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A SIMPLE MARINE VIVARIUM

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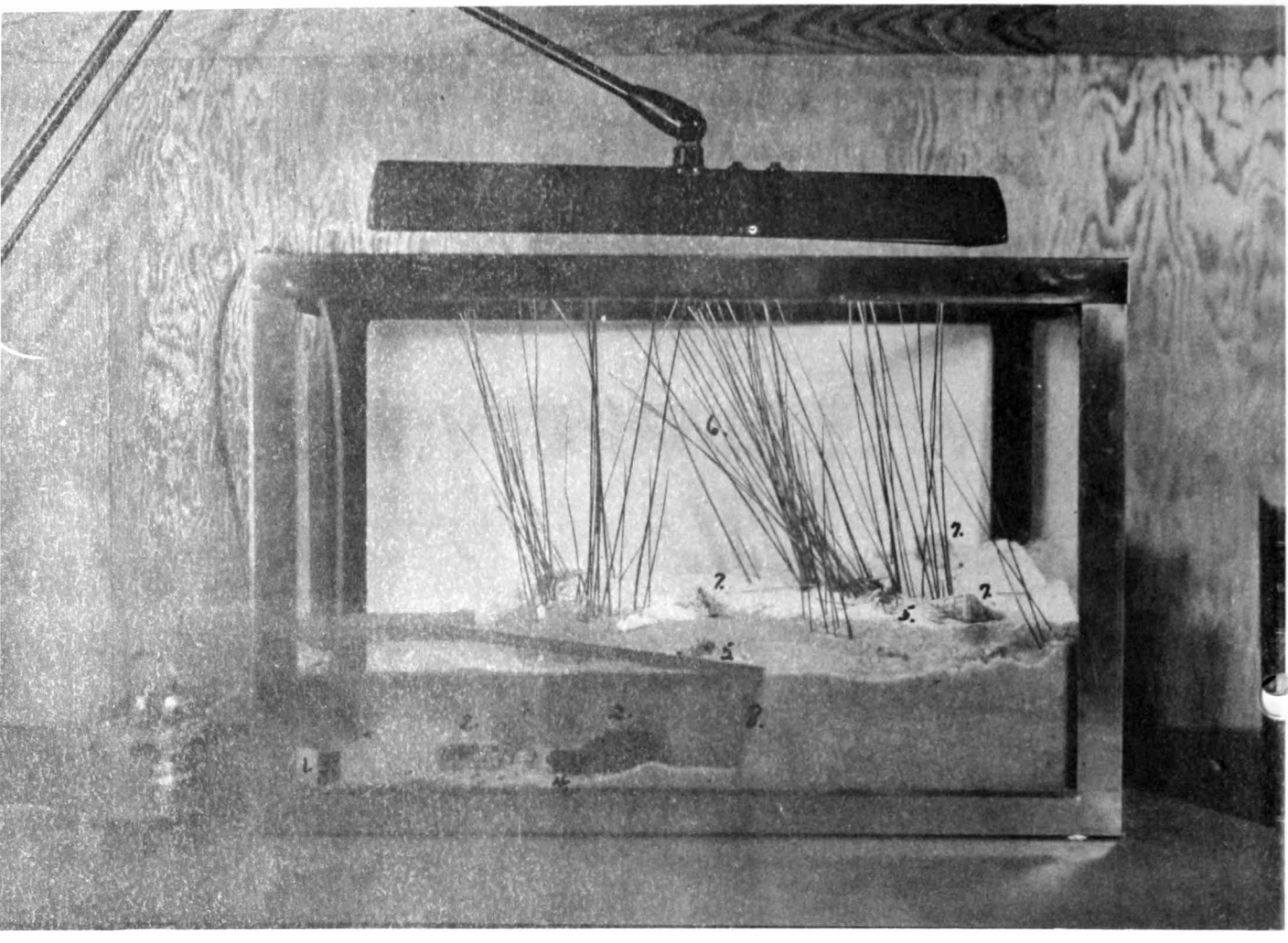

Aquarium ($20.00), 20 gallon, stainless steel, measuring 24" long, 16" high, and 13" wide.

