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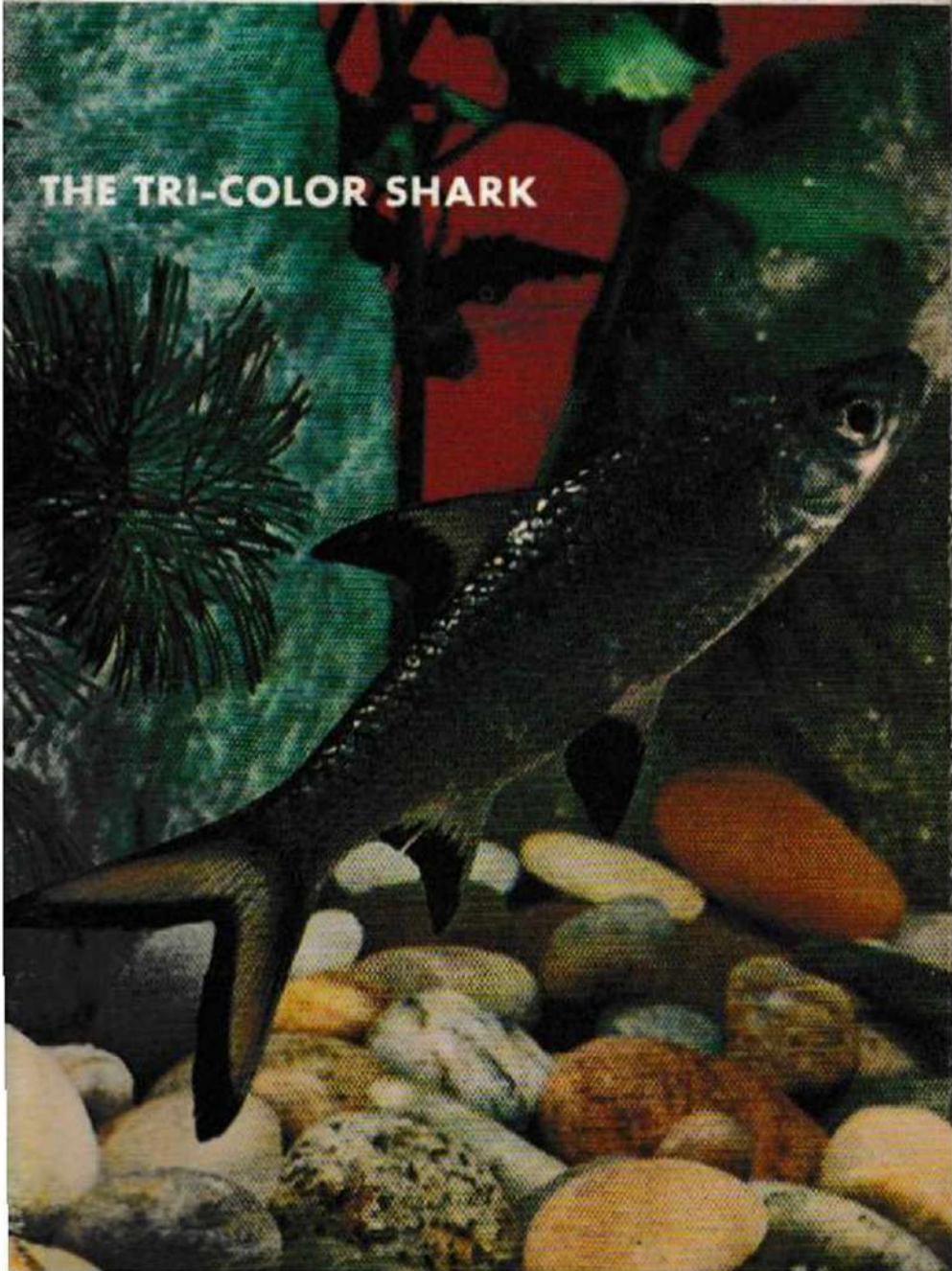
OCTOBER, 1968

