end of Yost Lake (T. 20 N., R. 3 E., S. 17), Payne County. The encrustations were three to four inches in length and surrounding a stick one inch in diameter. Specimens were also taken October, 1947, from Boomer Creek (T. 19 N., R. 2 E., S. 24) in sluggish water, encrusted on an old board. Gemmules (Pl. II) are abundant, and their yellow bodies seem to cling in packets of six or eight or more. Neidhoefer states that the foraminal aperture is hypostomal. The skeletal spicules are acerate (Fig. 1-3), finely spined, slender, straight or slightly curved. The gemmule spicules (Fig. 4-8) are also acerate, subcylindrical, rather short with various degrees of spination. The most common type is curved and abundantly microspined.

Spongilla fragilis Leidy
(Pl. III & IV, Fig. 1-8)

Spongilla fragilis was taken June 28, 1941, encrusted on rocks in a pool of a small creek during low water, south and west of Clayton (T. 1 N., R. 18 E.), Pushmataha County. Colonies were also found at the Culture Ponds below the dam at Lake Carl Blackwell (T. 19 N., R. 2 E.), Payne County (Pl. III). These covered several sticks and branches ranging from four to thirty-four inches with average diameter of an inch. The gemmules are abundant and are bound together in varying numbers into clusters in pavement layers on the support. The foraminal tubules are short, slightly curved and protrude toward the outside of the cluster (Pl. IV). The cellular parenchyma is filled with subcylindrical spined acerates.

The skeletal spicules are acerate, smooth, slightly curved and rather abruptly pointed (Fig. 1-3). Occasional globular swellings occur at the middle of the spicules, and axial canals are frequent (Fig. 4-5). There are no dermal spicules. Gemmule spicules are short, abruptly pointed, and densely spined acerates (Fig. 6-7). Masses resembling spined acerates are present throughout the body of the sponge (Fig. 8).

Genus Trochospongilla Vejdovsky

The genus includes sponges with the following characteristics. The gemmule spicules are small, homogeneous birotulates with short, usually smooth shafts and rotules that are smooth and entire. Both rotules may be of nearly equal diameter, or the upper one may be smaller than the lower one. The birotulates are usually formed in a single layer around the gemmule with the lower rotule in direct contact with the surface of the membrane covering the gemmule and the shaft perpendicular to it. The protective granular coat around the gemmule is generally of a thickness about equal to the length of the birotulates. The skeletal spicules are acerate, and may be either smooth or spined; their ends may be either sharp or rounded. Most of the sponges may cover considerable area with a thin crust-like growth.

Trochospongilla leidy (Bowerbank)
(Pl. V & VI, Fig. 1-10)

This species was collected at McAlester City Lake, August, 1947, (T. 17 N., R. 14 E.), Pittsburg County. When this impoundment was drained, the submerged wood from what had been a 200-acre forest was exposed. A large proportion of this wood was covered with an encrustment of sponges. Samples of these were taken from several parts of the lake, and all proved to be Trochospongilla leidy (Pl. V). The gemmules are numerous, each surrounded by a capsule of skeletal spicules. The birotulates form an armored surface within the gemmule membrane (Fig. 4). The skeletal spicules are short, smooth, robust with both abruptly

pointed and rounded ends (Fig. 1-3). Occasionally some spined acerate spicules were present for which no previous reference was found (Fig. 9-10). The gemmule spicules are short birotulates (Fig. 4); margins are entire and exflected, resembling round bobbins.

Genus Ephydatia Lamourous

This genus includes the sponges which characteristically have spicules of the birotulate type. These are uniform or variable in length but not separated into classes, long and short, and which have finely or deeply cut margins. The acerate skeletal spicules may be smooth or microspined.

Ephydatia crateriformis (Potts)
(Pl. VII, Fig. 1-4)

A specimen of Ephydatia crateriformis was collected October 23, 1944, encrusted on rocks in a pool of a small creek during low water, south and west of Clayton (T. 1 N., R. 18 E.), Pushmataha County. The gemmules are small, white and very numerous (Pl. VII). The foraminal tubules form a crater-like depression. The skeletal spicules are long, slender acerates, (Fig. 1-2), abundantly microspined, mostly toward the ends. The gemmule spicules are birotulates with microspined shafts (Fig. 3-4). The rotules have very short curved rays. No dermal spicules are present.

