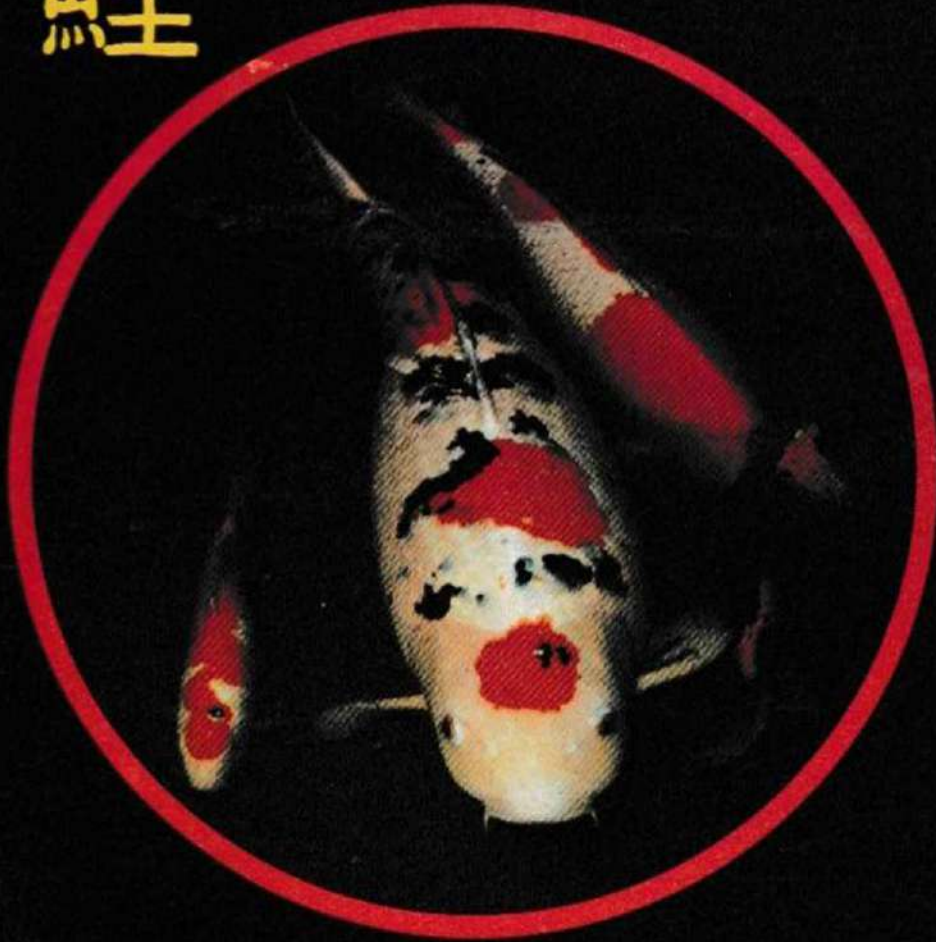


December, 1969

tropical fish hobbyist

50¢

鯉



KOI

tropical fish hobbyist

Vol. XVIII, December, 1969 (No. 4)

CONTENTS

Koi, Japanese Imperial Colored Carp	4
Enemy No. 1—Ichthyophthirius (Part I)	18
Knife Eels	25
For Whom the Tad Poles	36
<i>Kryptopterus macrocephalus</i> (Poor Man's Glass Catfish)	33
<i>Corydoras aeneus</i> (Albino <i>Corydoras</i>)	67
Mail Call	69
Your Fishes' Health	82
Salts from the Seven Seas	86
Photography Contest Winners	98

Cover

Dr. Herbert R. Axelrod
President, Executive Editor
William Vorderwinkler
Publisher Emeritus
Neal Francek
Managing Editor
Lincoln Littrell
Editorial Associate
Mae Levine
Advertising Coordinator
Dr. Leonard P. Schultz
Advisory Editor
Dr. A. Viggo W. Schultz
Translations Editor
Gerald M. Glover
Art Director
Sam Seidner
Production Manager

In Japan, koi are so popular and highly regarded among the populace that the country even sets aside a special day to honor this fish, which is considered the embodiment of a number of virtues held worthwhile perpetuating in Gay Nippon. Well, koi in Great Britain, the United States, and other English-speaking countries haven't yet attained the status of their Orient-domiciled brethren, but if the koi craze in England and the U.S. keeps up things might soon be different. Anyway, on the cover this month you'll find a photo of a (what else?) koi, photo provided courtesy of Yoshida Fish Farms.

exotic tropical fishes supplements

Pages 33 and 34, 67 and 68. These pages are perforated for easy removal and punched to fit into the Looseleaf Edition of EXOTIC TROPICAL FISHES.

rates

50c per copy in the U. S., 50c per copy in Canada or foreign, \$5.00 for 12 issue subscription in U.S. Add \$1.20 per year for foreign subscriptions. Index available in every 12th issue.

In England and the western Sterling area Tropical Fish Hobbyist magazine and T.F.H. Books are distributed exclusively through T.F.H. Publications (London) Ltd., 13 Rutley Lane, Basingstoke, Surrey, England. All subscriptions and inquiries should be sent directly to them.

©1969 T.F.H. Publications.
Second Class Postage Paid at Jersey City, New Jersey. Published monthly by T.F.H. Publications at 245 Cornelison Avenue, Jersey City, N. J. 07307. Printed in U.S.A.

editorial

Earlier in the month I had a chance to get together for a day with a group of Swedish aquarium hobbyists, retailers, and publishers. We traveled to the New York Aquarium and took in the sights at that institution, and then we visited a few shops, one in Brooklyn and one in Manhattan. Between the heavy traveling (by car) and taking time out to eat, plus the general gab and the nine or ten million photographs that our Swedish visitors took, we didn't get much of a chance to talk fish. We certainly didn't have much chance to discuss the differences between approaches to the hobby in the United States and approaches to it in northern Europe. Still, we learned from each other, and we even had a few surprises on both sides. I'd say that the biggest surprise our visitors got was from my estimate of the number of aquarium society members living in New York. My questioners knew that there are about seven and a half million people in New York City proper, and they were truly amazed when I put the number of aquarium society members in New York at a few thousand, absolute tops, with chances being greater that it's less than a thousand.

Which leads to a very interesting question: how come there are by European standards comparatively few American aquarists who join aquarium societies? I think that the difference is caused primarily, but certainly not exclusively, by attitude: in Europe, hobbyists in the main think they are supposed to join aquarium societies, whereas here they have to be sold on it.

So if we take it as a fact that aquarium societies deserve to be promoted, maybe we all--- hobbyists, dealers, publishers, and the societies themselves--- should try a little harder to do a selling job.

Neal Francek

鯉

KOI

Japanese Imperial Colored Carp

BY DR. HERBERT R. AXELROD
Photos by the author

Do you know any fish which changes color as it gets older? Perhaps you don't, for there are very few freshwater fishes which completely change color as they mature (but many coral fishes go through complete color changes as they grow). About the only freshwater fish that I can bring to mind that dramatically changes color is the Japanese Imperial Colored Carp, called Koi or Goi. Both words, *Koi* and *Goi* mean *carp* in the Japanese language and the same Japanese character can be read in either accent.

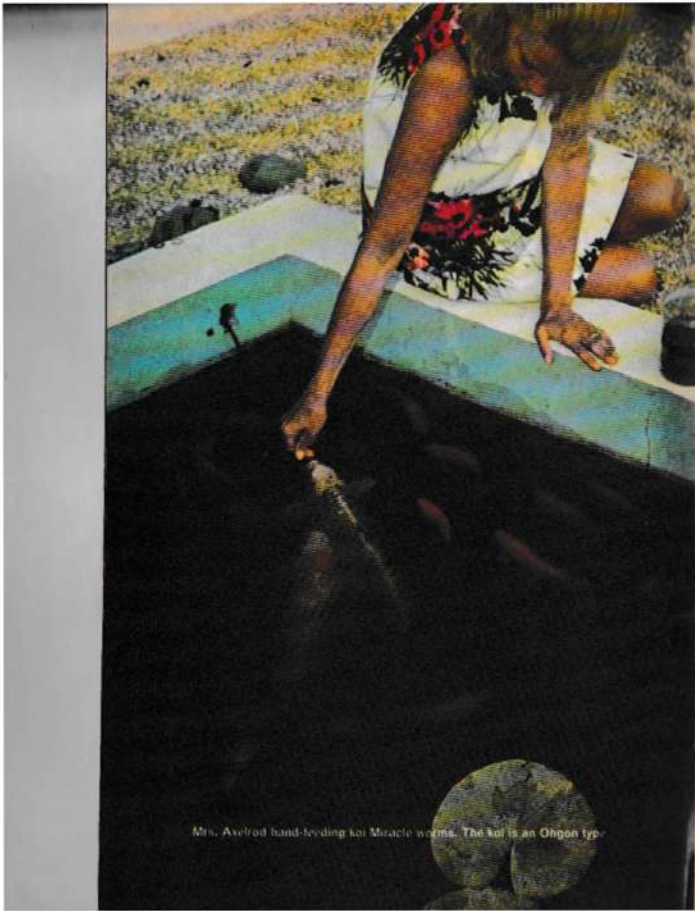
But why should an article about koi appear in a tropical fish magazine? Because these colored carp are the most expensive of all exotic fishes.



The Shiro-Utsuri which is mostly black on white.



A Taicho-Sanke with contrasting markings.



Mrs. Axelrod hand-feeding koi Miracle worms. The koi is an Ohgon type.

鯉

December, 1969

because we've just learned that they are the most efficient scavengers for the aquarium; because we've just learned that more koi are sold every year than any other single fish including the goldfish; because we've just learned that koi grow to fit the size of the container in which they are kept (they can be dwarfed for a small aquarium or can reach 30 inches in a large pool); because imports of koi have reached major proportions and they are now being sold in many of the aquarium shops all over the world. I doubt that there is an aquarium shop in Tokyo, Honolulu or London that can't supply you with koi . . . but try to find some in New York or Philadelphia.

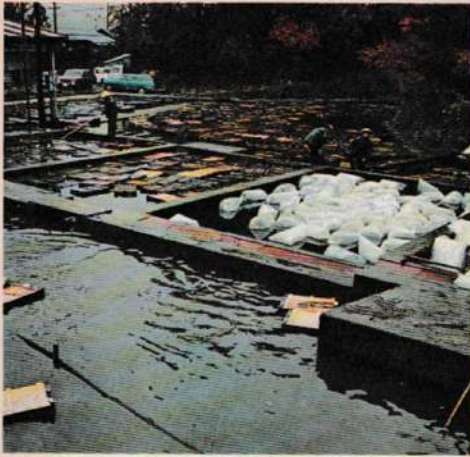
Two books have just been published in the English language on koi. One, *KOI, Keeping the Fancy Pond Carp of Japan*, was written by Mr. Colin D. Roe and Anthony Evans and was published by Petfish Publications, 544 Garratt Lane, London, SW 17, England. It is a 56 page booklet which is extremely well written and contains excellent photographs in both full color and black and white. It sells in the U.K. (United Kingdom) for 10s 6d, which to Americans is 10 shillings and sixpence, which is

The Ohgon actually sticks its head 4 inches out of the water to feed from Mrs. Axelrod's hand.



鯉

Tropical Fish Hobbyist



This is the view a prospective bidder gets when he comes to the fish auction. He cannot really see the color or condition of the fish he is buying.

about \$1.25. If you send them \$2, I'm sure they'd be happy to send you a copy of this wonderful booklet.

KOI for Home and Garden is the second book in English to be released. It was written by Glenn Y. Takeshita and published by T.F.H. Publications, Inc., P.O. Box 33, Jersey City, N.J. 07303. It sells for \$2 and is also available in England from T.F.H. Publications (London) Ltd., 13 Nutley Lane, Reigate. If you order it from England, send 20s. This booklet contains 96 pages and deals with koi in the more professional manner. All the secrets of breeding, pond construction, feeding and recognition of color varieties have been clearly detailed. The author is a Japanese-American who lives in Hawaii. Both of these books are highly recommended for the beginner and their two points of view on many subjects are very interesting.



WATTLE'S TURQUOISE DISCUS EXCLUSIVE FROM



ROBERTS
FISH FARM INC.

THE BEST IN TROPICAL FISH

P.O. Box 65 - 38 F
Miami, Florida
33165

LIMITED
QUANTITY
AVAILABLE



This new discus is extremely beautiful when full grown.
● WATTLE'S DISCUS is fourth generation and color fixed. We feel that this is a great opportunity for discus fanciers to enjoy a special new discus. URGE YOUR DEALER TO CONTACT US.

魚里

I became interested in koi when I first visited the Imperial Palace as a guest of the royal family in 1952. At that time I was too timid to ask for some fish to bring back to America, but since that time I became more friendly with the Imperial Household and we exchanged fish. I sent them cichlids from America and they sent me koi. The koi interested me because they became so tame . . . and because they actually stick their head out of the water to feed from your hand. This feature alone intrigued me and I knew they had a commercial future in the USA. I was very disheartened when I discovered that the English took to them before the American public. But this didn't stop me from investing substantial amounts of money in building the largest koi breeding facility in America. Here's how it happened.

