JANUARY, 1969
VOL. II NO. 3

THE AQUARIUM

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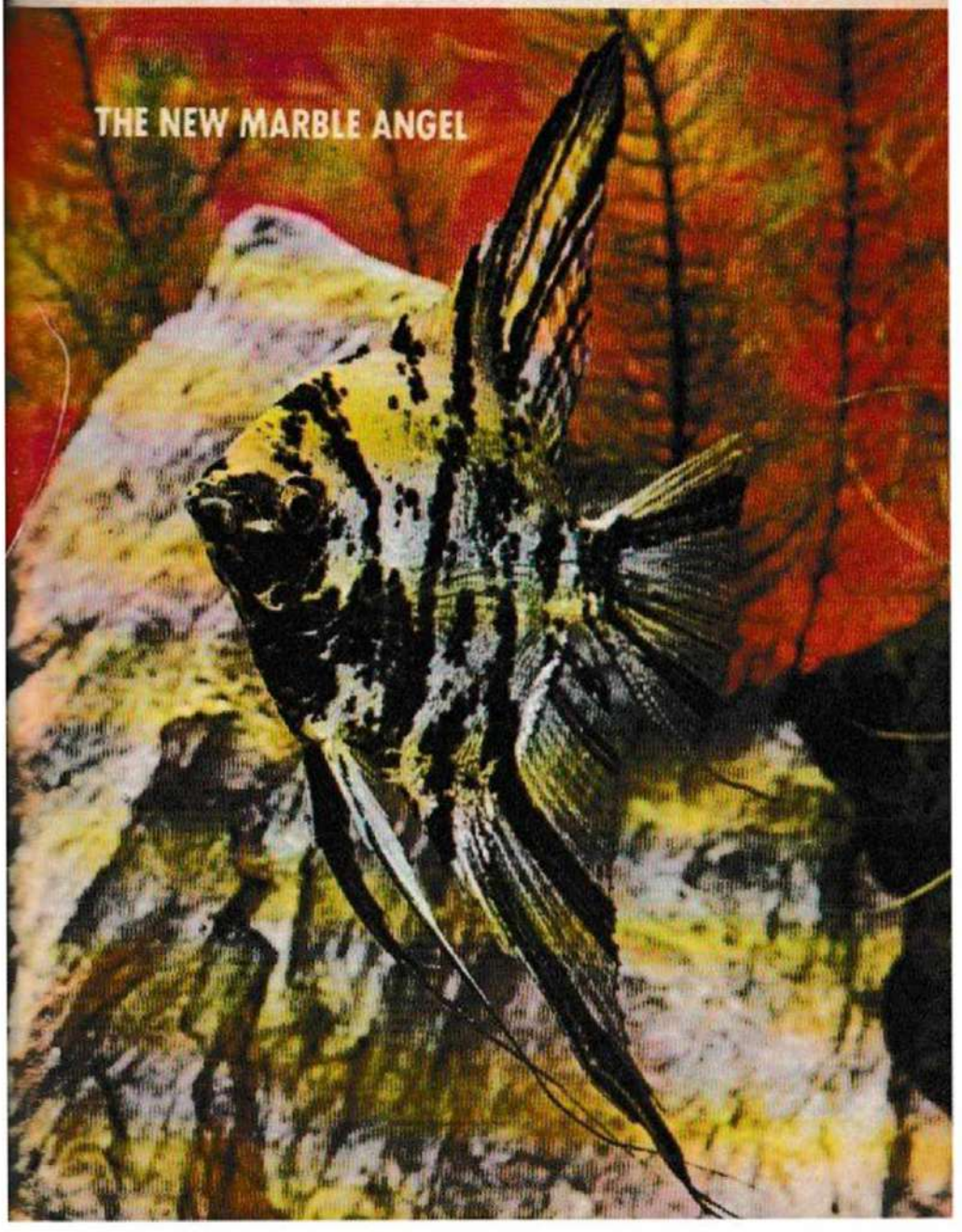

JANUARY, 1969
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THE AQUARIUM

founded in 1932 by Dr. William T. Innes

contents

cover

Andrey Roth captured this brilliant Marble Angel using a Zenza Bronica /S2 camera with a 75mm Nikkor lens with extension tubes, on Ektachrome X Film using artificial lighting. (Additional credits appear on page 69.)

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THE NEW MARBLE ANGEL

EDITOR'S NOTE: *The following account is taken from a report by Mrs. Dorothy Ash whose husband, Charles A. Ash, recently developed a spectacular strain of angelfish which he calls the "marbleized angel". A resident of San Bernardino, California, Mr. Ash is a member of both the Tri-City and Pomona Valley aquarium societies.*

BEING A HOBBYIST, Chuck is always watching for anything unusual in color or shape. One day, he found among his young angels a silver specimen that had a large V where the straight black bars are usually found on the side. The V was in a chain pattern, and on the opposite side there were broken bars. This fish was placed in a tank of black lace angels slated as future breeders, and when it had reached maturity, it was a very beautiful and showy specimen. When one year old it was placed with three mates as it was apparent that this fish was a large female. It wasn't long before she selected her mate. The young produced were kept by themselves for future breeding back to their mother. The young were very healthy, and large for their age at eight months. The bar pattern was very pronounced and dark, but none had the chain-like V pattern of their mother. However, they did have very large dorsal fins.

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WHY THE ALBINO IS RARE IN NATURE

By MICHAEL OLIVER

THE ALBINO'S CONSPICUOUSNESS in nature is illustrated by the photograph, (pg. 44), taken at San Francisco's Steinhart Aquarium. The albino fish is a six-inch silver salmon, *Oncorhynchus kisutch*, swimming among its normally pigmented brethren. Albinos are not particularly rare, but their chance of survival in nature is very small. The odds are against their even entering the world alive, let alone attaining maturity.

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MOLLIES IN SALTWATER

by GEORGE W. REIGER, Lt., USN

WHEN I PURCHASED A PAIR OF black sailfin mollies (*Mollienisia latipinna*), I intended them to be part of a 20-gallon brackish-water aquarium which included scats, monos and several pieces of shell and coral I had brought back from Hawaii and the Fijis. Most of the literature I had seen on mollies indicated that these fish were most content in a brackish alkaline environment, and though I had been none too successful with mollies in a freshwater community tank two years before, I was eager to try them again. Being active and one of the few all-black fishes, black sailfin mollies make a striking addition to any aquarium.

Taking a full twenty-four hours to acclimate the fish to a water density of 1·010, the mollies soon adjusted themselves to the company of a *Scatophagus argus*, a *Scatophagus tetracanthus*, and two *Monodactylus argenteus*. A separate 15-gallon saltwater tank nearby housed a rock beauty, a *Heniochus acuminatus*, an *Apogon nematopterus*, and two neon gobies (*Elacatinus oceanops*).

One day several weeks after bringing home the mollies for the brackish water aquarium, I discovered a serious leak in my neighboring saltwater tank. I called my local pet center and asked the dealer for either repair materials or a replacement tank. He was temporarily out of both. What was I to do with my saltwater fish? Since I was *in extremis*, I decided to raise the salt content of my brackish-water tank and see if the brackish-water fish could acclimate themselves to a specific gravity of 1·022. I was fairly certain that the monos and scats would make it, for they were known to be able to tolerate extremes of fresh and salt water and indeed to thrive at density levels of 1·032, but I was concerned about the mollies. The best authorities indicated that though these fish might be able to survive for short periods in sea water, little was known of their tolerance for salt water during sustained periods of inhabitation. My local pet dealer said that he should have a replacement saltwater tank "in a few days", and I weighed that prospect along with the possi-

bility of losing my hard-to-replace saltwater fish and decided to go ahead with my experiment. That was eight months ago, and except for the death of one of the monos which occurred during the change-over from brackish to salt and the transfer of the *Heniochus* to a new saltwater tank, the combination of brackish- and saltwater fishes noted above remains unchanged.

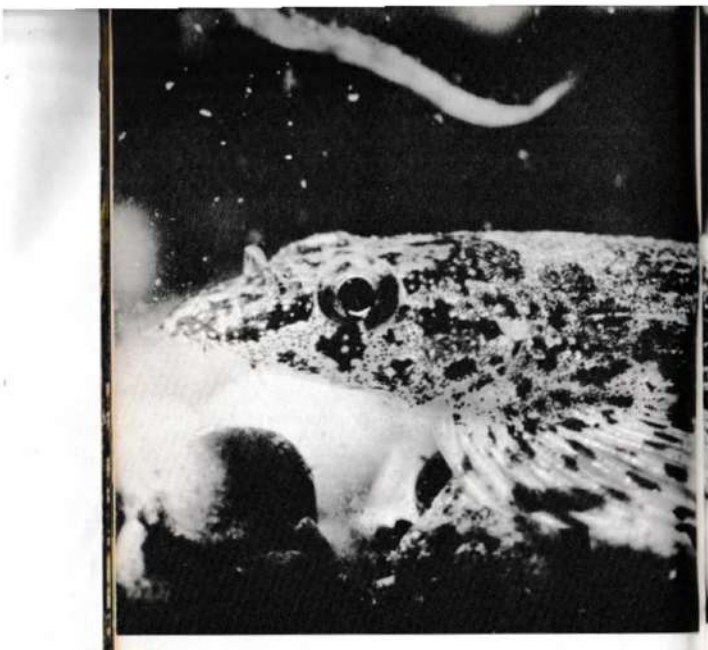
The mollies are a boon to a saltwater aquarium in many respects. They are active but not aggressive—setting an excellent example for the other fish, particularly in regards to a healthy appetite. They are eager algae eaters and do much to control any excess of the green or brown plant life. They are good scavengers, examining and tasting any particle that they come across while continually foraging about the tank, and this in an environment that has neither catfish nor snails. The mollies usually take the lead in nibbling at the pieces of lettuce I introduce from time to time to supplement the fishes' diet. In fact, the scats do not become interested in the greenery until the mollies have taken the first bites.

Mollies require warmth and much oxygen for their active lives. My saltwater tanks are kept near 80°F, and the aeration from two sub-gravel filters and one outside filter is supplemented by an airstone. I usually maintain a warm-water heavily aerated environment for my saltwater fish and in so far as this type environment seems to suit molly requirements, the fish thrive.

The black velvet color of the mollies contrasts nicely with the pale yellow background of coral and sand, and their black luster seems to be heightened by the proportionately greater quantities of live food I feed my saltwater fish over that which I allot for my freshwater tanks. Or perhaps this luster is a result of having raised the specific gravity to a 1·025 level!

Finally, the fact that mollies are active livebearers make them useful as a source of supplementary live food in the form of fry for the other fish in the aquarium. And, as mollies are less inclined to eat their young than are guppies or swordtails, the proportion of fry utilized as food by the other fish is higher than it would be for other livebearers.