Ephydatia subdivisa (Potts)
(Pl. VIII, Fig. 1-11)

Specimens of Ephydatia subdivisa were taken from the same site as Ephydatia crateriformis. Gemmules are few (Pl. VIII). The skeletal spicules are long, microspined or smooth and abruptly pointed (Fig. 1-4). The gemmule spicules are birotulates (Fig. 5-10) having heavily spined shafts. The rays are short and subdivided (Fig. 11).

Genus Asteromeyenia Annandale

This genus includes those sponges with the following characteristics. The

skeletal spicules are long acerates and may be smooth or microspined. The dermal spicules are birotulates of various lengths. Their shafts may be smooth or microspined. Numerous free star-like spicules are present.

Unidentified Species
(Pl. IX & X, Fig. 1-13)

These sponges were collected October, 1945, at the Culture Ponds, below the dam at Lake Carl Blackwell (T. 19 N., R. 2 E.), Payne County. Several massive colonies were found encrusted on sticks on the bottom of the pond. The colonies (Pl. IX) ranged from three and one-half to four inches in length and from two and one-half to three and one-fourth inches in diameter at the center. A specimen was collected by Shannon Springs October 22, 1939, by Dr. M. W. Shackelford and identified by Dr. J. D. Mizel as Heteromeyenia plumosa (Weltner). But available descriptions do not fit this identification. The genus name has been changed to Asteromeyenia as proposed by Annendale (1911).

Tentatively this sponge is to remain unidentified for lack of more complete descriptions. It resembles Asteromeyenia plumosa in the appearance of the gemmules (Pl. X); yet acerate microspined skeletal spicules are very abundant and smooth skeletal spicules are very scarce (Fig. 1-2). The microspined birotulates resemble those of Asteromeyenia radiospiculata (Mills), but three types of birotulates are present. The long birotulates are heavily macrospined (Fig. 3); the rotules have 6 or 8 rays joined at the base. Some of the rays are recurved (Fig. 6), but the majority are simply curved. The shafts of the short birotulates (Fig. 7, 10) and the intermediate birotulates (Fig. 8-9) are macrospined; their rotules are dentate and subdivided with curved rays. Numerous long birotulates with very heavy thorn-like spines (Fig. 5) are present. These vary in development of the rotules from six or eight rays to none at all. Modification of the short birotulates are frequent; most of these are spined and often subspined (Fig. 11). Stellate dermal spicules are also very abundant (Fig. 13).

SUMMARY

1. A list of some Oklahoma sponges with their descriptions is presented.
2. Four genera and several species of sponges have been collected in Oklahoma.
3. Three genera and six species are new records for Oklahoma.
4. One species remains unidentified tentatively for lack of complete descriptions.
5. Descriptions of some North American species of sponges are too incomplete to identify or describe certain specimens as either described or new species.

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Spongilla asponosa (Potts)

Key to Plate I

Spicules (camera lucida drawings) units in microns

Fig. 1-6	Skeleton spicules	length	311.6 - 384.88
		width	15.3 - 16.98
Fig. 7-10	Dermal spicules	length	90.56 - 226.4
		width	2.83 - 5.66

Spongilla lacustris (Linnaeus)

Key to Plate II

Gemmule and Spicules (camera lucida drawings) units in microns

Gemmule		diameter	270.6
Fig. 1-3	Skeletal spicules	length	185.78 - 311.3
		width	11.22
Fig. 4	Gemmule spicule	length	112.2
		width	5.4
Fig. 5-8	Dermal spicules	length	101.88 - 135.84
		width	5.66