Our company has a truly great man in charge of Far Eastern affairs. His name is Shoji Kimura. Kimura-san, as he is politely referred to in Japan, carefully researched the koi market under instructions from me. He visited koi show after koi show finding out who raised the best fishes and how it was done. Repeatedly the name of Yoshida came up in his discussions and he arranged a meeting with the Yoshida family for me during the All Japan Koi Show held in Tokyo in 1968. This was the largest koi show ever held anywhere in the world, even though koi shows are old hat in Hawaii. Our company was so interested in this show that

The koi are spawned in small pools and the eggs are transferred to large dirt bottom ponds.



Temper-Proof, Accident Proof, TRANSPARENT SAFETY CAP!
Prevents any change of thermostat setting by accident or intentional tampering. Control knob is numbered for accurate setting.



New Improved CORROSION-PROOF HANGER!
One-piece, high-impact, rusting has nothing to do with corrosion, even in salt water tanks.

PATENTED, SEALED CONDENSER & PILOT UNIT!
Reticulated aluminum and stainless steel construction provides long life, low humidity and condensation that prevents rust or corrosion. Extra heavy in construction. One-piece design. No joints. No leaks. HEATER ELEMENT AND THERMOSTAT. ASSURES MORE ACCURATE TEMPERATURE CONTROL.

PILOT LIGHT IS VISIBLE FROM ANY DIRECTION!
Always easy to tell if the heater is on and working.

HEATER ELEMENT WOUND ON OUTSIDE OF COILS - prevents corrosion, provides compact, tubular design. Compact, space saving design. All parts easily, quickly replaceable. High quality parts and workmanship throughout.



Supreme HEETMASTER

the only aquarium heater built with all these exclusive safety features!

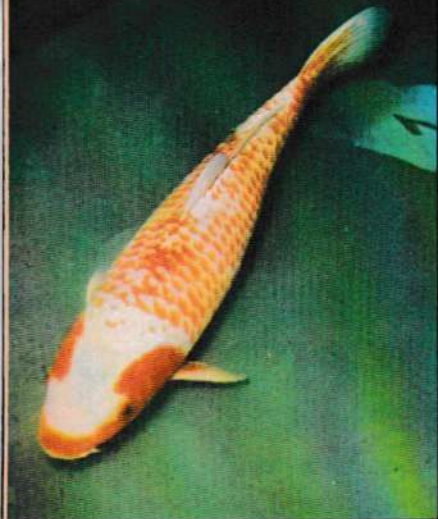
Available in Four Tube Sizes
8" - 20, 30, 75 watts
10" - 75 and 100 watts
12" - 100 and 150 watts
14" - 150 and 200 watts
Replacement parts always available.

Also available: Supreme MASTER THERMOSTATS
with 3-way switch, 300-watt capacity, to control up to 3 glass heaters.

EUGENE G. DANNER MFG. INC.
1660 Summerfield Street • Brooklyn, N. Y. 11227

- OTHER Supreme PRODUCTS**
- Filter pumps
 - Dip-tubes and air stones
 - Plant sump, sump platform
 - Pressure gauges and air regulators, parts and check valves
 - Oil for Aquarium Pumps and Motors
 - Pre-Cut Filter Pads
 - Master Thermostats
 - Adjustable chains

魚里



The Kanoko, a very rare color variety in which the scales are edged in gold.

A Kohaku (or Gin Goko). Gin-Goko means silver scale. This was the first color variety of colored carp.



The Asagi or light blue koi which is fairly common.



A very rare black on white koi known as Shiro-Bekko.





In Japan the source of fresh running water is from the melting snows. This shows the area around the Yoshida fish farm in the winter. It is located outside Tokyo near Mt. Fuji.

we donated a huge trophy for the winner of the show, and the display of trophies was evidence enough of the great interest in the show.

The winner of the show, a Taisho Sanke, was a three-colored koi developed from a strain which originated during the Taisho era of Japanese history (1911-1924). The fish was sold after the show for \$20,000. It went to Hawaii. The fish was bred by the Yoshida family.

Clearly, the Yoshida family were the koi kings in Japan and I was thrilled to find them very honest, humble people. Papa-san Yoshida was a kindly gentleman over 80 years old. He had 12 children, the youngest being 24 years old. His 12 children (they only count the boys; so he had 12 boys and a "few" girls) were all living except one killed in Okinawa during the war. Our first meeting was memorable as it took place in a geisha house but was so formal that the bowing and kowtowing took almost 5 minutes. Mama-san Yoshida was a beautiful old lady whose face radiated love and understanding. Her children loved her as was so evident by the way they looked after her. Imagine my embarrassment when, after the party, this beautiful 80 year old lady got on her hands and knees on a wet floor to put on my shoes and tie the shoelaces. I was told this was customary for an honored guest . . . but it felt strange to have her kneel in front of me when all the young kids were standing around watching.

The results of our first meeting were extraordinary. We were going to form a company in the USA to breed koi and fancy goldfish. The Yoshida

14

魚里



Hundreds of thousands of koi-lovers visit the koi shows held throughout Japan.

Koi are shipped around the world in large plastic bags filled 75% with oxygen and 25% with water.



The winner of the All Japan Koi Show with his trophy.

family were to send the koi, breeder goldfish and technical people to breed the fish and we, through our Gulf Fish Farms, were to supply the land, dig the ponds, construct the breeding facilities, etc.

In January, 1969 the first breeders arrived and with them came the youngest of the Yoshida sons . . . along with Papa-san. In a few weeks we started digging pools and breeding koi. There were innumerable problems. The koi and fancy goldfish were so slow swimming that almost all the fry were eaten by the tadpoles, snakes, birds and insects which are found in every outdoor pool in Florida. The fish had to be bred indoors. It only took a few months to get all the answers, but by the early summer our problems were over and we managed to breed more than 1,000,000 koi.

During the time we were having our problems, I flew to Japan to personally visit the Yoshida koi farms. I was amazed at the complexity of the operation and the way koi are sold in Japan on the wholesale level.

Because koi keep changing color, you can't really tell how valuable a fish will be until it's almost 5 inches long. That takes about six months in Japan. Naturally people buy koi when they are the cheapest so many are

16

December, 1969



A koi auction during which koi wholesalers and dealers bid for koi without knowing what they will get.

sold at one inch in length when they are usually all black or blackish gray. At two inches they begin to get color but every koi is different in color from the next, even though both parents may have been the same color. So the Japanese sell the koi in mixed lots. The lots are placed into floating traps made of wood, or into floating plastic bags. Each trap or bag is numbered . . . and they are auctioned off! You'd have to see the auction to believe it, for no one knows what they are buying until they have bought them. They don't know how many fish or what color as their view of the fish is from a distance and the auction is worked by the numbers. In most cases, if not all, people bid for numbers which they consider lucky without any idea of what they have bid for. These koi

Continued on Page 90

17

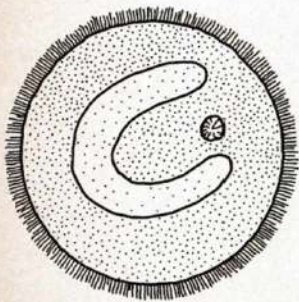
Enemy No. 1 — *Ichthyophthirius* PART I

BY DR. GOTTFRIED SCHUBERT

Whoever has kept fish for some time will know what "itch" or "ich" means, when used in connection with aquaria. Those little white spots on fins and body of our fish can drive a hobbyist mad!

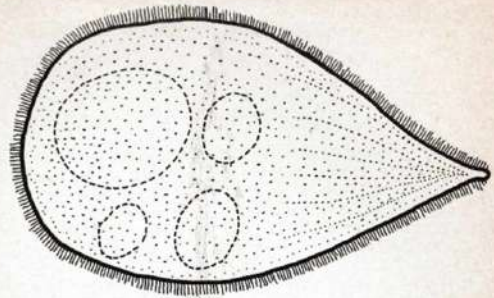
Usually all white spots are considered to be caused by ich. This isn't always true! It is better to check more carefully and to have some knowledge of this disease. "Ich" is caused by *Ichthyophthirius multifiliis* (if you debate about this disease with other hobbyists the conversation is prone to get rough. In such a case ask the guy to spell the Latin name! He will quiet down!) Translated into English the name means "many-threaded fish-louse." We shall soon understand the name, but we shall not use it, for the term "fish-louse" is reserved for a small crustacean also living on fish.

If we scratch off some of the white spots of our fish and put them under a microscope together with a drop of water, we shall see disc-like creatures. Even those of us not used to microscopical work will immediately detect them, for they are constantly turning and appear much darker than the tissue of the skin we scraped off, too. The dark appearance is due to numerous dark granules with which the parasite is filled. They derive from



Schematic drawing of *Ichthyophthirius*, showing the horseshoe-shaped nucleus and the cell-mouth.

18



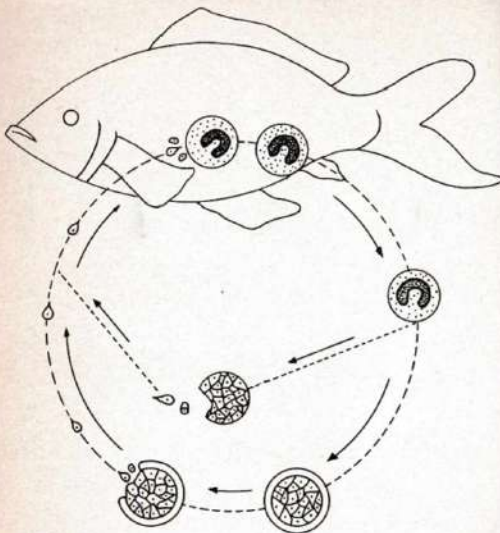
A swarmer of *Ichthyophthirius*. In nature about 1/10 the size of a ripe parasite, which uses its pointed end to dig under the skin of fish.

the food the parasite has taken from the skin of the fish. We also see that there is a horse-shoe shaped lighter spot in the center. It is the nucleus. *Ichthyophthirius* is a protozoan consisting of but one cell. Higher animals (and plants) are made of many cells. A newborn human is estimated to have about 2,000,000,000,000 cells. Every cell possesses a nucleus. Besides the horse-shoe shaped big nucleus (macronucleus) there is a small one (micronucleus) which we can scarcely see.

How does the parasite manage to move? Let us use a higher microscope magnification. We shall see that the surface of the animal is covered with tiny hairs, better called *cilia*. By regular beating they keep the parasite cycling. Because of the *cilia* *Ichthyophthirius* is classified as a *ciliate*, a group of animals to which *Paramecium* also belongs. If we watch carefully and have a little luck, we may see the cell-mouth of *Ichthyophthirius*, through which it takes up its food. There are some specially shaped *cilia* around the mouth spot.

For diagnosing *Ichthyophthirius* it is necessary to see the constant cycling and the horse-shoe shaped nucleus. White spots can be caused by a wide variety of other parasites, too. There are cases where there are no *Ichthyophthirius* on the fins and body of a fish but many on the gills. The fish will breathe heavily and may snatch air from the surface of the water.

19

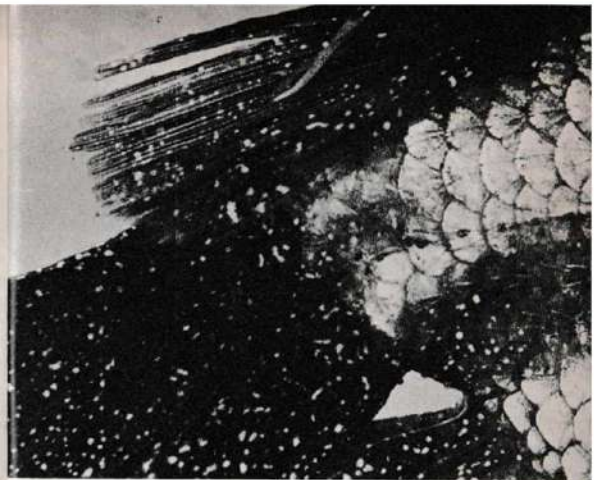


Life-cycle of *Ichthyophthirius*. See text for explanation.

In such a case we must study some slime from the gills to find out whether the fish is suffering from itch or another gill-parasite or if there isn't enough oxygen in the water.

