

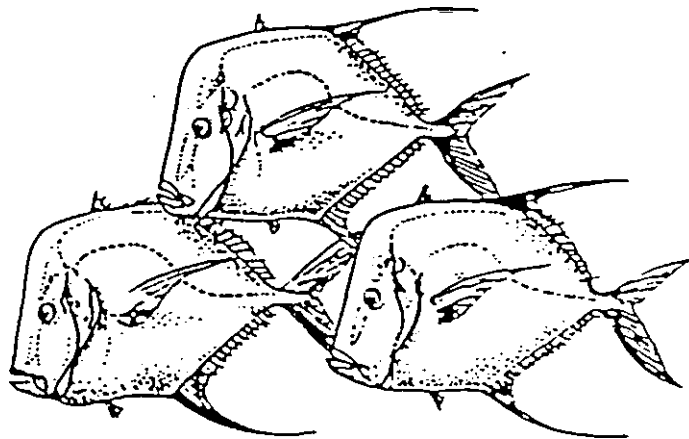
SALT WATER AQUARIA

**EVERYTHING YOU WANTED TO KNOW ABOUT A
SALTWATER AQUARIUM,**

BUT *WERE* AFRAID TO ASK!

by

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SELECTING BASIC EQUIPMENT

1. Aquarium Tank

The tank is a basic, but very important piece of equipment. The beginning aquarist is well advised to acquire a standard, all-glass tank of the type sold in most aquarium stores. The tank should not have any metal trim as this is easily corroded by salt water. Tank size should be a minimum of 20 gallons. This allows a large enough volume of water, as well as a large area of filter-bed, to aid the aquarist in maintaining water quality. A plastic tank cover for the aquarium is also advised. The tank cover will reduce the evaporation of water, keep materials from falling into the tank, and keep over-active animals from falling out. Most tank covers are equipped with lights. Florescent lights are preferable to incandescent lights as they give longer, more efficient lighting and burn cooler. Warm white or full spectrum florescent lights (Vita-Lite or Spectra-Lite) are best for general aquarium lighting.

2. Undergravel Filter/Airlift System

This piece of equipment is the most critical in maintaining a healthy aquarium. The filter supports the filter bed and controls the flow of water and air in the aquarium. A good undergravel filter system will consist of a perforated plastic filter plate, large diameter airlift tubes with directional caps, rigid air-line tubing, and air diffusers (airstones). The airlift tubes channel the flow of air and water from below the filter plant to the surface of the aquarium providing a continuous cycle of water circulation and aeration. These filter systems are available from several manufacturers and can be purchased at the same time the tank is acquired. It is important that the filter plate covers the entire bottom of the aquarium.

3. Air Pump

The filter system of an aquarium is powered by air. A pump capable of producing a consistent, powerful air flow is very important. A high-capacity model as recommended by the aquarium dealer is suggested. Other accessories needed to complete the system include flexible air-line tubing and a plastic gang valve. The tubing will connect the pump to the filter system. The gang valve controls the flow of air into the aquarium.

4. Aquarium Gravel

The gravel used in a saltwater aquarium performs several important functions. First, it acts as a place where beneficial bacteria can grow. These bacteria are called "nitrifiers" and are responsible for converting nitrogenous waste products into less toxic forms of nitrogen. Secondly, the gravel acts as a buffer for the water in the aquarium, preventing it from becoming too acidic over time. Lastly, the gravel traps suspended particles which accumulate in the aquarium. The filter system circulates water through the gravel allowing the bacterial action and buffering to take place. When choosing a gravel for your saltwater aquarium, these functions must be considered. The gravel should be the proper size to allow for efficient circulation, and it should be calcareous (containing calcium) to provide a buffer for the aquarium water. Saltwater aquarium gravel is available as crushed coral, or dolomite from most aquarium dealers. Avoid the use of colored gravels which are unnatural and not suitable for use in a salt water aquarium. Approximately 50 pounds of gravel are needed for a 20-gallon aquarium.

5. Synthetic Sea Salts

The most convenient way for the beginning aquarist to get salt water is to mix it using synthetic sea salts. These salts are sold under various names (Instant Ocean, Forty Fathoms), and are specially formulated to provide a simulated seawater environment which is healthy for marine animals. It is important to use these prepared salts because they contain many of the trace elements necessary for normal, healthy growth. The salts are easily stored and can be readily mixed when new water is needed. The use of natural waters is not recommended due to the presence of pollutants and disease-causing organisms. If this approach is used, consult the literature, or local aquarists, for the proper way to collect, store and use natural waters in the aquarium.

6. Hydrometer/Thermometer

Salinity and temperature are two components of the marine environment that are critical in the survival of the aquarium inhabitants. Salinity can be easily measured by the use of a standard hydrometer and a thermometer. The specific gravity determined with the hydrometer and the temperature reading can be used to extrapolate the salinity value of the aquarium water. Temperature readings are also needed to make sure the environment of the aquarium is not fluctuating too much.

