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THE TAXONOMY OF AMERICAN COMMERCIAL SPONGES[1]

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ABSTRACT

The taxonomy of the American commercial sponges is revised and four new species and one new subspecies are described, including one new species of commercial sponge, hitherto unrecognized, from the Mediterranean. The eleven species treated herein are: *Spongia obliqua, Spongia barbara, Spongia barbara dura, Spongia anclotea,* new species, *Spongia sterea,* new species, *Spongia graminea, Spongia graminea tampa,* new subspecies, *Spongia cheiris,* new species, *Hippiospongia gossypina, Hippiospongia lachne,* and *Hippiospongia kerion,* new species from the Mediterranean. All are illustrated.

INTRODUCTION

The commercial "sponge" is the macerated and dried skeleton of one of the sponge animals that has no proper spicules. It must be from a species whose skeleton consists of spongin fibers, and furthermore these fibers must continue to be elastic or "spongy" even after having been dried; this is not true of all sponges. Some 1400 genera of sponges have been described, but only two of these yield skeletons that have market value. Sponges are abundant in cool water, but grow very slowly in such environments. Only in warm water, such as that of the Mediterranean and West Indies, do they grow so rapidly as to have commercial possibilities.

Sponges of the eastern Mediterranean Sea, near Greece and Turkey, have the best quality for human use. Greek fishermen have collected and marketed sponges for at least three thousand years.

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Sponges of the eastern Gulf of Mexico, along the west coast of Florida, have quality nearly as good as the Greek sponges. For somewhat more than a century a sponge industry has been maintained in Florida, and to a lesser extent in the whole West Indian region. This has been surpassed in volume and quality only by the above-mentioned Mediterranean sponge industry. It was first maintained by American fishermen, with a marketing center at Key West, but about 70 or 80 years ago the principal market shifted to Tarpon Springs, and more and more of the harvesting was done by Greeks.

In late 1939 and early 1940, an epidemic of disease swept through the commercial sponges of the Americas. A small fraction survived, but the Greeks refused to accept conservation measures whereby these survivors could quickly replenish the denuded areas. They sought all remaining sponges so assiduously that from 1944 to 1954 American sponges practically vanished from the market. Since 1955, however, they have been coming back.

American commercial sponges fall into nine categories, with vernacular names that are well established in some localities, but not in others, with two or more national languages also involved. Because of this confusion, the proper establishment of the scientific names is more than usually important and is the subject of the present paper.

The senior author has studied the sponges of the world for a third of a century, with field experience in many parts of the globe, including some in the Mediterranean and much in the West Indies. Work was carried out underwater with diving apparatus, as well as in extensive collections.

The junior author has spent even more time underwater working with air hose and face mask which permit great freedom of action. His studies were made during 1955-57 and included more than 125 days of submarine exploration, chiefly at depths of 10 to 20 meters. Especial attention was paid to the area along the west coast of Florida, which is the best for commercial sponges. The studies were uniformly distributed through the twelve months of the year, and the daily average was ten "dives" of half an hour each, a total of over 625 hours. Emphasis was constantly placed on ecology, the relation between environment and the sponges.

The operation of environment warrants attention. Each sponge has its characteristic shape, and species theoretically should be identifiable on the basis of shape alone. Yet for each species a variety of shapes actually occur. Museum workers are thus faced with a quandary

and two extremes of policy have resulted. One was a multiplication of superfluous names based upon environmental modifications of a single species. The other was a conclusion that sponges were so easily molded that shape was meaningless; this has led to erroneous "lumping" of several species under a single name.

The environment can certainly subtract from the ideal assortment of characteristics, even to producing deformed and extremely stunted results, but it cannot add. The statement that sponge animals are "plastic" is true but misleading. The environment is not a constructive sculptor that can make a symmetrical vase-shaped sponge out of one that is naturally, intrinsically, or genetically merely an encrusting mass, but it can reduce a naturally vase-shaped sponge to an amorphous "blob." Radical temperature changes are especially potent in causing just such deformation . . . The ideal environment is one that does not damage, but instead permits the fullest expression of the intrinsic nature.

Modern nomenclature dates by common agreement from the publication in 1758-1759 of the tenth edition of the epoch-making book "Systema Naturae" by Carl Linnaeus. In 1759, page 1348, he put not only all the commercial sponges, but all the others as well, into a single genus *Spongia;* he had all the commercial sponges as *S. officinalis.* By 1859 all the others had been removed, and in that year H. G. Bronn proposed removing even *Spongia* into what he called *"Euspongia."* This was, of course, illegal, and the name *Spongia* must stand. Unfortunately, many publications employ the unwarranted name *Euspongia.*

The fact that commercial sponges fall into two distinct categories, each a genus, is the definite judgment here expressed. It was first recognized by F. E. Schulze (1879, p. 614) when he took some from *Spongia* into his new genus *Hippospongia.*

The eminent spongologist M. Burton of the British Museum (Natural History) believes that all the commercial sponges should remain in *Spongia.* Therefore, in 1934, page 575, he established a neotype specimen of *Hippospongia* that does not fit the second category, but instead is a typical *Spongia.* Schulze had not designated a type specimen, therefore Burton's action was legal and in order. It reduced *Hippospongia* to synonymy with *Spongia.*

The second category was again given generic standing by deLaubenfels (1936, p. 11) who set up the genus *Hippiospongia,* purposely choosing a name as much as possible like Schulze's obviated name.