How does an infection with *Ichthyophthirius* commence? There are tiny forms of *Ichthyophthirius*, called *swarmers*, in the water. We shall see later where they come from. They are pear-shaped and swim around searching for a fish. When reaching one they penetrate through the upper layer (epidermis) of the skin. *Ichthyophthirius* lives below the epidermis, not

20

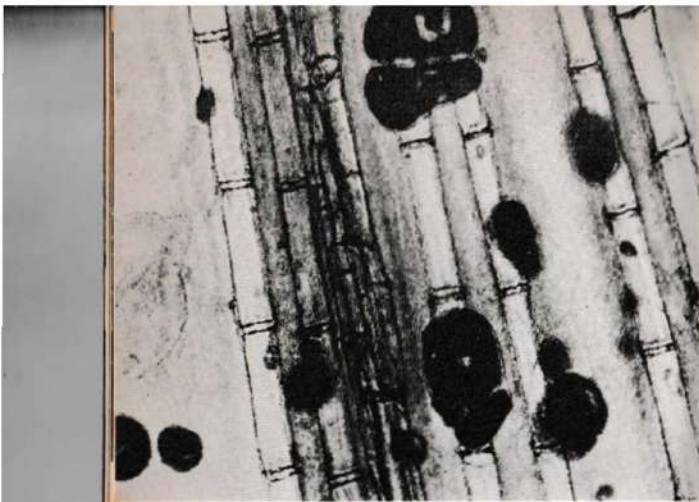


Posterior portion of a veiltail goldfish heavily infected by ich.

on top of it! That is the reason why itch gives us more trouble than other skin-infecting parasites. Medicines have to penetrate through the skin first before reaching the parasite. After having reached its final place the swarmer starts to feed and grow and changes to the form we have described above. When the parasite is ripe the covering epidermis is dissolved and the *Ichthyophthirius* leaves its host and will sink to the bottom. There it forms a cyst. In it several fissions take place until 250 to 1,000 new swarmers are formed out of the old *Ichthyophthirius*. The cyst bursts and the swarmers try to find a new host.

Infected fish probably feel a strong itch. They try to rub themselves against plants, stones, etc. If a parasite is rubbed off this way before it is ripe, it doesn't die but undergoes fissions to form swarmers without forming a cyst. But the number of swarmers produced this way is smaller. Cysts as well as rubbed-off specimens develop swarmers only when resting on the ground or other secure place. Development does not take place when the parasite is constantly whirled around. In this case the *Ichthyophthirius* will soon die.

21



The horseshoe-shaped nucleus is especially evident in this low-magnification photo of an ich-infected fin.

How quickly can this pest spread in a tank? It depends on the temperature! At 50° it will last 4 weeks and more until a swarmer will become a ripe *Ichthyophthirius*. At 80° the same process takes but 4 to 5 days. At this temperature the cyst will form swarmers within 18 to 20 hours. At 77° it takes about a day. The swarmers must find a new host within two days. After this time they are no longer able to penetrate the skin. After 55 hours all which haven't found a fish are dead. In warm water ich can spread very rapidly. Let us assume a 25 gallon tank with 25 fish. Each fish is supposed to have two parasites. An infection with such a low level you will hardly recognize. So we have 50 parasites, which will produce between 12,500 and 50,000 swarmers. In the limited space of the tank about 50% of them will find a new fish; under natural conditions less than 1% would succeed. But in our tank now every fish has about 500 parasites and a week later, following the same reasoning, there would be 125,000. Now even if we assume that only 25% of the swarmers will be successful, the disease will still spread quickly.

We know now about the life history of *Ichthyophthirius*. But we must add one item. Latest research by Herkner has shown that the swarmers may undergo a complicated way of sexual reproduction called *conjugation* under special conditions. Such swarmers seem to be able to live much longer than normal ones. But in our tanks this probably happens rather seldom, so we don't need to take this possibility into account for practical purposes.

You have seen if you detect ich on your fish you must react immediately or it may be too late. If a fish looks like the veil-tail in our picture it is dangerous.

But if you start fighting when there are but a few white spots, you have every reason to hope for success in curing the fish.

What can we do against ich? Next month we'll review some practical methods for treating ich.

Please Mention T.F.H. When Writing to Advertisers

ARE YOUR FISH SICK?
ARE YOU SURE OF THE PROPER
MEDICATION AND TREATMENT?

NO GUESSWORK INVOLVED WHEN USING
RID-ALL
THE GENERAL PURPOSE MEDICATION

Why use a dozen different remedies when "RID-ALL" is used for the positive control and the prevention of Ich, Fin & Tail Rot, Velvet, Body Fungus, Clamped Fins, and other fish diseases. Simple to use! Let "RID-ALL" do the work. No need to shut off lights, air, or change the temperature.

"RID-ALL" the liquid cure
TREATS YOUR FISH FOR LESS THAN ONE-HALF CENT PER GALLON
If Unable to Obtain From Your Dealer, Send \$1.00 For
ARSAN RESEARCH originators of "SNAIL-RID"
375 S. Hanlon, Westland, Michigan 48185

Tropical Fish Hobbyist

FILTER FLUFF



FINEST FILTERING MATERIAL

for Aquariums



- Contains NO glass fibers
- No irritation from handling

AVAILABLE IN
1 oz. Box, 2 oz., 7 oz.,
& 14 oz. Bags.

...PROVEN PROTECTION
FOR ALL FISH, WELL KNOWN
FOR MANY YEARS

EUREKA PRODUCTS CO., NEWARK, N. J. 07105
WORLD'S FINEST AQUARIUM PRODUCTS

IF YOUR SOURCE IS UNABLE TO SUPPLY YOU, WRITE FOR INFORMATION

Knife Eels

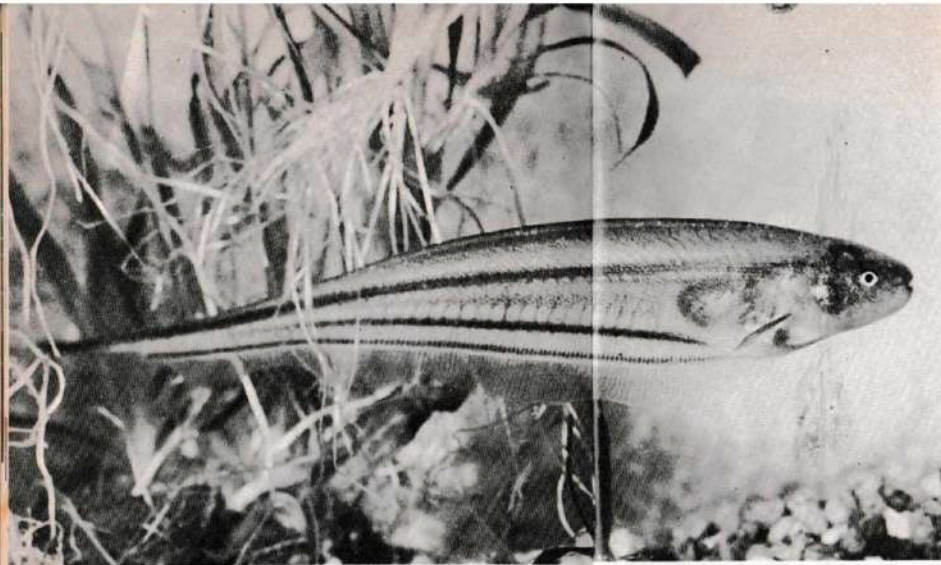
BY VIGGO SCHULTZ, Brazil, S.A.

"Nature never repeats herself." That is the opinion of a great thinker, someone you can probably identify easily enough. Now, there is a statement I would like to take exception to. Anyone looking closely at nature will find that she has created the same somatic types and features over and over again wherever the same type of ecological factors are repeated. In other words, the creatures of this world are always adapted to take advantage of their surroundings, and adapted in the same manner if the surroundings are the same. Take the case of fishes with supraterritorial, terminal, and subterminal mouths, for instance. The fact that a fish shows a supraterritorial mouth, (meaning a mouth that is located on the upper side of the tip of its snout) means that the species is one that usually skims along the surface of the water, or at least feeds there. Just look at the mouths of most livebearers, or better still at that of the dragonfin (*Pseudocorynopoma doriae*). A terminal mouth, meaning one horizontally located at the tip of the snout, makes the fish a sure dweller of the middle reaches, a "swimmer." That probably applies to the greater number of the fishes in your tanks. Finally a subterminal mouth, one that is turned downwards, is what one finds in bottom feeders and grubbers, i.e. the genera *Corydorax*.

The same truth holds for body shapes. Laterally compressed fishes, that is species with relatively flat, blade-like bodies, are swift swimmers as long as they go straight ahead. Arowanas and angelfish are examples of these. A fish that is perhaps not so quick but perfectly able to dodge the attacks of its foes by making quick turns is one with a rounded, "torpedo" shaped body. Just remember the zebra danio (*Brachydanio rerio*).

I know of no instance, however, in which ecological adaptation could be better illustrated than by the different species of knife eels. Not only all species but all genera are characterized by the same features: a supraterritorial mouth, a very long, wedge-shaped body, the tip of the tail ending in a point like that of a dagger, and the absence of most of the usual fins, excepting two very minute pectoral (or breast) fins and a very long anal fin that extends from the end of the belly of the fish to its tail. It is by means of undulations of this fin that the fish swims forward and backward with the same ease.

How about the similarity of their ecologies? . . . Allow me to go a little out of my way to make the explanation a little bit more vivid.



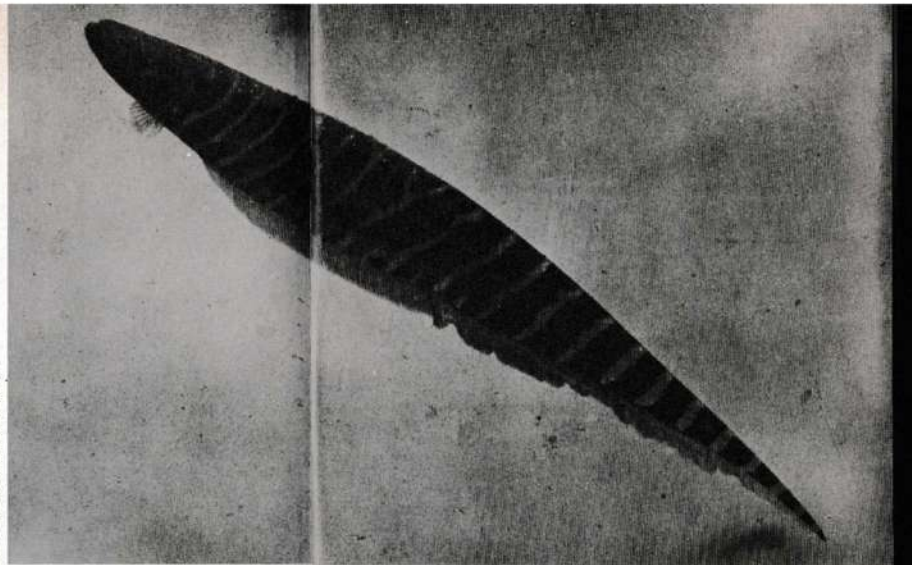
Eigenmannia virescens, the more peaceful of the "knife eels" that the author caught, takes up its station among vegetation in an aquarium. Photo by Gerhard Marcuse.

The first knife eels I ever caught were not placed in a tank. They were EATEN. When coming over to Brazil from Germany, one of the fond memories my mother always raved about was a formal dinner she had attended in Kiel, the German naval port, and one of the very special dishes she had eaten there had been "eels." No wonder that whenever I went fishing in my early boyhood—and the bug bit me when I was only six—I was especially keen after this kind of fish. In fact, any fish with a slippery skin without scales was at first hopefully dubbed an eel, until one had to find out it was a catfish or the like. A school-mate of mine, who lived near our usual fishing spot, told me of a place where one could catch eels that looked different from anything we had seen before. Of course we had to go there that same afternoon after the delicacy. Fishing was done in a very simple manner. We borrowed a large wicker basket from my friend's mother—what a scolding we got when we came back!—and placed it

standing on its side in the water, churning and splashing with our legs towards it until we had driven the fish in. After this we righted the catcher, as we called it, quickly and pulled it up. Usually one always caught a few characins and cichlids that way.

This time my friend took me to a place where the creek bottom was covered with dense vegetation from the middle right to the left bank. Off went our clothes, and in went two little boys with a basket for the adventure of catching eels. Beating the bushes brought forth nothing less than half a dozen of the fish, the largest ones of which I remember quite well as being at least twelve inches long. In fact, I have never caught them that large again. Later on I came to identify the species as *Gymnotus carapo*.

If this were the script of some theatrical production, I would now give you an intermission, and before the next act the program would inform you "twelve years later." The cast: Ernst F., a German electronics engineer



The disruptive color pattern that marks almost the entire length of *Gymnotus carapo* serves well to camouflage the fish from its enemies and prey as it lurks in the foliage-choked South American waters that are its home. Photo by Harald Schultz.

and fish fancier, "Pulle," his assistant, and myself, a student of linguistics in my early twenties. I believe that this time the time indication of twelve years later is not sufficient so let us make it an exact year: 1941, the year Brazil declared war on the Axis. Pulle (that is his nickname up to this day) and I, wearing swim trunks, were dragging an improvised seine—a piece of mosquito netting with a pair of ropes and poles attached to it—through the heavily weed-grown waters. Ernst was up on the dry earth lugging along our transportation cans. "Look, Ernst. Another submarine," I shouted. "Yes, but it's no good. It's a battle sub. Come now, let's have some of the merchant ones," was his reply. If any agent of the FBI or of the Brazilian Security Service had overheard us, we would certainly have ended up in jail. It sounded suspicious all right, especially coming from the mouths of two "enemy aliens," meaning two Germans in a Brazil that had declared war only a few days before and where the war enthusiasm was at a red hot

boiling point. The fact is that we were talking very innocently about fishes, knife eels to be exact. Bitter experience in our tanks had taught us that *Gymnotus carapo* is a notorious predator which attacks and eats all fishes it can subdue, or at least tears their fins if they are too big for it to devour. But there is a second species of knife eel in our waters. *Eigenmannia virescens* is as peace-loving an inhabitant of any community tank that one could wish for. The peculiar body shape of both species had led us to call them "U-Boat" which is German for submarine, and the fact that the newspapers were all the time full of news about subs, both war subs and the merchant sub "U-Deutschland," that was sent out to get through the Allied blockade at the beginning of the war, had given origin to the distinction made between the two species in our personal language.