VOL. 1 NO. 12

AQUARIUM

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THE TRI-COLOR SHARK





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Contents

THE TRI-COLOR OR BALA SHARK 5

ANABLEPS, THE FOUR-EYED FISH 7

HYDROCOTYLE LEUCOCEPHALA 9

A BOOKSHELF AQUARIUM 12

A NEW CLASSIFICATION OF FISHES 14

VIEWS AND REVIEWS 16

ADVERSARIA 20

SOCIETIES AT WORK 22

THIS IS MY PROBLEM 26

THE PERUVIAN LONGFIN 28

A HISTORY OF THE AQUARIUM HOBBY IN AMERICA 30

AGENIOUS MARMORATUS, THE SMILING ONE 32

PEOPLE WHO LIVE WITH GLASS HOUSES 34

THE AQUARIUM QUIZ 40

WHAT'S NEW 49

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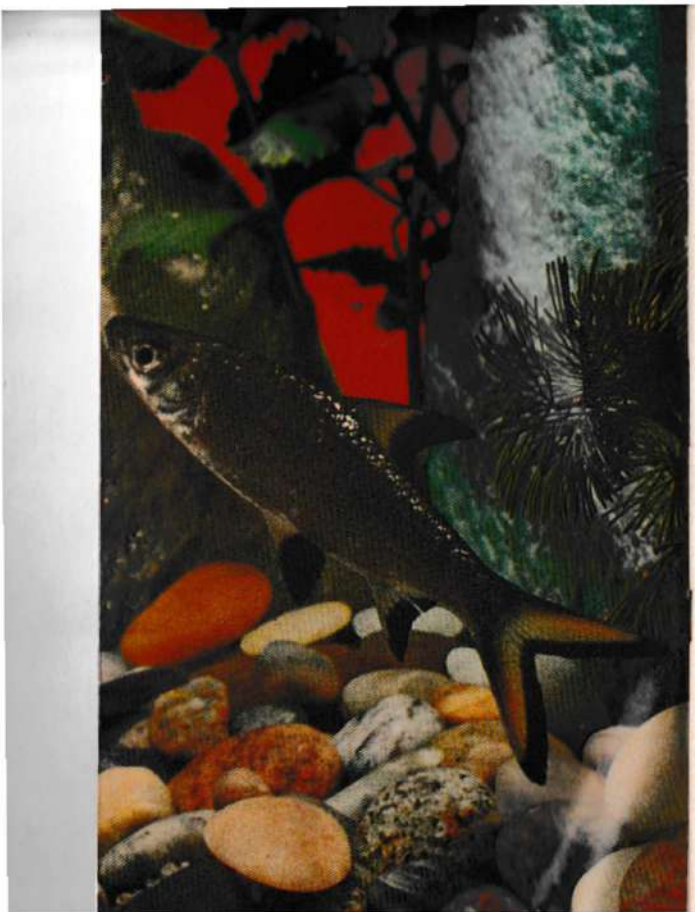
This stunning Tri-color "Shark" was captured by our photographer Andrey Roth using a modified Nikkormat camera with a Micro-Nikkor lens on high-speed Ektachrome film. (Additional credits appear on pg. 69)

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THE TRI-COLOR OR BALA "SHARK"