Hippiospongia is protected by a carefully designated type specimen, which is number 801 in the United States National Museum.

American sponges in some cases resemble certain European sponges. It has been suggested that they are merely subspecies of the European ones, rather than full species. For example, the senior author in 1948 cited the American "yellow" sponge, *Spongia barbara,* as merely a subspecies of the Mediterranean "zimocca" sponge. This decision was made with great hesitation, and is here revoked. The sort of observations involved in this later decision may be exemplified by a study of certain non-commercial sponges.

Sponge animals of the genus *Cliona* bore tunnels into solid limestone, especially oyster shells. *Cliona celata* and *Cliona caribboea* were differentiated for about seventy years only because the latter excavates slightly larger tunnels. Naturally there was criticism that this was a minor point, and that the two must belong to the same species. Old *Clionas* outgrow their hiding places and become exposed massive sponges; this form of *celata* has been well known for nearly a century. Recently the senior author has found corresponding old, massive specimens of *caribboea;* it turns out that they differ radically in several ways from the corresponding *celata* forms, proving that each is a valid separate species.

The American commercial sponges are completely allopatric with respect to the European ones. Whether or not they could interbreed is highly speculative. Subspecific designation requires a trinomial, and this is not so convenient as a binomial. The more one studies the sponges, the more points of difference are found. Thus a conclusion is reached which involves great skepticism concerning the hypothesis that any West Indian sponge is specifically identical (conspecific) with any Mediterranean sponge. In this connection, attention may be called to Ekman's masterly volume "Zoogeography of the Sea." In this summary of a vast literature Ekman points out that very few species in any phylum occur both in the Mediterranean and also in the West Indies. It is merely that corresponding types occupy corresponding ecological niches.

This paper constitutes a partial report to the U. S. Fish and Wildlife Service which supported the work of the junior author on a grant to survey the commercial sponge grounds off Florida. The work commenced in June, 1955 and terminated in August, 1957. The complete report by the junior author dealing with the ecology, growth and reproduction of sponges, the physical characteristics of the grounds and

economics of the fishery will be published in the near future as a bulletin of the U. S. Fish and Wildlife Service.

SYSTEMATICS

Genus *Spongia* Linnaeus, 1759

Spongia Linnaeus, 1759, p. 1348.

Sponges of this genus have protoplasmic structures such as are considered typical for RHAGON architecture, with extremely abundant diplodal flagellate chambers. There is a dermis, partly protoplasmic, partly spongin, 30 to 70 microns thick; it covers the surface of the sponge, but is pierced by oscules (exhalant) and by numerous pores (inhalant). The skeleton consists of a network of spongin fibers, which are 5 to 35 microns in diameter, most frequently 15 to 20 microns in diameter. The meshes are almost rectangular in outline, with dimensions varying from 100 microns to a millimeter. At distances nearly a millimeter apart, another type of fiber ascends from the interior of the sponge to the surface. These ascending fibers are 30 to 100 microns in diameter, and contain a nearly continuous core of foreign debris, which may consist of fine sand grains, or fragments of the spicules of spiculiferous sponges, or both.

Spongia obliqua Duchassaing and Michelotti, 1864

REEF SPONGE

Fig. 5

Spongia obliqua Duchassaing and Michelotti, 1864, p. 38.

This species was extremely widespread before the epidemic of 1940, chiefly in water less than five meters deep. It vanished almost completely in the epidemic, but in 1957, Mr. Frank Swift found one in Biscayne Bay, and a few have been recorded from the southern Bahamas.

This is the American sponge that most nearly corresponds to the European *Spongia officinalis,* but whereas that species has maximum commercial value (highest quality), *obliqua* has nearly no commercial value at all.

Reef sponges are often about the size of a human fist, seldom much larger. The shape is massive, with flat or plane areas at obtuse angles to one another, so that it is evident why its authors chose "obliqua" as a name.