Soon after starting to keep fishes in aquaria, I had discovered that among our many beautiful local species there were two kinds of knife eels, the first

Tropical Fish Hobbyist

of them a species with irregular lighter-colored oblique stripes on a dark background, the second one with a nearly uniformly gray or light brown body and two thin, long stripes. When the fish are small, the body is nearly translucent. Talking things over with Professor Rudolf Gliesch, a man to whom zoology in southern Brazil is deeply indebted, I found out that the darker-colored, aggressive fish was scientifically classed as *Gymnotus carapo*, a gymnotid, while the other, more peaceable species was *Eigenmannia virescens*, a sternarchid.

Back to their ecology now. If you have paid attention to the settings mentioned above, you will probably have noticed that I am always referring to the *vegetation* at the spots where they are caught. And it is a fact that I cannot think of one single case in which I have caught these fishes in open water.

Observing them in the aquarium soon gave me the explanation why. Both species have the habit of staying among the "shrubby" with their tails stuck into the bottom mud or sand, looking like the leaves of a rather large-leafed plant. In fact, this mimicry of shape and color is excellent. And the ecological factors being the same, the somatic ones—that is, ones relative to body shape—are the same too.

By the way, since we are speaking of knife eels, let me tell you that they make very interesting aquarium pets. Strange-looking, of good size, swimming backward and forward with the same ease you throw the gears of your car into reverse, they have the peculiar habit of scratching their flanks on the tank bottom.

A word of caution, though. If you are fortunate enough to be able to obtain one or more of these intriguing pets, be careful to afford them a tank with a soft bottom. Harsh sand or gravel will abrade the tips of their tails, and they will shortly develop a fungus infection there which usually turns out to be fatal. A mud bottom, like the one they are used to in their natural habitat, would be ideal, but the problem of keeping the water clear obviates the use of it. However, a layer of soft boiled peat moss, such as one uses for spawning annuals, should certainly do the trick, with the added advantage that it is said that peat moss is generally advantageous for fishes and plants due to its chemical contents.

Read it next month in
TROPICAL FISH HOBBYIST . . .

The greatest "happening" since the Marble Angelfish.

NAJA'S ANGELFISH

30



In this bottle is the most effective treatment for Ich and velvet that has ever been invented. It doesn't color the water, either. Neither you, your fish nor your friends will know that your fishes are being treated.

Sold at petshops only. From Miracle, the people with know-how.

MIRACLE PET PRODUCTS, INC.,
Box 33, Jersey City, N.J. 07303

FOR WHOM THE TAD POLES

The short unhappy life of the green frog

With apologies to Ernest Hemingway for the title and congratulations to Hans Pfletschinger for the photographs.

Observation of what goes on in an active aquarium has long taught hobbyists that the life of an infant in the aquatic world is tough going. A baby fish might escape its own parents only to find itself up against the greedy gulppings of a cichlid or the fretful snappings of a big tetra . . . and if it's lucky enough to beat the odds against its larger tankmates, it goes on to assorted dangers from disease, parasites, and mismanagement by the hobbyist.

But a baby aquarium fish probably fares better than its counterpart in nature, for the jungle streams of Malaysia and the overgrown rivers of South America harbor an assemblage of creatures that exact an even greater toll on the billions of fishes born in them each year. Don't think for a moment, though, that tropical and semi-tropical waters have a monopoly on mayhem; our temperate waters abound in skilled killers that



most short work of strugglers and strugglers of any kind. In witness whereof we hereunto set our seal and offer for your edification a series of truly remarkable photographs showing the birth, development, and fate of a bundle of green frogs born in a small pond near the home of gifted photographer and naturalist Hans Pflutsch.

As soon as the first rays of the spring sun warm the waters, the frogs wake up and seek mates in ponds and small lakes and even in water-filled road ditches and mud puddles. Shortly after a male finds a female, he clasps her around her neck with his forelegs, and she begins releasing her eggs, which the male fertilizes immediately.

The parent amphibians show no interest in their eggs, and the lumps of spawn sink to the bottom; later, when the jelly-like layer that surrounds each egg has swollen and the water has grown warmer, the lumps rise to the surface. Green frogs are prolific, 4000 eggs from a single pair is not at all unusual, and a pond can be almost completely covered by frog eggs. This photograph shows the frog eggs within their cover of jelly, as seen against the light. The layer of jelly protects the eggs; with the jelly on, they are insulated against the cold and less easy to eat.

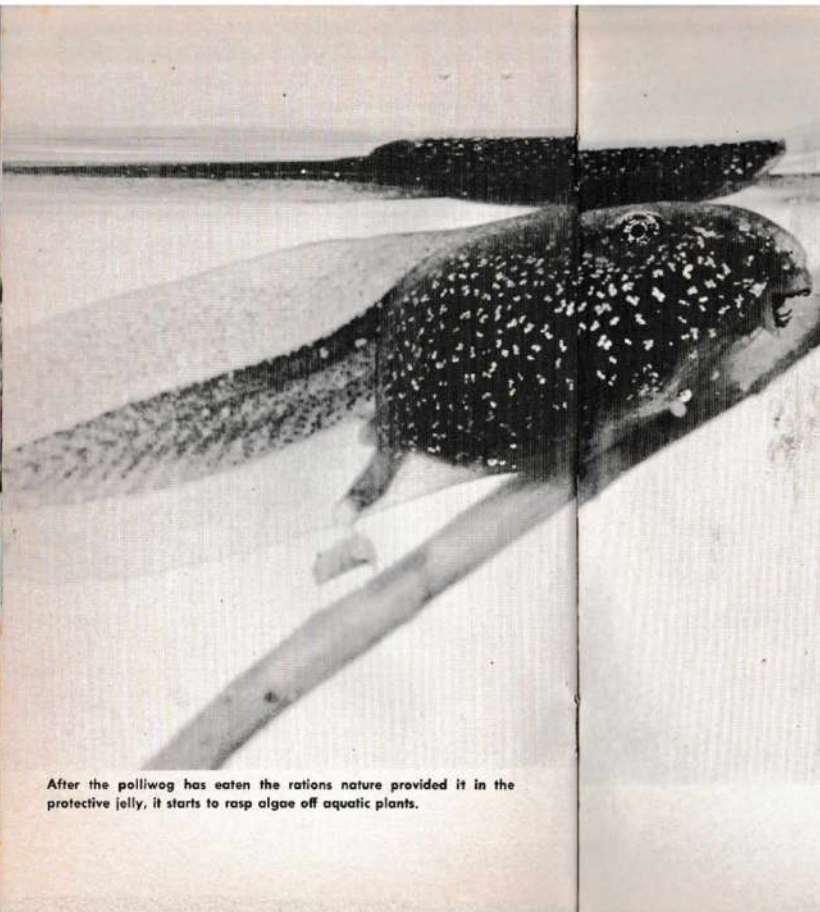
The eggs develop quickly if the water is warm and the days are sunny, and normally the outline of a piliwog can be seen in each egg within a few days. The embryos are here shown in their seventh day of development.

The first piliwogs, measuring about a quarter of an inch, have hatched.

More and more young frogs have hatched, and the jelly-like substance again asserts its importance, since it provides the first food for the larvae.



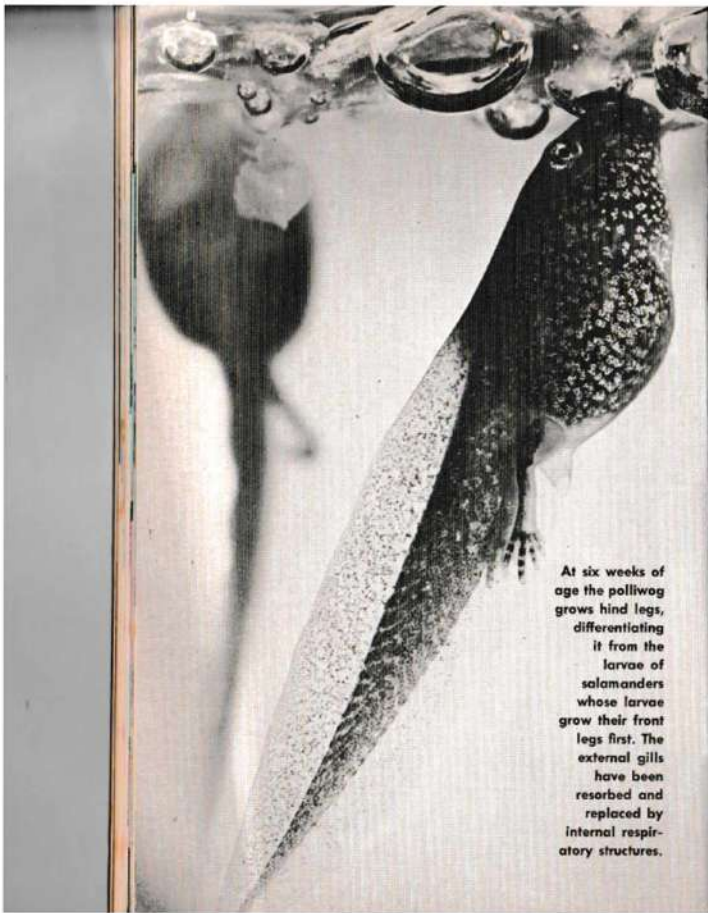
The appearance of the polliwogs changes from day to day; here the external gills that allow the baby frogs to extract oxygen from their watery cradle are well in evidence.



After the polliwog has eaten the rations nature provided it in the protective jelly, it starts to rasp algae off aquatic plants.



During a stage in its development, the belly skin of the polliwog is transparent and allows a clear view of the extended intestine and its outlet.



At six weeks of age the polliwog grows hind legs, differentiating it from the larvae of salamanders whose larvae grow their front legs first. The external gills have been resorbed and replaced by internal respiratory structures.



At eight weeks of age the polliwog is less polliwogish and looks more like its parents; both front and rear legs have grown, and the tail has shrunk. The frog larva does not breathe through gills any more, having acquired a lung, for which reason it must make an occasional trip to the water's surface for air. And when it goes up it might not come down, for at the surface it makes an attractive target for birds and other predators.

Now three months old, the little frog is finally able to leave its wet element at will. As an adult it will turn the tables on many of the creatures that feasted on its relatives while they were in the early stages of their metamorphosis.



This puddle is a sad story. Originally there were thousands of tadpoles in the puddle, the young of several green frog females. The last survivors remained in the puddle until the bitter end, and as the puddle shrank day by day. A day after this photograph was taken, the puddle dried up completely and all anuran life within it died.



Dytiscid beetle larvae are very dangerous enemies of the tadpoles. A single Dystiscus can suck dry twenty to thirty half-grown baby frogs a day.



High on the list of insect predators against tadpoles is the dragonfly larva. Here the poor tadpole is held helplessly while the dragonfly larva consumes it slowly.

Newts and salamanders, which generally spawn in the same waters as the frogs and toads, are among the most voracious of polliwag enemies; a lone adult salamander is able to destroy all of the thousands of larvae from one frog mating.



EHEIM

POWER FILTER

388 - fresh water and salt water for tanks up to 100 gals.

Technical data

Diameter	4.3 inches
Height	12.6 inches
Capacity of container	appr. 1000 cts (2 pints)
Flow rate	60 gals./hour
Power consumption	30 watts

Miracle

EXCLUSIVE DISTRIBUTORS IN THE UNITED STATES:
MIRACLE PET PRODUCTS, INC., JESSY CITY, N. J. 07203
FOR FOREIGN INQUIRIES, CONTACT:
GUNTHER EHEIM INC.
7301 HEIZISAU D ESSLINGEN, POSTFACH 65, GERMANY

MAIL CALL

If you have an aquarium question that you would like answered, send it to MAIL CALL. Each month the most interesting questions received and their answers will be published in this column. Letters containing questions cannot be acknowledged or answered personally. Address all questions to: MAIL CALL, T.F.H. Publications, Inc., 245 Cornelison Avenue, Jersey City, N. J. 07302.

Aphyoseion Gardneri
Q. I have tried for a long time to spawn my *Aphyoseion calliurum* ahli. I keep them alone in a 10-gallon tank which is heavily planted. The pH readings are always between 6.6 and 6.8. I would appreciate any further information.

