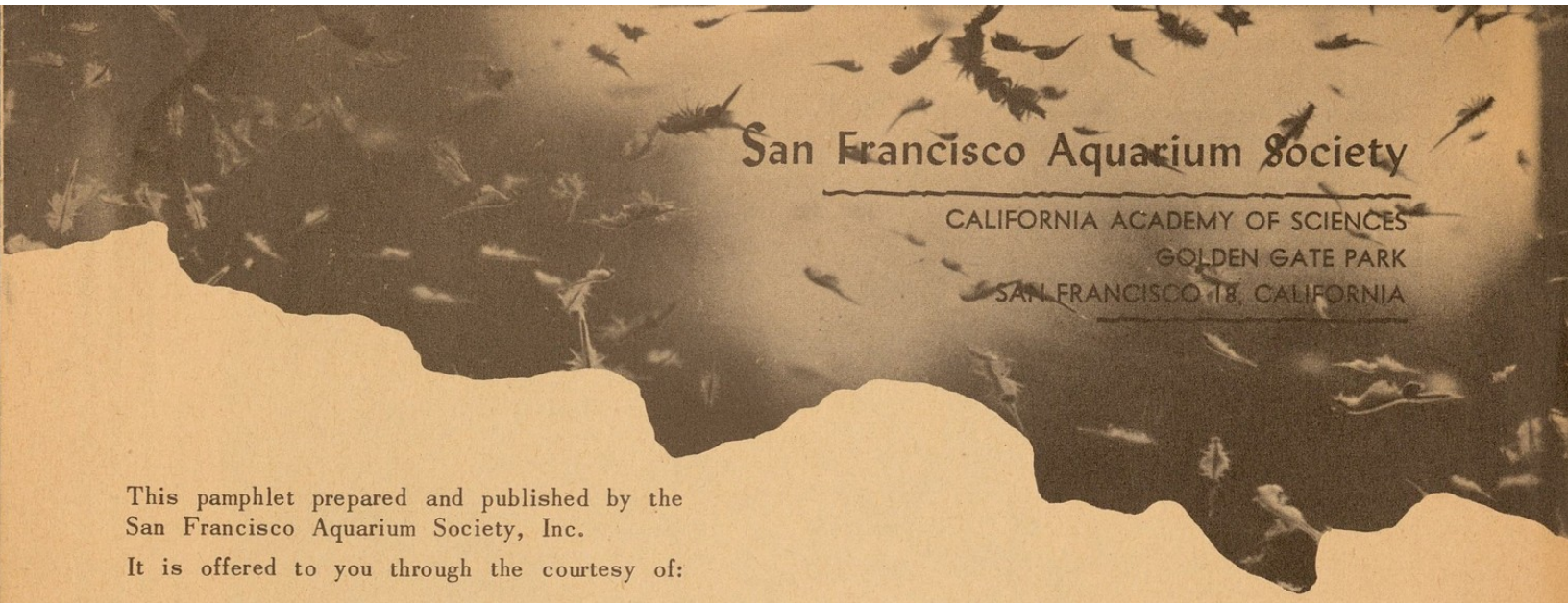


San Francisco Aquarium Society

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This pamphlet prepared and published by the San Francisco Aquarium Society, Inc.
It is offered to you through the courtesy of:

BRINE SHRIMP EGGS

HOW TO GET THE MAXIMUM HATCH

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HOW TO RAISE THE SHRIMP TO MATURITY