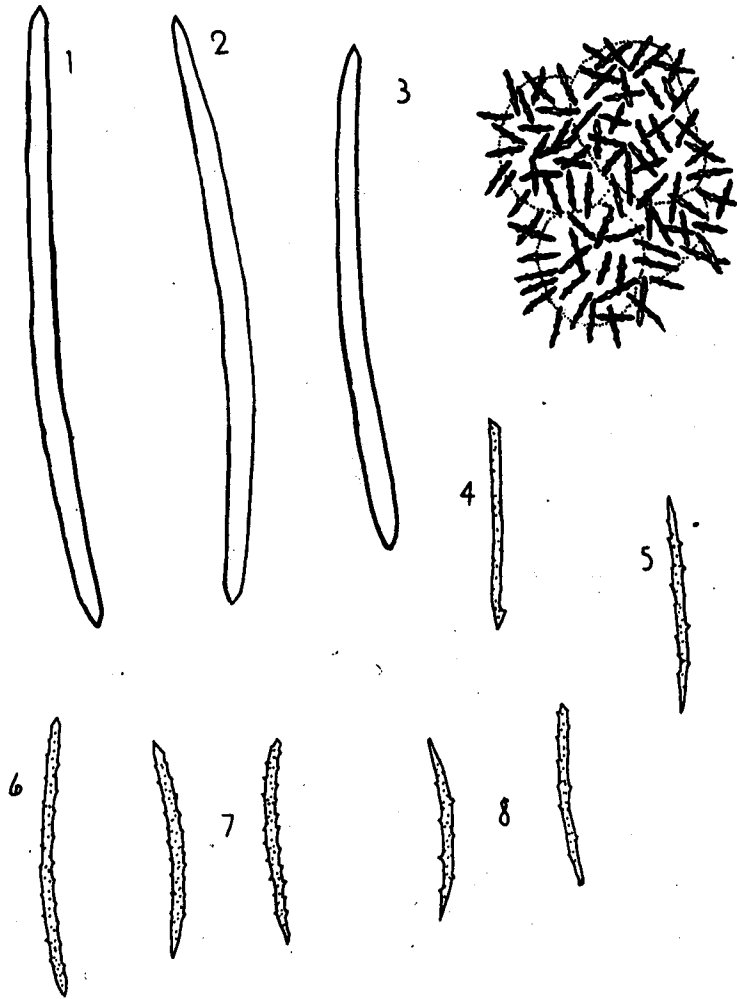


PLATE II

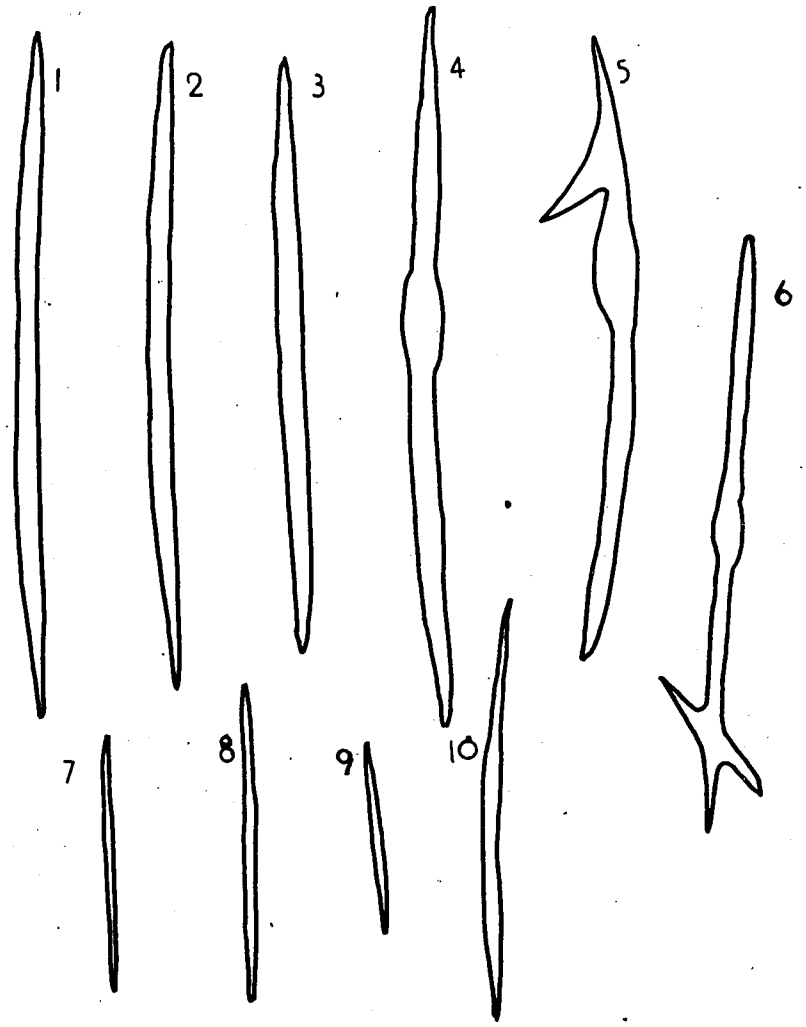


PLATE I

Spongilla fragilis Leidy

Key to Plate III

Colonies range from four to thirty-four inches.