How many other fish can be transferred from a freshwater to a saltwater environment or vice versa? While living close to the Chesapeake Bay, I've been impressed by the variety of species usually considered to be predominantly fresh- or saltwater fishes inhabiting the same vicinity. In the Severn River I find pumpkinseed sunfish, striped bass, spot, carp, needlefish (*Strongylura marina*), and perch both white and yellow. Experiments in Japan indicate that much may be done in the realm of ecological transposition. If mollies gain luster and swim more often with erected sailfins when transferred from fresh- to saltwater, might not the same effect be seen in other commonly considered freshwater species? ●



This head view of ***Hemimyzon meyersi*** *shows that it has a much more pointed snout than* ***Gastromyzon borneensis.***

SOME ASIATIC PROBLEM FISHES

by WILLIAM A. TOMEY

FOR ABOUT FIVE YEARS NOW a number of attractive fishes have come to us via Hong Kong which, unfortunately, pose several problems for the fishkeeper. One of these problems involves nomenclature as the determination of their scientific names is most difficult. We do not know exactly, for example, where these fishes come from. Hong Kong is one of the greatest market places for aquarium fishes and from there, they find their way to fish stores all over the world. Mostly, Hong Kong

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SOME BUTTERFLIES ARE BETTAS !

by WALT MAURUS

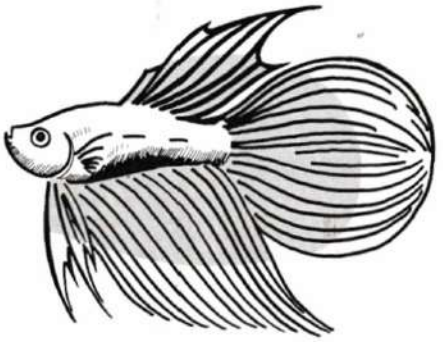
SEVERAL YEARS AGO I WROTE AN ARTICLE for an aquarium society bulletin in which I stated that today's breeders of bettas owe much to the breeders who preceded them. This belief has not changed and indeed, experience has proved the truth of it over and over again. A very interesting example might be the betta color pattern known in the hobby as the "butterfly".

In the midwest, one might have occasion to observe the beautiful butterfly (the insect kind) known popularly as the "tortoise shell". It is particularly striking because of its sharply contrasting division of colors. Darkly-colored on its body and almost all of its wings, the borders of the latter are light. In the betta "butterfly", the finnage is colored in much the same way; the inner half of the fins, closer to the body, is dark, the outer edge light.

For several years now, I have been working with this variety. Rumors of the existence of the butterfly pattern originally came from two widely separated areas—New York City, and Milwaukee, Wisconsin—and considerable work subsequently produced the pattern described for me. At first, no female exhibited the pattern and but a small percentage of the males. At present, a small percentage of the females are beginning to show the pattern and the yield has increased so that the strain breeds about 25% true. All other fish in a spawn possess solid fin-coloring, and much variation exists among those actually showing the pattern.

The best established of the butterflies is the "Cambodian" strain, the Cambodian body coloring being accompanied by part-red, part-white fins as shown in the photos. More poorly fixed are the red, green and blue butterflies. Gene Lucas of Drake University has seen the bettas here referred to as "butterflies", and he has suggested that these fish are more correctly described as "variegated". I tend to agree. "If the fins are variegated, as cattle are spotted, is it possible to determine any special pattern of variegation?" he asks. It therefore might be feasible to project a standard for the butterfly betta, and establish one form of variegation as the most desirable. The accompanying photos give at least an idea of the range of variation in this fish, and the drawings represent a suggested ideal. On rare occasions, by the way, some individual bettas have approached this idealized form. A color standard for the butterfly betta might necessarily be limited to the combination of part-colored, part-white fins within the scope suggested by the drawings, at least for the

An ideal color pattern projection for the "butterfly" betta under discussion in this article. The illustration shows color following into the rays of the fins, giving a serrated visual effect.



An ideal color pattern projection for the "butterfly" betta, showing the painted edge some individuals possess (but highly exaggerated).

An approximation of the Tutwiler butterfly betta.

time being.

During the past few years I have made the acquaintance of two breeders who have been working independently with strains referred to as "butterfly", viz., Mrs. Josephine White, in Kansas, and Mr. Carl Immeke, in Florida. It is interesting to note that, without being aware of each other's efforts, almost identical patterns were referred to by them under this name. Since then, of course, there has been an exchange and intermixing of their strains. The results of these exchanges, however, are not yet clear and will undoubtedly provide another story for the future.

To answer a question that might be in the minds of some readers, the use of the term "butterfly" by the breeders mentioned was purely for descriptive purposes. These butterflies do not, at least not yet, exhibit the pattern shown in the famous photo of the Tutweiler butterfly (see sketch). There are now a few more people working with these strains and it is hoped that the variety will be better distributed and improved. The future of these bettas should be interesting.

However, as far as the past is concerned, recent correspondence with J. C. "Doc" Niel of Arlington, Virginia, has mentioned a variety of betta he and his wife were breeding and raising in the 1940's. They had obtained their original breeders from the Orient, and the pattern apparently was similar to that referred to here as the "butterfly". Mr. Niel reports that the strain eventually was passed on to others but that it was ultimately lost. But was it? Are existing strains related to this early form, leaving us to conclude that we owe Oriental breeders a great debt and that the Tutweiler butterfly was a particular individual descended from their strain? If so, we can hope that the Tutweiler butterfly form might reappear and that a fixed strain might be permanently established in the hobby. ●

A NEW CLASSIFICATION OF FISHES, PART IV

by ALBERT J. KLEE

THE SUPERORDER ACANTHOPTERYGII is a mammoth assemblage of some 12 Orders and 216 Families, 22 of the latter qualifying as aquarium Families. It supplies about 28% of all aquarium species. Table I indicates that one Order is of overwhelming significance, i.e. Perciformes. With regard to the others, the Gasterosteiformes contains two Families of interest (in separate Suborders)—Gasterosteidae (the sticklebacks) and Syngnathidae (the freshwater pipefishes as well as the seahorses). In Channiformes we have the snakeheads, Family Channidae (formerly Ophicephalidae); in Synbranchiformes the peculiar single-gilled eels (*Synbranchus*, *Monopterus*) of the Family Synbranchidae, sometimes kept by oddball specialists; in Pleuronectiformes the freshwater soles, Soleidae; in Tetraodontiformes the puffers, Tetraodontidae. These Families are pictured in Figure 1.

This now brings us to the last Order, the Perciformes. With 20 Suborders, it is the largest Order of fishes. However, only 5 of its 20 Suborders contain aquarium fishes of interest, viz. Percoidei, Gobiodei, Anabantoidei, Luciocephaloidei, and Mastacembeloidei. Of the 16 aquarium Families in Perciformes, 9 are found in Percoidei, and 4 in Anabantoidei. Accordingly, we can take a quick look at the remaining 3 Families. These include Gobiidae (containing the previously-separated Eleotridae) in the Suborder Gobiodei, Luciocephalidae in the Suborder Luciocephaloidei, and Mastacembelidae in the Suborder Mastacembeloidei. In order, the aquarium fishes they represent are the gobies (e.g. *Brachygobius*), the pikehead (*Luciocephalus*), and the spiny eels (*Mastacembelecus*). Except for the gobies, most are specialist's fishes. The Families represented by these fishes, and the Families in the Suborder to be discussed, are shown in Figure 2.

A survey of the Suborder Anabantoidei is shown in Table II (all Families are aquarium Families). This is rather interesting as it shows that the bubblenesters are now divided into four Families. Separated from the Anabantidae (which contains the betta and the common aquarium gouramies) are the combtails, *Belontia* (in Belontiidae), the kissing gouramies, *Helostoma* (in Helostomatidae), and the gourami, *Osphronemus* (in Osphronemidae).

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ABOUT OUR AUTHORS

WALTER MAURUS

Walt Maurus, a teacher in the public school system in Livonia, Michigan, is one of the leading betta specialists in the country. Married for over 18 years and with six children, Walt even finds time for a related hobby — the making of ceramic versions of aquarium fishes for home decoration!

His betta credentials are impressive. Currently editor of the International Betta Congress Bulletin, he is also a member of the Greater Detroit Aquarium Society (in the past, he has served as Vice-President of that group), The Betta Bets, and the Detroit area betta club. At one time Walt edited the Detroit society's bulletin, Tank Talk.

A betta breeder for the past 12 years, Walt's interests are primarily in the color versatility of the betta, and he is particularly concerned with the more unusual colors such as black, yellow, brown, and golden, and in unusual patterns such as the butterfly. He also is doing some work with the doubletail mutant. A recent accomplishment was the completion of a 70-slide program on color variation in bettas.

GEORGE W. REIGER

George Reiger was born in Brooklyn 29 years ago and in time, his educational background could boast a Bachelor of Arts from Princeton University and a Master of Arts from Columbia University. Presently an instructor in the Department of English at the US Naval Academy at Annapolis, Lt. Reiger is also a Vietnamese linguist and has spent two tours in Vietnam under the auspices of the Navy and the RAND Corporation.

He first started keeping fish in the early 1950's after his family moved to Florida. Though all facets of the aquarium hobby are of interest to him, he is particularly interested in native fresh- and saltwater fishes. As an adjunct to this hobby, Lt. Reiger engages in free-lance writing for a variety of outdoor magazines. ●

THIS IS MY PROBLEM

by HELEN SIMKATIS

From: Ray Kester, Kansas City, Missouri

Are live plants better than artificial, and do fish prefer live plants?

Answer: From the hobbyist's point of view, since fish can live in an aquarium without plants, it is really a matter of whether the hobbyist prefers live plants. The only fishes we can be sure of that prefer live plants are those that eat them, and many hobbyists do not like those kind of fishes. All we can do here is compare the advantages of both live and artificial plants and touch on the disadvantages of both. Live plants have in their favor their faculty of utilizing waste products which, of course, promotes good water quality. Because they are not static, they provide good hiding places for fishes and fry. Certainly they add both interest and beauty to an aquarium because they are living and do not remain the same. They are often credited as oxygenators but actually they provide very little oxygen and only do so during the daylight hours. At night they give off carbon dioxide along with the fish. Plants that are not thriving in an aquarium are detrimental because they are giving off carbon dioxide all of the time and add to the debris that collects on the aquarium floor. Artificial plants serve as decorative appointments only. Many hobbyists discount this advantage because they do not change and collect algae much the way artificial flowers collect dust in one's living room. It is true that artificial aquatic plants can be used tastefully, but many hobbyists will not even admit to this.

Question: How does a person keep the temperature of the aquarium water down in the summertime? My tank does not receive direct sunlight but the water goes up to 89°F at times.

Answer: The standard suggestions for keeping aquarium water temperature down during the summer is to replace the glass cover of the aquarium with a plastic screen nailed to a wooden frame; place awnings on the windows near the tank; do not use overhead lights in the aquarium reflector; and direct an electric fan so that it blows over the surface of the aquarium water causing it to evaporate which cools it to some degree. Some not so standard suggestions are to step up aeration; do not have crowded tanks; and in emergencies, float plastic bags filled with ice cubes in the water. It would be nice if all fishrooms were equipped with air conditioners.

Question: Would the following list of species be considered a good

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A SUCCESSFUL BREEDING OF A COMMON GOLDFISH WITH A VEILTAIL IN AN AQUARIUM.

by CHRISTIAN AHRENS

(translated by Paul J. Hoppe)

ACCORDING TO AN ANCIENT CHINESE STORY, a 100-day long serious draught in 769 B.C. came to an end when a fish, the color of the sun, was found in a spring. This glowing red fish was probably a particularly bright red member of the chinese "Ti". The Ti are related to the crucian carp(*) and occasionally a reddish or slightly golden specimen may be found.