7. Heater

Proper tank placement and keeping of local marine animals often does not require the use of an aquarium heater. Some marine tropical specimens have different temperature requirements and may necessitate additional heating. One should research the temperature and salinity requirements of any new animal being considered to determine if it is suitable for a particular aquarium. If the aquarium is located in a room where the temperature will fluctuate outside an acceptable range, then a heater is a necessity. Remember, keeping a constant and stable environment for aquarium animals is the key to success.

8. Outside Filter

An outside power filter is not a necessity for a salt water aquarium. These filters can aid in the chemical filtration of the aquarium water and in the maintenance of water clarity. Further information on outside filtration is available in the literature, or from local aquarium dealers.

9. Water Testing Kits

Chemical water testing is not always necessary for the beginning aquarist if the rules of aquarium run-in and maintenance are followed. Test kits are available for determining oxygen, pH, ammonia, and other forms of nitrogen in the water. Of these tests, only pH is required on a regular basis and a good pH test kit is an important tool for the aquarist. The pH level in the aquarium should be maintained between 8.0 to 8.3 with the optimum level being 8.1 to 8.2.

10. Note

Avoid the exotic (and often expensive) machines which make fantastic claims of improved water quality for an aquarium. Stick to the basics until the early lessons of saltwater aquarium keeping have been learned. Once the desire to keep marine animals is established, one may wish to expand and try new products, larger tanks, and new animal species.

SETTING UP

1. Tank Preparation

Rinse the aquarium tank and all accessories in fresh water. Fill the tank with water and examine it for any signs of leakage. Remember, never use detergents of any kind to clean either the inside or the outside of the aquarium. These mixtures are toxic to marine animals and should be kept away from the tank.

2. Tank Location

Locate the aquarium away from areas of temperature extremes, such as next to a heater or air conditioner. Avoid direct sunlight which can cause temperature change and promote unwanted algal growth. Aquarium lights can be turned off at night to provide a natural cycle of day and night for the animals. However, the aquarium should not be plunged into total darkness because the sudden change can be very stressful. If the aquarium is not located in a room with natural light, a night light can be used to provide a low level of illumination while the main aquarium are turned off. It is wise to place your aquarium away from a major thoroughfare. Constant activity in front of your aquarium can stress the animals in a confined space. Finally, make sure that your table or stand is sturdy enough to support the tank. Water is extremely heavy (about 8 pounds per gallon), and a functioning 20-gallon aquarium may weigh almost 200 pounds.

3. Filter Installation

Install the undergravel filter and connect all air lines to the pump. If possible, locate the air pump above the level of the water in the aquarium. This will prevent water siphoning into the pump in the event of a power failure. Aquarium gravel should be washed thoroughly to remove all dust and debris.

4. Adding Salt Water

Mix the synthetic sea salts into the water until you obtain the desired specific gravity. If your freshwater source has been chlorinated, a dechlorinator should be used to prepare the water for use. A liquid dechlorinator can be obtained at a local aquarium supply store. The salinity may depend on where you have collected your animals, but salt water aquariums should have specific gravities between 1.020 and 1.021. This corresponds to a salinity range of 30-32 ‰ over the normal temperature ranges of salt water aquariums. Check the water temperature to determine the proper specific gravity reading for your tank. After mixing, add this water to the aquarium tank. Be sure to check the water at all stages with the hydrometer.

5. Starting Air Circulation System

Plug in your air pump and adjust the flow of air (with the gang valve) in the airlift tubes until they are about equal. The filtration system should be allowed to operate for at least 24 hours before introducing any animals into the tank.

FILTER “RUN-IN”

1. The undergravel filtration system in an aquarium requires time to become functional. The bacteria which provide “biological filtration” of nitrogenous wastes must be given time to populate the gravel in a tank. This process can take up to 6 weeks.
2. The first step in running-in the filter is to provide a source of food for the bacteria. The simplest way to do this is to add one or two hardy animals to the aquarium. The waste products from these animals will enter the aquarium water and provide food for the growth of the bacteria filter. At this time, levels of toxic wastes, such as ammonia, can become very high. It is important to use very hardy and readily available animals such as crabs or killifish for the run-in period. These animals will be able to tolerate poor water conditions until the biological filter is functioning properly.
3. The bacteria which form the biological filter will enter the aquarium with the animals. It will then take about 6 weeks for the filter bed to become functional. One way to speed up this process is to add some gravel from an aquarium which is already established. This “seeding” process will introduce healthy bacteria to the tank’s filter bed. “Seeding” can reduce the run-in time, but it is recommended to wait a minimum of 4 weeks before introducing any new animals.
4. Remember, beginning an aquarium takes careful preparation and most of all, patience. Trying to place too many animals into the tank too quickly can cause problems from the start. Begin slowly, learn the workings of the aquarium, and use the run-in period to plan your next collecting trip. This procedure will insure a successful start in the keeping of marine animals.

