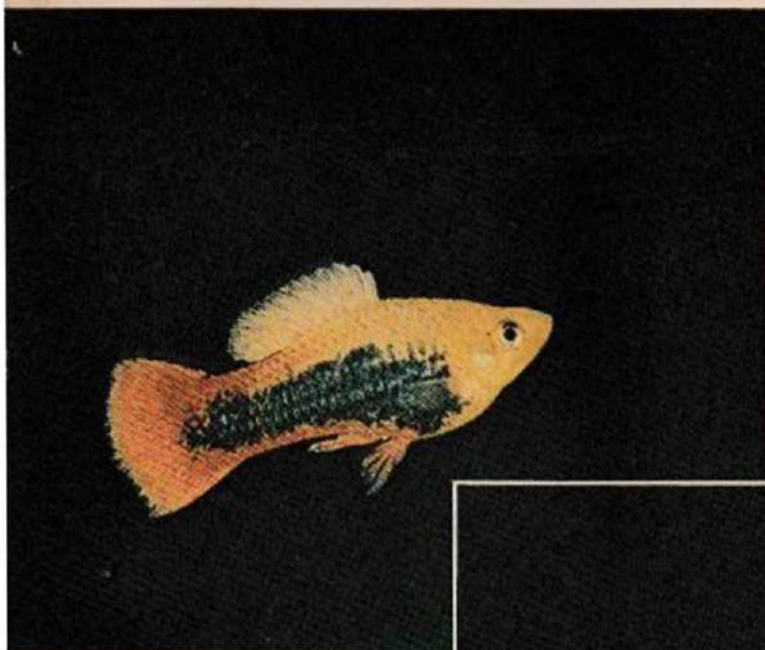


The AQUARIUM

Founded 1932 by William T. Innes

The world's standard monthly work for hobbyists and dealers, highlighting tropical and marine fish, goldfish and related pet news.



Tuxedo Variatus—a new strain developed by George Florschutz, formerly of Brooklyn and Long Island, New York, now of Sebastian, Florida.



Photographs by Dick Lugenbeel.

AUGUST 1966

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August, 1966
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The Aquarist's Calendar



ARIES



PISCES



AQUARIUS



TAURUS



GEMINI



CANCER



LEO



VIRGO



CAPRICORN



LIBRA



SCORPIO

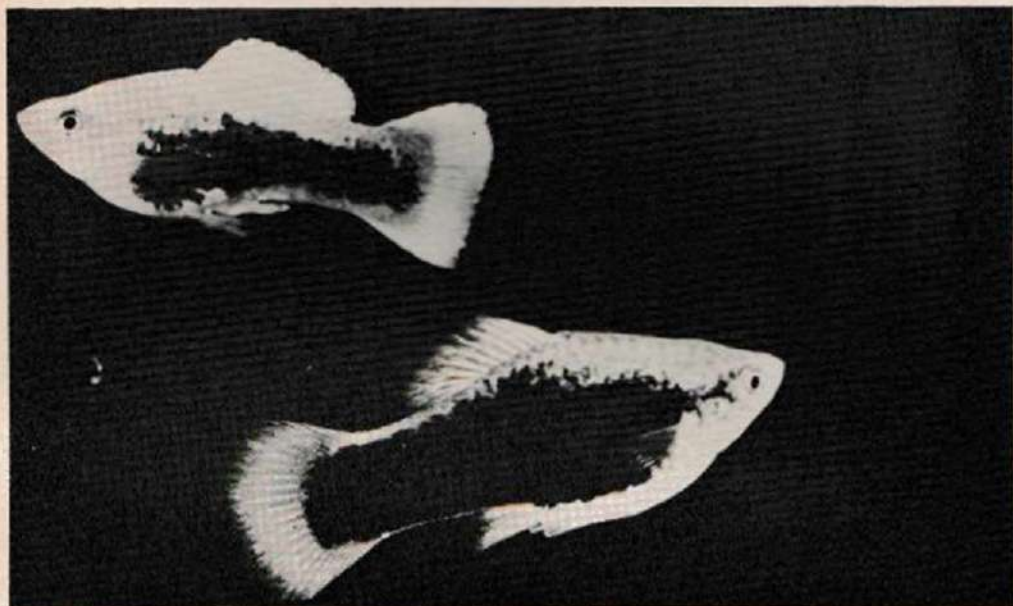


SAGITTARIUS

The poets seem to forget August. Perhaps the name of the month has something to do with it. Finding something that rhymes with it is rather difficult. A good poet could get around it somehow, though —. No, it probably is because by now we are taking the summer season for granted. This is summer as much as it ever will be. There is no promise here for this is a promise come true. Those that are away at the seashore, or in the mountains are too busy to think about it very much, but we who are staying home this month are apt to let the summer slip away, tripped up by the delusion that one has to go away to have a vacation. Actually, a holiday is a state of mind, and adventure can be found on one's front doorstep, if one has a talent for it.

The stay-at-home aquarist has an advantage over non-hobbyists for his avocation is adventure. Dealing with any living thing is. We know a stay-at-home aquarist who, early in June, decided he was going to take a vacation from the hobby. He gave his best goldfish away and he only had "best goldfish", so the end of June found him fishless and hobbyless. True, he never did empty out the big tank that cradled the greenest water you ever saw. He was too tired to, and kept putting it off. In mid-July out of boredom and out of adventure, he considered the big tank and discovered more than greenwater. In fact, he wasn't sure just exactly what he had. It seems the big, beautiful Japanese Imperials (VSF—very special fish) that used to live in that tank had spawned just before he gave them away without his knowing it. Greenwater is full of surprises. This ex-hobbyist was so busy in mid-summer (so we've heard), he never could have written a poem about August because he really didn't know what month it was. He just knew that Japanese Imperials have to be culled at an early age. At any rate, in August, he isn't an ex-hobbyist any more. In fact, it seems that he really never has been away. And so it goes with fishkeeping.

But should the stay-at-home aquarist still feel that getting away is the essence of a holiday, he might try getting away just a little bit. This can be accomplished by packing a net or two, a five-gallon jug, a pair of sneakers that a little wetting won't hurt, a big straw hat, a picnic basket of people food, and an aerating device into the family car. Inviting a willing companion to come along helps to liven things up a bit (two or three willing companions are even better), and take off to a nearby lake, cypress swamp, pond, or brackish inlet. Some call this a collecting trip, but the in-crowd knows that this can be as exciting as any African safari. Just one thing to remember, though,—don't bring back any fish that you don't have room for or that you don't intend to care for as well as you would any specimen you bought from your dealer. If you don't know how to care for native fish, read some articles on them before you go. And take it easy on the highway. There's no adventure in becoming a statistic.



Tuxedo Variatus, new strain developed by George Florschutz of Sebastian, Florida. (Male in upper position, female below).

THE TUXEDO VARIATUS

Some background on our cover fish
(Photographs by Richard Lugenbeel)

Early in the spring, our friend Mr. Hugo Schnelle, of Paramount Aquarium, telephoned us to tell us about a newly developed strain of *Xiphophorus variatus*, stemming from a carefully controlled breeding program between the Red Tuxedo Moon male and the Sunset Platy Variatus female, conducted by Aquarist George Florschutz, formerly of Brooklyn, New York, but now operating a tropical fish hatchery in Sebastian, Florida.

Mr. Schnelle's description of the strain sparked our enthusiasm to see it and to introduce it to our readers. Arrangements were made for specimens to be shipped to aquarist and photographer Dick Lugenbeel and the cover photographs are the results.

We are told that after a two-year breeding program, the yield is approximately 50 percent true, all offspring com-

ing to the Variatus side female. The desirable characterization common to the Platy Variatus, such as hardy stock, excellence of disposition, and attractiveness are unaltered in the Tuxedo Variatus strain, and the vivid colors are very appealing in the home aquarium. Paramount Aquarium of Vero Beach, Florida has a limited number of specimens and information regarding the strain can be obtained by writing that establishment.

George Florschutz has been associated with fish breeding for a period of 50 years. He served as chairman of the lecturer committee of the Greater City Aquarium Society of Brooklyn, New York for two years. Based on his extensive knowledge on tropical fish breeding and species development, he has judged tropical fish exhibits all along the eastern seaboard. He has made significant contributions to the tropical fish industry in Florida during the past 31 years.

The Editor's Letter...

Helen Simkatis

Because August is a vacation month, a hot month, and a generally take-it-easy time of year, we thought we'd talk about books. Our parent, Aquariums Incorporated of Maywood, New Jersey, has changed our name from The Aquarium Publishing Co. to Pet Books Incorporated because the scope of its publishing activities has widened.

Tropical fish, of course, are receiving primary attention in the venture as is evidenced by an economy edition of the revised 19th edition of William T. Innes's *Exotic Aquarium Fishes*. This issue of Dr. Innes's classic, not as it first appeared, but as it evolved from edition to edition to its present form (19th revised edition) is now available within the price range of all hobbyists, at a fraction of its original price.

The hobby is well represented in a new series of paper back publications being introduced by Pet Books Incorporated, also. *Your First Aquarium* will give the beginner step-by-step information on setting up a new aquarium, what he should have in the way of equipment, the parts light, heat, and aeration play in fishkeeping, and which species to choose should the first tank he owns serve a community of different kinds of fishes. This little work of 32 pages is well illustrated and the mechanics of aeration and filtration are explained by the written word as well as photographically.

Another book in the series is entitled *Tropical Fish for the Community Tank*. This booklet of 32 pages goes into the characteristics of the popular species of fish that attract the beginner. From the description of each species, he can judge what fishes he should consider for his aquarium community.

For those who are considering a turtle tank there is a 32-page booklet simply entitled *Turtles*. Turtle care is its prime purpose and certainly this much beloved but misunderstood pet will fare better in the future if prospective buyers will consult this little book first before going blindly into a purchase of a turtle without knowing its requirements.

The non-aquarist titles should be mentioned here also, as many hobbyists are owners of cats, dogs, birds, etc. *German Shepherds* receive attention in a booklet by this title. How to choose a puppy, how to train, feed, and breed are all considered along with a brief history of this important breed. *Poodles* which have won the hearts of us all, are treated in a booklet by this title and it is brought home that this attractive bundle of dog is far more than a fashion accessory. Personality, history, choosing a puppy, training, feeding, grooming, and breeding have a place in this brief but cogent work.

Hamsters and sub-teenagers seem to have a way of finding each other. The booklet by this title will help the child as well as the parent to set this whimsical little animal up in a style that will best accommodate its needs. Wild and domestic hamsters are considered, care and feeding are discussed, health and living quarters are gone into, and a very useful list of do's and don'ts are given that include the breeding and care of expectant mothers. The little book on *Parrakeets* is most thoughtfully written. Selection, housing, feeding, taming, and health are all considered and any owner of this colorful little charmer should have this 32-booklet for reference and consultation. We were especially pleased with *Kittens*.

(Continued on page 39)

DO THEY REALLY LEARN?

by Marguerita A. Reuting

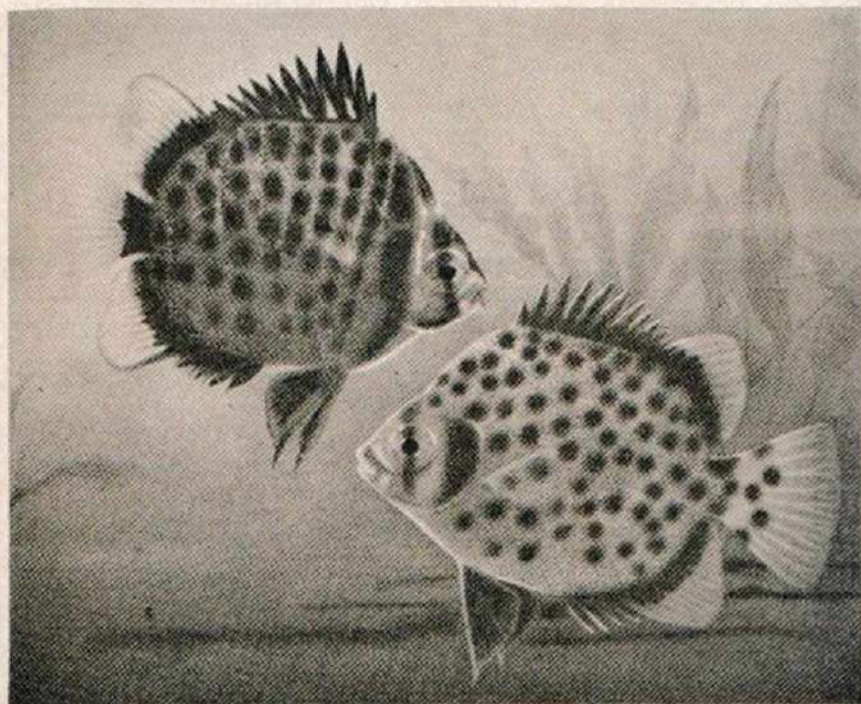
*Author's note: The editorial use of "we" is used strictly in the sense of the singular.

Some people say "no" to the above question concerning fish. Others say, that with the use of small electric shocks, they can be taught. We* only know that one certain fish that we had at one time, learned many tricks easily, retained the memory of them, and no electric shocks were necessary—only a little reward.