Even before the advent of our story, Chinese breeders had been successful in obtaining bright golden-red and brassy colored fish which shone as if they had been kissed by the sun itself: these were goldfish (*Carassius auratus*). Latest research indicates that these goldfish were bred from selected reddish specimens of the Ti, which in contrast to the generally accepted belief that goldfish, according to the Japanese expert Y. Matsui, developed from the gold-crucian (*Carassius carassius* forma *auratus*), a color variation of the common crucian carp. Other sources mention the common crucian carp as the ancestor itself; however Chrysism, i.e. the development of a reddish cast on scales or fins, is considerably less common in this species. In addition, body-form appears to favor the Ti or Gold-crucian. Offspring of these first Kin-yü or Kin-yo, as the Chinese called their goldfish, bred true to color. Other variations were developed and the waters of Chinese gardens soon showed an abundance of yellowish-red, coppery-brown, blue-brown and silvery-pink fish beside the golden colors of the originals. Chinese noblemen kept goldfish as pets in expensive vases and containers.

Goldfish reached Japan in 1550, and artificial insemination was started. A pair of fishes was removed from its container and massaged with thumb and forefinger until sperm and eggs dropped together into a bowl of water. After some time, the young fry were moved to special basins and reared to maturity. This way, the yield reached a much higher level than had been possible by natural breeding in ponds; similar methods are often employed by today's professional game- and goldfish breeders. The Japanese concentrated on inbreeding only those fish with the longest fins. Soon, some specimens developed with short, forked caudal fins and long flowing dorsals, ventrals and anals. These were the forerunners of today's veiltails which inbred willingly and developed into a distinct variant of the common goldfish. Other variations and aberrations appeared and it became clear that even the body form could be altered by selective cross- and inbreeding.

The *Ryukin*, or veiltail, could swim only clumsily through the plants; the *Demekin*, or telescope-eyed goldfish, known in China as the Lung-tsing-yü, was crossed with veiltails to produce the telescope-eyed veiltail, the only variety which can exist completely velvet black. Selective breeding further resulted in fish without dorsal fins, specimens with nodular growth about their neck and head (our lionfish) and many more.

The first goldfish reached Europe through Portugal in the seventeenth century and appeared in France about 1750. Exhibited at Fairs as scarce oddities, some eventually found their way into ponds and round glass containers of the rich and famous, only to become soon known and commonplace throughout the western world. Large goldfish-hatcheries have existed in southern Europe over a hundred years; the areas of southern France especially, produces and ships many thousands of goldfish every year; these may reach to 15 inches in ponds, perhaps 6 to 8 inches in room aquaria.

In one of my aquariums (28×12×16 inch high) lived a fairly large veiltail; some time ago I added a common, 4-inch long goldfish. The aquarium was partially planted with dense *Myriophyllum* thickets and well aerated. Temperature of the water held at approx. 72°F. The goldfish had a crescent-shaped caudal, shone brassy-yellow and was considerably more lively than the veiltail with its fingerlong tail; only a few large scales covered the rose-flesh colored body of the veiltail. He was surprisingly tame and swam to the surface gracefully rocking whenever I approached the tank. He begged for food in a strange way: Smacking loudly, he turned up his puffed-up lips, sucking in air which would then bubble from his gills. This strange behaviour carried on since an accident which had occurred when I had bought the fish. At that time he sprained the joints of his mouth during transfer to the shipping container, and black, coagulated blood vessels formed around his jaw. His mouth stood open for days and he could hardly breathe. After two days I noticed how the veiltail positioned himself vertically under the surface with his round, open mouth protruding a bit beyond it. When I sprinkled some dry food into his mouth, he would swim down, swallow it and return to the surface to get another load. For days my veiltail was fed this way until when, after perhaps a week, he started to use his mouth normally, the sprain disappeared and regular feeding resumed.

About half a year had passed, and the goldfish in my veiltail tank grew to 5 inches, becoming plumper all the while; he would nip at the

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Societies at Work

By
HELEN SIMKATIS

TO LEARN IS TO HUNGER FOR more knowledge no matter what pursuit we follow, and fish fanciers who have become seriously involved in the hobby soon discover that an answer to a question leads to further inquiry. George Pinter's article entitled *On Scales and Armor*, appearing in the August issue of *The Tropical Breeze*, published by the San Diego Tropical Fish Society, offers us more than a skin-deep scanning of what covers a fish. The author was motivated to engage in considerable research by his initial curiosity concerning the scales and skins of his various aquarium pets. After a brief explanation that fish skin, like that of other vertebrates, is made up of two layers, the outer layer (epidermis), and dermis, the inner more complex layer, he goes on to the slime-like substance that coats the fish and enumerates the various functions this excretion serves for various species. He then breaks down the classifications of scales and illustrates them with line drawings. Size, shape, and depth scales are imbedded in the skin are discussed, and we are told that some fish have scales so minute that they are considered "naked or scaleless" species. Most hobbyists are aware of "scaleless" species but many do not realize that scales are present on these fish but are so small that they can only be discovered with the aid of a microscope. This piece is excellent armchair reading for the curious, and reference material for the student. Appearing in this issue, too, is Richard Stratton's word picture of *Pelmatochromis subocellatus*, a cichlid Sterba describes as "sometimes rivalling the Coral-fishes in its colouring." Author Stratton bears this out when he goes into the spawning behavior of the species. The female at this time is jet black, her flanks glowing bright red extending "all the way up to the pink dorsal." He rates the species as more attractive than *kribensis*, pointing out their "pleasing body shape." A turned-over flower pot was used in San Diego tap water and newly-hatched brine shrimp is recommended as a first food for the fry. Certainly there is a bright future for this species as Mr. Stratton tells us that the fish is "as hardy as it is lovely." Guy Jordan, in his *Scanning the Periodicals* for August, comments on the editorial appearing in *Calquarium* for June concerned with water pollution and upsetting the balance of nature, and points out that "Much more than our hobby is involved." He suggests that we had better start insisting that our elected representatives "get off the dime and act." Clubs throughout the country might pick up the cue from here and encourage members to nudge their representatives in this regard. *The Tropical Breeze* is published by the San Diego Tropical Fish Society, and information regarding this stimulating bulletin may be had by writing the society at P. O. Box 4156, North Park Station, San Diego, California 92104.

Lois (we assume Ladwig, although the piece is signed merely "Lois") writes about *Lots of (Unimportant But) Interesting Stuff* in the September issue of *Ichthus*, published by the North Star Aquarists. Her material is just what the title purports it to be, a chatty editorial covering incidentals concerned with aquatic life gleaned from TV shows to mailorder house catalogues. Having been out of the United States for a month, this writer was especially willing to be filled in on happenings remotely concerned with the hobby. For instance, we learned that Johnnie Carson featured *Clarias batrachus* one night, and one specimen walked away, not with, but from the show, and that this species (we had some reports on this before) is settling in on Floridians and causing them some worry — a fish that doesn't know that its place is in water. A mailorder house is advertising a necklace with a small glass bubble as the pendant containing a live "rainbow" fish, we learn, and with Lois, we hope this goes over like a lead balloon. She also reports that Seaquarium has acquired another white porpoise and that the Lock-Ness Monster or some other hungry critter swam off with several pounds of salmon in a cannister that was tied to a buoy with a 10-pound 15-foot nylon test line in the area that the Monster is supposed to live. This writer saw rows of television cameras focused on the surface of Lock-Ness and was particularly surprised at how many people are engaged in this waiting game. In this issue, too, Richard Ibeling extols on the genus *Ctenopoma*, the African "climbing perches." He singles them out as having the most "character" of all genera, and then proceeds to explain his choice. Not only does their aggressive and attention-catching per-

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VIEWS AND REVIEWS

"A Preliminary investigation of an Albino Clariid Catfish, Clarias *sp., Introduced into Palm Beach County", by Vernon E. Ogilvie and Robert L. Goodrick. Florida Game and Fresh Water Fish Commission, West Palm Beach, Florida, June 28, 1968.*

In the August 23, 1968 issue of *Time* magazine there appeared an article entitled, "Fish Bites Dog"—and my neighbor promptly panicked. The thought of a 2-foot fish scuttling across lawns at night and attacking dogs was just too much for her!

The culprit is apparently the albino form of *Clarias batrachus*, an Asian catfish of the family Clariidae which has enjoyed a modicum of popularity with aquarists who delight in keeping "oddball" fishes. (This species, by the way, has just been spawned in a home aquarium.) The clariid catfishes are of great interest to both hobbyists and ichthyologists alike as they have, in addition to gills, accessory breathing organs that enable them to breathe atmospheric air. Indeed, their gills are relatively small and in some cases appear inadequate to sustain life; such fish that are prevented from reaching the surface of an aquarium soon die.

If kept out of water, *Clarias* suffers no inconvenience provided its respiratory apparatus remains moist. Sometimes the fish voluntarily leaves the water, presumably in search of better living or feeding conditions, or perhaps to escape enemies. Certainly aquarists are familiar with this propensity to leave its tanks and must take care that aquarium covers are well secured.

Its movements on land suggest swimming and can properly be described as wriggling, hence their native name of "pla duk dam" ("dull-colored wriggling fish"). Hugh M. Smith tells of a friend who brought him a specimen of *Clarias batrachus* that was picked up on a metaled driveway in his yard in Bangkok. The fish had left a small canal 50 feet away and was proceeding towards another canal 110 feet away! It was placed in a jar of water in Smith's office but during the night, it jumped from the jar, dropped from a table to the floor, passed through a short corridor, traversed a large exhibit room, went the entire length of a long hallway, and was found in a lively condition just inside the front door at 11 p.m. J. B. Welman described a mass migration over dry land of a shoal of *Clarias* (most likely *C. mossambicus*) in Nigeria. The shoal appeared to be on its way from water which was drying out, to more permanent water.

In 1967, the first wild albino *Clarias batrachus* incidents were reported from Florida, all from Palm Beach County (in particular, the Lake Worth Drainage District in the eastern part of the County). Several were caught on hook and line, using worms as bait; others were collected by dip net. One specimen, about 10 inches long (the species reaches about 16 inches in length on the average, with some individuals growing larger), was found by a night watchman on dry land some ½-mile from water! As the *Time* article further put it: "There are even some far-out reports that it has attacked curious dogs sniffing at it". The truth of the matter is that the only dog a *Clarias* will attack is a hot dog but that, of course, is not "news".

The conclusions of the Florida Game and Fresh Water Fish Commission's investigation of this introduction to native waters are stated as follows: "A potentially dangerous Clariid catfish has been introduced into South Florida. Although young fish have not been found, the high incidence and wide distribution of collected adults tends to indicate that an established population exists. The usual barriers (salt water, control structures, levees, etc.) which confine or control the movements of fresh water fishes do not apply to the family Clariidae. A fish with the ability and inclination to leave the water and 'walk' around is, to the best of our knowledge, unmanageable. The individual or individuals responsible for introducing the *Clarias* catfish may have done the people of Florida a great disservice. It is quite probable that the Clariids may have a more detrimental effect on the ecology of Florida than any other group of fishes including the piranhas".

One of the authors of the report, Vernon E. Ogilvie, appeared on National television (i.e., the Johnny Carson Show) on September 4, 1968, at which time he exhibited several of these fish. This was followed the next day with an appearance on the Dick Cavett TV Show.

Among the recommendations of the Florida report is a ban on all members of the family Clariidae. This is rather typical of reports produced by similar Stage agencies, i.e., if one species is the "culprit", ban the whole family. Because carp are a problem in California, that State once sought to ban *all* cyprinids which, of course, includes goldfish, barbs, rasboras and danios, among others. Only by concerted action and vigorous protest on the parts of hobbyists and members of the pet industry was this idiocy averted. Although the Florida report generally is well researched, it is marred in parts by some sensationalism (e.g., it overstates the aggressiveness of the fish—the report makes a point of the fact that their specimens terrorized piranhas—and erroneously gives the impression that *Clarias* are dangerous to human beings as well). The effect on the public understandably was tremendous. The writer had a difficult time explaining to his neighbor, for example, that practically any fish can terrify a piranha (a normally timid fish) under suitable circumstances, and that both she and her dog were perfectly safe and not likely to be devoured!