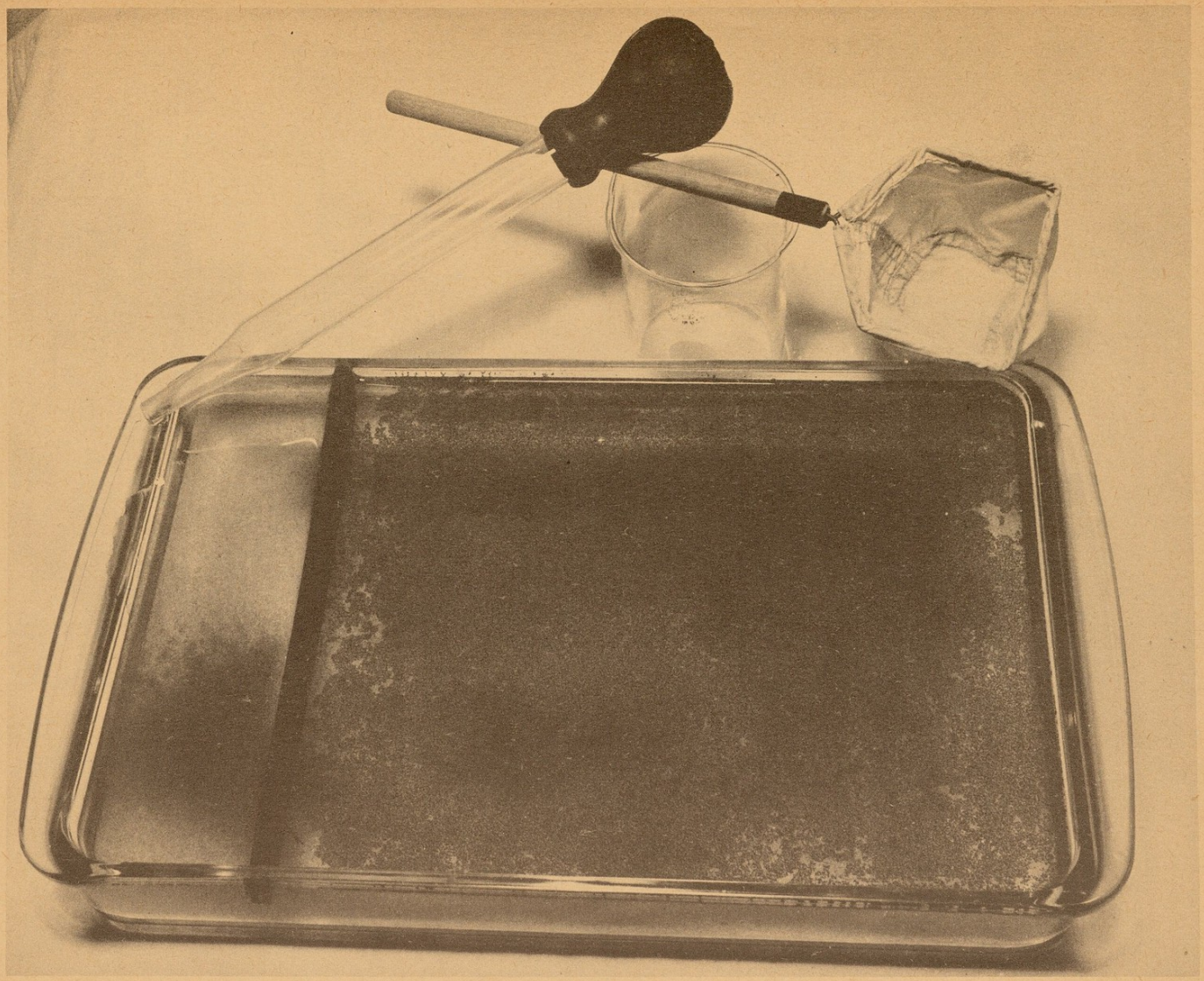
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Experienced aquarists are familiar with Brine Shrimp eggs and they are quite aware of their great importance in successful rearing of baby fishes, but there is sometimes controversy among aquarists over some specific step in their use.