This fish was *Scatophagus argus*, or, as is more commonly known, a Tiger Scat. He was just a baby and was about the size of a quarter when we brought him home from the tropical fish store. We had no idea of trying to teach him anything at first. He taught us that he was

willing to learn. The first little trick that he taught himself was to rise to the surface, with his mouth out of the water, and take brine shrimp pellets from our fingers. We only had him for about a month at this time. Then he started leaping up out of the water a little to catch the pellets as we dropped them from about six or seven inches above the surface of the water. He never missed.

We decided that if he were so willing to do this much, maybe he could learn other tricks a bit more difficult. He had been with us for almost six months now and we guessed he wasn't much older



Scatophagus argus (PALLAS)

than that—perhaps seven or eight months old. He was almost two inches long now and he shared a 20-gallon aquarium with one other fish as his tankmate, a 5-inch *Plecostomus*. To work with the Scat, we would take the *Plecostomus* out and board him in another aquarium for a while.

The Scat liked to be petted and whenever he saw us coming he would put his nose to the glass and swish his body this way and that, frantically swirling the water, trying to attract our attention. We decided to see if we could further this habit. We put a brine shrimp pellet in our hand and then put our hand into the aquarium. He backed up into the back corner as our hand was entering the water. Then he sailed out and up to meet it. We petted him gently, then gave him the pellet. This continued for several days. He became used to our hand being in the water. One day we put our hand in the water, petted him a little, then we slowly moved our hand away from him and edged it downwards. He followed it. Then we moved it under him. In trying to follow this maneuver, he turned a slow flip. We gave him the pellet right then and petted his sides with our fingers. He liked this and begged for more pellets, which he got.

He seemed to have understood from then on, because everytime we would put our hand in the water and move it in the same motion, he would follow it and turn the flip as we moved our hand under him. Each time he did this he was rewarded handsomely. He got so he could do this quite rapidly as we moved our hand a little faster.

One day, after quite a bit of time had lapsed and the Scat had learned the above trick very well, we thought that we might try something a little different. We walked up to the aquarium and he was swishing back and forth, wanting to be petted, but we didn't put our hand in

the water this time. We put it up to the front panel of glass instead. He looked at it, then up at us, then he backed away as if he were trying to figure out what we wanted him to do. We started to make the same motions on the outside of the aquarium that we had done inside it, very slowly. We did this about four times, and at the end of each time the Scat would come up to the glass and look real hard, first at the hand, then up to us. As the movement of the hand started for the fifth time, he backed into the back corner of the aquarium, and as our hand started close to the surface of the water he rose to meet it. Then continuing to follow the motion of the hand, he crossed the aquarium and started down and did the flip. We were thrilled! He did it! He had followed the hand from the outside of the aquarium! Needless to say, he got his share of pellets and petting after that. The next day we did the same thing, though this time he didn't need much encouragement to follow the hand that was on the outside of the aquarium. From that day forward, he never forgot that, or the other tricks, that he had learned. We went through the whole program often.

There were a few more tricks that he had learned before we had to give him away, but none so spectacular as the above. He never forgot any of them. He was three years old and five inches long when we gave him away. We understand that he is still alive, is almost seven inches long, is six years old, and is still very colorful with his brilliant orange and black, shading to grey in places. Though we don't know if anyone has continued to work with him, we hope so. He did so love to perform and be rewarded.

We don't think that we shall ever forget that Scat. Someday we must get another one and try to teach it, if it would be willing to learn. It was so much fun, and so rewarding to us!



"THIS IS MY PROBLEM"

In which we print the answers to questions that some of our thousands of readers are asking. Let us know YOUR aquarium problem.

From: Gilbert Broughton, Ashtabula, Ohio

We have a *Botia modestos* that make a loud clicking noise at the surface or submerged while eating or chasing another fish. What is the cause of this and why? Does anyone have any ideas?

Answer: *Many fishes make sounds. They have various ways of doing this. Sometimes the sound comes from the mouth or lips of the fish, and sometimes a fish produces sound by gas bubbles passing from the swim-bladder and released through the mouth. Catfishes make sounds from the swim-bladder, too, but this is accomplished by a spring-like arrangement that picks up a vibration. Many fishes have been given popular names because of their ability to make sounds. It isn't surprising that fish can make sounds when you consider the fact that they can hear sounds. N. B. Marshall in his The Life of Fishes will give you further information on this subject.*

From: E. Wiczorek, Chicago, Illinois

Recently my son became interested in tropical fish; fancy guppies to be exact. Upon the arrival of the first batch of baby guppies, he ran into a problem. The baby guppies are so small that they can swim or be drawn into the slots at the top of the filter. They thus become trapped and cannot get out. We solved the problem as outlined below: The top section of some aquarium filters has a series of slots which readily permit baby fish to swim or be drawn into the filter and become trapped. To eliminate this problem, encase the entire filter in a piece of ladies' nylon stocking of suitable size. The stocking section is secured to the filter by means of a rubber band at the air hose inlet. The nylon stocking

section does not affect the operation of the filter, and the baby fish can no longer be trapped. [Ed. note. The nylon stocking should be boiled in clear water for at least 20 minutes before used. An enamel pot or Corning cookware pot should be used.]

From: Bill Metakes, New York, N. Y.

I have 4 goldfish about 2 inches long each in a 10-gallon tank. I would like to know if there is any other kind of food I can give them other than plain goldfish food. I would also like to know if there is any kind of live food that goldfish will eat. I would appreciate it if you could tell me of any books on the subject.

Answer: *Goldfish should be given some fresh food. You could give them small pieces of green shrimp or small pieces of lean raw beef. They will eat frozen adult brine shrimp which can be purchased in aquarium shops and they like chopped earthworms. Your public library will have a good collection of books on fish-keeping some of which are devoted exclusively to goldfish.*

From: Robert Tong, San Francisco, California

I have a mated pair of angels which has been bred already by someone else who sold the pair to me. At present they are in a 11-gallon tank with a filter and slate. They have been in the tank for three and a half weeks and still there is no sign of any of them cleaning a spot on which to deposit their eggs. You might say, however, that the pair are not in condition, but they have not been bred for at least 2 months and during that time have been conditioned. I would now like to point out that the tank is covered with newspaper to insure privacy

(except for the side glasses). The tank I am trying to breed them in is like a show tank but a little bit wider. Do you think that is the reason why they are not breeding? Can they be picking on the slate without my notice? Brine shrimp and tubifex worms are their only kind of food I condition them on. Is that okay? The pH is 6.8 and the temperature is 79 degrees. In intervals the angels will show interest in each other and will often fight (especially during feeding time). Why is the breeding not started?

Answer: *Your angels are not yet acclimated to their new quarters perhaps. Usually this takes a little while. I do not believe it is necessary to keep them covered with newspapers. If the tank that you have supplied is well planted, they will feel the security they require and will not have to wonder what is happening outside the screen. I believe the tank is a little small. Angels should have a 20-gallon tank for spawning. This is not a firm rule, however, as they have spawned in a 10-gallon tank. Your feeding routine seems adequate and in that they are interested in food, they can't be too upset. Take away the newspapers and give them an opportunity to become familiar with their new surroundings and one day they will surprise you with a spawning.*

From: Richard B. O'Connor, Brooklyn, New York

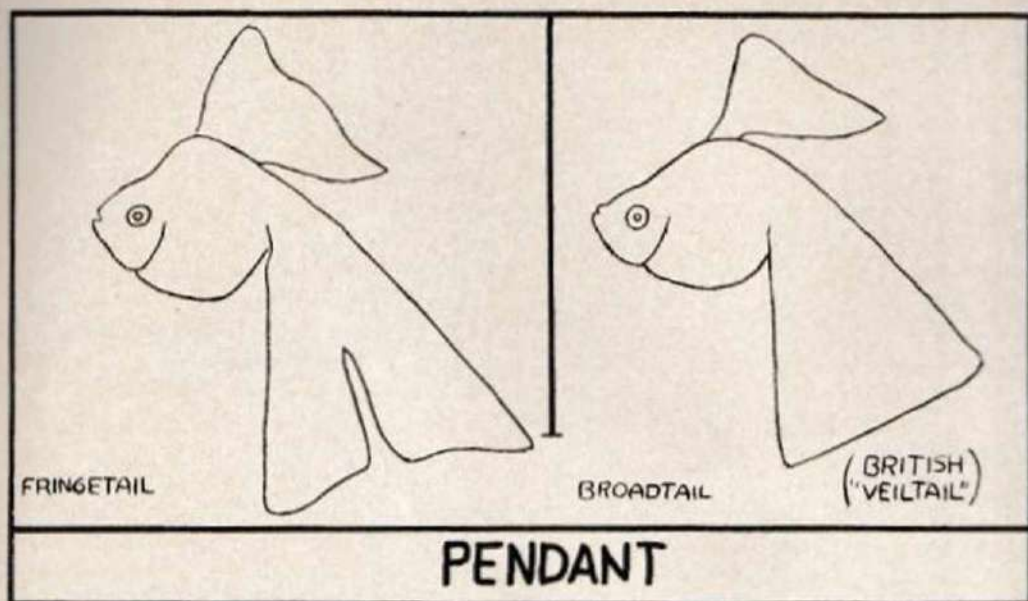
The feeding of baby guppies and goldfish as food to larger fish is one of the least attractive aspects of this wonderful hobby of tropical fish. It appears to be becoming more prevalent recently than before. It's ironic that we, who are so sensitive to animal creatures should be guilty of this crime. Who is to say which has more value: a goldfish or a Snakehead? You condoned this in response to a letter that appeared some months ago. You as a prime force in the hobby could lend your leadership to bring about eliminating this black mark against us. It is simply inhumane and there are many substitutes, as we know, that are

on the market that can be used instead of live fish. If you are not in agreement with these words would you at least publish such a viewpoint in your fine periodical *The Aquarium Magazine*.

Answer: *I agree with you whole-heartedly that one of the least attractive aspects in our hobby is the feeding of live fish to other fish. If you were at all familiar with my writing in the past, you would know that I have expressed this many times. The letter to which you refer, however, deals with a Piranha in the hands of a hobbyist. It seems to me that any aquarist handling a Piranha must feed it. He cannot allow the fish to starve to death. This may not be a good solution to the problem, and I personally would sidestep the matter by not keeping a Piranha. Incidentally, some Piranha enthusiasts state that if acquired young enough, a Piranha will accept chunks of lean beef, etc. and can be brought up on other than live food. Your protest, however, has been voiced before and I have considered it many times. The curator of a zoo is faced with the same problem when he maintains a snake or other creature that will accept nothing but live food. If you have a solution to the problem, I wish you would write us about it. I am very happy to have your letter and criticism. It makes me feel better to know that there are other people in the world who feel as I do about this. However, the world in which we live seems to accept the stronger being master over the weaker, and a zebra continues to be the prey of the lion. I regret the system but, of course, I did not invent it.*

From: Michael Robinson, Baltimore, Maryland

Can *Cryptocoryne* species be grown in the home aquarium? I have read a lot about Cape Fear Spatterdock (*Nuphar sagittifolia*) but never see any in the aquarium shops. Are these hard to purchase? When breeding Characins or barbs, should the filter be running? Would you please give me some informa-



MY PROBLEM — cont'd.

tion on the habits of flame tetras (*Hyphessobrycon flammens*)—breeding habits, etc.

Answer: *Cryptocorynes* do very well in the home aquarium. Cape Fear Spatterdock can be bought in most aquarium shops. Certainly it can be purchased from some of the advertisers in *The Aquarium Magazine*. When ordering, use the scientific nomenclature as there are several species of spatterdock. The filter should be turned off when spawning *Characins* or *Barbs* but the airstone should be allowed to run as usual. The Flame Tetra requires lots of space and plenty of live food such as *Daphnia*. It likes a temperature in the mid seventies. The species is bred in a well-planted aquarium where there are thickets of finely divided leaves such as *Myriophyllum*. The fish spawn in a close parallel position. At least 100 eggs are laid which hatch in about three days. Green water and infusoria are a first food. After a week or two, newly hatched brine shrimp should be offered.

AUGUST, 1966

FANCY GOLDFISH

by W. Bourcy-Beckley

Part II

TAIL TYPES

Some eleven or twelve distinct tail types of goldfish have, so far, made their appearance. They group into four basic classes: Trailers, butterflys, pendants and multilobes; there is also, reputedly, a tailless group. But, no evidence of any strains of such a type has, as yet, come to the attention of the author.

Trailers

Possibly the oldest (and probably the rarest) of the trailer types is the Phoenix tail*. This strain was evolved from goldfish which, although growing two complete tails, did not have the two tails separated from each other ("web tails"). Instead of breeding to separate the two tails, selections were made which retained the fusion of the two tails, and blended the side lobes into them to form what appears to be one enormous, single, horizontal tail, trailing behind the fish; there is evidence to indicate

that this particular tail type is rarely, if at all obtainable in other than the telescope-eyed breeds. All other tail types have at least two fully divided tails.

The simplest form of divided-tail trailer types is, in classification, difficult to limit, because, from it developed both the two remaining trailer types and the two (no longer trailer) butterfly types which exist today. This simplest form is the Wing-Tail type, which occurs in extra-fancy "fringetail" strains of celestials, egg fish and bubble eyes; the most fantastic development of this type so far seen by the author is in "extra-fancy" strains of eggfish. At two to three years of age, the lobes of extremely fancy Wing-Tail strains simply get so long that they can no longer be held out horizontally.