Although *Time* magazine further distorted the facts of the Ogilvie-Goodrick report, evidently the Associated Press distorted the matter even further. The AP release read as follows: "An albino 'walking catfish' that can climb out of water and attack a dog or amble away from a poisoned pond has been discovered in Florida. A biologist calls them monsters. 'It's wild', a fishery biologist, Mr. Vernon Ogilvie, said here. 'It's a very frightening thing to me. I think it's one of the worst things

continued on page 62

A HISTORY OF THE AQUARIUM HOBBY IN AMERICA PART 14

by ALBERT J. KLEE

IN 1917 TYPICAL PRICES FOR fishes were: platies 75c. to $1.50 a pair (i.e., $1.88 to $3.75 in today's currency); zebra danios and swordtails $1.00 a pair; guppies 25c. a pair, *Aplocheilus lineatus* $1.50 a pair. A 2½-gallon tinned-frame tank could be purchased for $1.75 (= $4.38 t.c.), an 8-gallon tank for $2.25 (= $5.63 t.c.), and a 10-gallon tank for $7.50 (= $18.75 t.c.). In terms of today's currency, these prices were quite high, especially in the case of the 10-gallon tank. The sale of fish eggs was also known at this time, and medaka eggs could be bought for $1.00 a dozen.

We have previously met Frank S. Locke of San Francisco, a pioneer hobbyist of the west coast. The following is taken from his reminiscences in which he discusses the prices paid for angelfish, the tremendous problems encountered in transporting fishes from east to west coast, and his "infernal machine" designed to resolve the latter problem. It presents a penetrating insight into the hobby of 1917.

"About 1916 or 1917, there were in the neighborhood of a dozen varieties of tropicals to be obtained from Eastern sources, but very few, if any, were imported through the Pacific Coast. The prices on everything of this nature were so very high it was looked upon as a hobby in which only people of exceptional means could indulge. (As an example, we will take the rosy *Barbus*. The first pair of these fishes bred in San Francisco I believe, were two that I procured at the bargain price of $4.00.) In 1917, I had saved enough money through sales of surplus tropical fishes, to send to Philadelphia for a pair of scalare. These were obtainable through one source—namely, William Paullin, who was the first tropical fish breeder to propagate this variety (*Editor's Note:* i.e., in 1915). The cost of this pair of *Pterophyllum* was $75.00, with positively no guarantee whatsoever of their condition on arrival. Sad to relate, mine arrived dead and I was very much chagrined.

"A second attempt was made a year later to obtain some of these scalare during a trip I had taken to Eastern points in an endeavor to obtain new varieties for the Pacific Coast. Such poor success attended all shipments of tropicals at that time that it became almost necessary

One of the pioneering aquarists of the West Coast, Frank S. Locke.

for one to personally transport them if they desired a minimum of losses. Of the many places visited during this trip, it was practically impossible to persuade anyone possessing *Pterophyllum scalare* to part with them. By this time, almost all those originally bred by Mr. Paullin had reached maturity and the various fanciers and breeders who possessed them were loathe to part with them, all feeling that they were on the brink of the unexpected, namely, duplicating William Paullin's original breeding technique. Despite anything which might be said to the contrary, it was several seasons before anyone in the East was successful in propagating this fish (*Editor's Note:* The next to breed them was Franklin Barrett in 1921. By 1927, only Paullin, Barrett and Julius Riewe of Chicago, had bred scalare in America) and shipments of young were being regularly received at New York from Germany. These found a ready market at from $175.00 to $200.00 a hundred. This was considered a fair bargain inasmuch as they were selling at anywhere from $7.50 to $10.00 a pair in the Eastern States and from $10.00 to $15.00 a pair on the West Coast. (*Editor's Note:* In 1917, $10.00 was equivalent to approximately $25.00 in terms of today's currency.)

"The mortality in the shipments of angelfishes trans-shipped from New York to San Francisco was terrific. It was not unusual to have an entire shipment of one hundred, divided twenty to a can, arrive a complete loss. The express charges would usually be from $35.00 to $40.00 on the shipment. The arguments and strife surrounding these angelfish shipments between the Eastern shippers and various dealers throughout the United States would fill a book, I imagine. There seemed to be no

continued on page 49

The nuptial play of the pair consists of the twisting and turning around each other so common to the bubblenesters. The female is the fish in the background.

The eye of the fry is pigmented with red and black pigment, as clearly shown in this photo.

TRICHOPSIS SCHALLERI

By WILLIAM A. TOMEY

TO THE AQUARIST, *Trichopsis schalleri* (pronounced TREH-KOP'-SIS SHALL'-ER-EYE) is undoubtedly one of the most beautiful and interesting fishes of tropical east Asia. Specifically, it is found in the shallow, highly shaded waters of Thailand (one locality is the river near Nam-Mun a clear but brownish-colored stream some 125 miles northeast of Bangkok). The mosaic patterns to its fins, red-bordered in the bargain, only enhance the sparkling brilliance of its greenish-blue body spots.

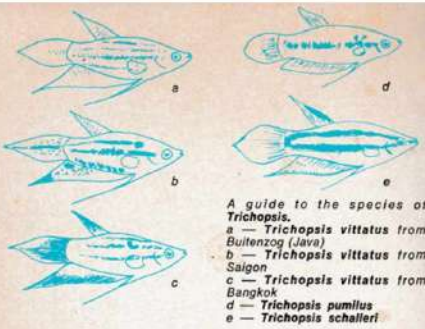
This fish, as with its relatives, is provided with a labyrinth organ that enables it to draw oxygen directly from the air above the water's surface. Thus, they are frequently positioned in the very top stratum of the

A newly-hatched egg of ***Trichopsis schalleri****. 200 to 250 eggs per spawning is normal.*

The fry have very clear fins and, of course, their eyes are large in comparison to their bodies.

The body of each fry is, however, covered with numerous micromelanophores or black pigment cells. In this picture, the fry are free-swimming and have lost their egg yolk sacs.

Here the male is peering from a thicket of plants, among which he will construct his nest.



A guide to the species of ***Trichopsis.***
*a — **Trichopsis vittatus** from Buitenzog (Java)*
*b — **Trichopsis vittatus** from Saigon*
*c — **Trichopsis vittatus** from Bangkok*
*d — **Trichopsis pumilus***
*e — **Trichopsis schalleri***

aquarium. Provocative to the imagination is the fact that *Trichopsis schalleri* produces a very audible sound which it makes while wholly under water, especially when it is engaged in the customary mock battles that characterize the species. During these battles, the fish circle each other like airplanes in a dogfight.

Even in the community tank, *T. schalleri* may often be seen constructing its bubble nest (an optimum temperature for this is between 75 and 82°F). The male constructs a very small nest of foam, frequently under a leaf located just near the water's surface. A short while after the nest construction is completed, the fish mate. Here, the female and male are intertwined, the male forming a pocket with his fins and fertilizing the eggs which are deposited therein. Sexing *T. schalleri* is very difficult for the females may be more colorful, and have longer finnage, than the males. During spawning, however, the female's colors are much more intense.

In the next step, the male transports the eggs in his mouth to the bubble nest. For one or two days afterwards, he guards the eggs, abandoning this task only when the fry have left the nest. Depending upon the temperature, the eggs will hatch in about two days.

The fry are, for some time, rather egg-shaped but as they grow, this shape is altered to a more normal form. For the very first few days, the best food for the fry consists of infusoria cultures or "pond water." Newly hatched brine shrimp can then form the basis for the next food. If the feeding is satisfactory growth is rapid and in three weeks, the first signs of color in the young can be detected.

Because the breeding behaviour of *Trichopsis schalleri* is, as with all bubble nest builders, a fascinating process to watch, and because they feature a delicate shape in both pattern and finnage plus an attractive coloration, they are highly recommended. Small, yes, but a jewel nonetheless! ●

The male pictured above was mated to a common female producing 22 marble angelfish and 26 common angelfish.

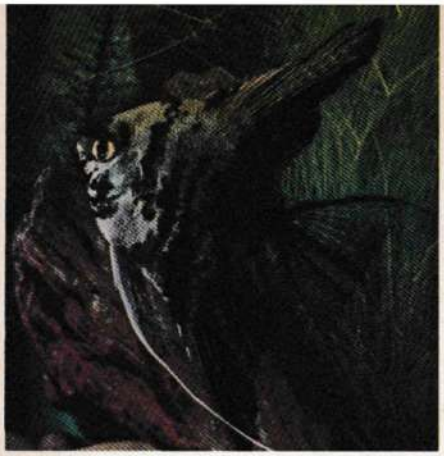
ASH: continued from page 5

Chuck selected several males when they were nine months old and placed them in a 30-gallon breeding tank. They were mated, mother to sons, and after many spawnings he discovered a total of three marbleized angels. One was marbleized only in its tail-to-midsection, another was completely marbleized and dark, and the last one was much lighter.

The three marbleized angels were given a 30-gallon tank to themselves. As the months wore on, the marble pattern became more dominant and beautiful. As they matured, it was evident that there were two females and one male. Finally, amidst excitement and expectation, one female—the lighter patterned one—mated with the male, and the remaining female was removed.

As Chuck hatches all of his angels artificially, the first slate of eggs was removed to a hatching tank. Four long days went by but disappointingly, all of the eggs were infertile, as were two subsequent spawnings. On the fourth spawning, however, a total of about two hundred young were hatched out. After becoming free-swimming, the fry were placed in rearing tanks and watched. After two or three weeks, Chuck brought out the magnifying glass as the fry were so tiny that it was impossible to determine the pattern on them otherwise. Even though the fish were still so very small, just starting to look like angels in fact,

A breeding pair of marble angelfish searching for a spawning site.



During the first few months, these marble angelfish were larger than common angelfish of the same age. The above fish was photographed at the age of 3-1/2 months.

one could see a definite difference in them. Then, when they were six months old, there was no longer any doubt—there were sixty percent marbleized angels in the brood, possibly even more. During these six weeks, we had obtained four more spawnings from the pair of marbleized angels and hatched a total of approximately one thousand fry.

Then disaster! The female died from some sort of bloating disease (we had also lost the dark female shortly after removing her from the tank containing the other two marbleized angels). During the next six months the marbleized young were separated from the normal silver young, the latter being fed to some large oscars. Of the five spawnings, about eight hundred marbleized angels were produced. The oldest were placed in a 30-gallon breeding tank and, at this writing, they are now nine months old. There are presently at least 24 proven pairs of young marbleized angels, with many more not far off.

The young marbleized angels are similar to the parents, i.e. black and white rays on the dorsal, and very marbleized with chocolate-brown tones and stippled with black markings which are highlighted with gold flecking and traces of green and blue-green. This is not just another angel, as can be seen from the accompanying photographs! One feels a keen sense of enjoyment as the marbleized pattern meets the eyes.●

OLIVER: continued from page 7

A close-up of the albino swordtail showing the deep-red pupil.

Since albinism is a recessive mutation, a brother-sister mating of fishes from one albino and one normal parent should, according to the laws of Mendelian inheritance, produce one albino per four offspring. Yet such a mating of guppies, for example, has experimentally resulted in only one albino per fifty-four young because most of the albinos, being inherently weak, die before birth. All the fry would be albinos only if both parents happened to be albino, and this would almost never occur in the wild.