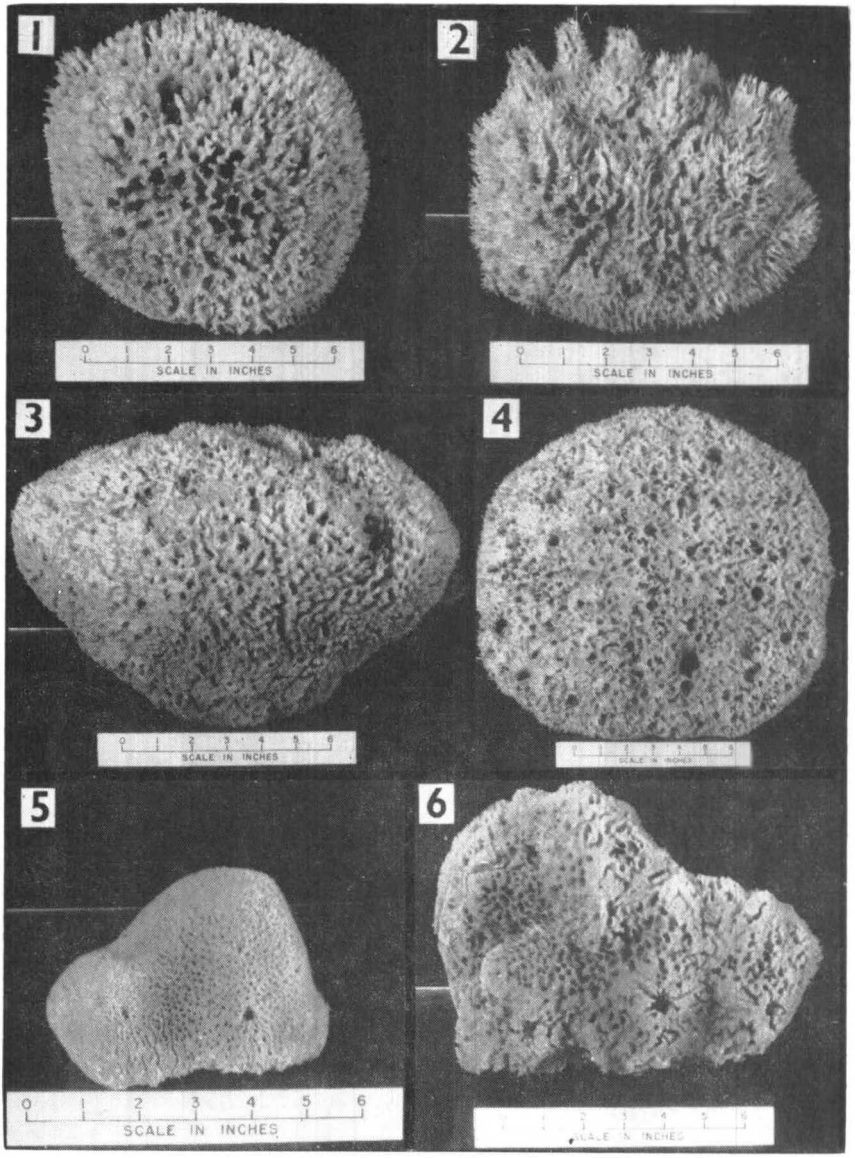

FIGURE 1. Rock Island wool sponge (*Hippiospongia lachne*). FIGURE 2. Wool sponge from strong tide area with chimneys around oscules. FIGURE 3. Mediterranean honeycomb or wool sponge—side view (*Hippiospongia kerion*). FIGURE 4. Top view of honeycomb sponge. FIGURE 5. Reef sponge (*Spongia obliqua*). FIGURE 6. Wire sponge (*Spongia sterea*).

The external color in life is black, with an ochraceous to rust-red interior.

The surface is finely conulose, conules less than one millimeter high, and only one or two millimeters apart. The entire lateral surface of the sponge is crowded with pores that are less than a millimeter in diameter, about three millimeters apart. The oscules are only three to four millimeters in diameter, and are located on the upper surface.

Spongia barbara Duchassaing and Michelotti, 1864

YELLOW SPONGE

Figs. 13, 14, and 20

Spongia barbara Duchassaing and Michelotti, 1864, p. 31.

This was treated as *Spongia zimocca*, subspecies *barbara* in deLaubenfels 1948, page 13, but the synonymy with *zimocca* was not then certain, and now appears completely uncertain.

Spongia barbara is abundant at least throughout the Florida Keys and the eastern Gulf of Mexico. Specimens as large as a human head are often found. The shape obviously tends toward being spherical or spheroidal.

The color in life is dark sepia, almost black, when the sponge grows at depths of less than two meters. At depths of ten meters this species is more abundant, and at that depth is always a yellowish-drab, grey-yellow or yellowish taupe in color. It is true of sponges in general that the greater the illumination where they grow, the darker is their pigmentation, but no other commercial sponge exhibits this color difference so strikingly as does *barbara* and few noncommercial sponges match it. The interior of the sponge, like nearly all commercial sponges, varies from yellow-ochre to rust red. The fibers of the macerated, dried yellow sponge are slightly but definitely more yellowish than the fibers of other commercial sponges.

The surface is finely conulose, much as in *obliqua*. The pores are somewhat larger but farther apart, say four or five millimeters on centers. Each specimen generally has ten to twenty oscules on its uppermost surface, each seven to ten millimeters in diameter, most often eight or nine millimeters. These oscules are never surmounted by thin walled sleeves or "chimneys."

The surface of a yellow sponge from shallow water, with the dermis removed and the skeleton macerated as in the usual preparation for marketing, may show an interesting configuration. The surface growth

to a depth of two centimeters may consist of cylindrical knobs or tufts, with flattened or slightly rounded apices, not tapering conically, nor enlarged at their tips. These knobs are three to four millimeters in diameter, and about twice that distance apart (on centers). This configuration bears a superficial resemblance to that of *Hippiospongia*, especially *H. gossypina*. On the yellow sponge, however, each such knob contains several ascending fibers, conspicuously thicker and straighter than the ordinary fibers; no such ascending fibers occur in *Hippiospongia*. Furthermore, in the latter genus, the corresponding knobs taper conically from base to tip in the "wool" sponge, and tend to be enlarged at the tips in the "velvet."

Spongia barbara dura Hyatt, 1877

HARDHEAD SPONGE

Fig. 17

Spongia agaricina dura Hyatt, 1877, p. 522.

This was treated as *Spongia officinalis* subspecies *dura* by deLaubenfels (1948, p.8). The extensive field experience of the junior author of this paper leads to the present conclusion that the hardhead is a modified "yellow" rather than a modified "reef" sponge.

