# The West Indian Tree Oyster on the Louisiana Coast, and Notes on Growth of the Three Gulf Coast Oysters


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It has long been known that two species of oysters are present on the South Atlantic and Gulf coasts of the United States: the common commercial species, *Crassostrea virginica* (Gmelin), and *Ostrea equestris* Say.[1] The first is an estuarine species present in great abundance in the bays and forming large reefs in some areas. It is not known to live in the open sea except at one reef just outside Atchafalaya Bay on the Louisiana coast, where the great discharge of the Atchafalaya River keeps the salinity low. In contrast, *O. equestris* is a smaller species living in saltier water and is not often noticed. Like other members of the genus, and in contrast to *Crassostrea,* it has fewer eggs, retains them and the early larval stages, and lacks the promyal chamber. It is not present in great abundance anywhere, although at times it is fairly prolific in some Florida bays. During years when the salinity of certain Texas bays is high, it invades bay waters to a greater extent than usual. In the summer of 1950 over half the spat in some parts of the middle and lower parts of Aransas Bay were *O. equestris.* It has also been reported (*1*) from shells in the open sea 5 miles off Aransas Pass, which is the westernmost record in the Gulf of Mexico. All *equestris* I have seen in the bays were small, ranging from 2 to 3 cm in length.

In July 1949 I had the opportunity of examining the fouling organisms from the templates of an oil-well platform belonging to the Humble Oil & Refining Company[2] in the Gulf of Mexico. 5½ miles offshore and 6 miles from the mouth of the Brazos River of Texas. It had been put down July 20, 1948, and was pulled up July 17, 1949, having been in the water almost exactly a year, at a depth of approximately 10 fathoms.

Three *C. virginica* measuring 61–94 mm (3.7 in.) in length were taken from the templates, and several others were present. (The minimum legal length for Texas oysters is 3.5 in.) When the oyster set is not known, but granting that it set the day the platform was completed, then the average daily growth rate for the year was 0.26 mm. This figure is a minimum, and if the oyster set later then the growth rate was faster. The oysters were in good condition, unlike the usual summer oysters of the bays. Another noteworthy fact was the absence of boring clams, boring sponges, and mudworms, the shell-boring associates. Furthermore, the shell was thin and smooth. So far as is known, *C. virginica* does not live in the Gulf of Mexico off the Texas coast, and presumably the larvae came from the bays 6 miles away. The oysters were found within 12 ft of the surface.

Also present on the templates were several *O. equestris,* which were found from 12 ft down to the mudline. Nine specimens ranged from 28 to 55 mm in length, averaging 44.1 mm. Some of them were ripe, but larvae were not seen.

On February 15, 1950, I examined templates from a Louisiana platform belonging to the Humble Oil & Refining Company, which had been pulled on February 12 after being in the water 10 months and 10 days. It was located at 29°08′08″N, 89°38′51″W, approximately 5 miles SE of Barataria Pass, in 50 ft of water.

Ten *C. virginica* ranging from 47 to 92 mm in length were taken from this platform. The average length was 81 mm. The minimum growth rate of the largest oyster was 0.30 mm/day. Thirty-three *O. equestris* were also taken, ranging from 35 to 72 mm, or 2.8 in., in length. The minimum growth of the larger *equestris* was 0.23 mm/day. In addition, 54 specimens of the West Indian tree oyster, *Ostrea frons* (Linnaeus), were taken from the templates. They were from 38 to 58 mm in length, and the minimal daily average growth rate was 0.19 mm. Typical West Indian examples of this species have prongs, or hooks, on the lower valve growing around and sometimes interlocking over mangrove roots. On the Louisiana tree oysters there were faint remnants of hooks near the hinge. Woodring (*2*) has pointed out before that tree oysters do not necessarily develop hooks when growing on flat surfaces.

This is the first report of tree oysters on the northern Gulf Coast. Similarly, so far as is known, it is the first time the 3 species named have been found growing together in one locality or on one structure. However, the oil-well platforms are the first permanent vertical structures erected in the Gulf at these depths, with the exception of some buoy chains, and the oysters grew at overlapping but different levels, with the common oyster nearer the surface, where the waters are less saline.

Geyer (*3*) shed considerable light on offshore Gulf salinities when he showed that waters at a mean depth of about 10 ft around oil-well platforms, 6–8 miles off the Louisiana coast, undergo marked seasonal, as well as pronounced short-period, variations ranging seasonally from 15 to 35 per mill. This explains how the common oyster of the bays can live on the upper levels of oil-well platforms in the shallow Gulf, whereas *equestris* and tree oysters, with less tolerance of low salinity, live in the saltier depths. Since tree oysters have not previously been found in the northern Gulf, one wonders where the larvae came from. Most probably the tree oysters live on and around the small coral heads and lumps found in these offshore waters.

[1] *O. equestris* Say has recently been synonymized with *O. cristata* Born, of South America, by some workers in this country. Gilbert Ranson examined the cotypes of *equestris* in Philadelphia and the type of *cristata* in Vienna and recently informed me that the two are quite different. The proper name, therefore, of this little oyster of the South Atlantic and Gulf coasts is *O. equestris* Say. *O. spreta* d'Orbigny is a synonym.


[2] The writer is indebted to the Humble Oil & Refining Company, and to R. A. Geyer of that company, for the opportunity to make these observations.

Ingle (*4*) has shown that the daily growth rate of Florida oysters in May and June may vary from 0.3 to 1.3 mm per day. The higher figures are doubtless daily maxima not maintained over the year, for otherwise oysters would attain a length of 12 in. in a year's time. Both his data and those presented here show, however, that the daily increment of shell on oysters in Southern waters is surprisingly high.