Even if it is born alive, an albino's troubles have just begun. The iris of a normal fish's eye is opaque, and so it can control by dilation and contraction the amount of light falling on the retina. An albino's iris is translucent, so that dilation and contraction provide no such control. The fish is therefore highly sensitive to bright light, and

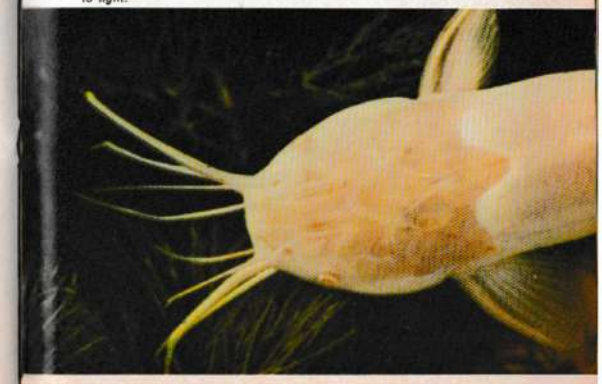
An albino silver salmon, *Oncorhynchus kisutch*, swimming in a school of normally-colored silver salmon.

cannot see clearly in it to avoid predatory birds, snakes, or other fishes. Worse, it is so immediately apparent to these predators as it swims among normal, protectively colored fishes that it is singled out as the first candidate for a meal. For this reason almost all albino aquarium fishes are tank raised. The only frequent exceptions are catfishes — the channel catfishes *Ictalurus lacustris* and *I. punctatus* are found as albinos in the wild, as is *Clarias batrachus*. Perhaps they are hidden by the muddy bottoms which they inhabit.

The photograph on page 44 received the Los Angeles Aquarium Society's first annual Gene Wolfsheimer Award. The contest, which the Society instituted to honor its distinguished fish photographer, was open to all the amateur photographers among its members. Color slides and black and white or color prints of any aquatic subject were eligible. Mr. Wolfsheimer judged the many fine entries and presented the Award and subsidiary prizes at the Society's annual Christmas Banquet last December 8th. He felt that the winning picture's demonstration of an albino's vulnerability more than made up for its admitted technical deficiencies.●

Clarius batrachus *is one of the few albinos found in the wild. They range from Ceylon through eastern India and as of late, Florida, U.S.A.!!*

The iris of an albino is without black pigment, therefore somewhat sensitive to light.



THE AQUARIUM QUIZ

Due to your overwhelming response to our first Aquarium Quiz, we've decided to test your skills once again. We think you will find quiz #2 as enjoyable and stimulating as quiz #1. According to your response to quiz #2 we will determine whether the Aquarium Quiz shall become a permanent feature. So keep those cards and letters coming folks.

1

2

3

4

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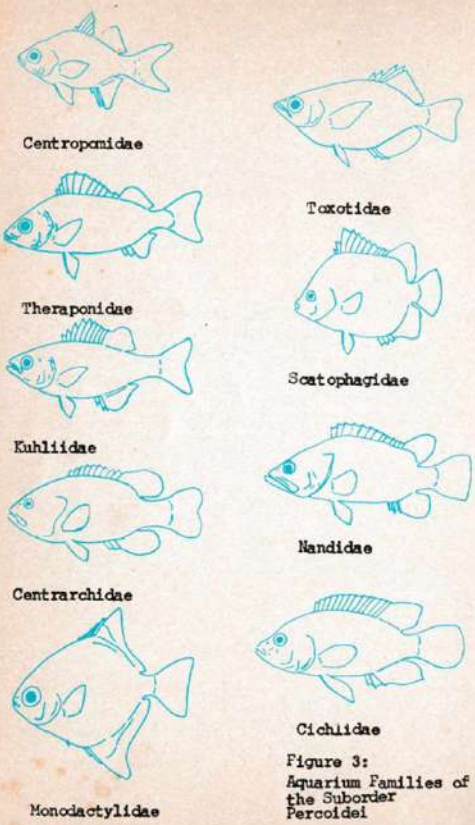


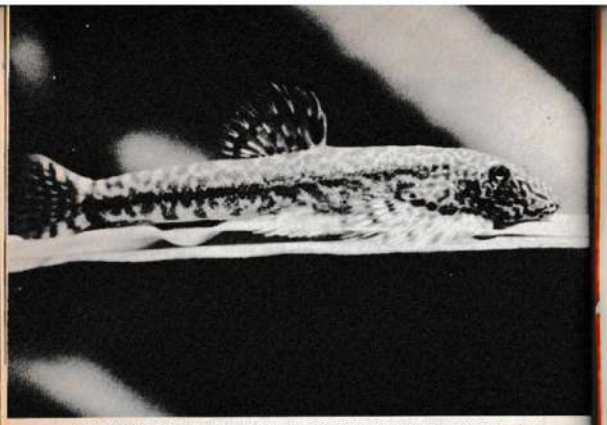
Figure 3: Aquarium Families of the Suborder Percoidei

TOMEY: continued from page 13

A view of ***Gastromyzon borneensis,*** *sticking to the cover glass of the aquarium. They do this to supplement their oxygen intake when the water is low in that gas, or when the water temperature is too high.*

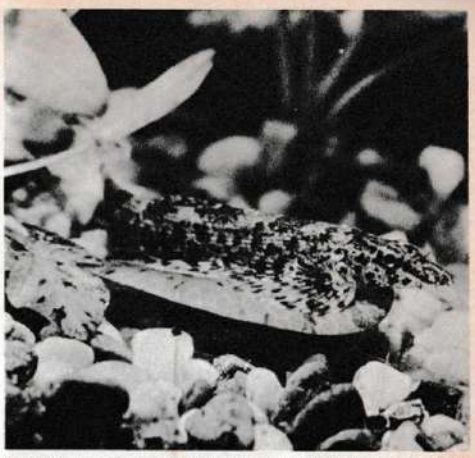
fishes originate from a wide Asiatic area, even from countries bordering on south China.

Our photographs depict one such problem fish, *Gastromyzon borneensis*. This one, at least, has a name and a habitat. (EDITOR'S NOTE: In Inger and Kong's "The Fresh-Water Fishes Of North Borneo", the authors give the following description of a particular locality in which this species was found: "Shore vegetation primarily dipterocarp forest. A few dead branches but no living submerged or emergent vascular plants. Banks flat to steep, 0·3–1 meter high. Bottom sand and gravel in pool, with dead leaves; gravel and rock in riffle. Pool width 3 meters, maximum depth 88 cm, length 7 meters. Riffles downstream from pool, width 1·5 meters, maximum depth 30 cm, length 20 meters. Water clear, bottom visible. Current 60 meters/hour in pool, 480 meters/hour in riffles. Previous rainfall none for two days. Sky partly cloudy. Shade 25 per cent in pool, 95 per cent in riffle. Surface temperature 25°C, air



A side view of ***Gastromyzon borneensis,*** *showing its pretty patterns on fins and body.*

An under-view of ***Gastromyzon borneensis,*** *uncovering the sucker disc formed by the placement of both ventral and pectoral fins. Unlike most fishes, these fins are held in a more or less horizontal position.*



A member of a different genus, ***Hemimyzon meyersi,*** *resting on a leaf. These fishes are constantly on the move, looking for food.*

27°C at 8.00 a.m." Among the other fishes found in this habitat, Inger and Kong list several kinds of loaches, spiny eels, some barbs and a *Rasbora*.) It is a member of the Family Homalopteridae, Subfamily Gastromyzoninae. Its most important distinguishing feature (common to the other members of the Subfamily as well) is the presence of a sucker disc on the abdomen, its rim formed by the pectoral and ventral fins. These fins, incidentally, extend out from the body in a more or less horizontal posture. In the genus *Gastromyzon*, the sucker disc is most highly developed and the ventral fins are actually joined. This is not the case with another related genus, *Hemimyzon*.

All sorts of Homalopteridae inhabit the fast-flowing streams and lakes of Asia, fastening themselves with the aid of their sucker discs to stones, etc., so that they are not washed away by the torrents. By making small jumps, they travel from stone to stone, a behavior pattern which is not lost in the aquarium.

Unfortunately, these fishes are not easily acclimated to the aquarium and few last more than a year in captivity. One explanation may be that they do not adjust readily to the concentration of chemicals that

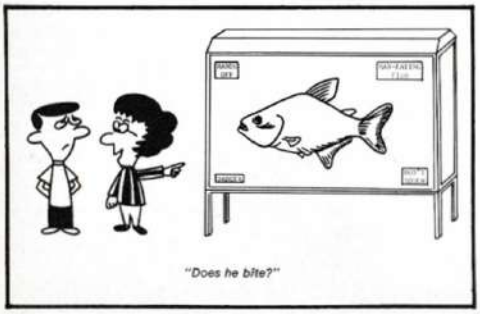
six inches by 12 inches by 20 inches in height. In this was installed a specially built air tank capable of holding 200 pounds air pressure. It was tested to 350 pounds before it was installed. All the lines were hooked up to a single opening by means of tees and crosses of one-eighth inch pipe. Just sticking out the end of the case, we had a valve, similar to the valve on any automobile tube, which was used to fill this tank. A high grade foot pump, double barrel, 20 inches high was our means of air supply for this tank when we were unable to walk up to an easier source, i.e., a bicycle shop or automobile gas station. A gauge, whose face was plainly visible outside, told us the maximum pressure in the tank. We seldom had more than 150 pounds pressure. This would last overnight, with considerable pressure to spare. A pressure regulator was installed on the line which aerated 10 small receptacles carried in separate compartments inside the case. These small receptacles held a quart of water each, and were constructed from brick ice cream tins. They were chosen at the time because of their durable strength and reinforced sides, and also because five of them just fit nicely in the space I had allotted for their set-up. A narrow splash rim, one-fourth inch, entirely around the top of the tins, one-half inch from the edge, kept water from splashing out and acted as a fine type of agitator whenever the going was rough. A glass cover set down on this rim was always in place, inasmuch as it could not get away. Each glass cover had a small hole, $\frac{5}{16}$ inch, drilled in one end. Through this, a piece of $\frac{1}{4}$-inch block tin tubing was used to hold a small aerator in the water. A pair of rubber gaskets, top and bottom of the glass, held this block tin aerator in place. Small pieces of porous wood were used as aerator releases. The pump had a compartment inside at the top. We also had another little extra space where spare rubber tubing, tubing fittings, extra air releases, and spare valves for our line were kept. Each individual tank had its own spare valve to control the amount of air passing through the releaser. This was found necessary, inasmuch as no two pieces of wood would seem to release the same quantity of air as its neighbor, one robbing the other. These valves were brought from the east at the time through Mr. William T. Innes, who was kind enough to chase them down for me, and were to be obtained only through Germany for many years. The price was very high then, but no other valve of this type was obtainable; so a dozen of them were bought and after our trip were used for many years in the hatchery where they gave fine service. I am not mistaken when I say that a few of them are still doing duty at the present writing (*Editor's Note:* i.e., 1937).

"Above each row of tanks, consisting of five cans in a row, we had two hooks, ordinary brass hooks such as are used to hang up pots. These hooks were about 12 inches apart. Two hot water bottles (rubber) with a metal hanger on each end were filled with hot water and stretched

out between these two hooks if the night on the train bid fair to be chilly.