From the Wing-Tail, were developed two scroll-tail types. In one, the outer lobes were, in the selective breeding, simply curled over the top of the two rear lobes; all four lobes trail to the rear. Although somewhat scarce, this type occurs in everything from lionheads to fringetails.

In the second type (so far known only in extremely rare pearlscale strains) the gap between both lobes of each tail has been, by selection, completely filled in with tissue (the broadtail: "Veiltail" of the British) and the outer, or bottom, edges have been rolled over the top to form a scroll on each tail. In this strain, the dorsal fin also has been subjected to extensive selection, so that it is an enormous "sail" above the body of the fish; the dorsal fin is inclined rearward, much as in "high fin" swordtails or platys. Pectorals and ventrals, likewise, have been overdeveloped, so that it is almost impossible for this fish to survive at all! This breed was first publically shown in the U. S., at the Los Angeles Hobby Show in June of 1965.

BUTTERFLYS

Also developed from the wingtail are two non-scrolled, non trailer, butterfly types of tails. The point of classification



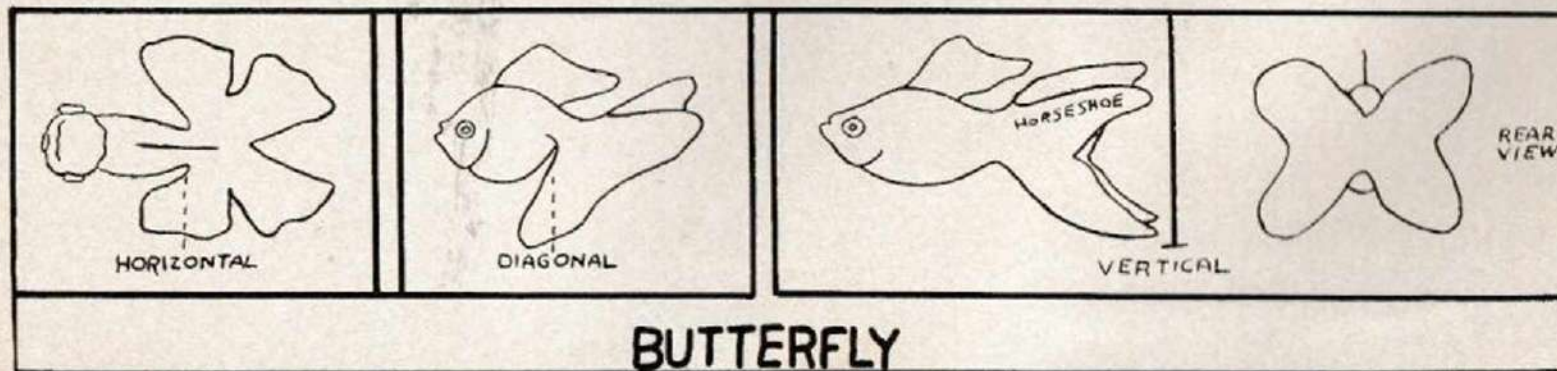
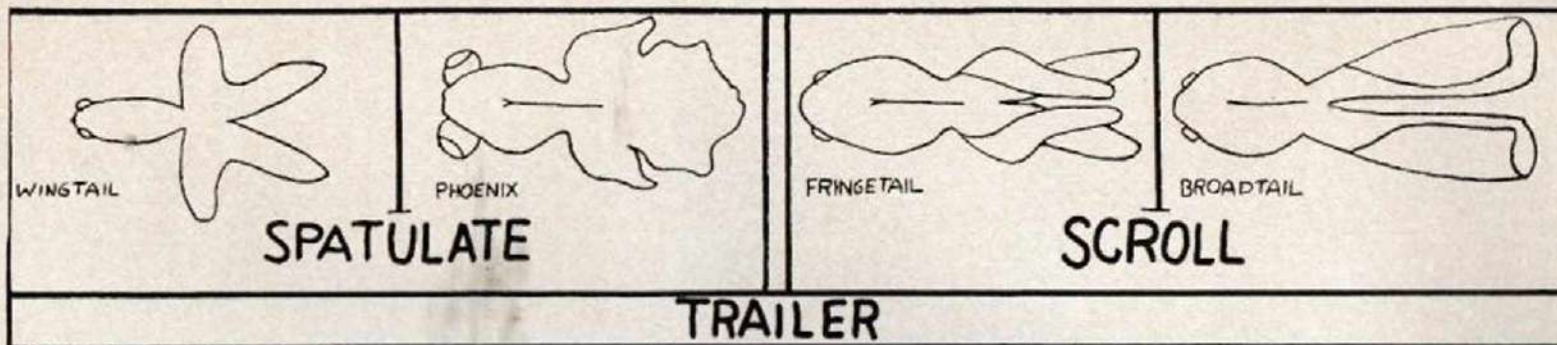
Chinese Broadtail with Scrolled tails.

of both the butterfly types is that the leading edges of the tail extend forward from the base of the tail. There are two types of butterfly tails. In one the tail is entirely horizontal. This type occurs in very fancy strains of telescopes and in some beautiful strains of calico pearlscales (the author has not yet seen the horizontal butterfly tail in any other pearlscales).

In the other butterfly tail type, each tail is nearly filled in solid (approaching a broadtail) and the tails are set at approximately a 30 degree angle to the body of the fish. The tails extend outward (sideways) from the body of the fish like two enormous fans. This is to be seen at its highest development in very select pearlscale breeds; this form of butterfly tail is also the mark of highly bred lionheads.

Two other butterfly type of tails, which, however, have no breeding connection with the preceding types are the *Watonai* and the *Peacock*. These two are Japanese strains and, until very recently, were entirely unknown to the Chinese. The *Watonai* has two parallel, entirely vertical, fringetails, well separated by a pronounced "horse-shoe" shaped space. It came about as an accidental crossing of two types in Tokyo, Japan, around the year 1883 and was first shown at the Fisheries Exhibition in Japan in that year. There is record to indicate a probability that Akiyama, the Tokyo goldfish breeder, saw the *Watonai* at the fair, and, possibly, that

TAIL TYPES



he acquired some of them; there is at the present writing only one identifiable specimen in the U. S. known to the author. Although the breed, very likely, survives in the Tokyo area in Japan, it seems to be unobtainable from Japanese goldfish exporters at present.

The *Peacock* also has two entirely vertical tails, but they are not fringetails (they are more "butterfly" in form) and, in the best specimens, they extend outward, 90 degrees from the body. Biological similarities of body types, color patterns, and tail types carry a very strong implication that the peacock is a present-day development of the *Watonai*. They have long been, and still are today, somewhat of a "monopoly" breed, not easy to obtain.

PENDANT TAILS

Although nearly all tail types from wing to *watonai* (see J. Urata's paintings for Matsubara's types) produce some individuals of such overdevelopment that, when they are fully mature, their tails drape, or hang, there are but two kinds of goldfish basically bred for pendant tails:—The fringetail, and, in China a *Semi-trailer*, the broadtail.

The mature fringetail has two distinct tails of at least the same length of the body of the fish. Specimens whose tail-length reached more than one and one half the body length (by actual measurement) have rarely been seen outside of China. Each tail is bifurcated. That is, there is a space without tissue at the center of the bottom, so that each of the two tails have two lobes at the bottom (a total of four lobes on each fish).

There is a relationship among the pectoral and ventral fins of the fringetail goldfish and its tails, so that; in some strains, a "forecast" of the tail development can be made. Long ventral fins in young fish generally indicate future length in tails; when both the pectoral fins and the ventral fins are wide, the tail lobes will usually grow correspondingly "full" or wide. Some strains have tail lobes so full that the fish look like overdeveloped broadtails. The largest

fringetails, the author has so far seen, are in some strains of bluescales (see page 25 of *Aquarium Magazine*, March 1966) and some Pearl Crane Orandas (see *National Geographic*, November 1964, page 630).

The broadtail type of goldfish is a classification that contains some long standing, generic and semantic problems which, up to this writing, have not been resolved.

The type distinction is that there is no bifurcation in the tails; each tail is completely separated from the other, but, the tissue of each tail is solid (all the way to the bottom edge); their tails do



Meiji Fringetail Goldfish has a long, involved history. W. Bourcy-Beckley tells us about it in his *Fancy Goldfish Part II*.

not develop to the great length of fringetails.

A half century of printed statement notwithstanding, the broadtail type did not derive solely and directly through selections made from the superb strain of goldfish which the Japanese Emperor, Meiji, sent to the Colombian Exposition, in Chicago in 1893. The actual records, and original drawings (particularly Wolf) show these Meijiis to have been probably the finest strain of fringetails to reach the U. S. in the 19th century; though very rare, the Meiji strain of fringetails still exists today.

Centuries before the Colombian Exposition, the Chinese had developed full-tissue types of butterfly tails in the

Pearlscale breed. Strains were developed from these in which the tails were evolved backwards as semi-trailers, retaining the *broadtail* quality (a scroll-tailed development of this breed has been previously described, here.)

Since both rare and fancy goldfish were reaching Mullert and other dealers as early as the 1820's, *directly from China*, and the Pearlscale breed was well known to early American dealers, the probable fact is that, in the 19th Century, Pearlscale strains of *established Chinese broadtails* were bred into several "stock-lines" in early American hatcheries. It would have been inevitable that the Mieji strain would have been directly bred into these Chinese broadtails.

This is, morphologically, further reinforced by their present day descendants; oranges do not grow from apple trees. The present day British and American strains show anatomical characteristics (when entire broods are examined) which are altogether foreign to the Mieji Fringetail strain, and which appear on no known breed of goldfish except the *Chinese pearlscale broadtails*: Body shape in broods *tend* toward the egg-shaped spheroid of pearlscales, and it is only by the most rigid attention to selection that the Mieji type of spinal curve is preserved. Pectoral fins extending *outward* as in the pearlscale (instead of *downward*, as in the Mieji) are almost a trademark of the "hybrids". Dorsal fins revert *strongly* toward the backward sloped "high-fin" type (like sword-tails and platys) of the pearlscale broadtails. And, finally, very few *individuals* in the British or American "hybrid" broadtails develop *full* tails; there is a *strong* tendency in these strains to *revert* to fringetails. The Chinese pearlscale strains breed true as *broadtails*; they *never* revert to *bi-lobed* tails.

Terminology, too, in this (broadtail) breed, has further increased the confusion regarding the type. Unfortunately, Bade, in an attempt to follow de Sauvigny's concept of classifying goldfish breeds *as specie*, evolved the German term

Schleierschwanz. (English translation: Veiltail). This was reported by Wm. T. Innes, the founder of this magazine.

Through the British circulation of *The Aquarium Magazine*, the term "Veiltail" was picked up by the hobbyist in *Britain*, who, still, knows nothing of the long established American term *broadtail* for the same type; The term *broadtail* goes back at least two decades before Bade and continues in print, in America, to the present day.

The *British adopted* term "veiltail" occasionally comes back to us in American print, where evidences of Anglo-mania, or British sources show.

"Veiltail" is a semantically dangerous term, since it can be equally applied to either broadtail or fringetail; its interpolation into the jargon has, already, set up such a state of ambiguity that no clear definitions of the three terms have heretofore been available, and, because of it, many hobbyists have been deluded into searching for *three*, instead of two, pendant tail breeds; veiltail (British) = broadtail (American).

*PHOENIX TAIL (Chinese—Feng wei): There is no doubt concerning the *type* Phoenix tail, but it is uncertain whether the term applies to the web-tailed strains or the multi-lobed strains. The term was applied to the one, or to the other.



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TIDE'S IN

Helen Simkatis



This column deals exclusively with the care of SALT WATER FISH. If you have any problems regarding YOUR Salt Water Fish, we would be glad to hear from you.

From: Joe Norris, Detroit, Michigan

Please let me know what combination of Atlantic fish will be compatible in a 29-gallon tank. I want five fish approximately 2 inches long in the tank. Also, what combination of five Pacific fish in the same sized tank mentioned above. Also, would a 12-inch Nurse Shark alone in a regular tank (20-gallon—24" x 12" x 16") be okay? How about the Nurse shark and one Moray eel in the 20-gallon tank? On page 149 of your book, you say that the Queen and Blue angelfish are best kept alone in one aquarium. What size tank should I use for only one fish? Would the large sized plastic tank found in most pet shops be okay? Or possibly a 15-gallon tank 24" x 12" x 12"?

Answer: *A possible combination for your 29-gallon tank (Atlantic fish) might be a pair of Neon gobies, a four-eyed butterfly fish, a high-hat, and a Sergeant Major. If you would settle for less fish, a pair of butterflies and a French or black angel seem to make a compatible combination. The lesser number of fishes will allow for growth. Black or French angels grow fairly rapidly when getting along well and either species makes an interesting pet and certainly is colorful. For Pacific fish in the same sized tank, a pair of clownfish (Amphiprion percula), one blue demoiselle, one Heniochus acuminatus (be sure to acquire one not measuring more than 3 inches from head to tail), and one of the many species of Pacific butterflies would make a good combination. You should eliminate one fish from each tank, if you plan to use a hermit crab. These little creatures are*

really wonderful scavengers and are most interesting to watch. I am of the opinion that a marine aquarist is missing a lot if one is omitted from his set up. A 15-gallon tank would be a good choice for a blue angel or a queen angel. At first it might seem like a lot of tank for one fish but these species both grow quite large eventually and can use the space. Of course, it is due to their disposition that I advised keeping one to itself in an aquarium. You will read advice to the contrary, but the specimens we have kept always picked on tankmates excessively and we found no exceptions. The shark would not have much room in the tank you describe and not having kept one, I cannot give you first-hand advice on the matter. A Moray eel might do better in a 20-gallon tank, if you choose a small specimen. Be sure that the tank you choose for this species is made especially for salt-water fish. This creature is as fastidious about water conditions as any of the reef fishes and will not survive in a standard tank unless the aquarium cement has been sealed off by Corning's Silastic Aquarium Sealant.