1. Aerator pump and stone
2. Scallop
3. Spider crab
4. Blenny
5. Fiddler crab
6. Marsh grass
7. Beach shells
8. Bulkhead

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A living exhibit of marine shore animals is an excellent way to stimulate student interest in the interactions of animal and plant communities and to demonstrate many fundamental concepts of biology. Once established, if a few basic requirements are carefully followed, you can maintain an interesting vivarium of marine plants and animals for many weeks without replenishing the original supplies.

Equipment

Use a standard 15- or 20-gallon aquarium (a smaller one can be used successfully if the number of plants and animals is reduced). A glass cover is needed, and fluorescent lights will be useful because they do not generate excessive heat. Place your vivarium in a well-lighted location, but away from direct sunlight.

Place a couple of bricks or stones diagonally across the floor of your tank so that the floor space is divided into parts of about one-third and two thirds. Fill the larger space to a depth of about 4 inches with sand which has been washed repeatedly in fresh water. It may be necessary to back up the retaining wall with a strip of asbestos board, glass, or other rot-proof material to hold the sand in place. About half an inch of sand should cover the smaller area to serve as the bottom of your "tide pool".

About 5 gallons of sea water will be required for your aquarium. In general, water depth should be at least half an inch lower than the lowest level of the "sand beach". It may be necessary to filter the sea water through a coarse cloth or cotton batting to remove larger particles of debris. Although the aquarium will be covered with a glass plate, there will be some evaporation of water, especially if it is a warm location. Consequently, the initial level of the salt water should be carefully marked on the outside of the tank; a piece of cellophane tape is convenient. When evaporation has reduced the water level by as much as half an inch, it should be adjusted back to its former level by adding fresh water, never sea water, and mixing it well.

You must install an aerator to bubble air into the pool. One may be obtained from a local pet store or a mail-order house for about $5. The smallest one available will be suitable.

Stocking the vivarium

Salt-water plants suitable for planting include marsh grass (Spartina) and marsh pennywort; other suitable types will probably be available locally. Spartina keeps well, supplies a resting place for

the periwinkle, and is usually abundant in marsh areas along the coast. Plants of the proper height to fit in the aquarium can usually be found. Pennywort is an attractive round-leaved plant found in sandy areas. It requires more light than Spartina to keep growing. Underwater plants, including algae, should never be used because they rot so quickly. Before planting, it is necessary to wash all of the mud and organic debris away from the roots to avoid decay and subsequent fouling of the water. It is better to have too few plants than too many; 10 percent coverage of the sand area is satisfactory.

The choice of animals is quite large, and the more suitable ones are well distributed on most of our shores. As a general rule, animals you find living in tide pools are sufficiently adaptable to establish themselves in a vivarium.