"Hardhead" sponges are common in the Bahamas, where they completely replace the "yellow" sponges. They seem to be absent elsewhere, where typical *barbara* occurs. They are much like "yellow" sponges, but not so yellow, and their fibers are much harder and stiffer. In fact, the whole sponge skeleton is nearly as rigid as soft wood, and therefore has little or no commercial value. The shape is the rounded or subspherical form as typical for the species *barbara,* and other characteristics (such as oscules) similarly correspond.

Spongia anclotea, new species

ANCLOTE SPONGE

Figs. 15 and 16

Holotype. USNM 23543. Collected by J. Storr, September 19, 1953, in 4 meters west of Dinner Point, St. Martins Reef, 8 miles west of Hammock Creek, Florida.

This species is common in the area about Anclote Key, Florida, 28° 11′ North latitude, 82° 20′ West longitude, and its range extends

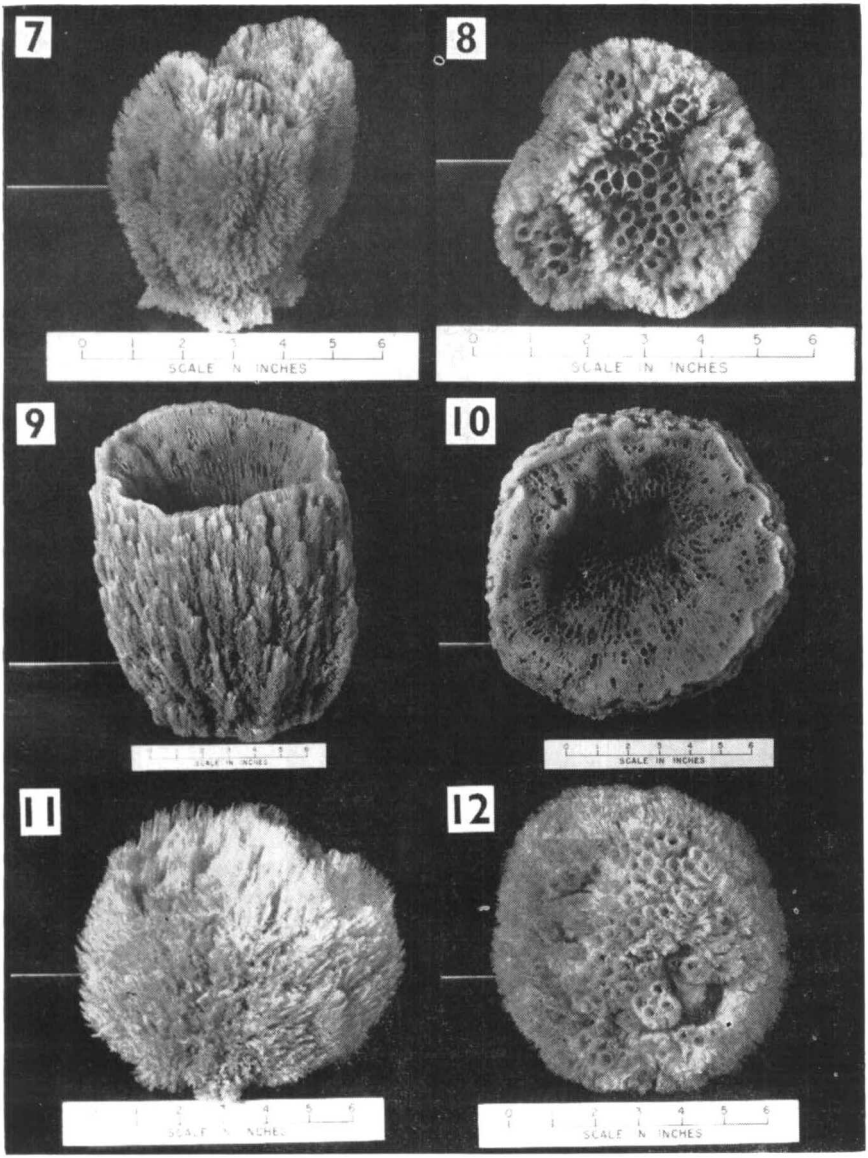

FIGURE 7. Key West grass sponge (*Spongia graminea*). FIGURE 8. Same—top view. FIGURE 9. Gulf grass sponge (*Spongia graminea* ss *tampa*). FIGURE 10. Same—top view. FIGURE 11. Grass sponge. Growth variation found in Biscayne Bay and Bahamas. FIGURE 12. Same—top view.

North to Cedar Keys. Occurrence is at depths of one to ten meters.

The shape of the "anclote" sponge is distinctive. Each specimen consists of a number (often between ten and twenty) of interconnected lobes. Each lobe is hemispherical in shape, 18 to 27 millimeters in diameter, and nearly as high above that which might be regarded as a basal mass. At the apex of each lobe is a single conspicuous oscule, seven millimeters in diameter, rarely a little larger or smaller.

The color in life is black, with the usual brownish interior. The dried skeleton is a trifle more brown than that of "yellow" sponges, and does not have the "tufted" appearance of the "yellow" sponge. Other than that, the skeleton is quite representative of the genus *Spongia*.

Spongia sterea, new species

WIRE SPONGE

Figs. 6 and 23

Holotype. USNM 23544. Collected by J. Storr, October, 1955, in 13 meters southwest of Pepperfish Key, Florida (west coast).

This sponge is common in the deeper waters west of Florida, at depths of ten to fifty meters, especially north of Cedar Keys. The junior author, in his extensive exploration, did not find this sponge east of Florida, nor in shallow water, but in July 1957 the senior author found it at a depth of only one meter, at Key Biscayne.