"One entire side of this carrying case, with the exception of a two-inch frame for its foundation, consisted of a piece of quarter-inch plate glass through which a thermometer, screwed to the back wall of both decks, was always visible. A glance would tell one exactly just what the temperature was inside the can. During our travelling, the outfit was kept in the gentlemen's dressing room, and on many occasions, we were able to place it so that the sun shone on the glass face and kept the fishes in a state of calm, which does not seem to be the case where they are in a darkened can for five or six days across the continent. This, I think, is really a very important feature in the transportation of tropicals. I am confident that the morale of the fishes is of a much higher nature than when they were kept in complete darkness for such a great length of time. A large and comfortable hand grip was obtained from a local trunk factory and this was installed on the outer top by means of small brass machine screws which went entirely through the case. An auxiliary ring was placed exactly in the middle and over our shoulder, a comfortable two-inch strap with a snap hook at one end, added quite materially in sustaining this 'infernal machine' in its flight through the air from place to place. As I look back upon the miles it was actually carried, I feel like shuddering a bit at the thought of having to go through it again; yet, twenty years ago, my enthusiasm and my muscle were about evenly balanced, one never getting entirely the better of the other.

"That was one receptacle, but strange as it may seem, we had another. Eighteen inches square by 10 inches high, it had at one time



"Does he bite?"

been the carrying case of an accordian. This was found down on McAllister Street in one of those places that carry such cast-off paraphernalia and seemed to be just what I was looking for when I bought it. The side opened down and the top opened up, giving full access to the interior. This was a very well built case and was lined with plush. Of course, the plush was not necessary, but inasmuch as it was there, it was allowed to remain there. A metal receptacle, exact dimensions of the inside, was made and when it was completed another one, one inch smaller all round (which was to be our container proper) was built into the former and the space between these two metal receptacles was packed with ground cork. The inside receptacle in which the fishes were to be carried and which held the water was divided into three compartments with a splash rim around the entire surface of the can, under which small pieces of silk sponge were wired in place. Between each compartment, six inches from the bottom, several small 16th-inch holes were drilled so that the water could pour back and forth to agitate it. The sponges were remarkably efficient aerators, inasmuch as any water which splashed into them and ran back, naturally became surcharged with air that was present in the receptacles. I took this along for the purpose of carrying any larger fishes which I might bring back with me and frankly, found it to be more cumbersome than the 'infernal machine' case of which I spoke before.

"Coupled with these two monstrosities, I naturally had a bag in which I carried my personal belongings and such other things as were absolutely necessary to keep me going. I had one suit when I started. When I got to New York, I bought another, shipped the one I was wearing from New York to Philadelphia (after it was cleaned). There I picked it up at Mr. Innes' home and just before I was ready to leave to start home, I changed suits again and shipped one home. So, I managed to travel as light as possible as far as clothes were concerned. Yet, if anyone imagines he would like to take a pleasure jaunt with an 'infernal machine' in one hand (which was the name attached to it by members of the train crew), a heavy carrying case in the other, and a bag slung over his back, he would probably feel he should have his brains examined as mine should have been at the time I undertook this trip. Anyway, it was not in vain, for I did bring back a lot of fishes to the West Coast; and despite the fact of terrific temperatures in Chicago, where my charges were given a swell swim in the bathtub to cool them off, we lost but two or three on the entire journey, which seems to me to be a pretty good record. They were fed only once; and that was during our stop at Chicago through a friendly connection, a brother fish fancier, Dr. Preusker, from whom we obtained a feeding of white worms (*enchytrae*) which had to suffice for the rest of the journey."

To be continued.

out between these two hooks if the night on the train bid fair to be chilly.

"One entire side of this carrying case, with the exception of a two-inch frame for its foundation, consisted of a piece of quarter-inch plate glass through which a thermometer, screwed to the back wall of both decks, was always visible. A glance would tell one exactly just what the temperature was inside the can. During our travelling, the outfit was kept in the gentlemen's dressing room, and on many occasions, we were able to place it so that the sun shone on the glass face and kept the fishes in a state of calm, which does not seem to be the case where they are in a darkened can for five or six days across the continent. This, I think, is really a very important feature in the transportation of tropicals. I am confident that the morale of the fishes is of a much higher nature than when they were kept in complete darkness for such a great length of time. A large and comfortable hand grip was obtained from a local trunk factory and this was installed on the outer top by means of small brass machine screws which went entirely through the case. An auxiliary ring was placed exactly in the middle and over our shoulder, a comfortable two-inch strap with a snap hook at one end, added quite materially in sustaining this 'infernal machine' in its flight through the air from place to place. As I look back upon the miles it was actually carried, I feel like shuddering a bit at the thought of having to go through it again; yet, twenty years ago, my enthusiasm and my muscle were about evenly balanced, one never getting entirely the better of the other.

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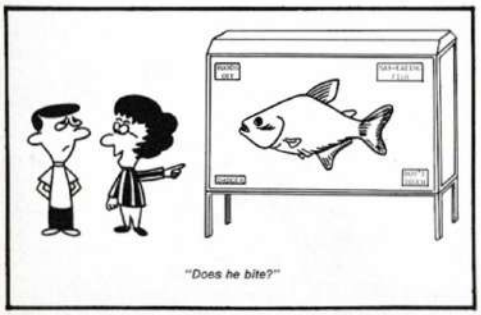
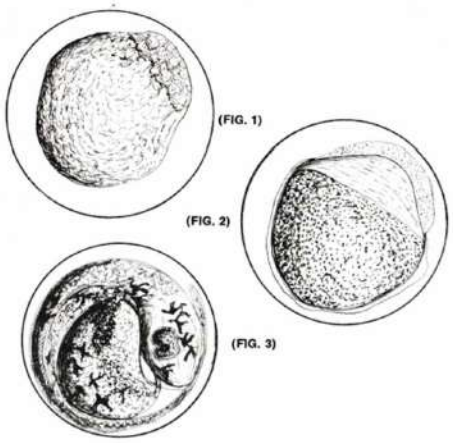


"Does he bite?"

been the carrying case of an accordian. This was found down on McAllister Street in one of those places that carry such cast-off paraphernalia and seemed to be just what I was looking for when I bought it. The side opened down and the top opened up, giving full access to the interior. This was a very well built case and was lined with plush. Of course, the plush was not necessary, but inasmuch as it was there, it was allowed to remain there. A metal receptacle, exact dimensions of the inside, was made and when it was completed another one, one inch smaller all round (which was to be our container proper) was built into the former and the space between these two metal receptacles was packed with ground cork. The inside receptacle in which the fishes were to be carried and which held the water was divided into three compartments with a splash rim around the entire surface of the can, under which small pieces of silk sponge were wired in place. Between each compartment, six inches from the bottom, several small 16th-inch holes were drilled so that the water could pour back and forth to agitate it. The sponges were remarkably efficient aerators, inasmuch as any water which splashed into them and ran back, naturally became surcharged with air that was present in the receptacles. I took this along for the purpose of carrying any larger fishes which I might bring back with me and frankly, found it to be more cumbersome than the 'infernal machine' case of which I spoke before.

"Coupled with these two monstrosities, I naturally had a bag in which I carried my personal belongings and such other things as were absolutely necessary to keep me going. I had one suit when I started. When I got to New York, I bought another, shipped the one I was wearing from New York to Philadelphia (after it was cleaned). There I picked it up at Mr. Innes' home and just before I was ready to leave to start home, I changed suits again and shipped one home. So, I managed to travel as light as possible as far as clothes were concerned. Yet, if anyone imagines he would like to take a pleasure jaunt with an 'infernal machine' in one hand (which was the name attached to it by members of the train crew), a heavy carrying case in the other, and a bag slung over his back, he would probably feel he should have his brains examined as mine should have been at the time I undertook this trip. Anyway, it was not in vain, for I did bring back a lot of fishes to the West Coast; and despite the fact of terrific temperatures in Chicago, where my charges were given a swell swim in the bathtub to cool them off, we lost but two or three on the entire journey, which seems to me to be a pretty good record. They were fed only once; and that was during our stop at Chicago through a friendly connection, a brother fish fancier, Dr. Preusker, from whom we obtained a feeding of white worms (*enchytrae*) which had to suffice for the rest of the journey."

To be continued.



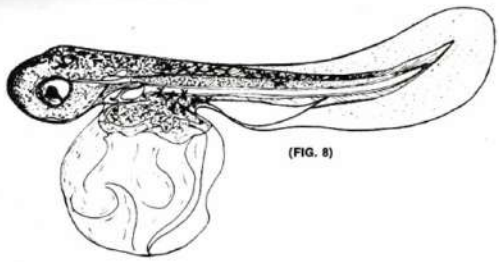
eggs had stuck to the tank glass. As much as they tried, the two fish were unable to remove them with their lips. The glue-like substance covering the eggs caused their solid attachment to the first object they touched, protecting them against the appetite of their parents and against dropping into the mud and being contaminated by bacteria. The *Myriophyllum* stems with their stuck-on eggs were cut off and laid flat into a shallow glass bowl with aquarium water. To prevent contamination, no gravel was used. Light aeration provided the necessary oxygen. During eight additional spawnings the pair produced at least 150 eggs. I removed 20 to permit close observation of their development.

Immediately after spawning, a goldfish egg appeared under the microscope as a smooth, very thin-walled ball, approximately 1 mm (·040 inch) in diameter; after a few minutes the content thickened and detached itself from the wall. A second, yellowish ball swam inside the eggshell. It was surrounded with clear liquid. Two hours after fertilization, a germinal bud developed on the yolk ball, the first sign of the appearance of the embryo (fig 1). Some 9 hours later, this bud had developed into several rudimentary organs (fig 2). Another 46 hours later, a tiny fish with enormous dark eyes hugged the yolk-sac in each transparent fish egg (fig 3). Next to the embryo's body, a flat, translucent heart pumped blood rhythmically through hoselike clear arteries of the

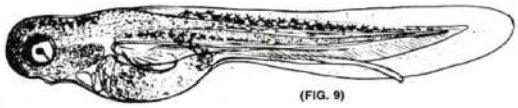
tiny fish. The heart would suck in the blood every 1 to 2 seconds, the visible flow would stop for an instant, the heart muscle would contract and the blood would spurt into the arteries. It would leave the body at the rear end, flow across the yolk-sack and be sucked again into the heart during the next cycle. (Fig 4).

Everytime I touched an egg with a fine needle, it would turn under the microscope, allowing additional observations. When it turned, the small fish would clasp its rear end in a different position around the yolk-sack, sometime even moving its head a bit. It was still translucent, but large pigment cells had formed on body and yolk-sack. (Fig 4, 5, 6.)

Three days after spawning the visibly longer embryos had almost devoured their yolk (Fig 7). It appeared that the eggshell would not be able to contain the lively organism much longer and sure enough, in the morning of the next day, a small, longish fish was hanging vertically in the plants. There were many of them and a few were still trying to



(FIG. 8)

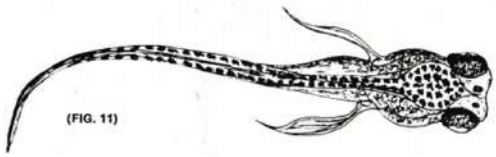


(FIG. 9)

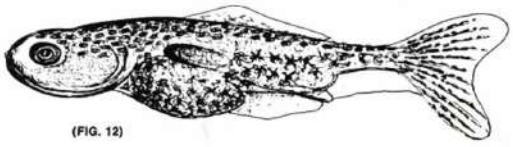
(FIG. 10)

escape their shrivelled shells (Fig 8). The slightest disturbance would cause the fry to scatter wildly. On the evening of the second day following hatching, the fry had grown from 2·5 to 4·9 mm (Fig 9). The yolk-sac was almost completely gone, but only after the third day did I notice formation of a mouth. Brine-shrimp and finely chopped, washed tubifex was fed twice daily and hungrily devoured by the yellowish-green, translucent fry. They swam obliquely free in the water but would rest frequently on plant leaves (Fig 10). Three days later, the now 6 mm long young fish were able to move their eyes jerkily; a clear lens behind a distinct cornea was clearly visible. The alert fish swam through the tank, continuously searching for food (Fig 11). Eleven days after they had hatched, a dent appeared in the center of the ventral fin; in addition, the caudal fin started to develop more strongly. It should be of interest that all young goldfish developed plain caudal fins. Only three specimens appeared to start developing a forked tail fin shortly after hatching but, alas, all of them died.