Michael De Santis
 Pelham Manor, New York

A. First, the fish that has been known for some time under the name *A. calliurum* ahli is more properly referred to as *A. gardneri*. This, however, has nothing to do with the spawning problem. I wonder if your fish have not in fact spawned, but you were unable to find the eggs. Try moving the pair to a three- or five-gallon aquarium with a single spawning mop. This makes finding the eggs much easier. Although your pH

THE EMERALD COBRA
 (Snakebite Guppy)

The Ultimate in a Green Cobra Delta Males have green snakebite patterns on body with wide tails. Large, prolific females are light colored with green coat. Guaranteed to breed true: \$12.50 per pair (\$4.50 extra for trial). Also available in blue.

Other varieties include Turquoise Green, Magnificent solid greens in body and Delta tail, Blue and Red Delta, Orange Tail Albinoes, \$8.00 per pair (\$3.00 extra for trial). Guaranteed Live Delivery, Postpaid, Special Fish, Airmail Service.

Send check or money order to:
DELTA AQUARIUM STOCK COMPANY
 All Fish Unit P. O. Box 93079
 Los Angeles, Calif. 90063
 Phone: (213) 545-6823

seems acceptable, you do not indicate the hardness. You might try half distilled water and half tap water.

Aquarium Chemistry
Q. 1. In my search for malachite green I have tried fish stores and they send me to drug stores where

ELIMINATE THOSE HARD WATER PROBLEMS with . . . RILA WATERSOFT POWDER

- Softens water easily and economically with complete control . . . to any desired level.
- Removes only those chemicals responsible for hard water . . . does not remove other elements essential for fish and plant life.
- Economical way to make soft water to replace aquarium water lost through evaporation.

FOR ACCURATE, RELIABLE TESTING: RILA WATER HARDNESS TEST KIT
 Ask your dealer today or write for complete Product Information.

RILA PRODUCTS P. O. Box 114 Teaneck, N. J. 07666

PET TOWNE

QUALITY TROPICALS IN
5 LOCATIONS

Massachusetts:

• 776 State St. (Rt. 20) SPRINGFIELD

• 1655 Boston Rd. "Eastfield Mall" SPRINGFIELD

Connecticut:

• 671 Silas Deane Hwy. (Rt. 9) WETHERSFIELD

• 544 K Windsor Shopping Plaza — in the mall. (Rt. 5A) WINDSOR

• (Rt. 69) Waterbury Ave. PROSPECT

Come See Us — Soon and Often

they treat me like I have spoken a foreign word. Chemical companies seem to want nothing to do with individuals. Where specifically can malachite green be purchased?

2. I cannot understand why you recommend boiled peat extract and call sodium biphosphate "poor material" for lowering pH, especially when sodium biphosphate is in easy to obtain and to use.

Mrs. Rudolph T. Ott
Downey, California

A. 1. Malachite green is rather commonly available in a number of commercial remedies, most of which bottle it in a 76% solution. Check the labels for ingredients.

2. I consider sodium biphosphate a poor material for acidifying water because it adds sodium and phosphate to the water. The former is dangerous because the sodium

already present in some tap water plus the sodium added by water softeners can combine to reach a concentration which is dangerous to both plants and fishes. Phosphate may promote excessive algae growth. Peat extract does none of these things and in addition is said to add a hormone-like substance which stimulates some species of fishes to breed.

Zebra School

Q. I have heard that zebras swim together in a school. I placed two male zebras in my aquarium, and they stay as far away from each other as they can get. They sometimes pick on each other. Should I add a few females to try to bring my males together?

Leland Burns
Fort Worth, Texas

**CLEAN AQUARIUMS
ONE HAND OPERATION
LARGER VALVES
LONG LIFE
GUARANTEED**



"ONE HAND" OPERATION

IS THE ANSWER
MILLIONS OF FISH
AROUND THE WORLD
ARE HEALTHY BECAUSE OF

"Jiffy" CLEAN AQUARIUMS

SOLD BY FINE DEALERS AND
DISTRIBUTORS EVERYWHERE
FREE CATALOG

FRAMAR MFG. CO.
3958 ALLA ROAD LOS ANGELES CALIF. 90066



WHAT NEW LIVE FISHFOOD IS THIS?

Micro-eels.
That's right — EELS!

And you'd need a computer to count them all!

Developed for feeding to fish, these are *Taraxia acis* that years ago grew in the sediment of non-pasturized vineyard.

Through experimentation, we've weaned these micro-eel-sized eels over to water! Thus, now when you want to feed your fish, JUST POUR THE FOOD IN!

To use this food:

- Add 1/2 teaspoon of cereal to 1/2 gallon of water.
- Add worms.
- Watch them produce millions "overnight".
- Leave them on shelf for months until actually needed.
- No foul smell.
- No spoiled culture!!!

We predict that within a year, all serious hobbyists will be using our micro-eels! This is the newest, best, and easiest live food to raise and use. Raising live food is extremely cheap in the long run!

For your starter portion, send \$2.50 plus 50¢ for handling and airmail—and we'll send your culture to you by RETURN MAIL. If you wish, add 30¢ for special delivery to your door.

AQUA ENGINEERS

Box 1
Ortonville, Mich. 49662

Ask about our monthly slide programs we send to clubs. And ask about our Grand International Champion eelery stock prices. You'll love these fish.

"EARN YOUR OWN LIVE FISHFOOD. MAKE IT CHEAP IN THE LONG RUN!"

FAST RETURN MAIL SERVICE. Our mailing mail gets filed on the afternoon where else do you get such sudden service? Directions always included.

1. Black Wingless Fruitflies (22.00) No food, most grow produce hand-fed. Baked from 100% into aquaria. Batches you start last over one month.
2. Microworms (21.25) 1/4" long. Excellent, traditional food. Over a million, try first.
3. Water Worms (22.75) New food, grows to 1/4" long. Excellent, live, as an alternative to live food. Excellent for all fish. Excellent for all fish. Excellent for all fish.
4. Earthworms (22.25) Water "bait", one of best natural foods. Easy to grow in gallon bottles.
5. Freshwater Springtails (22.25) Algae-eaters, excellent for home-keeping. Practical. Grow in aquaria and then water. No much. Excellent for all fish.
6. Watermites (22.75) The "STANDARD" food. Grow in small plastic bags in dark feed boxes.
7. Grasshopper (22.25) Superior stock of small white larvae. Excellent for all fish.
8. Insects (21.25) 100% in starter culture.
9. Insects (21.25) 100% in starter culture.
10. Insects (21.25) 100% in starter culture.
11. FISH MEAL (21.25) 1/2 30 lb. Name color. No airmail on this.
12. Fishmeal (20¢ per sack) Treats fishes, with vitamins, vitamins.
13. Eggs. Ask prices of our new interesting price-feeding eggs when you order.
14. Fishmeal (21.25) 100% in starter culture.
15. Fishmeal (21.25) 100% in starter culture.
16. Fishmeal (21.25) 100% in starter culture.

3. Package made of plastic (containing good for 1 year)

1. Fishmeal (21.25) 100% in starter culture.
2. Fishmeal (21.25) 100% in starter culture.
3. Fishmeal (21.25) 100% in starter culture.
4. Fishmeal (21.25) 100% in starter culture.
5. Fishmeal (21.25) 100% in starter culture.
6. Fishmeal (21.25) 100% in starter culture.
7. Fishmeal (21.25) 100% in starter culture.
8. Fishmeal (21.25) 100% in starter culture.
9. Fishmeal (21.25) 100% in starter culture.
10. Fishmeal (21.25) 100% in starter culture.
11. Fishmeal (21.25) 100% in starter culture.
12. Fishmeal (21.25) 100% in starter culture.
13. Fishmeal (21.25) 100% in starter culture.
14. Fishmeal (21.25) 100% in starter culture.
15. Fishmeal (21.25) 100% in starter culture.
16. Fishmeal (21.25) 100% in starter culture.
17. Fishmeal (21.25) 100% in starter culture.
18. Fishmeal (21.25) 100% in starter culture.
19. Fishmeal (21.25) 100% in starter culture.
20. Fishmeal (21.25) 100% in starter culture.

NAME: _____
ADDRESS: _____
CITY, STATE: _____
ZIP: _____

Fishclub member? _____
Name of Club: _____

Quantity Item _____
Worms _____
FRUITFLIES (22.00) _____
MICROWORMS (21.25) _____
WATER WORMS (22.75) _____
EARTHWORMS (22.25) _____
FRESHWATER SPRINGTAILS (22.25) _____
WATERMITES (22.75) _____
GRASSHOPPER (22.25) _____
FISH MEAL (21.25) _____
INSECTS (21.25) _____
FISH MEAL (21.25) _____
INSECTS (21.25) _____
FISH MEAL (21.25) _____
INSECTS (21.25) _____

AQUA ENGINEERS
Box 1, Ortonville, Michigan 49662

Order today—before you forget it and your fish regret it!

TOTAL \$ _____
YOU MUST ADD ANNUAL 30¢ POSTAGE
SPECIAL DELIVERY TO POST OFFICE BOX 1001
GRAND TOTAL \$ _____

Attention:
**AQUARIUM & PET SHOPS
EVERGLADES**
has been in business

39

YEARS
and wants to serve you!

Bonafide DEALERS please write for our wholesale list using your letterhead. Your name will be placed on our Mailing List.

NO RETAIL
EVERGLADES AQUATIC NURS., Inc.
P. O. Box 587
Tampa, Fla. 33601



Well Known Importer
and Exporter
Tropicalfish and Goldfish
Highest Quality - Prompt Service
WE DELIVER ALL OVER THE WORLD
AND YEAR ROUND
CEYLON AQUARIUM
NKIL 2763 C Shatin Pass Road
Kowloon, Hong Kong
Tel.: K-208383 - K201692
Cable Add. CEYQUARIA
Price list available free of charge
upon request on your business
letterhead

A. Two fish don't make much of a school, even when they swim together. The addition of four more zebras of mixed sexes would create the effect you desire.

Light and Sterility
Q. I have heard that a fluorescent bulb over an aquarium can promote sterility in some varieties of tropical fishes. Is this true?

Jeff Fisher
Lincoln, Nebraska

A. There seems to be growing evidence that some types of fluorescent lights can decrease productivity of livebearers and perhaps of killifishes. The bulbs which have been specifically implicated are those designed to promote plant growth. Other types of fluorescent light do not seem to have this effect.

Bottled Water
Q. I am enclosing a label from a bottle of spring water which is sold in our area. Is this type of water suitable for use with tropical fishes?

Mrs. Laura Hanford
Unionville, New York

A. The label itself gives very little information on the chemical composition of the water in spite of the fact that there are about 200 words telling how great it is. It would be very foolish to buy water for even a small aquarium when what you have from the tap is probably just as good.

Black Ghost
Q. I have a black ghost. Since the time I added it to my 30-gallon aquarium, it has been hiding in one corner of my tank. Is this normal for this species?

Sandra Estok
Cleveland, Ohio



Sternarchus albifrons

A. *Sternarchus albifrons*, the black ghost, is a nocturnal fish much given to hiding during the day. If a cave or similar shelter is provided, the ghost might prefer it to the corner.

Insecticides
Q. If you spray insecticide in your home, what precautions should be taken to prevent it from going into the aquarium?

Mrs. H. Weisman
New York, New York

A. Insecticides are responsible for the deaths of many fishes each year. Symptoms of insecticide poisoning vary with species and with insecticides. Never use insecticides in a room with an aquarium if at all possible. If it is necessary to use insecticides in a room with an aquarium, cover the aquarium with plastic and tape the plastic securely so that there is no danger of contamination of the water. If an air pump is used, it should be turned off or removed to an area which is not to be sprayed and a long line run to the aquarium. The plastic cover should not be removed.

Megaton Air Pumps? Who needs em!

YOU DO—if you're an aquarium operator. Megaton Air Pumps take a load off your mind. They're built to do a job and keep on doing it. Day and night. How come?

Because Megaton Air Pumps deliver nonpump efficiency continuously. They're compact, yet high powered. And because they're precision machined, they give years and years of trouble-free service.

So who needs the dependability of a Megaton Air Pump? YOU DO.

Internally air-cooled motor
Full 1/4" O.D. ball bearings
Heavy duty shafts and bearings
Fused motor — no adjustments necessary (can't be jammed out of position)
One-piece frame construction

THE MEGATON SUPER
• Output 1700 G.P.M., 325 cu. in. (Min. 8 tanks) \$18.95
• Output 1700 G.P.M., 325 cu. in. (Min. 8 tanks) \$18.95
• Output 1700 G.P.M., 325 cu. in. (Min. 8 tanks) \$18.95

AQUARIUM STOCK COMPANY, INC.
31 Warren St., New York, N. Y. 10017 • 8075 Beverly Blvd., L.A. 48, Calif.

from the aquarium for twenty-four hours and it should then not be allowed to come into contact with the water.

Please mention T.F.H. when writing to advertisers

AQUARIUM PLANTS THRIVE



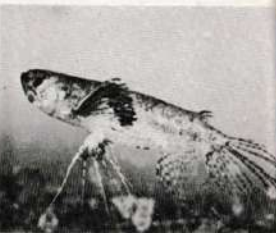
and so do fish... Plantabbs Aquarium Plant Food Tablets feed your aquarium plants to thriving, full-bloomed beauty. Beautiful to fish, too. Economical and convenient: just put in 1 tablet per each 5 gallons of water. Use once every 10 days. Guaranteed Safe!