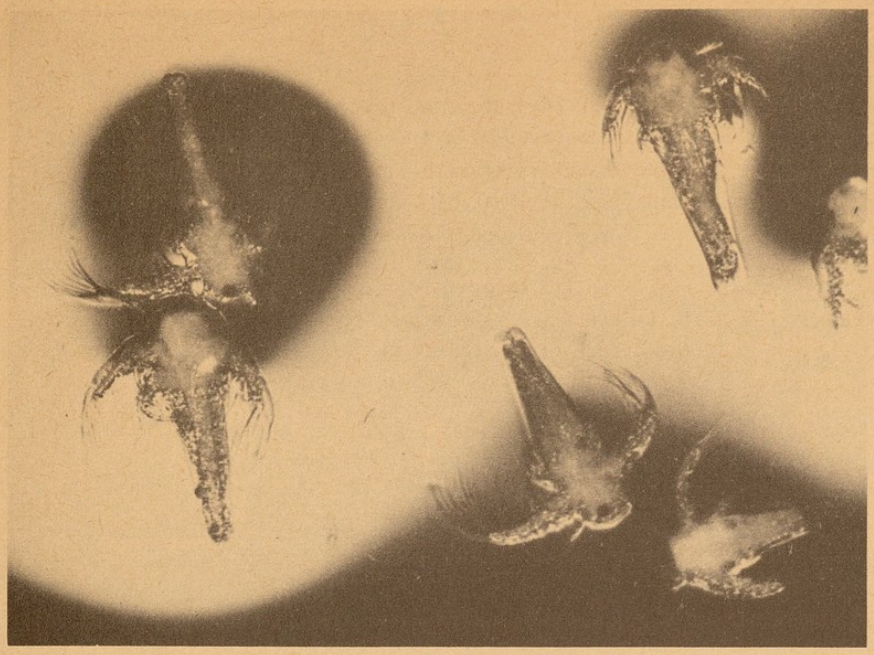
Also, there are always new enthusiasts of fish keeping who are seeking information on the hatching and use of Brine Shrimp eggs. This paper offers some answers to their questions, and seeks to clarify some of the points of controversy.

The Museum of Aquarium & Pet History

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This excellent photo shows an ideal way to hatch Brine Shrimp eggs, together with convenient accessories. An excessive hatch was necessary here to obtain a cloud of shrimp which would show in the photo. Enameled pans of same shape will serve equally well. Newly hatched shrimp congregate at brightest area. This tendency can be stimulated by darkening most of the container with a piece of cardboard. (Photo: Roy A. Card, S. F. Aquarium Society. Nylon net courtesy: Ken-Net, 1680 Lombard St., San Francisco 23, Calif.)



Newly hatched Brine Shrimp, greatly enlarged, as they might appear to baby fishes. Born with a single median eye and one main set of swimmerettes, they will develop a pair of stalked eyes and eleven pairs of swimmerettes by maturity. (Photo: California Academy of Sciences.)

Brine Shrimp eggs are the eggs of Artemia salina, a small crustacean that inhabits very salty waters — saltier than the oceans! To aquarists, their value lies in their importance as a live food for rearing the young of tropical fishes and also as a live food for very small adult Tropicals. **It is not the eggs which are used, but the tiny shrimp which hatch from them.**

These eggs are offered by most every dealer and wholesaler, and also by the San Francisco Aquarium Society, direct. They look like so much fine brown sand, each egg no larger than the period at the end of this sentence. It is well to remember that you can get fooled, for to produce a good hatch of tiny shrimp, the eggs must first have contained the embryos! Empty shells could be sold for "eggs" and the difference would not be apparent to the naked eye.

As a service to the hobby, one of the projects to which this Society has dedicated its efforts has been that of making really good eggs available to all at reasonable prices. The eggs are collected, processed, tested, packed and shipped by full-time, experienced personnel and they are offered in quantities for the aquarist, the breeder, the dealer and the wholesaler. So if you buy your Brine Shrimp eggs from reputable dealers — or from the San Francisco Aquarium Society direct — there need be no dissatisfaction with the quality.

TYPES OF HATCHING CONTAINERS

The most commonly used containers for hatching Brine Shrimp eggs are shallow enameled pans and glass ovenware dishes. These generally hold two or three quarts of water, and will hatch a convenient quantity of eggs. Some aquarists with great numbers of tiny fishes to feed will use an old aquarium, or like container, for larger hatches may be made — especially if aeration is given.