**References**

1. GUNTER, G. *Pub. Inst. Marine Science*, **1**, (2), 7 (1950).
2. WOODRING, W. *Carnegie Inst. Wash. Pub.*, No. 366 (1925).
3. GEYER, R. A. *J. Marine Research*, ix (July, 1950).
4. INGLE, R. M. *Science*, **112**, 338 (1950).

## Organic Origin of Some Calcareous Sediments from the Red Sea[1, 2]

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This note describes a preliminary attempt to decipher the origin of the calcareous part of the finer fractions of some samples collected from the northern part of the Red Sea during a voyage of the R.R.S. *Mabaheth* in 1934–35.

Shukri and Higazy (*1, 2*) have discussed the distribution, general character, and mineralogy of the samples collected by the expedition, and certain of their special features have been studied by Mohamed (*3, 4*) and Said (*5, 6*). The submarine topography of the Red Sea basin has been considered in detail by Crossland and Badr (*7*).

The Recent Red Sea sediments are whitish "coral muds" of high $CaCO_3$ content. The coarse fractions of these samples ($> 20\ \mu$) consist largely of fragmentary organic remains (as determined volumetrically under the binocular microscope: 80% corals, 5% foraminifera, 15% echinodermata, mollusca, calcareous algae, etc.). In this investigation only fractions finer than 20 μ were separated by ordinary settling methods for study. The carbonate content of these finer fractions was determined by acid leaching. It was found that the carbonate proportions in them were the same as in the bulk samples. The finer fractions were then separated in bromoform. The lighter portion, composed mainly of calcareous material, together with small amounts of clay, quartz, and feldspar, were dried and weighed. The latter accessory components in no case exceeded 3% by weight.

Spectrochemical analyses of the light part of the finer fraction of sample No. 17, and of a fragment of coral picked from the bulk sample, were made by H. C. Harrison, of the Rhode Island State College, to whom grateful acknowledgment is given. Tables 1 and 2 present the results of these determinations.

The analyses show that the calcareous part of the finer fraction of the sample is almost identical in composition to that of the coral. The sample, however, contains higher percentages of Si, Al, and Fe, which is quite expectable since it was impossible to remove all the clay and other light minerals. The fact that V, B, Ag, Pb, and other trace elements exist in the calcareous part of the finer fraction, as well as in the coral, strongly suggests that the sediment owes its origin for the most part to the accumulation of abraded organic remains. The fact that corals comprise 80% of the bulk sample, and that the spectrochemical analysis of the individual coral sample closely resembles the finer fraction, seems to indicate that such

[1] This work was done during the summer of 1950 while the author was working under a fellowship awarded him by the Woods Hole Oceanographic Institution.

[2] Contribution No. 540, from the Woods Hole Oceanographic Institution.

TABLE 1

DISTRIBUTION OF ELEMENTS IN SAMPLES

| | 1* | 2* | | 1* | 2* | | 1* | 2* |
|---|---|---|---|---|---|---|---|---|
| Si | $B^-$ | B | Au | X | X | B | E | $E^-$ |
| Al | $C^-$ | C | Ba | E | E | Ce | X | X |
| Fe | $D^-$ | $C^-$ | Li | X | X | Y | X | X |
| Mg | $B^-$ | B | Sr | $B^+$ | B | Nd | X | X |
| Ca | A | A | Rb | Not determined | | La | X | X |
| Na | B | $B^-$ | | | | Gd | X | X |
| K | Both less than 0.1% | | Cs | Not determined | | Pr | X | X |
| | | | | | | Sc | X | X |
| Mn | E | $D^-$ | Hg | X | X | Ho | X | X |
| Re | X | X | Zn | X | X | Dy | X | X |
| Ti | E | $E^+$ | Cd | X | X | Yb | X | X |
| Zr | X | X | Ga | X | X | Er | X | X |
| Hf | X | X | In | X | X | Eu | X | X |
| Th | X | X | Ti | X | X | Tb | X | X |
| Pb | $F^+$ | $F^+$ | Co | X | X | Lu | X | X |
| Sn | X | X | Ni | X | X | Tm | X | X |
| Ge | X | X | Pt | X | X | Sm | X | X |
| Cr | E | $E^-$ | Ir | X | X | S | Not determined | |
| Mo | X | X | Os | X | X | | | |
| W | X | X | Pd | X | X | P | Both less than 0.01% | |
| U | X | X | Rh | X | X | | | |
| V | $E^-$ | $E^-$ | Ru | X | X | | | |
| Cb | X | X | Be | X | X | F | Not determined | |
| Ta | X | X | As | X | X | | | |
| Cu | $E^-$ | $E^-$ | Sb | X | X | Te | Not determined | |
| Ag | $F^-$ | $F^-$ | Bi | X | X | | | |

1* Coral fragment.
2* Calcareous part of the finer fraction of sample 17, *Mabaheth* expedition.
+ Higher end of concentration range.
- Lower end of concentration range.
X Sought but not found.

TABLE 2

SUMMARY OF DISTRIBUTION OF ELEMENTS IN SAMPLES

| | A (over 10%) | B (10–1%) | C (1–0.1%) | D (0.1–0.01%) | E (0.01–0.001%) | F (< 0.001%) |
|---|---|---|---|---|---|---|
| 1* | Ca | Si, Mg, Na, Sr | Al | Fe | Mn, Ti, Cr, V, Cu, Ba, B | Pb, Ag |
| 2* | Ca | Si, Mg, Na, Sr | Al, Fe | Mn | Ti, Cr, V, Cu, Ba, B | Pb, Ag |