Spongia sterea is irregularly massive in shape, often twenty to thirty centimeters in diameter. Specimens up to 75 centimeters were reported, prior to the epidemic of 1938.

The color in life is very dark brown (sepia) or almost black, with the usual pale tan interior.

The surface is smooth or very finely conulose. The oscules are scattered, but are commoner on the upper surface; these openings are generally a centimeter (or a little less) in diameter. Exhalant canals right at the surface sometimes form a stellate pattern around an oscule.

Dried, macerated specimens of "wire" sponge are easily recognized because of their pore patterns. Instead of more numerous smaller pores, they have relatively fewer and larger skeletal pores, separated from one another by regions where dense reticulations of fibers make a flat, almost imperforate surface. The dermis may or may not contain

many additional contractile microscopic pores, but these skeletal pores are generally as much as three or four millimeters in diameter.

The fibers of the "wire" sponge are much stiffer than those of other species of *Spongia,* possibly even stiffer than those of the "hardhead," hence the vernacular name. "Wire" sponges have therefore little or no commercial value. There is another distinguishing feature, best seen by use of a microscope, but faintly distinguishable to the naked eye. Between the ascending fibers of *Spongia* there are always very numerous interconnecting secondary fibers. In *sterea,* at intervals of nearly a millimeter, there are especially straight connections at right angles to the ascending fibers, and nearly as thick as they, but not similarly supplied with debris. An effect is produced which resembles that of ladders with rungs, or of a crosshatching.

The name *sterea* is derived from the Greek ΣΤΕΡΕΑ meaning "stiff," and refers to the nature of the fibers.

Spongia graminea Hyatt, 1877

KEY GRASS SPONGE

Figs. 7 and 8

Spongia graminea Hyatt, 1877, p. 516.

This sponge is common in the area east and south of Florida, especially at depths of two to five meters; a few specimens of it may be found in deeper water, but these are small. Specimens of the "key grass" often are as large as twelve centimeters diameter, and some are as large as twenty-five centimeters diameter.

The shape of this species tends strongly toward being a truncated cone, with a base slightly smaller than the rather level upper surface. The dermis is black, and the interior is brown.

The very small pores are confined to the sides of the columnar sponge; these sides are very finely conulose. The pores lead horizontally inward to a large number of vertical cloacas or extra exhalant canals, a pattern uncommon in Recent sponges, but very common in fossil lithistid sponges as far back as the Paleozoic (Lithistid sponges have a stony-hard skeleton of interlocked lumpy siliceous spicules). These vertical canals of the "grass" sponge are nearly or quite a centimeter in diameter. The sides, affected by the cloacas, are thrown into vertical ridges and grooves, thus have a "fluted" appearance.

Each vertical cloaca, as described, leads to an oscule on the summit plateau of the sponge. There the oscules are crowded, often almost in

contact with one another, each nearly or quite a centimeter in diameter. Around each oscule is a paper thin "chimney," or collar, about a centimeter high; in it the thicker, straighter ascending fibers are conspicuous, protruding somewhat, perhaps reminding an observer of upright blades of grass. This may possibly represent the genesis of the vernacular name. It certainly forms a convenient and reliable diagnostic feature of the species *graminea.*

The top of the "key grass" sponge is sometimes concave, but never deeply concave except when foreign debris accumulates in the center, inhibiting growth there. The endosomal (interior) structures are quite representative of the genus *Spongia.*

Some very old specimens of the "key grass" variety begin to approach a spherical form as a result of much lateral growth as compared to vertical growth. This is especially the case in the Bahamas.

Spongia graminea tampa, new subspecies

GULF GRASS SPONGE

Figs. 9 and 10

Holotype. USNM 23542. Collected by J. Storr, October, 1955, in 6 meters on rocky sponge bar southwest of Pepperfish Key, Florida (west coast).

This sponge is abundant in the area west of Florida, that is to say, in the eastern Gulf of Mexico. That it is a grass sponge is evident from the presence of typical collars or chimneys around oscules, which are as crowded together, and are of the same size, as in the key grass sponge. It differs from this latter in a number of important respects. The two forms are allopatric, with possible contiguity near the Dry Tortugas, where neither is commonly present.

The subspecies *tampa* tends strongly to the shape of a vase that has a broad basis of attachment which is as wide, or nearly as wide, as the opening. The walls are upwards of six or eight centimeters in thickness. It grows to a large size so that specimens thirty centimeters in height are common; these would have nearly as great a diameter.

The color in life differs radically from the black nominate subspecies. *Tampa* is always drab or pale taupe in color. Furthermore, instead of having the conulose sides, it is smooth, even shining or glistening in appearance. These are the principal or most dependable bases for differentiation of the two varieties, because occasional un-