Generally speaking, the enameled pans are best for they offer an easy means of setting up staggered hatches, to assure a continuous supply.

Do not use jars or bottles in which to hatch the eggs. They are difficult to work with, and seldom yield good hatches.

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STRENGTH OF SALT SOLUTION

A salt solution of six tablespoons to the gallon of water is considered the best all-around solution. Weaker solutions may give quicker hatches but the newly hatched shrimp may also lack vigor. A stronger solution may produce more vigorous shrimp, but they will take longer to hatch, and you may not get maximum yield. Sea water may be used, but it is certainly not necessary. Plain rock salt is probably best, using tap-water in which to dissolve it.

A good method of dissolving the salt is to use hot tap-water. After an hour or so when the water has cooled, stir thoroughly — a salt solution of this nature will stratify if not stirred — and when the surface is calm, spread the eggs to be hatched in the middle of the container. This will help prevent the eggs from "creeping" up the sides of the container and getting stranded.

AMOUNT OF EGGS TO USE

In the shallow containers mentioned above, holding two or three quarts of water, hatch only a full **one-quarter teaspoon** of eggs. Be exact — use a measuring spoon. In old aquariums or like containers, holding three to five gallons of water, a teaspoonful of eggs may be used if aeration is given.

Exactness at this point is important, especially with the smaller containers, if you are to get the maximum yield from your eggs. Extensive experiments here have shown conclusively that if more eggs are set to hatch the amount of newly hatched shrimp will be greater, **but it will not be in proportion to the additional quantity of eggs used.** For example: **two** one-quarter teaspoonsfull of eggs hatched in one standard container will produce less newly hatched shrimp than **two** standard containers, each hatching only **one** one-quarter teaspoon of eggs apiece. There are other advantages, too, as will be mentioned later.

TIME FOR HATCHING

Temperature and salinity are the two most important factors influencing the time required for the eggs to hatch. In a six-to-the-gallon solution, with temperatures in the low 70's (room temperature) most of the eggs will have hatched in 22-24 hours. At least, a lot of newly hatched shrimp will be available for feeding, and the rest of the eggs will have hatched in the following 24 hours. When the temperature falls below 65 degrees F., the eggs may require a week or more to hatch!

SEPARATING SHRIMP FROM EGG SHELLS; FEEDING

To insure a tidy aquarium, try to avoid getting any of the egg shells when removing the newly hatched shrimp. In the flat containers this can be avoided easily — simply trim a thin piece of wood, or other material, so that it can be set edgewise across the hatching tray and will hang down just below the surface of the water. Set the eggs to hatch on one side of the divider, cover this side with a piece of cardboard, and the shrimp, when they hatch, will swim under the divider to the brighter end. There they will congregate in a cloud where they are readily accessible. In the larger containers, remove the aerator and soon the shrimp will gather at the brightest part of the tank. Use a syphon or syringe to remove the shrimp.

DO NOT PUT THE SALT WATER INTO YOUR AQUARIUM

Strain the water from the newly hatched shrimp through a fine meshed cloth net. A close woven Nylon material is best, but there are many suitable materials.

To feed your fishes, simply invert the net and wash the shrimp from it into the aquarium, or if several tanks are to be fed, rinse the shrimp into a cup or jar of aquarium water, and use a syringe to distribute the shrimp as needed.

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For a continuous supply of newly hatched shrimp set up staggered hatches, using two or more containers. So long as you do not try to hatch too many eggs at one time, the water may be used over again several times. Strain out the old egg shells before setting up a new hatch, and replace evaporation with **fresh** water.

STORING THE EGGS

Brine Shrimp eggs will retain their viability for many years, if only they are kept dry. They have a tendency to pick up moisture from the air, particularly in humid climates, or where they are subjected to rapid fluctuations of temperature.