Collected at Culture Ponds: October, 1945.

Trochospongilla leidy (Bowerbank)

Key to Plate V

Colonies shown encrusting sticks twenty-eight inches long.

Collected at McAlester Lake: August, 1947.



PLATE III



PLATE IV

Spongilla fragilis Leidy

Key to Plate IV

Gemmule and spicules (camera lucida drawings) units in microns

Gemmule (cluster)		diameter	5575.58 microns
Fig. 1-5 Skeletal spicules	length	226.7 - 254.7	
	width	5.66 - 8.49	
Fig. 6-7 Gemmule spicules	length	92.2 - 124.52	
	width	5.94	
Fig. 8 Free mass			

Trochospongilla leidy (Bowerbank)

Key to Plate VI

Gemmule and spicules (camera lucida drawings)

Gemmule		diameter	418
Fig. 1-3, 5-8 Skeletal spicules	length	84.9 - 113.2	
	width	11.22 - 16.98	
Fig. 4 Gemmule spicule	rotule	diameter	16.98
	length	5.66	
Fig. 9-10 Spined acerates	length	151.52 - 67.9	

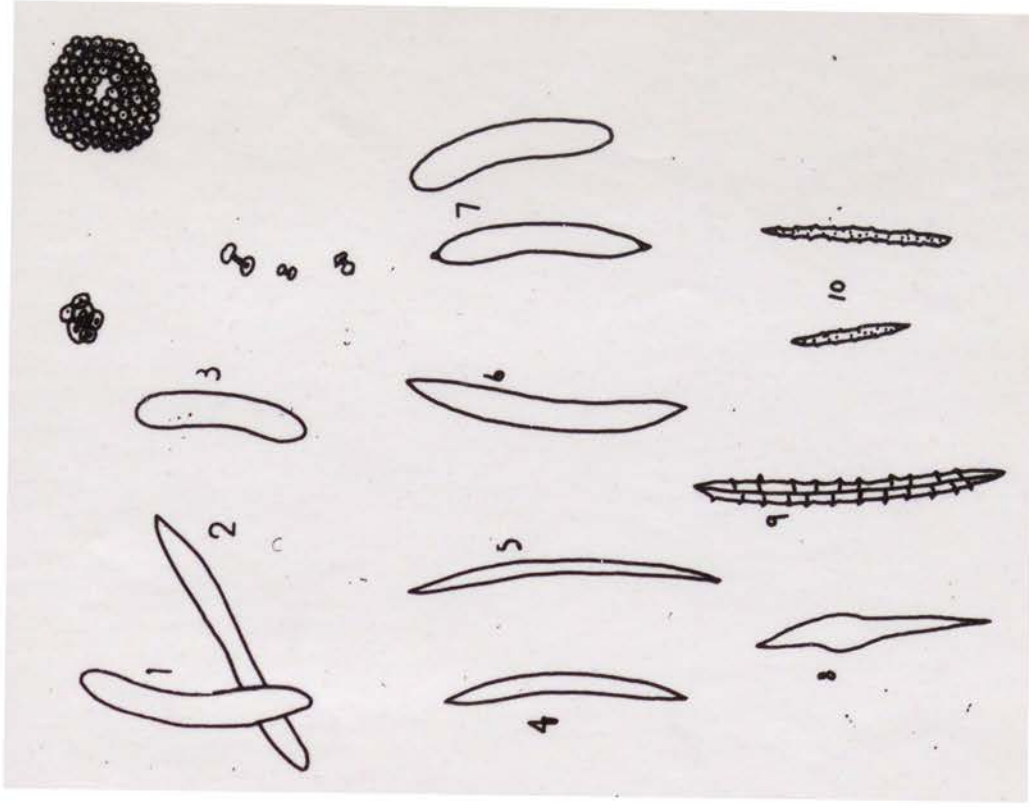


PLATE VI

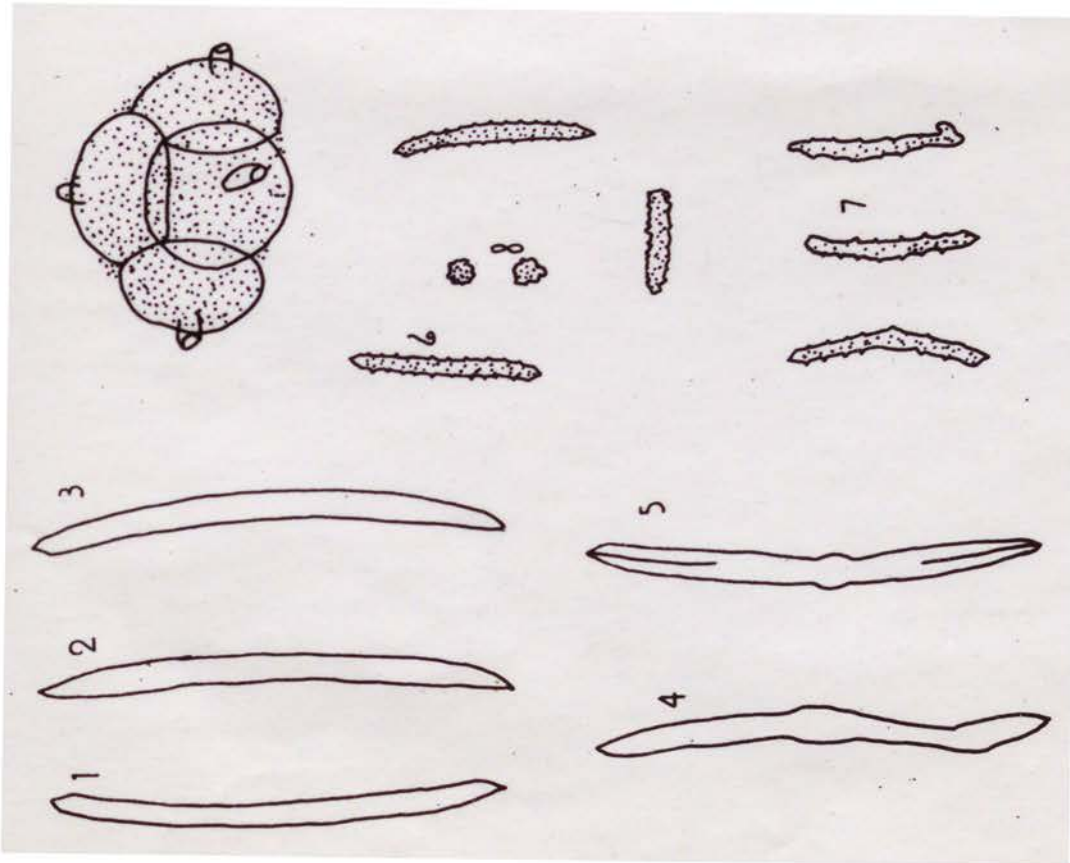


PLATE IV

Ephydatia crateriformis (Potts)