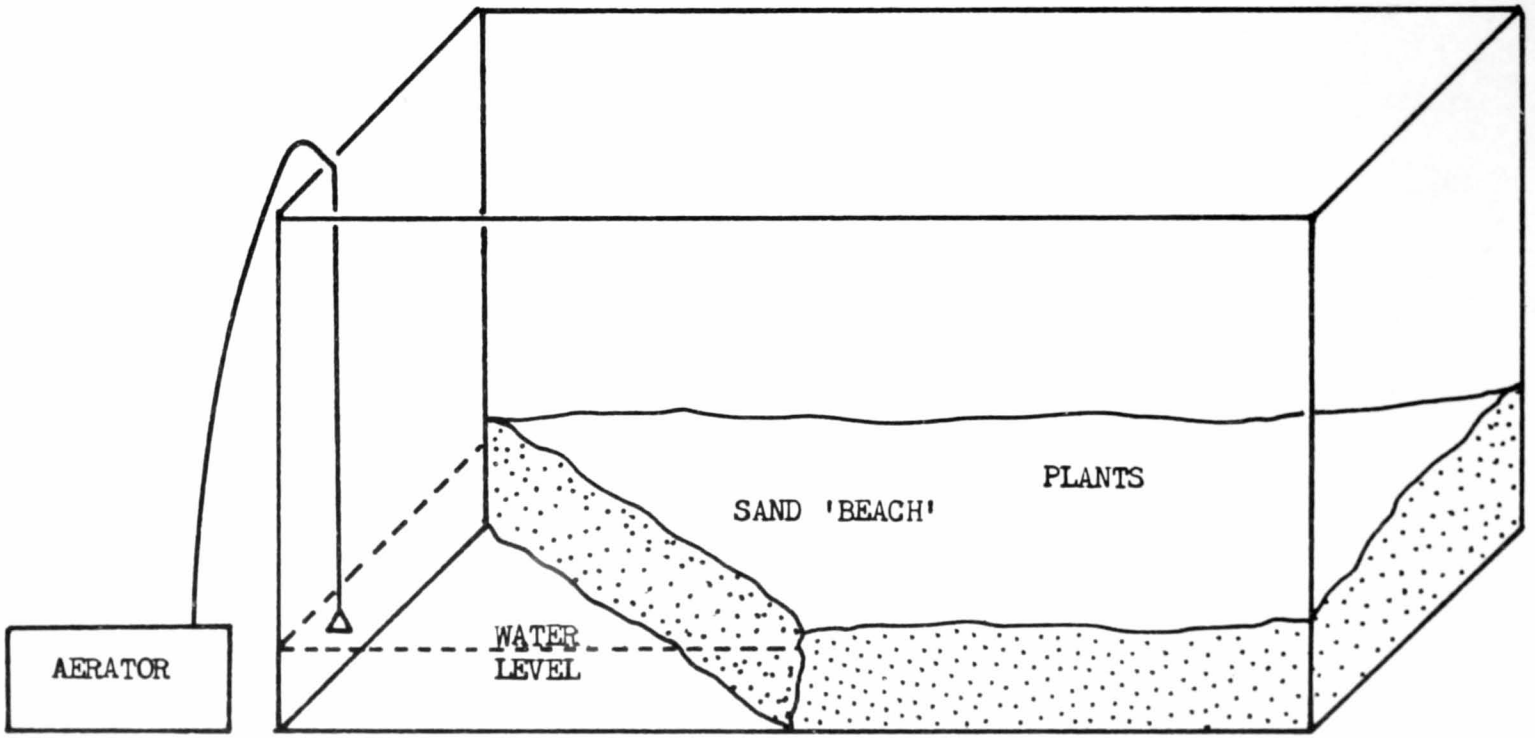
Most interesting because of their activity are fiddler crabs; these are useful in demonstrating social behavior, burrowing habits, and sexual differences in shape. In an aquarium of this size, about 25 fiddler crabs can be maintained. In some areas, the white ghost crab or the shore crab, Sesarma, may be captured. There are many species of hermit crabs available; they demonstrate well the role of the scavenger in nature and help keep the vivarium clean. The shells they inhabit with their usual complement of associated animals make excellent study subjects.

Among the mollusks, the periwinkle, Litorina, is easily obtained and hardy. Its habit of clinging to Spartina grass is of interest. Frequently in the marsh, fairly large mussels may be found attached to grass roots. These survive well in the "tide pool" and by their feeding activities help keep the water clear. Scallops are of greater student interest and, although they do not survive very long, are worth some effort to obtain.

Small blennies and gobies, as well as small toadfish, may sometimes be found under rocks and shells, and these are very hardy. Other suitable tide-pool animals which are of interest but more difficult to locate and remove are the sea anemones and tube worms.

Maintenance of your vivarium can be summarized briefly:

> Feed animals bits of shrimp and fish (canned is suitable); never so much that it lies untouched after an hour. Avoid direct sunlight, which overheats the water. Keep the water as cool as possible without allowing it actually to freeze. Remove dead animals and debris as soon as you notice them, to avoid fouling the water supply. Adjust the aerator so that there is a steady stream of small bubbles but not so many as to make the water turbulent.



Diagramtic view of vivarium.