IF YOU ARE MOVING . . .

Please inform us immediately,
giving us your OLD and NEW
addresses.



Dr. Cahalan's *Aphyosemion coeruleum*-*A. nigerianum* cross.

AN INTERESTING KILLIFISH HYBRID

by Thomas L. Cahalan, Ph.D.
Fordham University

In the spring of 1965 I placed a full-grown *Aphyosemion coeruleum*, female, in a five-gallon tank with a male *Aphyosemion nigerianum*. I put several nylon mops and a small glass dish of peat moss in the tank, which had water, half of which was rainwater, of a very low degree of hardness (around 3 dh) and a pH around 6.2, temperature about 77 degrees Fahrenheit. After several weeks I removed the dish of peat and syphoned the bottom of the tank, putting the drainings through a small mesh net. I let the net and contents dry over night, and then put the contents into a plastic bag for storage. Six weeks later I flooded the peat moss with rainwater, and the next day there were four fry visible.

I might mention that originally I had chosen the male *nigerianum* and female *coeruleum* because I thought that there would be less chance of a fatal fight with a smaller male. I hesitated to try the reverse arrangement. Curiosity later won out, and I tried this reverse combination. No driving by the male *coeruleum* took place, nor did he harass the female *nigerianum*. He simply ignored her. I have since tried these combinations several times with the same results. As the initiative seems to be with the male, most of the time it is desirable to use a female as large as, or larger, than the male. Of course, too, with the larger female, the hybrid begins with a larger egg, and the

chances of getting them through the early stages are increased.

The fry grew with great speed, taking baby brine shrimp from the very start, and by the end of summer were fully grown, having reached nearly the size of a *coeruleum*, perhaps three inches. I was at the same time raising some *coeruleum*, and I noted that one could detect a general difference between the two kinds of fry even though I am hard pressed to tical lines which appear very early in

coeruleum fry towards the rear of the body, seemed fainter or absent in the hybrids, but horizontal rows of deep crimson dots began to become marked. Then the largest of the fry began to show sex coloring.

The color photo accompanying this article is unhappily very indistinct, and the fish has been gathered to his ancestors, without my being able to get better ones. But the general details show in the photo. The shape is like that of *coeruleum*, large, bulky, a trifle clumsy. The fish reached a little over three inches in length, not approaching the six or seven inches of a really large *coeruleum*. The tail did not develop the three-pronged shape characteristic of *coeruleum*, and as the male was about a year old at the time of its death, I believe its form was not likely to change with greater age.

The basic color was a much more brilliant blue-green than *coeruleum* usually has and somewhat darker than *nigerianum*. The pectoral fins were dark, and gave the curious "paddling" effect found in some killies, *nigerianum* among them. There were webworks of red lines on the head and gill-covers, and a strong blue line across the lips. Over the body in a somewhat irregular pattern very suggestive of *nigerianum* were bright red be precise in describing it. The faint ver-spots. Just behind the gill plate about a third of the length of the fish from its

mouth were two horizontal dark red bars, one directly over the other. This mark is seen in several species.

A yellow streak similar to that found in *coeruleum* passed through the lower lobe of the tail. The dorsal and anal fins were in form similar to those of *coeruleum*, but not proportionately as large. These fins were a bright yellow-orange, with strong black edgings, very suggestive of *nigerianum*. When excited, the fish got very dark and spread the fins in the "sunfishing" way of male killies. The females were lighter in color than their *coeruleum* sisters, but not otherwise strongly different in color or shape. They seemed to follow *coeruleum* not *nigerianum* in general appearance.

Just after the male reached maturity, during the fall of 1965, eggs began to appear. None of these were hatched, although some development took place. In the early months of this year the male ceased to drive. Although he ate voraciously, appeared in good color, and was active, he lost sexual interest apparently. Shortly after, he died.

When the male ceased to court the females, I put a male *nigerianum* with them. A curious phenomenon took place. This male, an ordinary-sized one that I had bred, started on a spurt of growth which made him by far the biggest *nigerianum* I had ever grown, although I have seen imported specimens nearly five inches long. He immediately courted the females, and eggs soon appeared. Some of these are now some weeks old without spoiling, and development is evident. So I hope to raise some.

Some interesting speculations arise from this breeding:

1. It would appear that the hybrid sterility element in this case is more marked in the male than the female.
 2. The cross is curious in that it mixes a bottom spawner and an adhesive egg spawner, a large species and a small species.
 3. The hatching time and the placement of the eggs in peat follow the behavior patterns of the female, which was true also where the hybrid females spawned
- against the male *nigerianum*. The general shape of the fish followed that of the female parent, while the color was more like that of the male parent.
4. The cross suggests some further lines of breeding which I hope to pursue. *Coeruleum* is said to breed against *A. beauforti* (*gulare*), and if both *nigerianum* and *beauforti* breed against *coeruleum* it is at least possible that they might themselves cross. Unfortunately I have been unable to secure *beauforti* females to test this out.
 5. The possibility of a fertile hybrid would open up fascinating opportunities for the development of improved forms of killifishes. The record of the breeders of livebearers in producing the magnificent *helleri* and platy hybrids, not to mention the recent nearly incredible development of the no longer lowly guppy, suggests that something similar might develop should the problem of infertility of hybrids be overcome.
 6. It would be highly desirable that this cross be repeated by others. I don't believe that just any pair of these fish thrown together will produce results. Some factor of compatibility may exist. Thus a knowledge of even the failures would be significant. It would be interesting to know whether the appearance of the cross would be the same in all cases as that of the fish bred in this experiment. Would the reverse cross (theoretically, not genetically different) produce the same fish, thus not following the trend above noted that shape followed the female parent and color the male?
 7. It would appear that *nigerianum* is evolving to or from a bottom spawning habit. It is now notoriously erratic in its hatching, although the eggs are scattered in the manner of adhesive spawners, which are not usually erratic.
 8. Some clearing-house of information on such crosses is needed to avoid duplication of effort and to bring about maximum utilization of research results.

SALTON SEA EXPEDITION

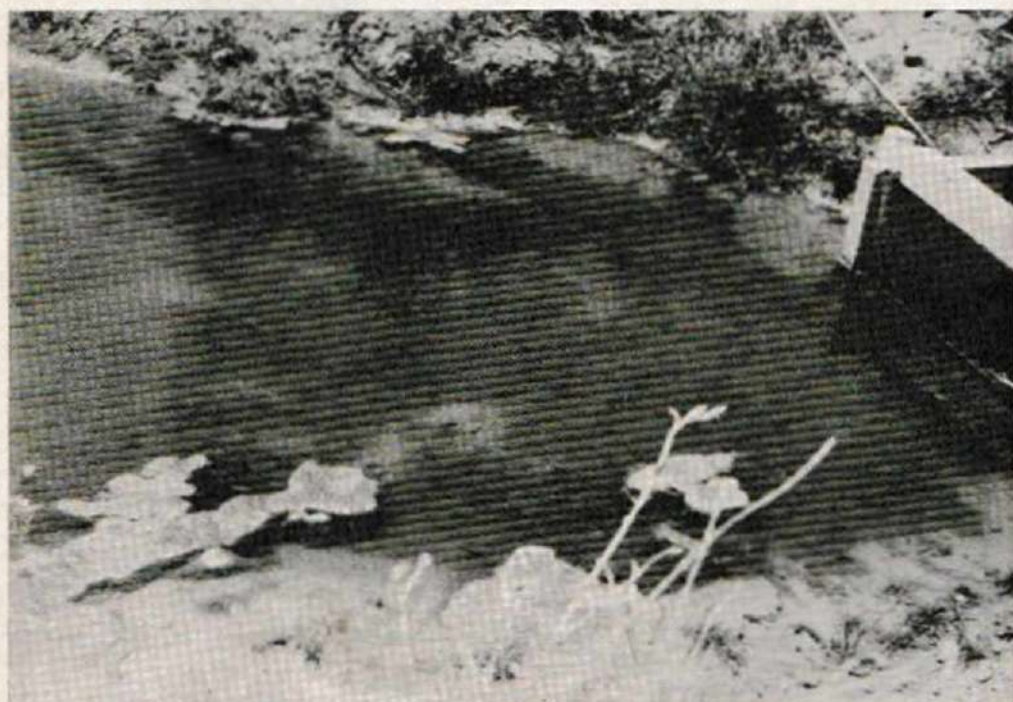
by Charles A. Pratt

Rumors heard at the local pet store told of solid black mollies in the Salton Sea. No! we scoffed, there are no solid black mollies in the wild, and none this far west.

Our home is in San Diego, only about two hours drive from the Salton Sea,

didn't prepare me for wild black mollies in southern California, another place they shouldn't occur.

Finally, we set out to spike this rumor completely. We were well prepared with written directions on exactly how to find the fish, we had a couple of small nets, and just in case, we also had styrofoam



A series of drainage canals encircle the Salton Sea. This is a photograph of one of these, as the water drops into a spillway. Many mollies can be seen amidst clumps of algae in the brackish water.

which is a large inland salt water lake, in Southern California. Local fishermen returning from there, with their catches of *Corvina*, told not only of seeing wild black mollies, but of using them for bait.

Several years ago, I caught wild green mollies (*Mollienesia latipinna*) in coastal waters of North Carolina, which surprised me at the time, as the books didn't mention them so far north. These were at least green, however, so this

coolers for bringing them back. Also of course camera equipment, photography tank, a small vibrator pump, and a car-load of other odds and ends.

We pulled into Westmoreland, a small town on the sea, after dark and found a motel. Much against the wishes of the wife, we went right out in the dark to try to find mollies. We followed the directions exactly, and by flashlight dipped a net into the water of one of the small

canals on the southern end of the lake. Sure enough, there they were! In about half an hour, we caught over twenty mollies.

Back at the motel, we set up a small tank with them, plugged in the little vibrator pump, and set back to examine them. Of the twenty, there were eight almost solid black.

The next day we caught a few more, and selected from those until we had quite a few large almost solid black fish, all the males with beautiful sailfin dorsals. These are magnificent fish. They are the biggest mollies I have ever seen. All the males, both green and black, have a brilliant orange stripe across the top of the dorsal.

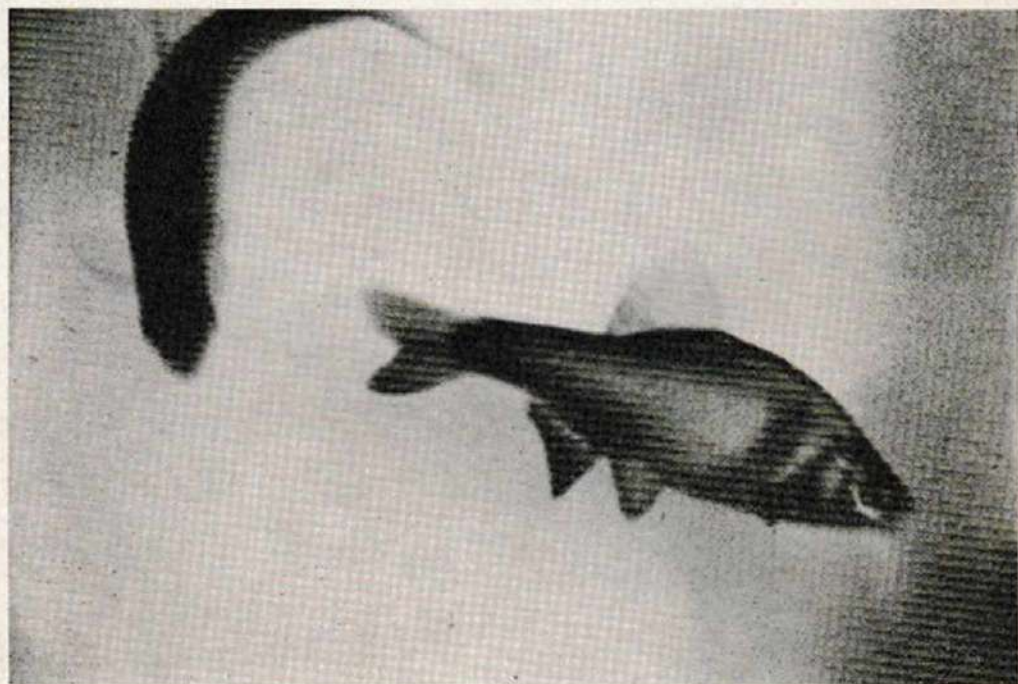
The fish occurs in the sea itself, although most profusely in small canals which encircle the Salton Sea. Here the water is brackish, not as salty as in the sea itself, with large clumps of algae floating on the surface. The water is shallow, and warmer than in the sea. The males seem to spend most of their time chasing females, and there are spots

where several hundred mollies can be seen in the shallow water, with groups of eight to ten males chasing one female. There are large numbers of young among the adult fish.