PLANTABBS
AQUARIUM PLANT FOODS
Plantabbs, Timonium, Maryland

Pantodon buchholzi
Q. I have two *Pantodon buchholzi*. I would like to know the sex differences and some tips on breeding them.

Geoffrey Smith
Mitchellville, Maryland

A. The spawning of the butterfly fish is not too difficult. Water



Pantodon buchholzi

should be moderately soft and the pair must be heavily fed. Cockroaches and crickets have been suggested for this purpose. The male butterfly has stronger colors and a deeply notched anal fin.

Please Mention T.F.H. When Writing to Advertisers

FIRST PRIZE WINNER AT THE INTERNATIONAL 1960 GUPPY SHOW, BERLIN, GERMANY

THE BRONZE DELIGHT

After more than 30 years of breeding exhibition guppies, Mr. Hartung now introduces his greatest achievement — the Bronze Delight with its large Vail-tail breeds true. They are a firm hybrid of golden and grey guppies. You may choose from Green, Leopard, Blue, Variegated or Blue-green fish, \$14 per pair, \$55.00 extra for Trios.

HARTUNG GUPPY SPECIALIST

Other prize-winning varieties are: your choice of Red, Blue, Black, Dark Blue, Variegated — only \$6.50 per pair. Albino Vails, \$8 a pair. Beautiful Green Body and Vails \$9 a pair. **GUARANTEED** Live Delivery — Postpaid. Send check or money order to: Wm. HARTUNG, 91-24 88th St., Woodhaven 21, N. Y. — VI 7-2528.

Why Gills?

Q. I have been keeping tropical fishes for five years, but I cannot understand why air-breathing fishes also have gill plates when they obtain their oxygen from the air.

Gary Stanton
Macon, Georgia

A. These fishes have gill plates to cover the sensitive gills which these fishes, like nearly all others, use to obtain oxygen from the water. The air-breathing organs are merely accessories to the gills in these species; under normal conditions the gills extract most of the oxygen required by the fish from the water.

Black Swordtails

Q. I have been raising swordtails for about two years and I have some questions which are not answered by the aquarium literature I have on hand.

1. Many green swordtails have some black markings on the sides. I have expanded these black markings to a great degree by selective breeding. Is this the way the black swordtail was produced?

2. A friend said to get more black coloration on my fish I should



Famous for the four most modern, attractive stores in the east.

Famous for the MULTI-LINE of medications and aquarium products for the health and comfort of your fish.

Famous for salt-water fishes from the world's tropical waters.

Famous for rare species of tropicals shipped direct to us from all over the world.

Famous as specialists in Killifish breeding.

When in New York, stop in to see our new, modern aquarium facilities and our extensive display of rare and beautiful fishes.

Main Office, Lybrook
Ed's Aquariums

LYNBROOK, N. Y., 2 Scanton Ave., 11563 FOREST HILLS, N. Y., 45-53 - 169th St. FARMINGDALE, N. Y., 9 Hempstead Turnpike, ROOSEVELT FIELD, N. Y., Garden City

Teo Way Yong & Sons, Ltd.
Importers & Exporters of
Fancy Tropical Fishes,
Wild Birds & Animals
Shipments to Any Part of the World

28, Yio Chu Kang Road
Singapore 19
Cable Address:
"CATFISH" SINGAPORE

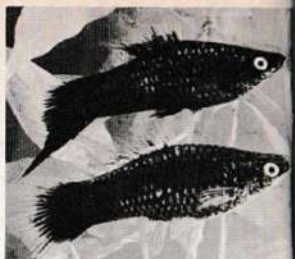
MASTER BREEDER CULTURES by DALECO

ENJOY CONTINUOUS LIVE FOOD SUPPLY CLEAN, DEPENDABLE, FOOL PROOF

Mail Coupon Today! DALECO, 414 Glenelby, Tenawanda, N. Y. 14150. I enclose \$_____ Rush postpaid on Money-Back-Guarantee.

- Culture Method (weekly) 5.25
- DIOSOPHILA (helixes Fruit Flies) 1.50
- DIOSOPHILA MASTER BREEDER 3.00
- Culture plus 1 yr. AGAR supply 1.00
- MIKROVORAS* 1.00
- MIKRO MASTER BREEDER pkg. (Culture, breeder jar and Media) 3.00
- EUGLENA* (green infusoria) 1.50
- TENEBRION* (Meal Worms) 1.75
- GAMMARUS* (1/4" crustacean) 1.75
- CLIOPELONIA* (1/2" aquatic worms) 2.00
- DAPHNIA MAGNA 2.00
- WATER SOFTENER (Permanently Reusable) 2.29
- SR. WATER POLISHER FILTER prevents fungus on fertile eggs
- "SILENT TIGER" AIR PUMP for multiple tank owners 14.88 (1-30 aquariums)

Name _____ Address _____



Black swordtails

breed a black one back to a plain green sword. I would guess that to get the coloration darker and more extensive one would breed two black ones together. What do you think?

David Harker
Napa, California

A. It is my guess that the black sword was produced by crossing a green sword to a Berlin platy. The interaction of certain genes carried by the swordtail with the black pigment genes of the platy causes an extension of the black color.

Bulk Tropical Fish Food

The sea was purchased direct from Canada's largest and oldest producer of guaranteed sea-70% Protein Tropical Fish Food. 100% Digestible with no fillers, a product of the sea, composed of small fish, shrimp, crab, fish liver, eggs, vitamins, natural food used for tropical or salt water fish and used by top breeders for years.

SPECIAL MAIL ORDER OFFER

- 1 ONE POUND BAGS FAMOUS VARIETY PACK \$10.00 POST PAID AND DUTY FREE. OR
- 1 ONE POUND BAGS GUPPY FOOD \$10.00 POST PAID DUTY FREE. OR
- ONE POUND GUPPY FOOD \$1.30 POST PAID DUTY FREE.

Reserve Shrimp and Mussels, special price \$9.00. Bags shipped Airtight freight duty free. Send for descriptive price list.

Hart & Howes Ltd. 569-Steveson Highway Richmond, B. C., Canada Tel. (604) 277-4228

FOOK FISH FARMS CO.

is the most experienced fish farm in Hong Kong specializing in Fancy Livebearers (albinos and hifins), Tank-raised Neons, Penguins, Headstanders, Extra-Fancy Goldfish, etc.

Write for price list (minimum order \$50) to:

FOOK FISH FARMS CO.
11 Fu Hing Street, 1/F,
Sheung Shui, N.T.,
Hong Kong, BCC

2. Your friend's advice has merit, but even greater extension would take place if you crossed your dark sword to a Berlin platy. It may work so well that there is too much interaction and the fish will develop skin cancer.

THE CALICO GUPPY
(first place winner at 1969 San Gabriel Valley G. Show)

A unique addition to the variable Guppy family. Delta males are a patchwork of orange, black and red, against a background of gold. Females, a solid gold carrying calico color in tails. They breed true. \$14.00 per pair (\$5.00 extra for trios). Other unusual, true breeding Delta varieties include: Leopard (yellow with dark spots in tail), Ebony Black (black body and tail, white dorsal), Red Cobra, Snakeskin (red Delta), Royal Dark Blue (solid dark blue tail), First Place winners, 1969 Long Beach, Cal. Show. \$9.00 per pair (\$3.50 extra for trios). Guaranteed live delivery, postpaid, Airmail Special. Send Check or Money Order to:

GUPPY CHAMPIONS INTERNATIONAL
P. O. Box 95225, A. F. Unit
Los Angeles, Calif. 90045
Phone (213) 545-4421

Fin "Fungus"

Q. A little while ago my catfishes started to rub themselves on objects in the aquarium, and the other fishes in the aquarium showed a deterioration of the fins. I have used terramycin, malachite green, methylene blue, salt, and various other remedies. Could you please tell me how to cure this fin deterioration?

James Howell
Lanonia, Michigan

A. The usual practice is to refer to anything which causes deterioration of the fins as a "fin fungus." This is probably unfortunate because it tempts the aquarist to try the wrong remedies. Some types of fin deterioration are caused by any of several fungi. Others are caused by bacteria and still others

HOBBYISTS

Buy direct from breeder and importer. We have been breeding and importing show fish for over twenty years.

WE KNOW OUR FISH AND ONLY HANDLE THE FINEST!!

ANGELS BREEDERS - SEXED AND SOLD IN PAIRS

Marbles	50.00	Marble Vails	60.00
Black	35.00	Black Vails	35.00
Shantling	30.00	Shantling Vails	35.00
Black Lace	25.00	Black Lace Vails	25.00
Silvers	20.00	Silver Vails	25.00

MISCELLANEOUS

Albino Cory Cat	7.50	Sumatranus	5.00
Black Paradise	7.50	Loori Gourami	6.00
Albino Paradise	8.00	Kissing Gourami	10.00
Black Phantom Tet	6.00	Hi-Fin Varietas	7.50
Hi-Fin Black Tet	6.00	Golden Zebra	6.00
Nanosthops Tet	7.50	Kribensis	7.50

GUPPIES

Large Broadtail - True Breeders - Red, Green, Blue, Teardrop, and King Cobras - \$15.00 per trio.

SHOW FISH

Bettas 3" and up assorted colors, 4 for \$25.00. Large Broadtail show Guppies 8 months old and over assorted colors, 4 for \$25.00. Bicus 4" bodies and up. Blue Heckel, \$50.00 per pair. Blue, Green, and Browns, \$35.00 per pair. Flaming Fire Eel, 8 to 12", \$25.00 each. Arwana, 9 to 12", \$75.00 each. Black Chest Knife, 9 to 12", \$25.00 each. Piranha, 1" and up, \$20.00 each.

Our fish come from all parts of the world and we can supply you with the type of fish you desire. In ordering unlisted fish give us both the common and scientific names of the fish. All shipments are made by air-parcel post, express, or freight according to size of shipment. Guaranteed live delivery! Customer will be notified in advance the date of shipment and approximate time of arrival. Minimum sale of \$15.00.

MAIL YOUR ORDER TODAY. CHECK OR MONEY ORDER. NO C.O.D.

WORLDWIDE EXOTIC FINS - P. O. BOX 407 - BRADENTON, FLORIDA 33505

by protozoa. It has been my experience that most fin deterioration is caused by the latter. Although it would seem that either the malachite green or the methylene blue would kill the protozoa, many attacks do not respond well to this treatment alone. I have found a combination of malachite green in a .75% solution at the rate of one drop per gallon with quinine sulfate at the rate of 2 grains per gallon to be effective. The cure generally takes two to three days.

Albino "Pimelodella"
Q. I would like to know about the albino pimelodella, because I have not been able to find this species in any of my books. Some experienced aquarist friends of mine told me that my albino pimelodella were really American channel catfish. I disagreed because it looks very much like *Pimelodella pictus*. I would appreciate information on this species.

Peter Meier
Whitman, Massachusetts
A. Your friends appear to be correct. To the best of my knowledge there have been no albino members of the genus *Pimelodella* reported. The American channel catfish,

Ictalurus lacustris, looks a good deal like *pimelodella*, but as it grows older it loses the streamlined appearance and there is no confusing the genera.

Please mention T.F.H. when writing to advertisers

PUT A TURTLE IN YOUR TANK



79c

WITH AQUA-STOCK'S EVERFLOAT TURTLE RAFT

Hours of fun. Watch them dive, swim, frolic.

- Now they surface in the same tank with your fish.
- Fits any aquarium.
- Turtles can get on and off with ease.
- Special food compartment. Turtles can eat and dry themselves at same time.



The unique EVERFLOAT also design lets the raft ride or fall with the water level, so keeps the raft in a fixed position.

AQUARIUM STOCK COMPANY, Inc.
11 AUBURN STREET, NEW YORK, N.Y. 10017
800 SEVENTH BLVD., LOS ANGELES, CALIF.

Please Mention T.F.H. When Writing to Advertisers

THE ICHTHYOPHILE A NEW TROPICAL FISH PUBLICATION
Your dealer's gift to you for being a good HOBBYIST
Dealers WRITE FOR SAMPLES AND PRICES
THE ICHTHYOPHILE RT. 4 BOX 925 MIAMI, FLA. 33156

Brown Water
Q. I am having a problem with my 30-gallon aquarium. The color of the water is a light brownish. The water originally was crystal clear for a long time. My filter is working fine. I have a 20-gallon tank in which the water has remained clear. What causes brown water and how can it be prevented?

Rubin Maimark
Bowie, Maryland
A. Brown water is caused by decaying organic material in the gravel of your aquarium. Many aquarists feel this type of water

is desirable for tetra and some killies. It can be prevented by periodically vacuuming the sand and by changing about 1/4 of the water weekly.

Please mention T.F.H. when writing to advertisers



Open Wide and Say A-h-h-h...
DO THIS ONCE EVERY TWO WEEKS... AND GROW LUSHER, GREENER, AQUARIUM PLANTS MINERAL TRACE PLANT FOOD

Powerful Mineral Trace Elements make plants thrive. Compensates for aquarium deficiencies. Results: healthy, full-bodied plants that enhance your aquarium and provide a better environment for your fish. Does not make water alkaline and reduces excessive alkalinity.