During the next weeks, the small goldfish grew rapidly to about ½ inches; their bodies were still translucent and no scales had formed



(FIG. 11)



(FIG. 12)

as yet (Fig 12). Soon a brassy-looking sheen of greenish cast colored the bodies. This persisted for the next 9 months or so. After that about one-half of the young fish changed their colors to a reddish tinge. Many carried extraordinarily long caudal fins and resembled the comet fish with their simple, long tail. At approximately the same time, the gill-covers of the three largest goldfish developed whitish rutting-warts and in short order, a number of the young "veiltail-goldfish" spawned. Rearing of the young was again successful, but no double or forked tailfins developed in the offspring.

The original veiltail and longtailed goldfish pair continued to spawn regularly during the next two years in intervals of approximately 2 months regardless of the year's season. The fertility of the pair was amazing; they would produce over 100 eggs every time even though they lived in such a comparatively small aquarium! It may be of interest to mention that after the first successful breeding there were, in all, five generations, all of them in-bred and yielding increasingly stronger specimens. This was apparently due to my selecting only the fittest parents which showed the most sturdy build; otherwise there might have been some degeneration and stunted growth. Unfortunately, the last generation met their death in the garden pond of a neighbor of mine who had forgotten to take them into his house during a severe winter. ●

* *Translator's Note:* The CRUCIAN, also crucian carp (modification of karuse, kruske; French: karuske, karusse; German: Karausche): a European carp (*Carassius vulgaris* syn. *Carassius carassius*). *Carassius carassius* forma *auratus* is a golden hued variation of the former.

VIEWS & REVIEWS: continued from page 31

that has ever happened to south Florida, as far as fish is concerned. I think this thing is going, eventually, to spread all over the southeastern United States', said Mr. Ogilvie, exotic fish research project leader for the Florida Game and Fish Commission. 'We don't even know what species of fish it is', Mr. Ogilvie said. 'It's possible this fish won't get over 16 or 18 inches long, but then there are members of the Clariidae that get five feet long and weigh 50 or 60 lb'. Mr. Ogilvie says the walking catfish are 'odd-looking creatures. They have two side fins with spines in them' and 'a real long dorsal fin. They're very strong and they taper down to where there's nothing to hold on to. This fish is an important food fish in Africa, but this doesn't mean it's going to be good in Florida'. Mr. Ogilvie said the fish are not poisonous, but he describes them as 'very pugnacious and they're very voracious fish'." So ends the AP report.

To this, the editor of the African Aquarist remarked: "We think we may be excused for looking at this report somewhat sceptically. Apart from being a bad piece of reporting, we cannot quite make out who is more garbled; the reporter or Mr. Ogilvie. The English is putrid and the contradictions are fantastic, as is the description of the fins that taper down to where there is nothing to hold on to—just like our legs; after the toes we seem to be grabbing fresh air." We tend to agree with the editor of the *African Aquarist!*

We are currently in an age when imported animals, especially fishes, are being subjected to restrictions and bans never before witnessed in the history of our hobby. These actions are sought by fish and game officials to prevent real or imagined damage to our ecosystems. The problem arises from accidental or deliberate release of fishes (in the case of these animals) into public waters. The writer has considerable sympathy with the fears of the conservationists in this matter and has encouraged fish farms and hatcheries to ensure against accidental release of exotic fishes, and has roundly condemned any deliberate release (or, as put by George Torres, writing in *Aqua Jewels*, ". . . some chicken-hearted neophyte hobbyist who thought it would be best to throw this oddball tropical fish in the canals, since he had to get rid of it."). It is about time that hobbyists were alerted to the facts and that the pet industry enter into educational programs for this purpose.

On the other hand, the enthusiasm of public officials sometimes leads to outright abuses. The banning of the aruana in Texas, and the neon tetra in California (since rescinded) are examples of such absurdities. The hobby should well remember that "the price of liberty is eternal vigilance", and be prepared to counter the many pointless and irrational proposals that seem to run rampant among those who believe that the perfect world can be obtained simply by creating more laws, rules, regulations and bureaus.

●

PROBLEMS: continued from page 22

combination for a beginner: 2 *Corydoras*, 2 zebras, 2 guppies, and later a betta and an angelfish? What about pH for this combination?

Answer: This combination might work out well enough although it would be inevitable that the guppy offspring would fall prey to the angelfish and the betta. The angelfish would not be too happy about the activity of the zebras and as it put on size, it would be best to keep it in another aquarium with several other angelfish of comparable size. A pH in the neutral zone would be good. The species you have listed

acclimate well to water in most areas.

From: Donna Ching, Norfolk, Virginia

I have two questions. I read in *Exotic Aquarium Fishes* by William T. Innes "that fish sometimes come up to breathe atmospheric air if they are overcrowded". In my 10-gallon tank I have few fish, yet my *Corydoras aeneus* is constantly hurrying up for air and dashing back to the bottom. Why is this?

Answer: *Corydoras aeneus* and other catfish take in atmospheric air by doing as you describe, and diving down to the bottom of the aquarium again. The air taken is stored in a branchial cavity to be used when needed. Your fish is not doing this because of crowded conditions as might be the case with another species (one that is not equipped with a storage space for air), but because this is in keeping with its respiratory design.

Question: In my lake I catch many minnows less than one-half inch long. Is it safe to feed these to my fish? I have tried it and they eat them readily.

Answer: It is natural for many fish to eat baby fish and if the practice of feeding young fish to your aquarium specimens does not offend you, we are sure it does not offend your aquarium fish, a fact that you have already determined for yourself. Most aquarium fish, however, will accept other than live food as you no doubt have discovered also.

From: Thomas Drougas, Bayshore, New York

Please tell me how to tell male from female Texas cichlids (*Cichlasoma cyanoguttatus*)?

Answer: The male has longer points to his dorsal and anal fins.

Question: What size tank is recommended for breeding the Texas cichlid? What are their other require-

ments?

Answer: This species is considered large for the home aquarium. They attain 9 inches in length and should have a 40- to 50-gallon tank. A neutral pH range and a water temperature of 78°F comprise their undemanding water requirements for spawning. Flat rocks might be used to receive their eggs which are laid in cichlid fashion and so fertilized. The eggs hatch in about three days and the fry are free-swimming in a week when they are ready for newly hatched brine shrimp. These are mild fish and although the eggs could be hatched artificially, it would be interesting to watch the parents handle the situation themselves.

From: Jerry Florczak, Chicago, Ill.

I have a 30-gallon tank with a 40-watt fluorescent tube; water temperature is kept at about 78°F constantly. My tank is not over-

crowded and I have medium gravel. I keep my light and Dynaflo Filter on for at least 10 hours a day. I am now troubled with an excess of algae and my plants such as *Vallisneria* and *Sagittaria* turn brown and die. I have planted my tank twice with no success. Even my sword plants are suffering. I tried changing the type bulb, but the condition worsened.

Answer: If your aquarium receives little daylight, the artificial light should be on from 12 to 14 hours per day. *Vallisneria* and *Sagittaria* are not good together. *Vallisneria* would be better suited to the temperature of your water. Your algal problem may be partly due to the fact that your rooted plants are not doing well. Sword plants are heavy feeders and it may be there is too much competition in your aquarium for several of these plants. Perhaps if you settled for one or two sword plants and several *Vallisneria*, your plants would feed on the nutrients which are now being utilized by the algal growth you describe. Algae thrive when rooted plants are failing.

From: Dennis Black, Los Angeles, Calif.

I have a 20-gallon tank stocked with 10 neon tetras and 2 discus. My question is, will my discus spawn even though Los Angeles water is notorious for being very hard and having a very high pH level? I have tried to reduce the alkalinity and increase the acidity gradually, using a product devised for this, but to no avail.

Answer: Gene Wolfsheimer, a very famous aquarist from your area, and one of the successful breeders of discus, describes his method of dealing with the water problem in your city in an article appearing in THE AQUARIUM MAGAZINE, January 1957. He used an ion-exchange type of water softener "very gradually"

and then hung small inside filters in the tank filled with German peat. These were run constantly. The softness accomplished was a DH of 4 and a pH of 6-9. Zeolite is one material that might be used for the water softener, and peat used for gardening can be purchased in most hardware stores. The issue in which Mr. Wolfsheimer's article appeared is not available, but your public library may have it in its periodical section.

From: Mrs. Lorraine B. Yeck,
Milwaukee, Wisconsin.

Can you tell me anything about the fish called *Anostomus anostomus*?

Answer: Anostomus anostomus likes a large aquarium and several specimens of its own kind, all about the same size. This species likes hiding places and a fairly well-planted aquarium. If there is no algal growth on the walls or rocks in the tank, add spinach (boiled and chopped) and water-soaked lettuce to its diet. It will eat almost any standard fish food, dry, live, or frozen. Although difficult to distinguish male from female, the latter of this elongated fish is the plumper. We do not know of a spawning of *A. anostomus* in captivity, but its head-down swimming stance, and its coloring make it a favorite among hobbyists. The base of the dorsal and caudal fins shows red in varying densities, and longitudinal stripes from dark green to brown interspersed with yellow to gold, adorn its body from nose to caudal peduncle. Although shy when first introduced to a new home, its love of activity soon prevails and its interesting swimming habits provoke comments from a human audience and endear it to its owner. It is found in western Guyana and in the Amazon from Manaos. It is hardy and prefers a temperature in the mid-seventies. ●

Answers to THE AQUARIUM QUIZ.

1. BELONESOX BELIZANUS — TOP PIKEMINOW. 2. PANTODON BUCAHOLZI — BUTTERFLY FISH. 3. CHALCEUS MACROLEPIDOTUS — REDTAILED CHARACID. 4. LABEOTROPHEUS TREWAVASAE — LAKE MALAWI SPECIES. 5. SERRASALMUS RHOMBEUS — SPOTTED PIRANHA.

CREDITS

PHOTOS:

W. A. Tomey, P. 12, 34-37, 75-78; M. Oliver, P.44, A. Roth, 4-8, 39-47.

FISH:

MARBLE ANGEL supplied by Mr. Charles A. Ash*, ALBINOS supplied by Grassyfork Fisheries, Saddle River, N. J.;

*The name Marble Angel is registered to Mr. Charles A. Ash.

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KLEE: continued from page 18

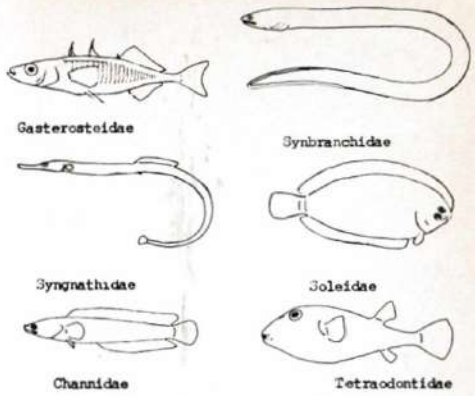


Figure 1: Miscellaneous Families of Acanthopterygii

We now come to the final Suborder, Percoidei. Because it contains 71 Families, however, it is impractical to list each of them. Accordingly, we have listed only the 10 aquarium Families in Table III, with sketches of each Family being shown in Figure 3. The most significant Family is, of course, Cichlidae, which provides about 10% of the total species of aquarium fishes. Other moderately-important Families include Centropomidae (which contains the previously-separated Chandidae and Ambassidae) for its glassfishes, Monodactylidae, Toxotidae (archerfishes), Scatophagidae (scats), and Nandidae (leaffishes). The less-important Families include Theraponidae (target perches), Kuhliidae (certain cichlid-type fishes found in Australia, and Centrarchidae (pigmy sunfishes).