We transported the fish home in our styrofoam containers, and as we had to travel for about two hours through the desert, we floated bags of ice in the containers. Almost all of the fish survived the trip.

The Salton Sea is a natural phenomenon. The area it covers today was originally a part of the Gulf of California, with the Colorado River emptying into the Gulf at that point. Over a period of time, the river emptied sand and silt into the Gulf and filled in the entire area. Still later, that greatest of natural disasters, Man, dammed up the Colorado River, and the low area of desert, that is now the Salton Sea, began to fill with water as the water table rose in the surrounding area.

At present, the Salton Sea is an inland saltwater lake. It has been stocked with Corvina, from the Pacific Ocean, which



Red Horse Minnows . . . only the males have bright red fins.

Photo by the author



Black mollies from the Salton Sea.

Photo by the author

weigh up to twenty-five pounds, and with Sargo, a two-pound fish. Both of these are eagerly sought by fishermen.

Other fish in and around the sea that would be of more interest to aquarists are the Red Horse Minnow (*Notropis lutrensis*) and the Desert Minnow or Puppy Fish (*Cyprinodon nevadensis*). Both of these are colorful and easy to keep, and can make a beautiful contribution to the home aquarium. They are found among the mollies, but generally hiding in cooler spots, such as under the spillways.

We found that these two species, as well as the mollies, adapted easily to water in the San Diego area, though this process must be accomplished slowly for best results. Since our expedition, we have observed all of these fish in other aquariums in this area, which is proof that several others have been successful also.

So now I know. There are black mollies in the Salton Sea. Wonder if there could be anything to that rumor about angels in the city reservoir?

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Ed. Note: It isn't often that an editor is presented with two fine articles on somewhat the same subject. However, after reading Mr. Pratt's piece on the Salton Sea, we felt a little sad that it ended so soon. Much to our surprise Mr. Loiselle came through with a much longer piece on the same area. In that both articles have much to say about the Salton Sea and very little is repetitious, we decided to use them in the same issue. We hope you enjoy them as much as we did.

The desert sun was just above the horizon, but already some of the chillness of the previous night had been dissipated by its presence. Although the weather forecasts gave promise of a 70° day, the keen northeasterly winds made a jacket

shiner, *Notropis lutrensis*, another introduction, and the native *Cyprinodon macularius*, a testy but attractively marked little killie. I had a further purpose: to investigate some of the possible causes of the remarkable mass mortalities of mollies in some of the closed irrigation channels that drain ultimately into the Sea. To this end, then, we had equipped ourselves with several dozen large plastic bags, a half dozen styrofoam shipping boxes, an oxygen cylinder, the necessary nets, and equipment for determining water temperature and quality. Previous experience had shown us that this was the very minimum in equipment

. . . . OF MUD AND MOLLIES

by Paul V. Loiselle

necessary for comfortable outdoor working. My companions sipped haltingly from cups of scalding coffee as they bent over a map of the northern portion of the Salton Sea. Tea in one hand, pencil in the other, I marked the spots where previous experience and solicited advice indicated our quarry might be found. As the wind brushed briskly by, I uttered unspoken thanks that we would not have to fight off flies and midges, the usual bane of collecting trips.

The goal that had brought us two hundred miles in the early hours of the morning to the parking lot of a drive-in cafe was the prospect of collecting numbers of the green sailfin mollies, *Mollienesia latipinna*, that had in recent years established themselves in the waters, both peripheral and actual, of the saline lake known as the Salton Sea. Denny Williams, a fellow employee and a plain-clothesman on the Los Angeles police force, Bill Schatzlein, a board member of the Los Angeles Aquarium Society and the author had elected to spend the day collecting mollies for the Del Amo Aquarium, where Denny and I are employed. We hoped, by way of a bonus, to collect saleable numbers of the red-fin

required to bring mollies back alive and in saleable condition.

My first introduction to the Salton Sea mollies came in late 1964, when a friend and I heard of their presence in the Sea, and of a demand for good quality sailfin mollies on the part of dealers in the Los Angeles area. We therefore set out in the February of 1965 to collect the fish in saleable quantities. We found what seemed an ideal collecting spot in an irrigation ditch draining into the southern end of the Sea. What made it less than ideal as we discovered later, was the fact that the majority of the mollies were undernourished, and many were infected with a most remarkable spectrum of ills, ranging from ich and fungus to what is known in the trade as "creeping crud", a term that refers to any disease that cannot be given a more specific designation. Despite rigorous sorting and the careful choice of only the healthiest fish, the dealer to whom we sold the bulk of our catch lost the balance of them, partly due to his own ability to store them in holding tanks while bringing them over to normal water conditions, and partly due to the appearance of latent infections brought on by the weakened condition

of the fish. The trip was something less than a smashing success from the financial standpoint.

Bill and Denny, collecting during the month of June in approximately the same area, encountered few diseased or malnourished fish, but experienced a similar problem after the sale of their catch. Dealers reported heavy die-offs, primarily caused by secondarily derived fungus infections contracted after a brief period in unfavorable water. We hoped for better success this time for two reasons. First, our employer, Bill Anderson, had available large concrete holding pools in his hatchery, which could be used to acclimate the fish to aquarium conditions. Second, he and I had made a reconnaissance of the eastern shore of the Sea, and found several rapidly flowing creeks containing ample populations of all three desirable species. Experience had taught us that mollies caught in the somewhat saline waters of the irrigation channels seldom survived the change of waters in large numbers. Fish caught in fresher waters of the creeks, we reasoned, would undoubtedly take the transfer with fewer mortalities. We also hoped to avoid the problem of poor quality fish that had plagued our earlier irrigation-channel expeditions. Hence, we headed for the northeastern end of the Sea, where these creeks flow on a year-round basis.

Before progressing further with this personal narration, it might be in order to discuss briefly the origins and character of the Salton Sea itself. As geological phenomena go, the Salton Sea is an unslapped infant, having its origins at the turn of the century, when a combination of earthquake and flood sent the waters of the Colorado and New Rivers backflowing into the desert depression known as the Salton Sink. Within a remarkably short time, this low-lying piece of desert floor, once an arm of the Gulf of California, was again supporting a large body of water, one that kept growing until it covered an area of 340 square miles to a maximum depth of forty feet. Thanks to the temporary

backflow of its parent streams, the Sea began its career as a fresh-water lake, with a number of fishes characteristic of the Colorado drainage. Contemporary reports speak of trout, and bass were soon afterwards introduced. As time passed, the Sea grew progressively more saline due to evaporation and the inflow of heavily mineralized irrigation runoff from the developing agriculture of the Coachella Valley. The trout were the first to go, followed by the bass and most of the other fishes. However, mullet, which had been present from the start, flourished in the saline water. Although unable to spawn in the Sea, they were able to maintain contact with the Gulf of California through the irrigation canals, which connected ultimately to the Colorado River. Hence the mullet were able to reach a marine environment to spawn, and as long as their access to the Gulf was undisturbed, they thrived. Indeed, a sizeable commercial mullet fishery was established during the Second World War.

In the late 1940's, however, a change in irrigation patterns cut the mullet off from their breeding grounds in the Gulf, and unable to reproduce, the existing population grew smaller and smaller, finally disappearing about 1958. In the meantime, the water had continued to grow saline, until the absolute salt concentration very nearly approached that of sea water. The only difficulty lay in the fact that the balance of salts was quite unlike that of sea water. Calcium and sulfate ions being more abundant, sodium, magnesium and chloride ions less abundant, than in sea water. For those who are interested, the chemical composition of Salton Sea water is presented in tabular form, but the immediate upshot of this phenomenon was the virtual impossibility of introducing most marine fishes into the Sea to replace the vanished mullet. The California Department of Fish and Game, operating on a hit-or-miss basis, tried several scores of species from the Gulf of California and the Pacific with no success. Finally, two members of the family Scianidae, *Bairdi-*

ella incistia and *Cynoscion xanthulus*, the orange mouth corvina, were established. The former is a forage fish, preying upon the small marine worm *Neanthes* and being preyed upon in turn by the corvina, a superb game fish. The corvina are caught by man, using the long-jawed mudsucker, *Gillichthys mirabilis*, an introduced goby, as bait. A neat picture, it would seem.

The situation is somewhat more complex than this due to the fact that unlike the oceans, the Salton Sea does not experience upwelling. That is to say, sediments that settle to the bottom of the Sea are not returned to the surface by upward moving masses of water. These sediments collect on the bottom of the Sea and decompose, rendering water below a depth of twenty feet essentially anoxic, that is to say, lacking in sufficient oxygen to support life. Hence, the important little worm *Neanthes* can exist only in the shallow, marginal waters of the Sea. But due to its mineral-rich waters, the Sea is immensely productive of phytoplankton—microscopic one-celled plants—in the springtime. Because the zooplankton are not present to feed upon them, they eventually die, and sink by the billions to the bottom. Some are eaten by *Neanthes*, but most decompose, and in the process render the water temporarily anoxic to depths of as little as twelve feet, killing *Neanthes* and other small bottom dwellers at these depths. Deprived of a substantial portion of their food supply, the *Bairdiella* die in tremendous numbers, resulting in a food shortage for the desirable corvina, which also die in quantity. This process continues until a new equilibrium has been established with respect to available food. If all of this occurred during the winter, the impact might not be so keenly felt by humans using the Sea. But it takes place during the summer, when the number of fishermen is at its peak and the demands upon the corvina population are at their greatest. There is more to the problem than just a school of dissatisfied fishermen, however. Much

of this dead matter eventually winds up on the mudflats at the southern end of the Sea, transforming them into the world's largest open-air cesspool. Given the proper wind, the odor, even in the winter, must be experienced to be believed. In the summer, it is indescribable. The problem is under study, and there is reason to hope that a fish will eventually be found that can convert the embarrassing abundance of phytoplankton into desirable fish flesh, rather than less desirable odors. Possibly one of the plankton-feeding *Haplochromis* from Lake Rudolph or an analogous *Tilapia* from Lake Nyassa may prove the answer. Both of these lakes are quite saline, and at least a few of their inhabitants should be able to live in the Sea. Those interested in a more detailed account of the ecology of the Sea are referred to State of California Department of Fish and Game Fish Bulletin No. 113, *The Ecology of the Salton Sea*, edited by Boyd Walker.

The complexities of fish management in the Sea account for the displeasure of Fish and Game officials at the successful establishment of *Notropis* and *Mollienesia*. However, sometime during the mid '50's *Notropis* was introduced by accident, probably as live bait. The *Notropis* appear to be restricted to the peripheral waters of the Sea. Mollies appeared suddenly in the late '50's. Their introduction also accidental, but the mechanics are somewhat more plausibly deduced. There is a commercial establishment which raises mollies on a large scale, using water piped in from the nearby thermal springs to maintain a suitable temperature. It seems quite probable that the initial colonists were escapees from such an establishment. The mollies have established themselves both in the waters peripheral to the Sea, and in the Sea itself. It seems certain that the practice of using them as live bait speeded the process of colonization by transporting gravid females to previously unpopulated areas along the borders of the Sea. This does not end the list of intro-

ductions, however. According to Mr. James St. Amant, of the Department of Fish and Game, *Tilapia mossambica* has also established itself in the peripheral waters of the Sea, and may also be in the Sea itself. Diligent search by the author and friends upon two occasions failed to turn up any traces of this unwelcome addition to the ichthyofauna, so it is not possible to claim personal verification of Mr. St. Amant's observations. Among the reputed introductions observed to have established themselves in the vicinity of the Sea are the swordtail, *Xiphophorus helleri*, the goldfish, *Carrasius auratus*, *Macropodus opercularis*, and *Astronotus ocellatus*. The author has personally encountered none of these, and presents them as second-hand reports only. Verification by other observers, which would include the definite locality where the animals were encountered and ideally, preserved material, would be greatly appreciated.

Such then, is the background of the fishes we sought and the waters in which they were to be found. By eight o'clock in the morning, we had arrived at our first promising locale, a swiftly flowing creek that broadened as it approached the open waters of the Sea. The stream was surrounded by citrus groves that gave way to scrub as one approached the banks of the Sea. Beyond a certain point, the soil becomes too saline for cultivation, and is covered instead by a tough complex of salt-resistant shrubs and grasses. An access road, if one could dignify it by that term, followed the banks of the stream. The first ten yards we covered made us thankful that our vehicle had a four-wheel drive. In negotiating a turn, we ran the back wheels into a hole, and embedded ourselves in the loose, sandy soil up to our rear bumper! With an ordinary car, several hours of digging might not have served to free us. With our beast, it was merely a matter of switching over to four-wheel drive and driving out. Once the orchard had been passed, our 'road' degenerated into a set of tire marks through shoulder-high

scrub, then broadened out into an open way again. The waters all along our route gave ample evidence of fish, and having driven as far as appearances deemed prudent, we stopped to reconnoiter.