Key to Plate VII

Gemmule and spicules (camera lucida drawings) units in microns

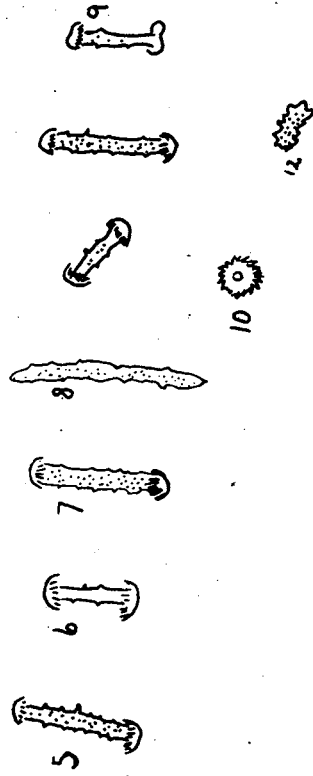
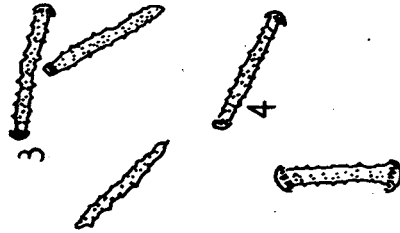
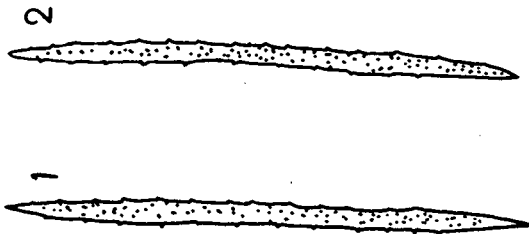
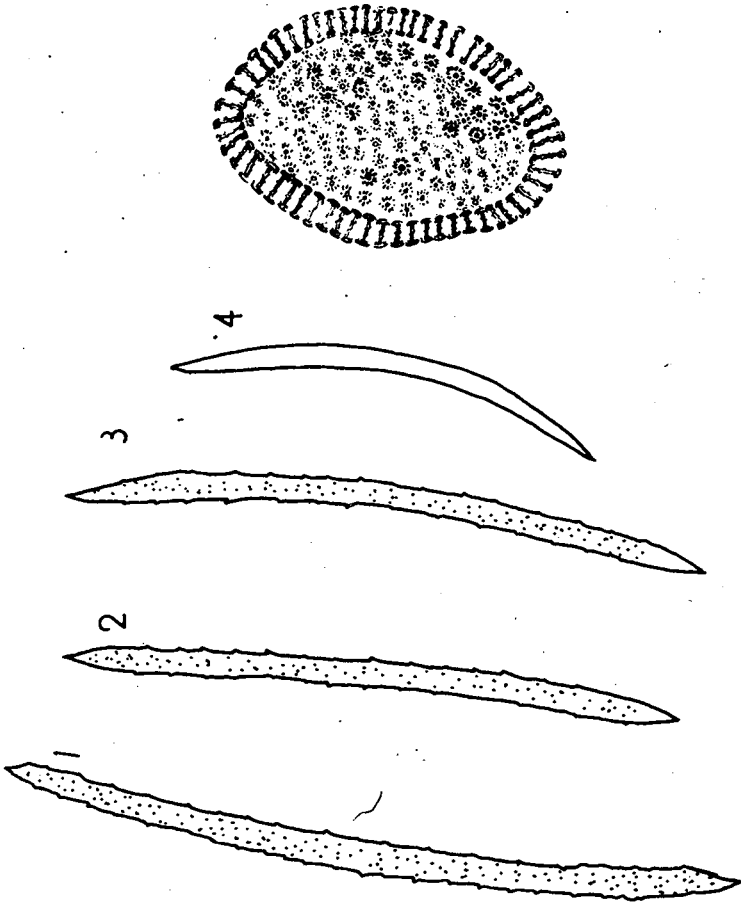
Gemmule		diameter	467.4
Fig. 1-2 Skeletal spicules	length	177.34	
	width	11.31- 16.43	
Fig. 3-4 Gemmule spicules	length	67.92	
	width	11.32	

Ephydatia subdivisa (Potts)

Key to Plate VIII

Gemmule and spicules (camera lucida drawings) units in microns

Gemmule		diameter	492 by 738
Fig. 1-4 Skeletal spicules	length	283. - 356.58	
	width	11.32 -16.98	
Fig. 5-10 Gemmule spicules	length	39.62 - 76.92	
	width	5.66	
Fig. 11 Gemmule rotule		diameter	16.98 - 21.08
Fig. 12 Discoidal mass			



Asteromeyenia Unidentified Species

Key to Plate XI

Gemmule and spicules (camera lucida drawings) units in microns

Gemmule			diameter	615
Fig. 1-2	Skeletal spicules	length	332.62	
		width	11.32 - 13.98	
Fig. 3, 5, 12	Long gemmule spicules	length	192.64 - 322.62	
Fig. 6	Rotule		diameter	23.96
Fig. 7, 10	Short gemmule spicules	rotule	diameter	28.3
		length	73.8	
Fig. 4, 8, 9	Intermediate gemmule spicules	length	81.88	
		width	5.48	
Fig. 11-12	Gemmule spicules (malformed)			
Fig. 13	Dermal spicule			



PLATE IX

Asteromeyenia Unidentified Species

Key to Plate IX

The colonies measure from three and one-half to four inches in length and from two and one-half to three and one-fourth inches in width.