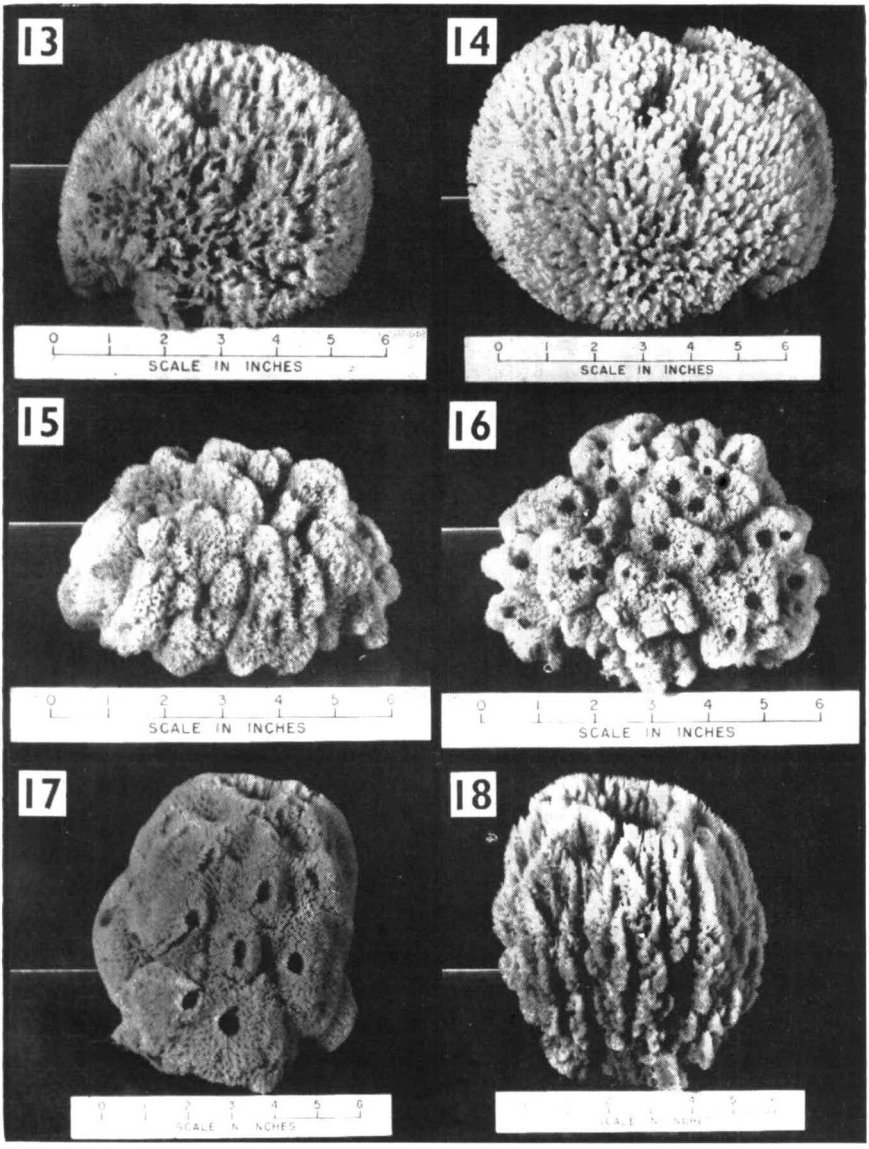

FIGURE 13. Yellow sponge (*Spongia barbara*). FIGURE 14. Yellow sponge from shallow water with long tufts. FIGURE 15. Anclote variety of yellow sponge from shallow water (*Spongia anclotea*). FIGURE 16. Same—top view. FIGURE 17. Hardhead sponge from Bahamas (*Spongia barbara dura*). FIGURE 18. Glove sponge from Florida Keys (*Spongia cheiris*).

usual specimens of the nominate subspecies have upper surfaces that are somewhat concave, and some unusual specimens of *tampa* have only slightly concave tops. These latter are found where currents are especially strong, and may lack the typical vase-shape as a result of these currents.

The outer sides of macerated, dried specimens of *tampa* are not quite the "fluted" columns of the nominate subspecies, but have a peculiar configuration. This is basically a number of lobes, three to six centimeters in diameter, but so flattened against the sides of the sponge that they are almost like imbricated cycloid scales, convexities turned upward. These sides contain scattered pores, each of which is about one millimeter in diameter.

In the deepest part of the central concavity of the "gulf grass" there are about twenty to forty collared oscules like those that are typical of all grass sponges, and equally crowded together. The rest of the concave surface is probably also chiefly exhalant, but contains openings of various sizes, not all of which are certainly oscules.

This subspecies is especially abundant near, and to the north of the city of Tampa, Florida, and the subspecific name has been selected with reference to that city.

Spongia cheiris, new species

GLOVE OR FINGER SPONGE

Figs. 18 and 24

Holotype. USNM 23545. Collected by J. Storr, September 19, 1955, in 4 meters on St. Martins Reef, Florida, west of Dinner Point (west coast).

This sponge is characteristic of shallow water, generally less than ten meters deep. The junior author found it from Key Biscayne around Southern Florida and as far north on the west coast as Cedar Keys. The senior author found it much farther north, at Alligator Harbor.

Spongia cheiris consists of one, or generally more than one, upright columns, each tapering to a rounded apex and containing one or more relatively large vertical cloacas, thus resembling the fingers of gloves. The cloacas are, in fact, so large that one may insert his finger as though into the finger of a glove. Almost always there are five or more such finger-like columns, and these are never in a straight line, but instead tend to group in a circular form, enclosing a central hollow area. It is easy to tear the columns from one another.

The outer surface of each column often bears upright longitudinal ridges, nearly a centimeter thick, with conspicuous pores along the crests of these ridges. This structure is obscure in specimens from the shallower depths (less than three meters).

"Glove" sponges are black in life, and not especially conulose.

The name *cheiris* is derived from the Greek XEIPIΣ, meaning "glove."

Genus *Hippiospongia* deLaubenfels, 1936

Hippiospongia deLaubenfels, 1936, p. 11.