Fish were obvious, and present in considerable numbers. We noted with pleasure that all three of the species we desired were present. In the wild, it is possible to distinguish between the three species quite easily from the banks of a stream. *Cyprinodon macularis* is a bottom reater, and moves about in short, rapid dashes. *Notropis lutrensis* moves in small schools of its own species, or in company with mollies, from which they can be distinguished by their intense silvery appearance. The *Notropis* also display a marked preference for the deeper, faster-flowing portions of the streams, as contrasted with the mollies and *Cyprinodon*, which prefer to stay in the quiet water closer to shore and brave the current only when frightened. The mollies were conspicuous by their olive-beige backs and an occasional flash of bright blue or yellow as the sun struck the momentarily upraised dorsal of a courting male. Had it been springtime, the male *Notropis* would have been conspicuous indeed as they displayed their bright red heads and fins and excavated their spawning depressions on the bottom. Male *Cyprinodon* also undergo a remarkable color transformation in the spring, becoming a steely dark blue with a yellow breast and defending a set territory from which they display their coloration to passing females. But it was November, and these marvels existed only in our imaginations. Both *Notropis* and *Cyprinodon* are tied to a spring-summer spawning rhythm; The mollies, on the other hand, apparently drop young year around, and we captured numbers of fry less than an inch in length, even this late in the year.

The stream was some ten feet wide at this point, and its bed was a mosaic of firmly packed sand and less stable mud.

The current varied in intensity, being quite strong in the deeper spots, but only moderate in the muddy shallows. Emergent plants, in the form of cattails and a rhizomatous grass were present in the shallows; where the water flowed swiftly, a most attractive *Potamogeton* species grew submerged. Duckweed was present in moderate quantity in the quieter waters, and submerged twigs were covered with heavy growths of a filamentous green algae, while the mud was carpeted with diatoms. The main channel of the stream meandered from one side of the bed to another, and any one side was a succession of deep and shallow, sandy and muddy, unplanted and planted spots. The number of *Potamogeton* decreased markedly as one moved towards the Sea; the number of cattails increased sharply. Ramshorn and pond snails (*Planorbis* and *Limnaea*) were noted, and a small species of bivalve was accidentally upturned. No crayfish were encountered, but the presence of many burrows gave ample evidence of their presence. Insects were varied and abundant. Several species of dragon and may flies were observed, many of them coupling, so it seems reasonable to suppose that their larvae were present in the water. Neither chironomid midges nor mosquitoes were encountered, due to the lateness of the season. These insects are conspicuous and abundant by the Sea in the spring and summer months, and their larvae are probably an important fish food. No microcrustaceans of any sort were noticed, but in the absence of intensive collecting, their presence should not be dismissed. The chemical makeup of the water is presented in tabular form.

Armed with adequate nets, we entered the water, descending the steep banks as best we could. We rapidly discovered that this also meant entering the mud to a degree that varied from ankle to knee deep. Extricating ourselves as best we could, we emplaced our nets. Our strategy was simplicity itself. We would place our net across a given point,

and one person, entering the water about ten yards upstream, then proceeded, with much yelling and waving of arms, to drive as many fish as possible into it. I shudder to imagine what impression this scene must have made upon anyone who chanced to see it. When carried out in shallow water, this operation yielded numbers of *Cyprinodon macularis*, extremely well marked, juvenile mollies, and quite a few *Gambusia affinis*. *Gambusia* are almost ubiquitous in southern California, introduced as they are to control mosquitoes. These fish were a steely violet with intense yellow fins. The much larger females had tiny black dots on their dorsal and caudal fins, and some had a narrow black dorsal margin as well. All the males captured lacked this black margin. We captured many female *Gambusia* slightly over three inches in length, and while admittedly handsome, the thought of what havoc a three inch *Gambusia* could wreak in a community tank deterred us from collecting them in numbers. We continued until we had captured several dozen *Cyprinodon*, and then moved our net over to deeper water. Here the same technique proved productive of mollies, all females and of moderate size, and of *Notropis* in numbers. We averaged three or four *Notropis* per run, and as it appeared that the mollies in this spot were eluding our efforts, we stopped at twenty *Notropis* and decided to move further upstream, in the hope that our nets would prove more effective in the narrower channel. We bagged our captures and retraced our path along the trail.

We selected a spot some two hundred yards from the main road, where an earth and stone bridge had been erected over the stream and culvert connected both segments of the channel. There were, if anything, even more fish here than at our previous spot, all *Notropis* and mollies. The current was extremely rapid, and had scoured away all of the sand and mud, leaving only a bare gravel bottom. The depth of the channel

averaged two feet. The margins of the channel were thickly planted with *Potamogeton*; cattails were absent. The same filamentous algae observed earlier carpeted some of the larger rocks on the bottom, but no diatoms were noted. Collecting was considerably easier here. There was no plodding through knee-deep mud, which clouded the water and impeded progress. We captured fifteen more *Notropis* and a dozen magnificent mollies, including our first black individual. Several males were six inches long, and had splendid dorsals of yellow, blue and black. The mollies captured here had vivid yellow breasts, but lacked the rows of red spots along the scales of the ventral region that we had previously noted in fish from other localities. Also, blacks were quite scarce, being present in a crude ration of 1/300. In the spring and summer months in certain localities, the number of melanistic and partly melanistic individuals may rise as high as 1/4. Large males with good dorsals and large females were also scarce. It generally required three or four netloads to obtain one desirable individual. We could have easily captured our quota of twenty-five pairs here, but we wanted to investigate another spot on the west coast of the Sea. So we once again bagged our captures and set out.

Our second locality turned out to be a typical irrigation channel draining into the Sea. The water depth went to three feet in mid channel, and the current was negligible. Indeed, a small amount of backflow from the Sea was noted. The channel was some twenty feet in width, and the bottom was very muddy, almost hip deep in some places. An area of hard sandy bottom was present beneath an effluent pipe bringing runoff from a nearby orchard. No higher plants of any sort were noted, but filamentous algae and diatoms were abundant. Mollies were the dominant fish, far outnumbering the occasional specimens of *Cyprinodon* and *Notropis* visible from the banks. Many crayfish were seen, and several captured. No

snails or bivalves were observed, and insects were considerably less abundant than at the previous locality. No microcrustaceans were noticed. The water was slightly turbid, but not sufficiently so to hamper visibility; as we soon discovered, the bottom sediments made the water completely opaque when roiled. The chemical composition of the water is presented in tabular form.

Due to the greater depth of the water, the only effective strategy was to move into midchannel, find a good school of fish, and drive them towards shore, in hopes of trapping them against the bank. This proved a somewhat unpleasant chore, and an unrewarding one as well. The effort entailed in raising one's feet when they have sunk almost knee deep in mud is considerable. So is the quantity of sediment raised in the process. We consequently succeeded in obscuring our own vision quite effectively, and many of the fishes we had initially sighted managed to escape undetected. Good fish were, if anything, scarcer here than at the previous locality. It took us the better part of two hours and a good deal of rigorous selection to fill our quota, and of the many fish we captured, only six were either black or marbled in color. The frequency of fish displaying symptoms of malnutrition or patches of fungus on the fins, head or body was by no means reassuring. Conditions in the channel were obviously deteriorating, and had reached the point where not all of the large population of mollies present were obtaining sufficient food. In their weakened condition, the fish were easy prey for the many diseases present in their environment. It was now reasonably clear that the mass mortalities of later in the season were presently in the making, and that the fluctuation in numbers characteristic of these channel populations was due to nothing more than a population outstripping the minimal seasonal carrying capacity of its environment. This would lead to a large percentage of adult fish eventually becoming too debilitated to withstand any

sort of environmental fluctuation. In the shallower streams, the numerous fish-eating birds and racoons offer some check to population growth. Further, these open streams, leading into the Sea, offer the opportunity for migration denied populations living in the largely closed irrigation channels. Both of these factors undoubtedly prevent the stream populations from exceeding the carrying capacity of their environments.

The same absence of cultivated land along the immediate margins of the Sea that prevailed at our first locality was also evident here. Instead of an association of shrubs and grass, however, a salt marsh was present. Between the occasional hummocks, with their burden of wind-twisted, salt encrusted scrub, were numerous splash pools, filled during storms but having no direct connection with the Sea itself. The water in these pools was intensely saline, even more so than that of the Sea itself. Yet these pools were well populated by *Cyprinodon macularius*, displaying once again the versatility of this tough little killie. The individuals of these populations were beautifully marked, and many of the males were an icy silver-blue, with broad, dark fin margins, even outside of breeding season. The difficulty in acclimating fishes from such extreme environmental conditions to ordinary aquarium life deterred us from bringing any back with us, and the few we captured were allowed to rejoin their companions.

The temptation to explore further was great, but already the afternoon shadows were beginning to lengthen, and the promise of an extreme temperature drop was in the air. We realized that our labors would be undone if the fish were allowed to chill and contract ich, so we oxygenated our bags and placed them in styrofoam shipping boxes for the long trip home. Because of the large size of many of the fish, we limited ourselves to twenty fish per bag. This might seem excessively cautious, but experience had

taught us the folly of being greedy. Our precautions were rewarded, for despite the length of the trip back, we lost not one fish, and to our great pleasure, all of the mollies survived the acclimation period without loss.

The hobbyist living in the Los Angeles area, after reading this article, may feel he has stumbled across a financial bonanza. This, alas, is not the case. The demand for good sailfin mollies is constant, but it is not great. There is a greater demand for marbled and sailfin mollies, but this only reflects the greater difficulty in collecting them. Nor is collecting a succession of pleasant experiences. In the spring and summer, insects abound, and the intense heat is enervating. In the fall and winter, the insects and heat are less bothersome, but the strong winds hamper the use of nets and the number and quality of the fish is considerably reduced. Most of the better collecting localities are accessible only with a four-wheel drive vehicle. And always there is the mud, clinging, yielding, malodorous, hindering movement, impairing efficiency, reducing visibility. Nor is the element of danger absent. The marshes about the Sea are hazardous and several people have drowned in them over the past few years. And along the southern and western shores of the Sea, rattlesnakes are distressingly abundant during the spring and summer months. The hobbyist who merely wishes to collect a few pairs of fish for himself and at the same time gain some insight into how these fish live in nature is well advised to make a trip to the Sea. The would-be commercial collector, unless he has both adequate collecting equipment and holding facilities and considerable experience, is best advised to spare himself the many fruitless hours of effort his ambitions will entail.

MUD AND MOLLIES - cont'd

Table I

A. Ionic Composition of Salton Sea Water as Compared with that of Ocean Water and of the Water from Two Streams Draining into the Sea.

	Salton Sea	Ocean Water	Colorado River Water	New River Water
Ca ⁺⁺	.764	.413	.072	.141
Mg ⁺⁺	.951	1.270	.022	.066
Na ⁺	9.438	10.55	.138	.435
K ⁺	.224	.380	.015	.010
CO ₃ ⁼	.021		.091	
HCO ₃ ⁼	.159	.014		.209
SO ₄ ⁼	6.806	2.649	.200	.444
Cl ⁻	14.422	19.150	.138	.605

All concentrations expressed as parts per thousand

B. Some Other Pertinent Environmental Data. The average pH of the Salton Sea is 8.5, occasionally dropping as low as 8.0 and rising as high as 8.9.

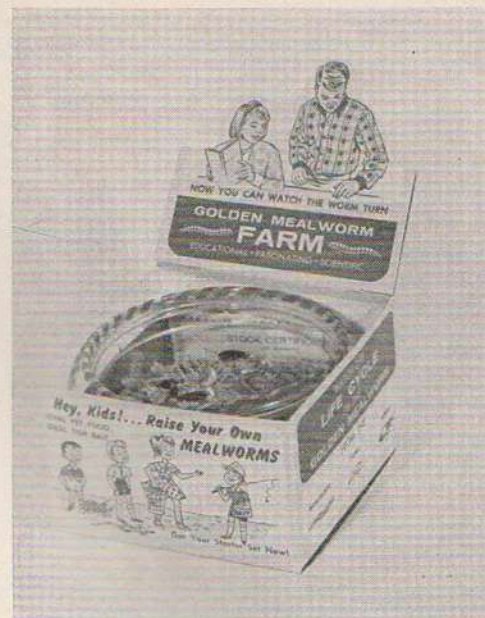
The temperature range of the Salton Sea extends from 68°F. to 90°F. It is to be noted that these are daytime highs, and that the temperature may drop several degrees at night, especially in shallow pools or near the surface. The warmest months are late August and early September, the coldest November and December.

Table II

Environmental Characteristics of Two Collecting Localities in the Peripheral Waters of the Salton Sea.

	Locality I	Locality II
Situation	A small, flowing stream, draining directly into the Sea.	An irrigation runoff channel not directly connected to the Sea.
Bottom	Sand and gravel, giving way to sand and mud towards the mouth.	Muddy silt.
Temperature	72°F. at 11:00 A.M.	70°F. at 3:00 P.M.
Water Chemistry	pH: 7.8; hardness: .676	pH: 7.6; hardness: 1.021

All concentrations expressed in parts per thousand.



NEW GOLDEN MEALWORM FARM

Combining educational and scientific study of the life cycle of the mealworm with raising the insects as feed for pets or as bait for fishing, the Golden Mealworm Farm has been introduced by the Sure Live Worm Co. of Torrance, Calif.

The Farm consists of a breeding and observation container, with 100 large mealworms, food for a complete life cycle, special burlap breeding cloth, a pamphlet on "How to Use the Mealworm for Pet Food", and instructions on care and raising.

During a complete life cycle of about 90 days, the multiplying insects may be observed as they change successively from worm to pupa and finally into beetle form. Suitable as a gift either for child or adult, the Golden Mealworm Farm is capable of producing hundreds of insects from the original allotment. The mealworm is high in protein, in vitamins A and B and in other minerals, and is a perfect pet food for all kinds of birds, fish, turtles, monkeys and small mammals.