AQUARIUM STOCK COMPANY, Inc.
27 MURRAY STREET, NEW YORK, NEW YORK
1070 SEVENTH BLVD., LOS ANGELES, CALIF.

live cultures (with instructions)
Micro Worms \$1.00
White Worms 1.50
Meal Worms 1.50
Drosophila (wingless) 1.75
Food for Cultures \$1.00 ea.
(Mailed U.S.A. only)
Authentic Distributors, Inc.
Box 414H St. James, N.Y. 11780

Please Mention T.F.H. When Writing to Advertisers

VITA-BRITE Introductory Offer!
Three 59c size dispensers for only \$1.00 (\$1.77 value)
VITA-BRITE is a complete, scientifically balanced all-purpose tropical fish food... especially formulated to bring out the best of color and health in your fish. Money refunded if you are not satisfied, providing you return, postpaid, two unused dispensers.
Check kind desired:
 Fine—for fish up to 1" Pellets—larger fish
 Three 2 1/2 oz. ctns. for \$1 3-in. ctn. \$6.25
 Medium—Fish 1" to 2 1/2" 10 lb. ctn. \$10.00
 Coarse—Fish 2 1/2" to 4 1/2"
Far Canada and areas beyond U.S.A. add 75c postage. Shipped prepaid—Send this order together with your money, name and address to: VITA-BRITE Dept. TFH, 67 West 9000 South, Sandy, Utah 84070

Saprolegnia
Q. In a diseased tank at a local store I observed about ten fish, diseased, and about five of them were enclosed in a partly transparent, light milk colored case. It

resembled a light colored plastic cocoon. Can you tell me the exact explanation for this phenomenon?
George M. Melby
Roseville, Minnesota
A. It sounds as though these fishes are infected with saprolegnia, an aquatic fungus. I have seen dead fish covered in the way you describe, but never a living one.



TRUE-BREEDING GUPPIES by **RON and TINA AHLERS**
From International Prize-Winning Strains
SELECTED TRUE BREEDERS
Blue-Stream, Subtle Variations of Both Colors in a fish that carries a spectacular high delta tail at maturity.
1 pair \$10.00 2 pair \$18.00 2 trios \$28.00
Red Tail Half Black, A solidly established strain, noted for the large size, and bright red delta tail.
1 pair \$12.50 2 pair \$22.00 2 trios \$32.00
No-odor micro-worm culture—add \$1.00 to fish order. Prices include Air-Mail Special Delivery.
Send check or money order to:
MID-ISLE AQUARIUM
P.O. Box 206-F1, Deer Park, N.Y. 11729
Live Delivery Guaranteed

Sterilizing Aquariums
Q. What can be used to sterilize aquariums in which diseased fishes have been housed?
Mrs. E. V. Leighton
New York, New York

Please mention T.F.H. when writing to advertisers

Shipment From **SINGAPORE**
Tropical Fish, Marine Fish & Aquatic Plants to all parts of the world.
Write to: **Tropicana Products Supplies**
P.O. BOX 3215, SINGAPORE

Please Mention T.F.H. When Writing to Advertisers

IMPORTERS, BREEDERS & EXPORTERS
"Specializing in All Types and Sizes of Discus"
ANGELS • EXOTIC & POPULAR EGGLAYERS • AQUATIC PLANTS • FANCY AND COMMON GOLDFISH • LIVE, FROZEN, AND FREEZE DRIED FOODS
★ SHIPPING WORLD-WIDE ★
—We exclusively sell red discus— salt or fungused fish
Talk to us or write to us in our monthly special. All orders will be shipped by air to the nearest major airport. We ship the fastest by Road Line Service. When shipped within 30 days after leaving New York, we include air shipping to the fish.
WHOLESALE ONLY
WARREN BIOLOGICAL SUPPLY COMPANY
2330 KAREN STREET
WARREN, MICHIGAN 48091 U.S.A.
CABLE ADDRESS: "DISCUS", WARREN, MICH. U.S.A.

THE DEGAULLE GUPPY (Flag of France)
The most unusual breed of this era. A large, firm hybrid with light face, jet black body, flaring red tail, and white dorsal fin. Profuse females are olive color with black cast. They breed true. \$12.50 per pair. (\$4.50 extra for fish.)
Other varieties include Albino Yells, Red Peacock, Las Vegas Green, Lavender. \$7.50 per pair. (\$2.50 extra for fish.)
Guaranteed Live Delivery, Postpaid, Airmail. Send check or money order to...
MANHATTAN AQUARIUM SERVICE
224 - 21st St., Manhattan Beach, Calif. 90266
Phone: 545-4421

Please mention T.F.H. when writing to advertisers

A. This is an important point which is seldom covered in aquarium literature. There are a number of treatments which can be effective. A strong brine solution of table salt is a simple but effective sterilizing agent. For the aquarist who prefers to be a bit more sophisticated, washing the aquarium with a solution of rubbing alcohol and water will do the trick. Similarly, a strong solution of potassium permanganate could be used.

Please mention T.F.H. when writing to advertisers

FOR SALE
The FISH BOWL
Irvington, N.J.
One of the country's best known and most popular tropical fish stores. Highest reputation.
Reply to:
1064 Springfield Ave.
Irvington, N.J. 07111

For those who prefer...
THE LATEST ADDITION TO THE WORLD'S AQUATIC JOURNALS IS THE AFRICAN AQUARIST AFRIKAANSE KWARIST
Published on the first of every month to promote the knowledge of tropical fish in general and of African fishes in particular.
Annual subscription in the U.S.A., Canada and dollar areas:
5.00 dollars (post free — surface mail)
11.75 dollars (post free — airmail)
*Optimum crop to water
Order direct from the publishers:
TORPIS PUBLISHING CO.
P.O. Box 1375, Bloemfontein, Rep. of South Africa

Zoo-Pet Wildlife
A BRAND NEW ANIMAL, FISH AND BIRD MAGAZINE
The whole family can enjoy it. Illustrated in color and black and white.
Edited by Robert P. L. Straughan
Starts JAN-FEB. 1970
\$7.50 per year (six issues)
or
Salt Water Aquarium MAGAZINE
All salt water, beautifully illustrated.
\$4.50 per year (6 issues)
Write:
CORAL REEF EXHIBITS
Box 1005 (Kendall br.)
Miami, Fla. 33156

YOUR FISHES' HEALTH

Fish lice

By
Roger
Lee Herman

Fish louse is the common name for the parasitic copepods of the genus *Argulus*. Like anchor worms, these parasites also have a low host specificity and may be found on a great variety of fish and occasionally on tadpoles and salamanders. They have been known to kill fish in great numbers in the wild.

The adult is found attached to the host by two suction-cup organs. This is not a permanent attachment as with anchor worms. Fish lice are able to move about the fish at will. With their mouth, they pierce the skin and inject a toxin which kills the fish's cells. The parasite then feeds on the juices and blood in the area. The bites often become ulcerated due to the effects of the toxin. This offers an excellent place for secondary infections to start.

Symptoms are not specific. As with many other external parasites, flashing and other unusual swimming behavior may be seen as well as reduced growth. In advanced cases, the fish may lose equilibrium and appear lethargic.

Unlike the anchor worm female which remains on the host until she dies, the female of *Argulus* leaves the fish to lay her eggs. These are deposited on objects in the water such as vegetation, sticks, rocks or (in aquaria) ornaments. The embryo

CALIFORNIA DREAM HATCHERY

20 acres developed into nurseries and lakes. Flowing water—DEAL—mean water fish—full acre more available. Ranch is located on beautiful Salton Sea near Mexo, Calif. A healthy, happy winter-time paradise and less than an hour from Palm Springs. . . Climate, fishing, hunting, water sports go with it. Beautifully engineered landings designed for volume, growth and ease.

WATER PARADISE. 2000+ acres water. 1. Artesian well flows crystal-clear drinking water at 200 GPM. Presently pumping 1,000 GPM at 80°F constant to keep 20 acre facility warm year-around and promote fish growth at a full, constant pace. 2nd source of water: not yet used, a 4,500 GPM stream of local spring origin. This water is clear, 78° constant, not affected by storms, protected, and canal water from Colorado River source of varying temperature, available if desired—just hook up. Fish crates for the salt water aquarist and Fisheries Consultants are water available.

WATCH THIS ANYWHERE! Also no feed danger, good soil will raise anything, yet stays below hard water 100%. This location is the "Gold" of a 12 year search by us . . . and NOW—only partially completed—already showing profit—domestic, profit—some face us to relinquish \$150,000.00 or best offer we will consider partnership. Carsons Bros., Box 161, Azusa, California 91702. Ph. 713 234-8851. P.S.: Don't forget the Calif. Market. Almost unlimited. This is the finest climate and opportunity to discover the "Golden State" and why we believe it is the top — beautiful desert living with sports, to you and all the other good things.

develops through the nauplius and metanauplius stages within the egg and hatches resembling the adult copepod. Seven copepodid stages are necessary before the sub-adult form is achieved. The parasite molts several times and increases in size up to about 1/8 inch before becoming a sexually mature adult.

The optimum temperature is 82°F although the adults will tolerate temperatures over 100°F. At 45°F and below, the animals hibernate but remain attached to the host. At near optimum temperature, *Argulus* requires about one month to reach full maturity. Depending on the species and temperature, 40 to 100 days are necessary for the entire life cycle. Under ideal

conditions for the parasite, 3 or more generations may occur in one year. The female may remain away from the host for up to 15 days during the egg-laying period.

The large size of this parasite makes them easy to see and thus diagnose. The size, shape, and color are different from any other parasite. They somewhat resemble a horseshoe crab. The carapace (head shield) nearly covers the entire body. The abdomen sticks out like a tail. Underneath the carapace, one finds small antennae, a pair of compound eyes, mouth parts, the suckers, and eight leg-like appendages.

When few fish are involved and are easily handled, a pair of forceps

Something New is Added !

Now you have a market for your Fish

We buy Fry & Adult Fish from you
The — Hobbyist.

Looking for rare or hard to find Fish?
Pairs, or Fry — Young Specimens.

We buy & sell all types.
Fresh & Saltwater.

Write
J & J Tropical Fish
60 Loyola Avenue
Menlo Park, Calif. 94025



17 page
Catalog
Available

is the best method of removal. Chemical treatments are similar to those for anchor worms. Potassium permanganate at 10 ppm for up to 1 hour or 2 ppm for an indefinite period should prove effective. Lysol at 2000 ppm as a quick dip has been reported effective with some cyprinids. Insecticides are equally effective against *Argulus* as *Lernaea* but they are highly toxic and should be used only under the supervision of qualified workers.

The best treatment is to prevent introduction of the parasite into your aquaria and ponds.

JOIN YOUR
LOCAL AQUARIUM SOCIETY

UNIVERSAL FISH FARM

— the only fishery from where you can buy the finest fish at lowest price. Our modern hatchery present you 200 varieties of livebearer and egg-layer.

Please write to:

UNIVERSAL FISH FARM
45, Hankow Road, 7th fl.
Block C, Hong Kong
(minimum order \$50)

OURS ALONE

NEW

COMPACT

NEW

DOUBLE AIR PUMPS

New compact size fits all small tanks
Saves space in large tanks

DURABLE EFFICIENT
Equal to pumps twice the size at

HALF THE COST

Address inquiries to:

MAHBUICK CORP.

18 Hashizume-cho, Uchi-Honmachi, Higashi-ku, Osaka, Japan
Manufacturers of Aquarium Supplies



- Importers
- Breeders and
- Exporters of

Quality Aquatic
Livestock

Main Suppliers in

- Hong Kong
- Singapore
- Thailand
- South America

WE'LL SHIP ANY SIZE ORDER TO ANY PART OF THE WORLD!

We specialize in Discus. Tank raised and wild varieties are available. Angels, Fancy and Common Goldfish, aquatic plants, exotic and popular egg-layers, live, frozen and freeze dried foods are also available from us in quantity. ALL LIVESTOCK FULLY GUARANTEED. We supply live San Francisco Bay Brand Adult Brine Shrimp. Open 24 hours a day, 7 days a week only to serve you better. Write or call for latest price list. When writing, please use your letterhead and include telephone number.

XMAS SPECIALS - 1969

— Minimum Order —

Brown Discus	70	White Clouds	100
Marble Angels	10	Neons	500
Black Angels	100	Assorted Male Bettas	25

OUR XMAS SPECIAL FOR YOU

Every order totaling a minimum of \$100.00, we will pay half the shipping charges to any destination in the U. S. and many parts of Canada.

Every order totaling a minimum of \$275.00, we will ship FREE to any destination in the U. S. and many parts of Canada.

NOTE: Hawaii and Alaska not included in above offer.