Sponges of this genus are closely related to those of the genus *Spongia,* more closely than to any other genus except the genera *Aulena* and *Agelas. Hippiospongia* and *Aulena* are members of the family Spongiidae of the order Keratosida, but *Agelas* is put in the family Agelasidae of the order Poecilosclerida because, among other items, it contains proper spicules. Except for these, its specimens might be allocated to *Hippiospongia,* and some species now so allocated may actually be *Agelas* specimens in which the rather uncommon spicules were not found. *Aulena* has very peculiar flagellate chamber structure, and is rare. There are several points of distinction between *Hippiospongia* and *Spongia.*

In *Hippiospongia* there are relatively enormous subdermal spaces, meandering over the sponge, but covered in life by the dermis. The areas between these spaces are often so reduced that they are merely fascicular columns, perpendicular to the surface. The subdermal spaces are rounded in transverse sections, three to ten millimeters in diameter, most commonly four to six millimeters diameter.

In *Hippiospongia* there are no fibers of the ascending type. In fact, foreign inclusions in the fibers are so rare as to be practically non-existent. There are reports for European *Hippiospongias,* that the very young juvenile sponge appears to contain ascending fibers, but this has been compared to embryonic recapitulation of ancestral features; for example, the human embryo at one stage possesses gill slits and a tail.

In *Hippiospongia* the dermis adheres firmly to the main skeletal reticulation, whereas in *Spongia* it is always easily removed, sometimes even by merely gentle rubbing. In some species of *Hippiospongia* of the Western Pacific the dermis needs to be cut off with knife or scissors.

In *Hippiospongia* the oscules tend to be especially conspicuous. It

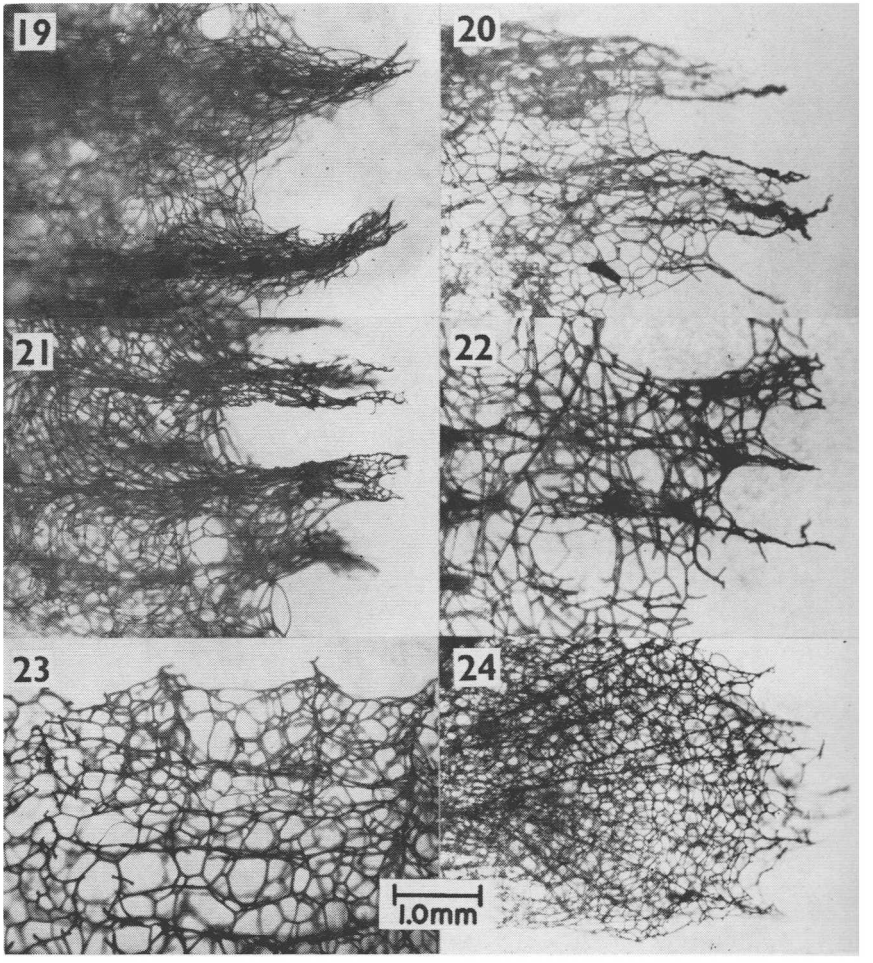

FIGURE 19. Wool sponge fibers in region of conules. Note lack of regular mesh work and the fineness of the fibers. FIGURE 20. Fibers from yellow sponge with heavy ascending or primary fibers—the principal difference between the genus *Spongia* and *Hippiospongia*. FIGURE 21. Grass sponge. Note heavier fibers and more regular meshwork. FIGURE 22. Fibers from grass sponge at four times the enlargement of figure 21. Note inclusions in primary fibers. FIGURE 23. Wire sponge. Meshwork is very regular and fibers are course and stiff. FIGURE 24. Cross section of edge of column of glove sponge.

is the experience of both authors that in American waters the oscules are rendered conspicuous by having dark, blackish linings to the

cloaca or canals which lead to these exits. Published accounts of sponges for other parts of the world do not make clear whether or not this is a cosmopolitan characteristic of this genus.