Collected at Culture Ponds: October, 1945.

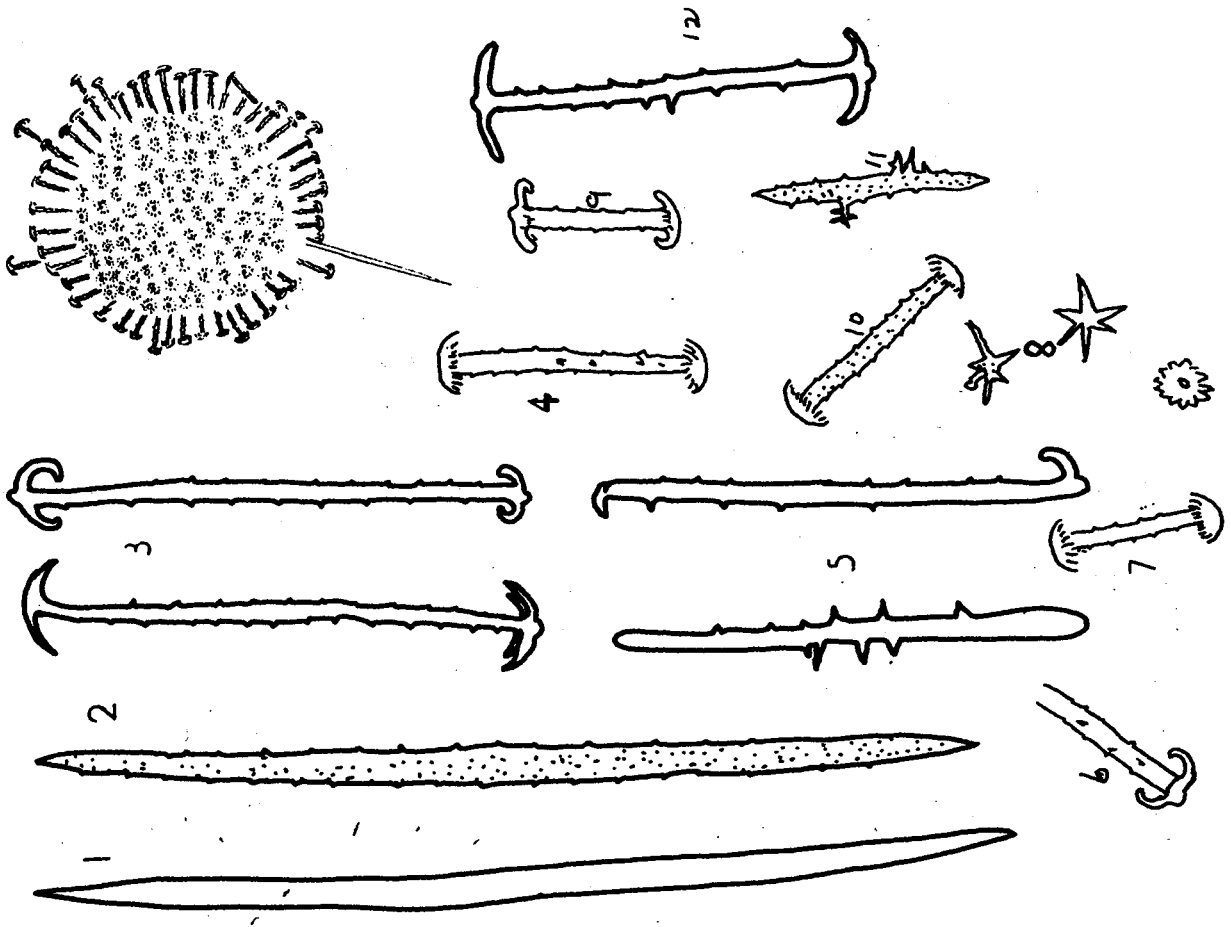


PLATE X

Typed by Marie Herring