Price of the Golden Mealworm Farm is \$3.00, plus postage. A Large Hobbyist Size Farm is \$7.50. Orders may be sent to Sure Live Mealworm Co., 22536 Halldale Ave., Torrance, Calif.

DO YOU HAVE A BRAND NEW PRODUCT?

If so, and if home aquarists would be interested in it, tell us about it. We may write it up in our New Products column. No obligation!

SOCIETIES — at work

by Helen Simkatis

The Kokomo Tropical Fish Club held its first fish display late in the spring and combined it with an open competition show at the Kokomo National Guard Armory. There were 258 entries and hundreds of visitors showed up to see the colorful event. The show, under any circumstances, might be considered a success, but noting that this club organized in February 1965 brings home once more that a group of people willing to cooperate and work together for a common cause can bring forth an exciting and rewarding event. A large number of entries represented Illinois, Ohio, Kentucky, as well as Indiana. The many donations made by manufacturers were used as drawing prizes for the entrants. The club also donated a door prize which was drawn for by the public as well as a \$25 and \$50 savings bond. Ken Prosser of West Dundee, Ill. won Best of Guppies, Bill Haywood of Kokomo, Ind. took Best of Species, The Fin & Gill Club won Best of Show (Novelty) of Michigan City, Ind., as well as The Peoples Choice. Write to W. W. Haywood, 1222 S. Armstrong Street, Kokomo, Indiana for information regarding this association. (See photos)

The Pomona Valley Aquarium Society held its Second Annual Show late in the spring at the Los Angeles County Fairgrounds in Pomona. Robert J. Wyndham served as judge. There were three classes of entrants, namely, senior, novice and junior. Trophies were awarded to the first-place winners and in addition to these were the Sweepstakes Trophy, awarded to Chuck Ash, the President's Trophy, awarded to Richard Johnson, and the Show Manager's Trophy, awarded to Chuck Babbitt. Also, a trophy was provided for the society having the most

entries which was won by the Tri-City Aquarium Society of Riverside. The 115 entries were well displayed, each tank framed in black paper. Palm trees, bamboo canopies and decorative fish netting created a tropical setting. Following is the list of winners:

SENIOR: Community 15 gallons and under—Betty Barr. Community over 15 gallons—Bill Damaske. Egglayers—Gladson's Pet Shop. Livebearers—Betty Barr. Goldfish—Norito Hasegawa. Betta—Betty Barr. Guppy—Nancy Gamby.

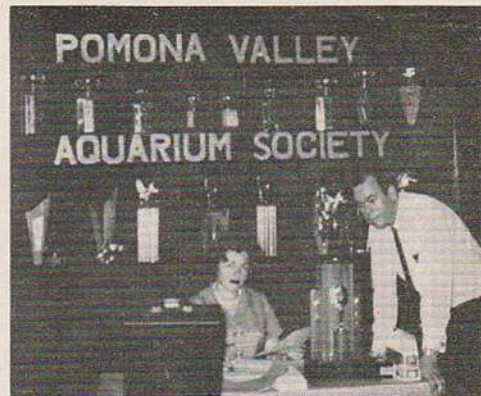
NOVICE: Community 15 gallons and under—Peggy Winkles. Community over 15 gallons—Hank Malinoski. Egglayers—Ken Olsen. Goldfish—Frieda Eastwood. Guppy—Janet Johnson.

JUNIOR: Community—Paul Funston. Egglayers—Steven Johnson. Goldfish—Danny Ramirez. Guppy—Melody Ogle.

NOVELTY—Bill Werner.

CUSTOM—Chuck Babbitt.

Judy Lacey writes us that the Pomona Valley Aquarium Society now has more than 200 members. Write to Judy at 747 Ramona Avenue, La Verne, California



Judy Lacey, Show Manager of the Pomona Valley Aquarium Society's Second Annual Show at the trophy booth with member Wayne Smith. (See story).

for information regarding membership in this lively club. (See photos)

The Tropical Breeze (San Diego Tropical Fish Society) for May found its way to us via Guy D. Jordan, of Scanning-the-Periodicals fame. We later received our June copy through regular channels but we were stopped by the May issue by noting that we were quoted by Guy as erroneously stating "The Chocolate cichlids, according to aquarium literature, have not spawned in captivity and your spawning must be one of the first." We plead guilty to the statement but must point out that the Chocolate Cichlid (*Cichlasoma coryphaenoides*) is reputed by a rather impressive authority as not having spawned in captivity. Furthermore, the author who reported his pair spawned in *The Aquarium Journal* wrote us in regard to our statement. He suspects that the species making the rounds in aquarium shops is not truly *Cichlasoma coryphaenoides* but is another species which it closely resembles in one stage of growth, *Cichlasoma hellabrunni* which Sterba describes as a peaceful species that has spawned in captivity. On the other hand, Sterba states that *Cichlasoma coryphaenoides* (Chocolate Cichlid) has not bred in captivity and that hobbyists have found pairs to be so hostile to one another that one sooner or later ends up by being killed by the other. We suggested that Dr. Stanley Weitzman be consulted in the matter. We are happy to be on the mailing list of *Tropical Breeze* once more, and as usual find it stimulating and good reading. We especially liked Richard F. Stratton's *Cichlasoma Dovi* in the May issue. This is not destined to be a popular aquarium fish, author Stratton tells us, in that it grows to from 13 to 17 inches and will not tolerate a tankmate, but it does have personality and becomes very tame. The *Tropical Breeze* is published by the *San Diego Tropical Fish Society* and information regarding the publication and the publishing society can be had by writing the society at P. O.

Box 4156, North Park Station, San Diego, California 92104.

The May issue of *Duluth Aquarist* (Duluth Aquarium Society) carries a reference article on the old favorite The White Cloud Mountain Minnow by W. L. Whitern, F.Z.S. wherein we are reminded why this species once brought to the attention of hobbyists rapidly became a part of the aquarium scene. The author points up the characteristics that make

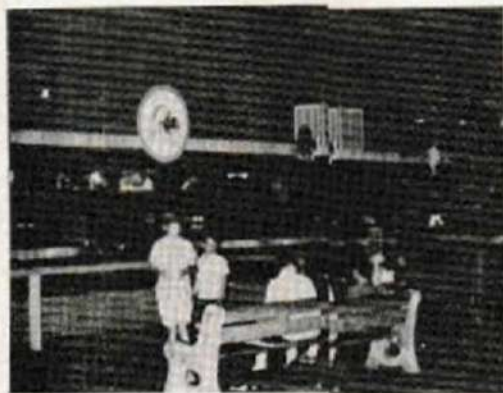


Some of the winners of the Kokomo Tropical Fish Club Show—L to R: W. W. Haywood, Dean Jarrell, Richard Shepherd, Lewis Wilson and Wayne Simmons.

it seem designed for the home aquarium. Its tolerance for temperatures from 40 to 85 degrees F. make it especially suitable for outdoor pools, its colorful pattern is appealing to all, and its willingness to produce its kind certainly adds to its acceptability by aquarists in all stages of experience. Here we are given detailed procedure on how to maintain and breed this little fish that was discovered by a Chinese Boy Scout named Tan which explains why it is affectionately designated occasionally as Tan's Fish. In *It's Raining Cats and—What's the Difference?* by G. D. Summ, we are given an outline of the *Corydoras* species which will encourage some of us to be more selective when choosing a catfish for our collection. *The Duluth Aquarist* is a well-prepared publication, edited by Betty Jayne Ormsby. Subscriptions can be had for \$1.50 per year, and single copies are 20 cents. Write the Duluth Aquarium Society, 304

North 53rd Avenue West, Duluth, Minnesota 55807 for further information.

The May issue of *Fish Tales*, published by The Greater Iowa Aquarium Association, brightened up our reviewing chore considerably on Sunday afternoon, and we came to the conclusion that to be a success, a publication should be a surprise package. *Fish Tales* always seems to be just this. Reprints are used without qualm (credit given, of course), but original material springs from the membership, also, and it is never dull. (In fact, we didn't get our office cleaned up that Sunday afternoon, if we remember correctly.) In this issue, Ralph Wandrey tells how he raises *Daphnia* in an enameled washtub (robbed from an



A random shot of the attractive display tanks at the Pomona Valley Aquarium Society's Second Annual Show. (See story).

abandoned washing machine), and Lorraine Buck in her D-Day tells how to collect them. Gene A. Lucas goes into aquarium arrangement in his More on Tank Decoration. Cleanliness is paramount, he explains, and location of filters, airstones, etc. is important to avoid a cluttered appearance. He frowns on wiring, tubing, etc. that shows and offers ways of concealing these necessary evils. He encourages original decor (here, we took time out to give a silent cheer!) and doesn't insist that it necessarily look "natural". He points out that many interesting backdrops can be employed such as wallpapers, fabrics, and even photographs or other types of pictures

might be used. He describes a third dimensional trick that he picked up in a European book which employs a dry enclosure behind the tank where materials that cannot be used in the aquarium proper may be used for decorative purposes. We have used this successfully when setting up salt-water tanks and have seen the idea used in public aquariums. Author Lucas supplies several line drawings to further explain his theories. We are confident that this imaginative piece will be picked up by other editors of society bulletins. Sash Cord has gone to a great deal of effort to put us in on the anatomy of the worm in his *The Worm Turned*. This treatise will be important to those who have learned the value of the earthworm as a food in the diet of larger fish such as the Cichlids, etc. Reproduction, feeding, and anatomy are gone into more thoroughly than is usual in such material and earmarks this article for the fishkeeper's notebook. Here we have skimmed the surface of *Fish Tales* (May issue) and we hope that we have projected our feeling that it is a storehouse for ideas for editors who have found themselves fresh out of this commodity. Write to Greater Iowa Aquarium Association, Larry Arnold, Editor, 1910 60th Street, Des Moines, Iowa 50322 for information regarding the publication and society.

The May issue of *Driftwood* (Aquarists of Omaha) carries Charlie Hess's *Lighting for Plants* which offers a schematic for aquarium lighting which should be most helpful to those who want to know how far light should be from plants, how strong a light should be used, etc. The author gives, for instance, an example of a plant that has been doing well in one tank but the owner wants to move it to a larger tank where he hopes to give it the same growing advantages. Author Hess's mathematical approach to the amount of light the plant was receiving and should receive in its new home should help the aquatic gardener in this problem. There is a list

will be of interest to those vacationers who wish to visit such exhibits while away. The addresses of many of the more important public displays are included in this timely listing. *Driftwood* is published, as mentioned above, by the Aquarists of Omaha. The bulletin is well prepared, and its cover is most attractive. It is edited by Kathie McCall, and information concerning it and the publisher may be had by writing the society at 1810 South 51st Street, Omaha, Nebraska 68106.

The June issue of *Tropical Topics* (published by the Aquarium Hobby Club of Indianapolis) carries an article by William Holmes entitled Bettas With Bill that should be of particular interest to those hobbyists who have wanted to spawn this species but just didn't happen to have an empty 10-gallon tank available. The author describes his method of spawning Bettas in a one-gallon tank or jar. His equipment consists of a one-gallon container, a jelly jar, a heater, floating plants, and a plastic plant or two, along with a piece of Saran Wrap. His directions are as easy to follow as the equipment is easy to gather together. He doesn't neglect some of the pitfalls, either. One of which is the error of breeding an immature female to a mature male. Bettas, he tells us, play the first spawning by ear, or in other words have a little difficulty in following the blueprint nature has drawn up for them in their instinct. Therefore, the pair should be kept in the spawning container for a week or so before the female is released from the jelly jar that is allowed to float in the gallon spawning vessel. Feeding is gone into and the reason for the floating and artificial plants is explained (the female requires them for hiding when the male becomes too aggressive). Handling the young is not forgotten and instructions are given for first infusoria feeding, etc. This is an excellent beginner's article and will be helpful as well to the experienced aquarist who has not yet worked with this species.



One of the Oscars entered at the C.A.O.A.C. Convention, looking the judges over.
Photo by Alan Noon (London)

Editors should earmark it for reprint material. *Tropical Topics* is edited by Mrs. Ida Corder. It is well-prepared with clear readable type. Reprints are used frequently but are carefully and wisely selected. We note in this issue that the Aquarium Hobby Club of Indianapolis will hold its Annual Show September 10 and 11 and Paul Wilson is the person to write to for further information. Write to the Aquarium Hobby Club of Indianapolis, P. O. Box 11106, Indianapolis, Indiana 46201 for information regarding the club or its publication, *Tropical Topics*.

Societies contemplating a publication will find *Aquarium Art and Reproduction* by Gene A. Lucas, appearing in the June issue of *Fish Tales* (published by the Greater Iowa Aquarium Association) most informative and helpful. Author Lucas goes into matters other than the *Reproduction of Art* (his sub-title) and discusses methods of duplication, format and editorial philosophy, advertising, covers, etc. Many of his thoughts on society bulletins will be of interest to societies now publishing. We should like to see him take one step further and stress the importance of a masthead giving all the information necessary for a non-member to write the society. We still get a bulletin each month that neglects to give an address for the club that publishes it. In this same issue Ralph Wandrey discusses Rocks for the

Aquaria, giving guidelines on those desirable for aquarium use. Some hints on having rocks cut are offered, as well as suggestions for collecting them on field trips. We note that Dallas Knight, Betty Jayne Ormsby, and Josephine White will serve as judges for the annual show of the Greater Iowa Aquarium Association but that a firm date for the event that is to take place in October has not yet been set. Write to Editor Larry Arnold, 1910 60th Street, Des Moines, Iowa 50322 for information regarding *Fish Tales* and the publishing society, The Greater Iowa Aquarium Association.