STOCKING THE AQUARIUM

1. Obtaining marine animals for an aquarium can be exciting, fun, and last but not least, educational. Many interesting animals can be collected in the Tidewater area from shallow water and with simple equipment. Starfish, large snails, hermit crabs, seahorses, and even tropical fish can be found among the many animals which regularly visit local waters. Local marine animals are often hardy and best of all, they are free.
2. When introducing a new animal to an aquarium, make sure that the temperature and salinity of the water in the tank matches that from which the animal was taken. Many times these conditions are not met and the new animal will require some acclimation. The temperature of the new animal’s water should be allowed to slowly equalize with the aquarium’s temperature. Salinities should be close, but need not be exact. Aquarium water may need to be added to the new animal’s water to regulate a gradual adjustment of the salinity. Aeration of the water will be required while acclimation takes place. Remember, rapid changes of temperature and salinity can cause severe stress in marine animals. Keep this in mind when collecting or introducing new animals to an aquarium.
3. When introducing new animals to an aquarium, patience must again be practiced. Never add more than one or two animals to an aquarium at a given time. Adding many animals can overload the biological filtration system and dangerous levels of toxic wastes may develop. By introducing animals more slowly, the bacteria in the filter can adjust to the added loads of wastes in the water.
4. When collecting marine animals and stocking an aquarium, one important rule should be remembered: **overcrowding of the aquarium is the single most common cause of problems for the beginning aquarist!** As efficient as an aquarium filtration system can become, it has a limit to the amount of animal wastes which it can treat. The number of animals which a tank can hold (carrying capacity) is determined by the volume of water and area of your filter bed. One suggested “rule of thumb” for determining the carrying capacity of your tank is “one inch of animal for every 2 gallons of water.” This figure may be somewhat conservative, but one should be careful to follow good aquarium maintenance practices and avoid exceeding these levels. An aquarium tank with a few prize specimens in healthy condition can be much more rewarding than one where animals are overcrowded for living space and struggling to survive.

AQUARIUM MAINTENANCE

1. Water Quality

Maintenance of good water quality in an aquarium requires several simple activities. First, one should follow the rules of aquarium set-up which will ensure that the system begins on a healthy basis. Secondly, certain aspects of water quality should be checked on a regular basis. Water temperature should be checked daily and salinity and pH at least twice per week. Fresh water can be used to top off the aquarium and keep the salinity from rising due to evaporation. If the water source has been chlorinated, remember to use a dechlorinator to prepare the water for use. The pH can be adjusted using baking soda if the reading is too low. One level teaspoon of baking soda per 20 gallons of water will raise the pH value in the aquarium. The baking soda should first be dissolved in fresh water before adding to the aquarium. If the pH reading the following day is still too low, repeat these steps daily until the pH value is acceptable. Finally, partial water changes of about 20-25% per month will keep the aquarium water from accumulating harmful levels of certain substances. Regular water changes replenish some trace elements and dilute any substances which would normally build up in the aquarium. This simple procedure is most effective for keeping a healthy aquarium environment and should be practiced on a regularly scheduled basis.

2. Feeding

The feeding of marine animals can be one of the most enjoyable parts of aquarium keeping. Many species have interesting adaptations for feeding which make their behavior quite unusual to watch. On the other hand, feeding can be quite frustrating when the animals won't accept the food offered to them. Since the nutritional needs of marine animals vary greatly, some experimentation may be necessary. General rules apply to the feeding of animals in the salt water aquarium. First, and most important, **do NOT overfeed!** Excess food in an aquarium will decompose and can severely affect the water quality. Any uneaten food should be removed after 15-30 minutes. Second, try to feed the proper food for the animals being kept. For example, seahorses will not eat large chunks of cut fish or shrimp, but take readily to brine shrimp. Many times the need to experiment can be avoided by researching the feeding habits of the animals in the literature, and with local aquarists. Third, feeding schedules may vary depending on the particular animal. Many invertebrates require feeding only twice a week while most fish need to be fed at least once a day. Finally, feeding time is when one can get to know the marine animals. Observations of their behavior can tell one a lot about their natural life cycles and also about their health. Every aquarium will have certain peculiarities about its community. If one follows the general rules of feeding, a diet and schedule can be developed for the salt water aquarium.

3. Troubleshooting

If all the practices of good aquarium keeping have been followed, it will result in a healthy, happy community. Since problems can sometimes occur, remember these general rules of troubleshooting. First, when a problem is noticed in the tank, such as erratic behavior of feeding, a partial water change should be made. Second, check all parts of the aquarium system for proper operation. Any changes in temperature, salinity, pH, aeration or other factors should be corrected. Third if only one animal is affected, this animal may need to be moved to a separate, smaller tank.