By BRAZ WALKER

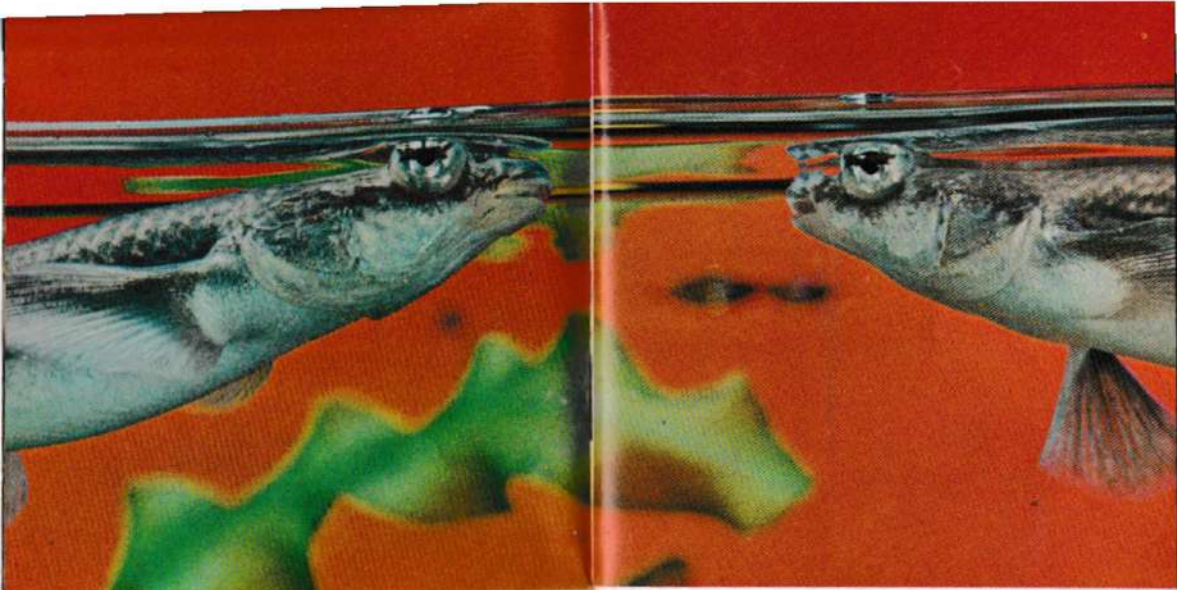
IN A WORLD WHERE OFTEN THE REPULSIVE becomes attractive through curiosity, the aquarium hobby has emburdened a number of decidedly innocent and un-terrible creatures with the name "shark," usually through some remote and un-related similarity of form, posture or movement. Typical of this rather promiscuous use of what otherwise might be a meaningful and descriptive nickname for certain fishes is the obviously un-sharklike and relatively mild-natured fish, *Balantiocheilus melanopterus* (Bleeker), the tri-color or bala "shark."

It is rather difficult to imagine under what circumstances the name "shark" became associated with this silvery, scaly cypriniform fish whose reddish or yellowish vertical fins are bordered in black, but somehow after living with the name and the fish for a while, a union occurs which would seem to

mesh correctly. If blame is to be placed on the importers whose job originally was to "push" a new and outstanding fish, some absolve-ment must be given for the fact that more of these relatively higher-than-ordinary priced beauties have reached the hobby as "bala sharks" and "tri-color sharks" than ever would have as "bala minnows" or "tri-color minnows."

The "burnt-tail fish" as it is known in parts of Thailand, is a streamlined, swift moving fish capable not only of speed which is comparable to that which might actually be induced by a smoking posterior, but also of prodigious leaps when frightened. For this reason, the aquarium should be covered completely. Hugh M. Smith reported that "a sheer jump of 2 meters was observed" in Thailand. Considering that in that area *B. melanopterus* ordinarily does not reach a length of more than 8 inches, this is quite a respectable hop.