Merry Xmas and a Very Happy New Year from All of Us at the:

Warren Biological Supply Company

23820 KAREN STREET - WARREN, MICHIGAN 48091 - U.S.A.
24 HOUR TELEPHONE: (313) 755-0527
CABLE ADDRESS: "DISCUS" WARREN, MICHIGAN



salts FROM THE seven seas

BY ALFRED A. SCHULTZ

Q. After having seen a specimen of *Pomacanthus imperator* at the home of a friend, I decided to go out and get myself one of these beautiful fishes. I paid a call on a very reputable aquarium shop that specializes in salt-water species and asked to see his stock of the species. The fish he showed me were small, black creatures with circular white markings. They look-

ed nothing like what I had seen first. Are there two species with the same name or was I getting my leg pulled?

Stanley Markowitz
Shaker Heights, Ohio
A. There are not two species of *P. imperator*, and your leg was not being pulled. The fish you saw in the shop were young specimens and your friend's fish is a mature



WHY RILA MARINE MIX?

Simply because you'll be getting the finest synthetic sea salt available — proven by years of consistent, dependable performance.
A quality product guaranteeing the highest degree of uniformity and purity.
Contains the 19 major trace elements of natural sea water.
Provides the ideal media for all marine life.
Ask your dealer today or write for complete Product Information Bulletin and free Salt Water Bulletin.
RILA PRODUCTS • Box 114, Teaneck, N. J. 07666

MARINE WORLD

MIDWEST'S LARGEST EXCLUSIVE MARINE FISH DEALER
ATLANTIC • PACIFIC
MEDITERRANEAN
RED SEA IMPORTS

DISTRIBUTORS OF:
CHEMI-PURE, ION FILTER MEDIUM
LAMOTTE, WATER TESTING KITS
MARINE CURE, SALT WATER REMEDY

Finest selection of Marine Fish, Invertebrates, Corals, Salts, and related accessories, continually in stock! All fish tank acclimated and eating when sold.

WHOLESALE • RETAIL
3452 W. Devon Ave., Lincolnwood, Ill.
Phone: 312-677-1175 or 312-774-7921

A MARINE AQUARIUM IS A JOY TO BEHOLD WITH "NEPTUNE SALTS"



Since 1933, world's #1 product for marine fish and sea horses. Tested, approved and used by experts of 18 public aquariums, over 100 universities, U. S. government agencies, industrial researchers, and hobbyists throughout the world. Just mix with tap water... It's as simple as that. Crystal-clear water lasts 4 to 7 years and longer by actual experience. "NEPTUNE SALTS" costs far less per year than any other product ever developed since you buy it only once... do NOT have to change water every few weeks. Write for salt-water catalogue, jobbers and dealers, no charge... hobbyists, 25¢.

WESTCHESTER AQUARIUM SUPPLY CO.
INC.
184 Mamaroneck Ave., White Plains, N. Y.
Tel.: 914 WH 8-0011

animal. The transition from black and white to the gorgeous color the species is famous for comes with maturity. The dealer should have explained this point to you.

Q. My brother and I are setting up a marine aquarium and would like to add some green plants for their visual appeal. We live fairly close to the ocean, so it would be an easy matter to gather the plants ourselves. What are the best ones to get? How do we prepare them before putting them in the tank and what care do they require once they are in?

Brooks Harkin
Atlantic City, New Jersey
A. As beginners, you would be much better off to rule out the use of plants altogether in a marine aquarium. At first they will look very attractive and add interest to your tank, but before long you will regret having included them. Marine plants in a closed-system aquarium are subject to quick decomposition, and decomposed plants are often responsible for the death of valuable fishes. It is much better to use coral, rocks, and shells as decoration.

3 PET SEAHORSES \$2.00 & FREE HITCHING POST

These selected fresh caught live Seahorses sent Air mail from Fla. hobbyists receive a kit with FREE! Food, hitching post, and simple instructions for raising these cute little pets in jar or fish bowl. The father gives birth to the young (red) alive. All the family will enjoy hours of fun with this exciting and educational hobby. Guaranteed live delivery. U. S. A.

TWO SEAHORSES & ONE FREE only \$2.00. THREE PAIR SPECIAL... \$3.50 — Order TWO PAIR and receive ONE PAIR FREE (One address.) No C.O.D.

F. F. MARINE LIFE Since 1960
P. O. BOX 244 TF 05 DANIA, FLA. 33004

Tropical Fish Hobbyist

Q. Among the fishes in my marine collection I have a blue surgeon fish, *Acanthurus leucosternon*. I have had him for about eight months, and he has grown and seems to do reasonably well. The problem concerns his color. I have seen other fish of the same species in shops and at the public aquarium and their color was very brilliant, with very dark face masks. My fish is a very pale color and his mask is faded. He is also very lethargic in his motions but eats well and does not seem sick.

Larry Westphal
Moline, Illinois
A. *A. leucosternon* must have optimum tank conditions in order

to look and act at its peak. Make sure your fish has enough room and sufficient aeration. Regular additions of algae and other green foods will also help.

Please mention I.F.H. when writing to advertisers.

Salt Water Fish!

Sea Horses, Angelfish, Gobies
Butterflyfish: All Kinds



FAST DELIVERY! Little Waiting!

Don't be fooled by dealers who offer cheap prices on marine fish. They can't deliver and will only disappoint you. Send \$1.00 for Sea Horse Book and Marine Pamphlet. National Distributor for Reef Salts and Reef Carbon. Lowest prices on Socks and Filter Medium. Dealers wanted. Robert F. L. Strongman, Marine Collector.

CORAL REEF EXHIBITS
P. O. BOX 1005 (Kendall br.)
MIAMI, FLA. 33156
Ph. Miami 271-3331

Send for free price list "We deliver fish not promises"

RED SEA AQUARIUM

44 DHOBY GAUT
SINGAPORE 9

Exporters of:

- Fancy Tropical Fish
- Goldfish
- Marines
- Aquatic Plants

Inquiries Invited

44 DHOBY GAUT - SINGAPORE 9

NEW PRODUCT... A MAJOR BREAKTHROUGH IN THE SALT WATER HOBBY RILA NITRITE-NITROGEN TEST KIT

- WILL DETERMINE THE LEVEL OF TOXIC NITROGEN COMPOUNDS IN THE AQUARIUM WATER.
- TESTS ARE ACCURATE... EASILY & ECONOMICALLY PERFORMED.
- REGULAR TESTING WILL ALERT THE HOBBYIST TO ANY CHANGE IN NITRITE LEVELS & THUS AID IN PREVENTING TOXIC CONDITIONS FROM OCCURRING.
- REAGENTS CARRY THE MANUFACTURER'S LIFETIME GUARANTEE FOR STABILITY & ACCURACY.
- COMPLETE PLASTIC PACKAGING FOR DURABILITY & EASE OF USE.
- AN ESSENTIAL ITEM FOR EVERY SALT WATER HOBBYIST.
- FREE! A NEW BOOKLET: "BASIC CHEMISTRY OF THE SALT WATER AQUARIUM".

Ask your dealer today or write for complete Product Information Bulletin and NEW FREE Booklet. Please include ZIP.

RILA PRODUCTS

P. O. Box 114

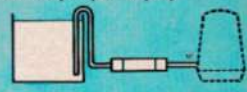
Teaneck, N. J. 07666

Your fish can die from impurities in the air!

BIOZONICS D-TOX AIR PURIFIER gets rid of atmospheric pollutants

Keep a trouble-free aquarium and your fish will live longer. To establish a natural environment for fish in your aquarium, it's important not only to protect them from infectious diseases, but also from air pollutants. These include hair sprays, tobacco smoke, cooking oils, pesticides and other airborne particles which concentrate in the tank and are the cause of many diseases in fish. Placed between air pump and aquarium, the D-Tox Air Purifier does more than merely filter air. It actually scrubs the hundreds of atmospheric pollutants right out of the air supply.

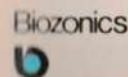
The Biozonics D-Tox Air Purifier connects easily to your air pump.



D-Tox Air Purifier, another scientific product for aquarists developed with Biozonics technology.

BIOZONICS CORPORATION
15 Tech Circle, Natick, Mass. 01760
 Please send me your free literature.

Name _____
Address _____
City _____ State _____ Zip _____



AVAILABLE FROM YOUR LOCAL AQUARIUM SUPPLY DEALER

Tropical Fish Hobbyist

鯉

Continued from Page 17

auctions take place twice a week, so be sure to take in one when you visit Japan.

For the tropical fish hobbyist, koi will be a treat. Their main value is, of course, their beauty when viewed from the top, for as pond fish that's the only view you get. So the most valuable koi are those with the most colorful backs. Koi for the aquarium, however, are those which are most beautiful and colorful when viewed from the side, and the valuable aquarium fish with beautiful bright red colors and contrasting blacks on their sides may be colorless on the top. Fishes which have no color on their backs are destroyed in Japan as worthless, regardless of how much color they have on their sides.

I have koi in my aquarium and in the pond in my garden. They are the favorites of my guests who truly enjoy having a 5 pound fish gulp huge mouthfuls of freeze-dried Miracle works from their hands. My wife even has them trained so she can pet them and rub their bellies. "This is really the first time," she says, "that I can really believe that fish can be pets."

Even a close inspection of the fish to be auctioned wouldn't do much for the prospective buyer. He merely bids for a number. They do know who is the breeder of each batch of koi and the amount bid depends upon the reputation of the breeder. There is a lot of honor involved in all Japanese business dealings.



Koi are transported from the auction to the place of business in large open tanks mounted on a truck through which oxygen is continuously bubbled.

In the winter the koi are handled exactly like the summer. Because the pools are so deep, they do not freeze.



In the fall, when the leaves begin to turn color, the koi are also supposed to change color and the pools are drained.

Koi dealers separate the koi into holding vats where they are sorted according to size. This is a self-service business. Customers catch their own fish.



As the ponds become shallow, fish farmers walk into the ponds and begin netting the fish. Koi do well with mud bottom ponds, similar to their carp ancestors.

At the Yoshida farm some of the ponds are almost a mile long and scores of workers are needed to collect the koi as the water recedes in the pond.





Judges inspect the koi not only for color, but for health, condition and weight.

The prizes on display at the All Japan 1968 Koi Show in Tokyo.



Sometimes the winner of the koi auction only takes a few fish that he needs for breeding and sells the rest right on the spot. He then puts the koi in a plastic bag with oxygen and walks them home, as proud of his new fish as a woman with a bouquet of flowers.

Koi rearing ponds are always in valleys between mountains so the running water from the mountains can irrigate the pools.



鯉

Tropical Fish Hobbyist



The three-colored koi at the bottom of the picture, almost out of sight won the show and was sold for \$20,000. This is the final judging where they had the best five koi all together and finally had to select one.

When I needed the fish for breeding purposes at Gulf, she absolutely refused to let me have "her" fish.

In Japan, koi are big business, and I am truly thankful to the Yoshida family for allowing photographs of their koi auction and their fish farming techniques to be published.

While it is true that Gulf Fish Farms is the only one in Europe or America now raising the true Japanese Imperial Colored Carp, we offer young breeders and technical assistance to any commercial fish dealer or farmer who wants to get into this business. It will take many fish farms to fill the needs of fish-lovers all over the world, and we are already over-sold until next spring.

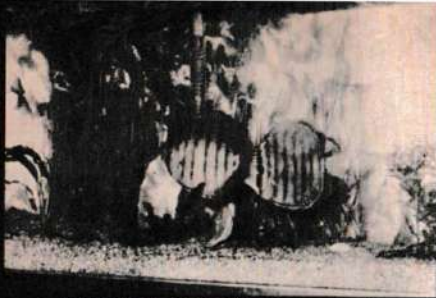
By the way, koi sell for about the same price as tropical fish. A one inch koi can be bought for about 79¢ (6s 6d) and the price is about double for a two inch fish. Get them as small as possible and watch them change colors. Get one of the koi books and read about their care and breeding. They are the easiest fish in the world to care for . . . easier than goldfish!



Koi are truly fish pets and they readily become tame and feed from anyone's hand. Many koi farms sell food and allow guests to roam the farm feeding the fish.

This is a Japanese koi Garden. It is certainly within the means of every middle-class Japanese family to own their own koi garden. A koi pool like this one costs about two weeks' wages excluding the cost of the fish.





Landscape: Dick Fournier, Holyoke, Massachusetts

Contest Winners

Closeup: Rayburn L. Taylor, Alington, Texas.



Grand Christmas Gift

CHRISTMAS COMES BUT ONCE A YEAR . . . but this magazine is published 12 times a year and you can be remembered 12 times a year if you give a gift of a one year subscription to TROPICAL FISH HOBBYIST magazine. Each gift subscription will be preceded by a beautiful, full color tropical fish note card letting the recipient of the subscription who sent it to him. Just fill out the form below and send \$5.00 for each subscription to T.F.H. MAGAZINE, 245 Cornwell Avenue, Jersey City, N.J. 07310

Send subscriptions to:

Name _____

Street _____

City _____

State _____ Zip Code _____

Name _____

Street _____

City _____

State _____ Zip Code _____

Name _____

Street _____

City _____

State _____ Zip Code _____

Name _____

Street _____

City _____

State _____ Zip Code _____

Please send note card from: _____