This, then, concludes our discussion of the classification of fishes, with particular emphasis upon freshwater aquarium Families. It has been possible, as a byproduct of this series of articles, to estimate the individual contributions to the total number of species of aquarium fishes on the basis of both major groupings and Families. These estimates are shown in Table IV. Of the 412 Families of teleostean fishes, therefore, we obtain almost half of our aquarium species from but five of them! ● *continued*

TABLE I
ORDERS OF ACANTHOPTERYGII

	Number of Aquarium Families
Beryciformes	0
Zeiformes	0
Lampridiformes	0
Gasterosteiformes	2
Channiformes	1
Synbranchiformes	1
Scorpaeniformes	0
Dactylopteriformes	1
Pegasiformes	0
Perciformes	16
Pleuronectiformes	1
Tetraodontiformes	1

TABLE II
FAMILIES OF THE SUBORDER ANABANTOIDEI

Anabantidae (ANA-BAN'-TEH-DEE)
Belontiidae (BEL-LON-TY'-EH-DEE)
Helostomatidae (HEL-LO-STOW-MAT'-TEH-DEE)
Osphronemidae (OS-FRO-NEE'-MEH-DEE)

TABLE III
AQUARIUM FAMILIES OF THE SUBORDER PERCOIDEI

	Typical Aquarium Genus
Centropomidae (SEN-TRO-POE'-MEH-DEE)	*Chanda*
Theraponidae (THER-AH-PON'-EH-DEE)	*Therapon*
Kuhliidae (KU-LYE'-EH-DEE)	*Nannoperca*
Centrarchidae (SEN-TRARK'-KEH-DEE)	*Elassoma*
Monodactylidae (MONO-DAK-TY'-LEH-DEE)	*Monodactylus*
Toxotidae (TOX-OTE'-TEH-DEE)	*Toxotes*
Scatophagidae (SCAT-TOE-FAY'-GEH-DEE)	*Scatophagus*
Nandidae (NAN'-DEH-DEE)	*Polycentrus*
Cichlidae (SICK'-LEH-DEE)	*Cichlasoma*

TABLE IV
COMPOSITION OF AQUARIUM SPECIES

A. By General Type		B. By Families	
Characin forms	18%	Cyprinidae	12%
Carp-like forms	15%	Characidae	11%
Catfishes	13%	Cyprinodontidae	11%
Killifishes	11%	Cichlidae	10%
Cichlids	10%	Poecilidae	5%
Livebearers	6%	Anabantidae	3%
Bubblenesters	3%	Callichthyidae	2%
		Loricariidae	2%
Total	76%	Total	56%

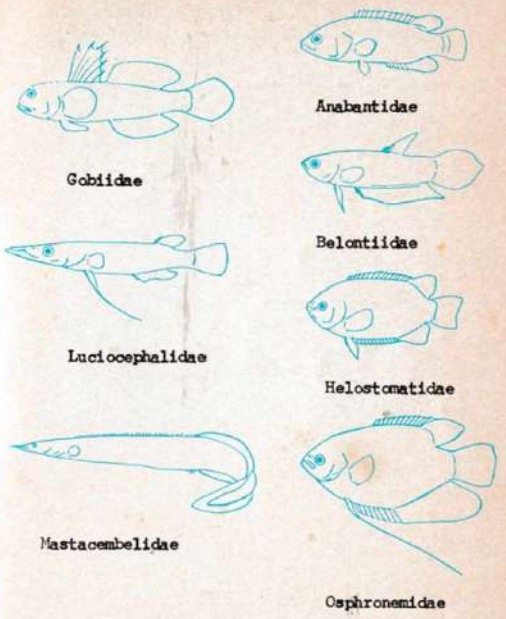


Figure 2: Miscellaneous Families of Perciformes. The Families in the right column belong to the Suborder Anabantoidei.

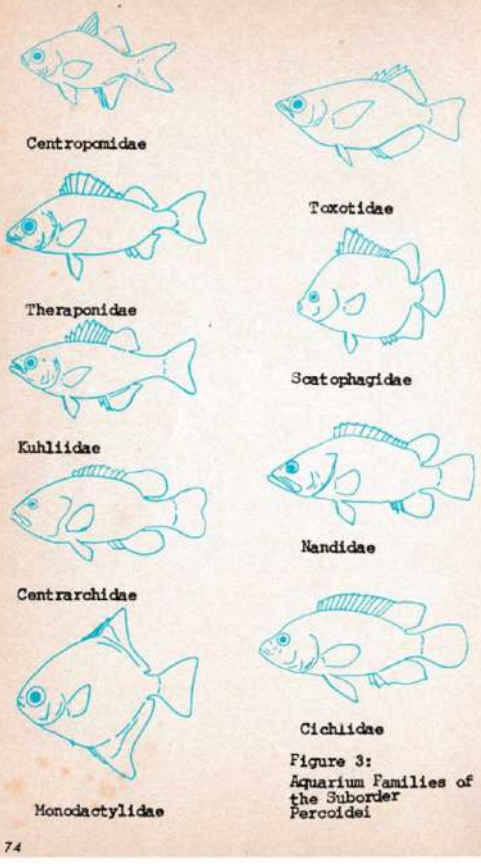


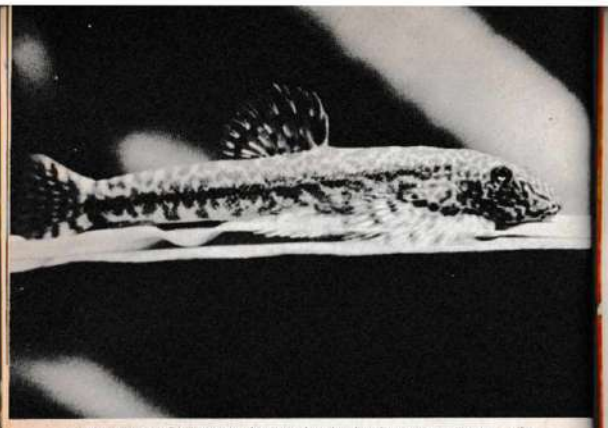
Figure 3: Aquarium Families of the Suborder Percoidei

TOMEY: continued from page 13

A view of ***Gastromyzon borneensis****, sticking to the cover glass of the aquarium. They do this to supplement their oxygen intake when the water is low in that gas, or when the water temperature is too high.*

fishes originate from a wide Asiatic area, even from countries bordering on south China.

Our photographs depict one such problem fish, *Gastromyzon borneensis*. This one, at least, has a name and a habitat. (EDITOR'S NOTE: In Inger and Kong's "The Fresh-Water Fishes Of North Borneo", the authors give the following description of a particular locality in which this species was found: "Shore vegetation primarily dipterocarp forest. A few dead branches but no living submerged or emergent vascular plants. Banks flat to steep, 0·3–1 meter high. Bottom sand and gravel in pool, with dead leaves; gravel and rock in riffle. Pool width 3 meters, maximum depth 88 cm, length 7 meters. Riffles downstream from pool, width 1·5 meters, maximum depth 30 cm, length 20 meters. Water clear, bottom visible. Current 60 meters/hour in pool, 480 meters/hour in riffles. Previous rainfall none for two days. Sky partly cloudy. Shade 25 per cent in pool, 95 per cent in riffle. Surface temperature 25°C, air



A side view of ***Gastromyzon borneensis,*** *showing its pretty patterns on fins and body.*

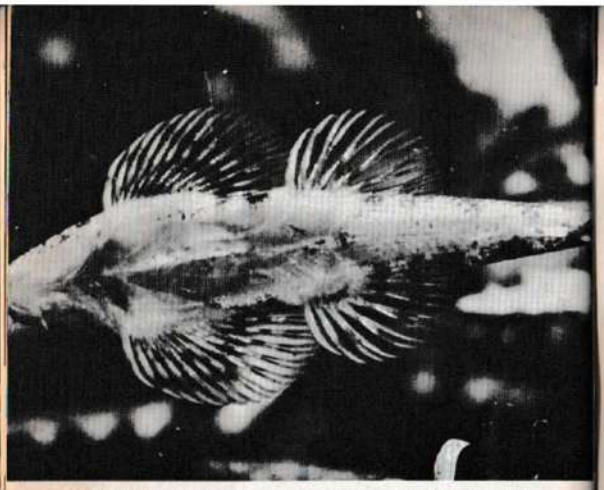
An under-view of ***Gastromyzon borneensis,*** *uncovering the sucker disc formed by the placement of both ventral and pectoral fins. Unlike most fishes, these fins are held in a more or less horizontal position.*

A member of a different genus, ***Hemimyzon meyersi,*** *resting on a leaf. These fishes are constantly on the move, looking for food.*

27°C at 8.00 a.m." Among the other fishes found in this habitat, Inger and Kong list several kinds of loaches, spiny eels, some barbs and a *Rasbora*.) It is a member of the Family Homalopteridae, Subfamily Gastromyzoninae. Its most important distinguishing feature (common to the other members of the Subfamily as well) is the presence of a sucker disc on the abdomen, its rim formed by the pectoral and ventral fins. These fins, incidentally, extend out from the body in a more or less horizontal posture. In the genus *Gastromyzon*, the sucker disc is most highly developed and the ventral fins are actually joined. This is not the case with another related genus, *Hemimyzon*.

All sorts of Homalopteridae inhabit the fast-flowing streams and lakes of Asia, fastening themselves with the aid of their sucker discs to stones, etc., so that they are not washed away by the torrents. By making small jumps, they travel from stone to stone, a behavior pattern which is not lost in the aquarium.

Unfortunately, these fishes are not easily acclimated to the aquarium and few last more than a year in captivity. One explanation may be that they do not adjust readily to the concentration of chemicals that



In this under-view of ***Hemimyzon meyersi,*** *note that the ventral and pectoral fins do not form the "tight" circle found in* ***Gastromyzon borneensis.*** *The sucker disc, however, is there just the same.*

naturally build up in an aquarium with time. Further, they are somewhat specialized in food intake. Although they are fond of grazing on the algae growing in wood or rocks (and the minute animal life found amongst it), they do not touch daphnia or any other food for that matter.

The Gastromyzoninae do not relish high temperatures, either. In their natural habitats, the temperatures do not exceed the 70's, and indeed, most likely they prefer temperatures in the vicinity of 68°F. When the oxygen content of the water is low, *Gastromyzon borneensis* leaves the water and may be found sticking to the coverglass of the aquarium, much like certain of the *Rivulus* species. In this way, they attempt to satisfy their urgent needs for oxygen.

If, at regular intervals, the aquarist replaces old rocks with new ones covered with algae, increased success will be had in keeping these fish. Certainly at present they are to be kept only by the more experienced hobbyist, not the beginner, but with time it is hoped that they will abandon the secrets that make them so difficult to keep at this time. Whoever thinks that there are no new "frontiers" for the aquarist to conquer, is very much mistaken! ●