continued on page 37



ANABLEPS, The FOUR-EYED FISH

by ALBERT J. KLEE

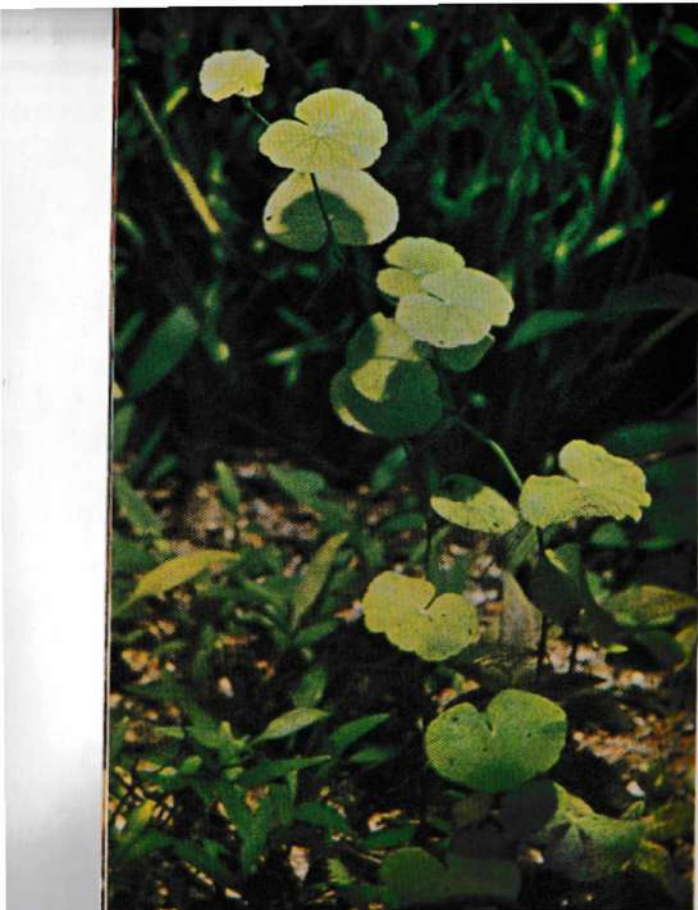
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Two *Anableps anableps* searching for food at the water's surface. These so-called "four-eyed" fish are among the strangest of all aquarium fishes, not only with regard to their vision but their reproduction as well.

IN 1608, ROBERT HARCOURT of Stanton Harcourt in the county of Oxford, England, set sail for the Canaries and the coast of Guinea. After a long voyage, they took possession of "a goodly country, and spacious Empire, on the north part bounded with the sea, and the great river of Orenoque... on the east and south parts with the famous river of Amazonas, and on the west part with the mountains of Peru".

continued on page 42

7



HYDROCOTYLE LEUCOCEPHALA

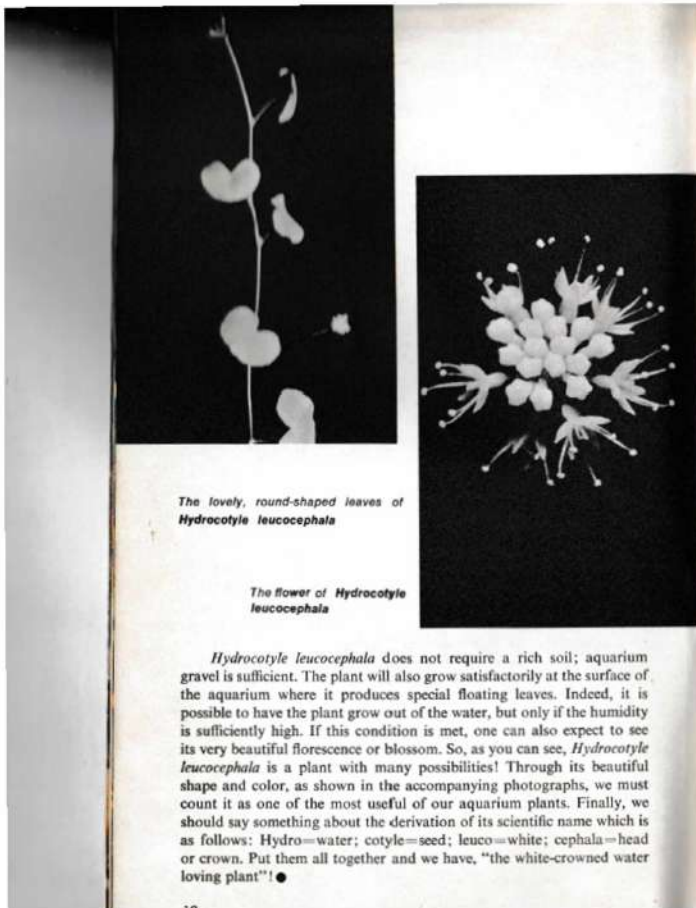
By WILLIAM A. TOMEY

AS THE QUANTITY OF INFORMATION regarding aquatic plants increases, the subject will become of more and more interest among true aquarium hobbyists. Indeed, an aquarium without plants is much like a living-room without furniture, disregarding even considerations of the very real biological value. Towards the end of 1964, a most useful aquarium plant was imported into Europe for the first time, under the popular name of "the long water nave" and the scientific one of *Hydrocotyle aquatica*. The plants were generally quite expensive, a consequence principally of the long air transport distances involved from their native habitat.