English aquarists have hatched our Brine Shrimp eggs after they had been in storage for 12-13 years, and you can do the same if only you will take the trouble to store them in a dry place with a relatively even temperature. **Do not keep them in a "fish room", or leave them on the cover glass of an aquarium.**

Given good eggs, probably the most common reason for a "mysterious" decrease in the amount of hatch is that the eggs have absorbed some moisture. This will seldom be apparent to the naked eye, but you can suspect that moisture has reached your Brine Shrimp eggs when the size of the hatches begins to decrease. Do not despair that you have lost some good eggs. The chances are good that you can bring them up to standard again by simply re-drying them. Spread them on a newspaper and dry them in a sunny window, over a radiator, or even in an open oven with the heat **very** low. Take pains to see that they do not get exposed to very high temperatures. Bear in mind that you are handling **living organisms.**

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RAISING BRINE SHRIMP TO ADULT SIZE

Often there are inquiries about how to raise Brine Shrimp to a larger size. Some come from new aquarists who misunderstand the intended use of Brine Shrimp eggs, still others from inland aquarists for whom the live food problem for their adult fishes may be a difficult one.

After seeing the swarms of newly hatched shrimp in a hatching tray—so easily hatched—a natural conclusion would be that the shrimp might be just as easy to raise, in about the same numbers. They can be raised with relative ease, but unhappily, not in the multitudes that can be hatched from the eggs. Still, when the problem is demanding enough, it can be considered practical to raise your own live food—adult Brine Shrimp—particularly if it is intended for only a few fishes. Also, it can enable you to keep some of those fishes which must have live food to survive.

Perhaps as many as one hundred shrimp may be raised in a gallon of water, and though more can be raised in larger containers such as old aquariums, washing machine tubs, sinks, etc., this writer recommends that the experiment be tried first with a gallon jar or two.

Here's how it's done: use wide-mouthed jars, with lids, and fill them to the point where the jar begins to narrow, with a brine solution made up with one measuring cup of rock salt, two tablespoons of Epsom salts, and one tablespoon of baking **soda** to each gallon of tap water. It is plain from the above that Brine Shrimp like a **really salty** water, and that is the most important thing to remember in raising them.

In each jar put about one-quarter teaspoon of any brand of moist bakers' yeast (no more) and let stand for one day. Then add about an eye-dropper full of newly hatched shrimp—taken from the cloud of shrimp in your hatching tray—cap the jars just a little less than tight to allow for some exchange of air, and forget them for a week.

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After a week you will be able to find the tiny shrimp—if you look carefully—and some growth will be noted. In four or five weeks, though, they will have reached maturity, and a length of about three-eighths of an inch. At that size they are ideal for food for your adult tropicals and for small marine fishes.

Yeast is the only food required to maintain the culture. The second feeding may be given after the culture is two or three weeks old, and the shrimp should be fed about once a week thereafter. Never use more than one-quarter teaspoon of yeast per feeding. Too much may foul the water and the culture will die. That much yeast will make the water cloudy and no more will be needed until the shrimp have cleared the water. Perhaps it would be better to use less yeast and feed more often, but experience and observation will soon help you to work out a schedule for maintaining the cultures.

The same water may be used over and over for new cultures if all the adult shrimp are used for food. Just start again with another eye-dropper of newly hatched shrimp. On the other hand, the adult shrimp will live and reproduce, both by eggs and vivparously for several months, although the numbers of shrimp may gradually diminish.

To preserve the lids from corrosion smear the insides with vasoline. Keep the cultures at room temperature or thereabouts, and away from much direct light, lest they become green.

Once the experience has been acquired in raising Brine Shrimp in gallon containers it's an easy matter to adapt these methods to some of the larger containers previously mentioned, and then you may be raising shrimp in relatively large numbers. It is our opinion that you will have a lot of fun just raising some Brine Shrimp to adult size and observing their breeding habits—whether they are used for fish food or not.

ROBERT VON HEIN



Containers such as these can be used to raise Brine Shrimp to maturity, using a prepared brine solution as described. Evaporation should be replaced with fresh water.

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