Hippiospongia gossypina (Duchassaing and Michelotti, 1864)

VELVET SPONGE

Spongia gossypina Duchassaing and Michelotti, 1864, p. 32.

This species was common around Florida and the West Indies prior to 1938, but was rendered all but extinct by the great epidemic. In fact, it was considered to be entirely wiped out until, in 1957, a few were reported from Cuba. It was at one time the principal commercial sponge of the Bahamas, constituting about three-fourths of the catch.

The "velvet" sponge tends to be more or less spherical, with rather conspicuous oscules on the uppermost surface.

The color in life is black, with a drab interior.

The surface is smooth or finely conulose except over the subdermal space, where it is always smooth. This space is four to six millimeters in diameter, round in cross-section, and it is covered by a tough dermis through which the microscopic pores open. This space meanders over the whole exposed surface of the sponge so that it leaves, as a residue, only columns of skeletal reticulation, like islands. The tops of these columns are flat or slightly convex, and bear the conules. The dermis is so firmly adherent to these tops that it must be cut or scraped off.

Hippiospongia lachne deLaubenfels, 1936

SHEEPSWOOL SPONGE

Figs. 1 and 2

Hippiospongia lachne deLaubenfels, 1936, p. 11.

This species has been for more than a century the most important commercial sponge of the Americas. Its specimens on the average are finer, more durable, better quality and value than those of any other New World species. It has been abundant throughout the West Indies and the vicinity of Florida, especially along the west coast of Florida.

The representative shape of *lachne* is that of a bun, round, but with greater horizontal than vertical dimensions; the top may even become

somewhat concave in the largest specimens; these may be over thirty centimeters wide and eighteen centimeters high.

The color in life is a sepia brown or extremely dark drab, not black. Against this the oscules stand out very conspicuously, because the linings of the (exhalant) cloacas are black. The oscules are generally twelve to eighteen millimeters in diameter, about six to twelve per sponge, always on the upper surface.

The surface is lumpy rather than conulose, and is smooth where the tough dermis acts as a ceiling over the subdermal space. This dermis (as noted above) is very difficult to remove. The subdermal space is a bit smaller and much less regular in outline than is the corresponding space in *gossypina*. The islands left by the subdermal meandering in *lachne* are not round columns, but have an irregular, often elongate transverse section. Furthermore, they do not terminate distally in platforms as in *gossypina* but instead taper off to pointed tufts that may be as much as two centimeters high.

The endosome of *lachne* is drab in color, with the very abundant small flagellate chambers typical of the family spongiidae.

As an appendix to the discussion of *Hippiospongia lachne*, comment should be made concerning the European (Mediterranean) sponge known colloquially as the "honeycomb" sponge. Specimens of this sort have been shipped to America and sold as "wool" sponges which they somewhat resemble.

In the dermal tufts of *lachne* some of the fibers pack together as aggregates, one to two hundred microns in diameter. Each aggregate contains ten to twenty ordinary fibers. In the "honeycomb" sponge similar aggregate columns are developed, but so much more strongly that they come to resemble single ascending fibers of the *Spongia* sort. By means of keen eyesight or a hand lens, however, the difference is at once evident. The surface of the "sheepswool" sponge is always heavily tufted; the surface of the "honeycomb" sponge is tufted only in scattered areas, leaving large smooth intervals around them.

The name "honeycomb" is suggested by the wax-like appearance of the sponge, and by the numerous openings on the upper surface. Many of these openings are about two centimeters in diameter, and six to ten centimeters apart, and clearly are oscules. Others are only three to five millimeters in diameter and only about one centimeter apart; these are probably inhalant.

It appears that no scientific name has so far been given to the "hon-

eycomb" sponge as above described. Therefore it is here proposed that it now be named.

Hippiospongia kerion, new species

HONEYCOMB SPONGE

Figs. 3 and 4

Holotype. USNM 23546. Specimen obtained from Greeks who take them in the Dodecanesi Islands in the Mediterranean Sea.

The name is derived from the Greek KHPION, meaning honeycomb.

REFERENCES

BRONN, H. G.
1859. Die Klassen und Ordnungen des Thierreichs, wissenschaftlich dargestelt in Wort und Bild. Vol 1. Amorphozoen. Leipzig. 142 pp.

BURTON, M.
1934. Sponges. Sci. Rep. Gr. Barrier Reef Exped. *4* (14): 513-621.

DELAUBENFELS, M.
1936. A discussion of the sponge fauna of the Dry Tortugas in particular, and the West Indies in general, with material for a revision of the families and orders of the Porifera. Publ. Carneg. Instn. No. 467: 1-225.
1948. The order Keratosa of the phylum Porifera, a monographic study. Occ. Pap. Allan Hancock Foundn. 3: 1-217.

DUCHASSAING DE FONBRESSIN, P. AND G. MICHELOTTI
1864. Spongiaires de la Mer caraibe. Mémoire publié par la Société hollandaise des Sciences à Haarlem. 124 pp.

HYATT, ALPHEUS
1877. Revision of the North American Poriferae, with remarks upon foreign species. Part II. Mem. Boston Soc. nat. Hist., *2*: 481-554.

LINNAEUS, C.
1759. Systema Naturae. Tome II. Vegetabilia. Holmiae.

SCHULZE, F. E.
1879. Untersuchungen über der Bau und die Entwicklung der Spongien. 7th Mitt. Die Familie der Spongiadae. Zeit. Wiss. Zool. 32: 539-660.