The Wet Pet Gazette, Vol. 6, No. 5 (published by the Norwalk Aquarium Society) came through to us in vivid hues this month — little sea horses in black, yellow, green, red and orange hover around a pink sea fan on the cover, and about half way through the issue we were startled by a full page in bold print announcing that the Norwalk Aquarium Society wants ENTRANTS for its First Annual Aquarium Show to take place on November 12 and 13. A brick red male betta blowing salmon colored bubbles adorns this announcement, center page, and further down we learn that there will be Betta, Guppy, Open Class, and Community Tank competitions. (Wish we could go but this is our deadline weekend.) Additional information, regulations, and entrance blanks can be had by writing Richard Millard, Jr., 9 Burlington Drive, Norwalk, Connecticut. This colorful page should pull them in! W. L. Whitem, F.Z.S. explains the comings and goings of *Nannostomus anomalus* in this issue in careful detail which is notebook material for anyone fortunate enough to have this species in his collection. There is another worthy piece by Dr. Isabel L. Bayly, Assistant Professor of Biology at Carleton University in Ottawa, entitled Try a Salt-Water Aquarium — Parts I and II. Part I deals with the assembling of equipment and setting up the tank. Dr. Bayly's directions are precise and appro-

pos for the tidepool animals she discusses in a sub-section entitled Collecting The Inhabitants. She recommends specimens measuring under 2 inches and advises against jellyfish, nudibranchs (sea slugs, or mollusks that lose their shells and gills in the adult stage), and sea cucumbers, as these creatures do not fare well during transportation, unless they are separately packaged in filtered sea water. In Part II she deals with the installation of the tidepool specimens in their new home. Editor Ginny Reed tells us in a footnote that this piece was picked up from the *Fireside Chatter* (Fireside Aquarium Society), and was originally published in *Carolina Tips*, a publication of the Carolina Biological Supply Company. It is one of the best articles on



Mr. and Mrs. Anthony Dalvo, members of the Show Committee, working hard to make the C.A.O.A.C.'s 7th Annual Convention a success.

the subject we have had the pleasure of reading and certainly is worthy of reprinting and should be read by all hobbyists who have ventured into the salt-water field. Single copies of *The Wet Pet Gazette* can be had for 20¢. A subscription (year's) is included with a corresponding membership to the Norwalk Aquarium Society at \$2.00. Write to Mrs. Virginia Reed, Editor, 15 Center Drive, Old Greenwich, Conn. 06870 for information regarding both the society and its publication.

The Cleveland Aquarium Society will hold its Annual Tropical Fish Show at the New Cleveland Garden Center, 11030 East Blvd., Cleveland, Ohio, August 20 and 21, 1966. Several films will be shown

continuously on Setting up the Basic Aquarium, Building Your Own Wooden Tanks, and The Fabulous Betta. Show hours are Saturday, August 21, 1 p.m. to 5 p.m., and Sunday, August 21, 10 a.m. to 5 p.m. For further information write to the Cleveland Aquarium Society, P. O. Box 5126, Cleveland, Ohio. The show is open to the public and admission is free. (Ed. note: This was to be included in our July issue but somehow it was omitted. The show date being late in the month, we are giving the announcement here although we do not usually announce a show in an issue of the month the event is to take place.)

A letter from Allen Hull tells us that an aquarium group is forming in Spokane, Washington. Those interested in membership might write to Mr. Hull at 1220 W. Kiernan, Spokane, Washington, 99205. Societies publishing bulletins might get in touch with Mr. Hull, also, as the group is interested in contacting established clubs.

The Central Ohio Aquarium Society is a new club that has grown from 35 to 90 members in less than six months. This group would also appreciate hearing from other clubs. Write to Jeffrey B. Franklin, Board Member, 3019 St. Johns Ct., Columbus, Ohio 43202.

Mrs. Donald G. Arpin, Publicity Chairman for the Rhode Island Tropical Fish Society writes that the association will be addressed by Bester Weed at its September 7th meeting. Mr. Weed is a well-known hobbyist and authority from the Worcester Aquarium Club. His talk will be about live foods which will be accompanied with a film. Meetings are held the first Wednesday of every month at the Colony Motor Hotel, Route 1-A, Providence-Cranston Line, R. I. Corresponding Secretary is Mrs. Adeline Potter and the club's address is 231 Lawnacres Drive, Cranston, R. I. The official society telephone number is (401) 351-2993.

The Manhattan Aquarium Society of Manhattan, Kansas will hold its Third Annual Tropical Fish Show at the Community Building Auditorium, 4th and Humbolt, Manhattan, Kansas October 14 through 16, 1966. Mrs. Betty Schank of Kansas City, Kansas and Mr. Guy Paugh of Kansas City, Missouri will serve as judges. Judging will be on Saturday morning, October 15 and the display will be open to the public from 8:30 a.m. until 8 p.m., except during the judging. Write to Mrs. Josephine White, P. O. Box 332, Newton, Kansas for further information.

Mr. Larry Arnold of the Greater Iowa Aquarium Association writes us that the new address for the G.I.A.A. is 1910 60th Street, Des Moines, Iowa 50322. He also tells us that a member of the G.I.A.A., Howard Anderson, has organized a new aquarium society which is called the Central Iowa Aquarium. It has been organized to serve the Knoxville-Pella-Oskaloosa area in central Iowa and is affiliated with the G.I.A.A. The club meets the third Tuesday of each month at 7:30 p.m. in the Knoxville, Iowa Courthouse. Howard Anderson is President, Elmer Shafer, Vice President, and Ron Sheetz is Secretary/Treasurer.

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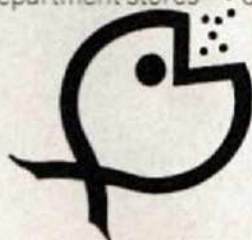
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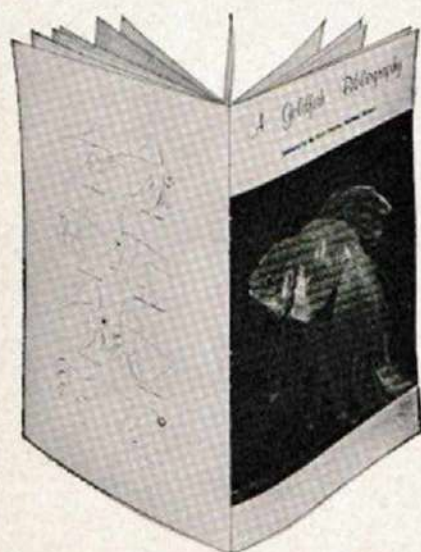


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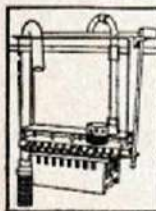
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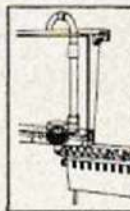
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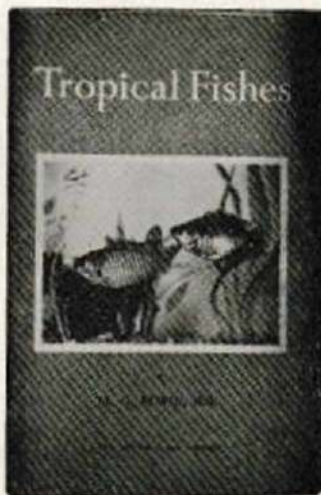
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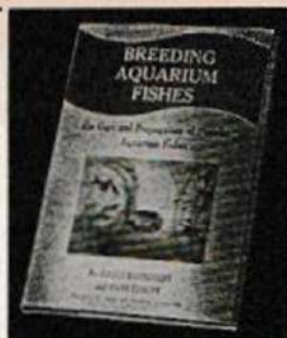
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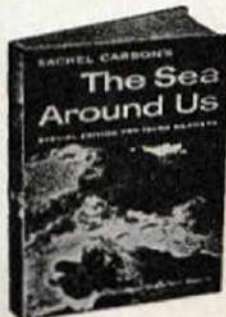
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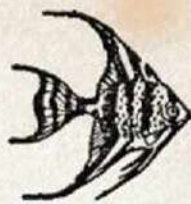
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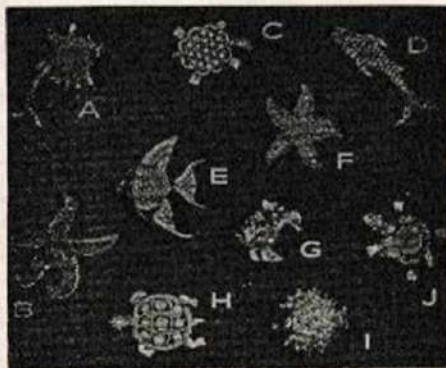
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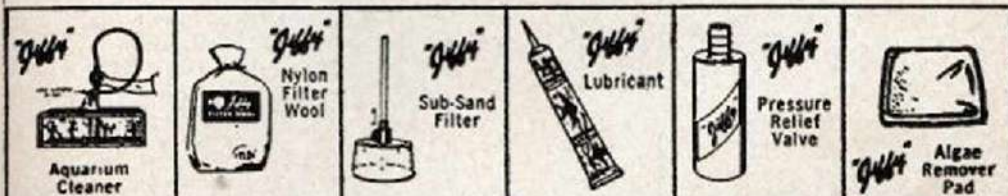
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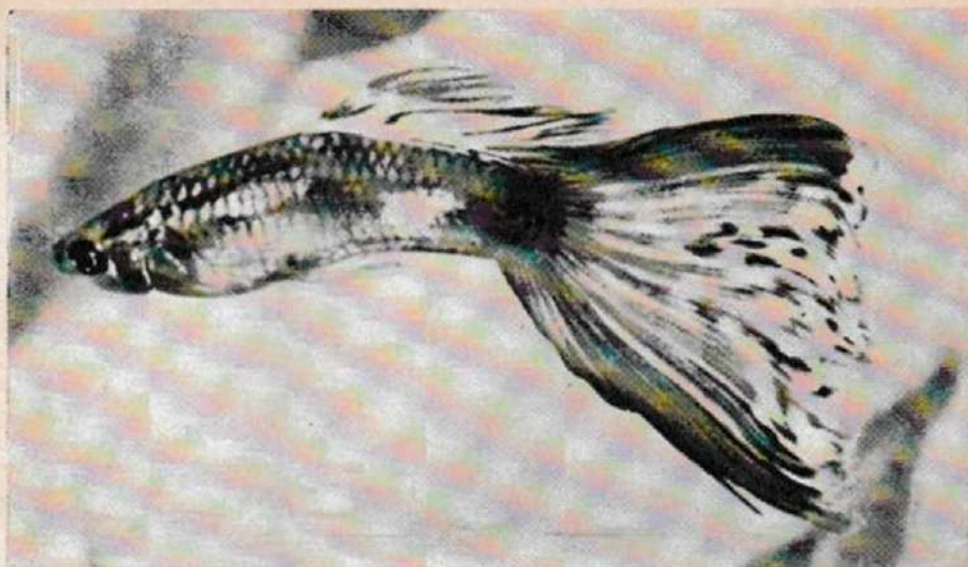


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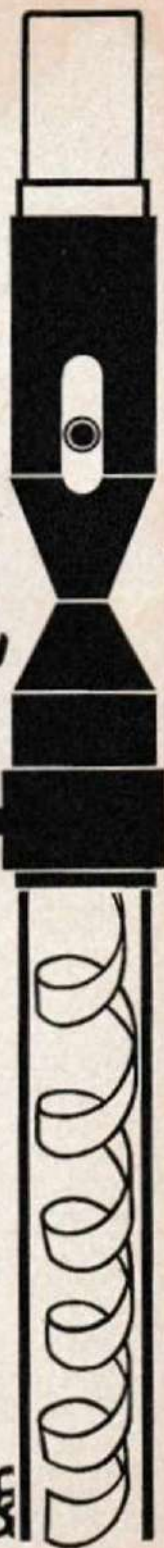
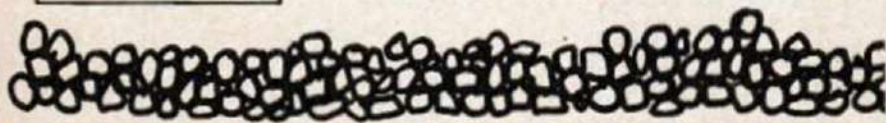
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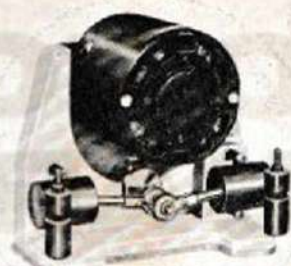


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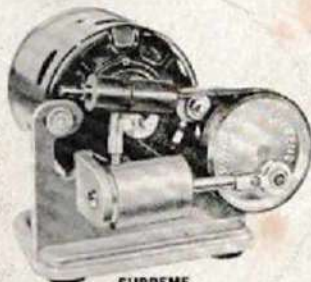
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