In the shape of its leaves the new plant resembled somewhat the small water nave, *Hydrocotyle vulgaris*, but in growth the resemblance was more to the Chinese ivy, *Cardamine lyrata*. After some research of the plant and its flowers at the University of Leiden, Holland, it was firmly established that its correct scientific name was *Hydrocotyle leucocephala*, a Brazilian plant found in creeks and rivers, as well as inundated areas, mostly in clear water.

The leaves of this plant are bright-green, somewhat round and finely ribbed, and up to 2 inches wide. In contrast to the smaller *Hydrocotyle vulgaris*, *H. leucocephala* forms leaves which fork off to either side of its stems. Growth, even during wintertime, continues normally if the plant receives satisfactory light and a temperature between 68 and 75° F. One characteristic of *Hydrocotyle leucocephala* is the presence of small white-colored bunches of roots coming from the internodia on the undersides of the leaves.

continued



The lovely, round-shaped leaves of *Hydrocotyle leucocephala*

The flower of *Hydrocotyle leucocephala*

Hydrocotyle leucocephala does not require a rich soil; aquarium gravel is sufficient. The plant will also grow satisfactorily at the surface of the aquarium where it produces special floating leaves. Indeed, it is possible to have the plant grow out of the water, but only if the humidity is sufficiently high. If this condition is met, one can also expect to see its very beautiful florescence or blossom. So, as you can see, *Hydrocotyle leucocephala* is a plant with many possibilities! Through its beautiful shape and color, as shown in the accompanying photographs, we must count it as one of the most useful of our aquarium plants. Finally, we should say something about the derivation of its scientific name which is as follows: Hydro=water; cotyle=seed; leuco=white; cephalo=head or crown. Put them all together and we have, "the white-crowned water loving plant"! ●

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A BOOKSHELF AQUARIUM

By HARRIET CONNELLY

ALTHOUGH MY FASCINATION WITH FISH is great, my ardor for a labyrinth of wires and airline tubing is strictly lukewarm. Being in need of additional bookshelves, I decided to solve both problems simultaneously by combining an aquarium with a piece of functional furniture. A Chippendale I am not, so the construction to be described was accomplished with the use of hand tools plus an electric drill, the millwork (cutting) being done for me by the lumber yard from which the wood was purchased. All of the joints were of the simplest possible type, i.e., "butt joints". Screws (1 1/2 inch) were used throughout, their heads countersunk and filled with plastic wood. After sanding, such a construction is ready for painting. Believe me, the liberal use of plastic wood, sandpaper and paint hides a great many of the amateur's mistakes. Indeed, the results look quite professional!

The primary wood used was 1" x 12" hemlock (a clear pine is also excellent). Step one (see Figure 1) consisted of fastening together a box, 6 1/2" x 30". Step two added five more pieces of wood (see Figure 2). Four of these were 30-inch horizontal shelves, situated at 12, 24 and 36 inches from the bottom, and 12 inches from the top. A 12" x 12" divider piece was placed in the middle between the second (counting from the top) and third shelves as shown in Figure 2.

The construction between shelves one and two was a bit more complicated. The tank (I used a 12-gallon aquarium) was to sit on shelf two, to be serviced from the top. To this end, a "false" shelf was constructed between shelves one and two, located 12 inches below shelf one. This provided about 18 inches of space between shelf two and the false shelf above (see Figure 3).

First, a front (30" x 18") which ultimately was to frame the tank, was cut from 1/2 inch plywood and fastened in place as shown in Figure 3. Next, a divider piece was cut so that it projected 3 inches below the top of the front piece (this is clearly shown in both Figure 3 and Figure 4). The divider piece was screwed to shelf one, and one screw entered it at the bottom through the front piece. This last screw, however, was not sufficient to hold the divider piece steady at the bottom, so a piece of 1" x 2" pine connected the divider to the side of the construction (the left side) at the back. The details are shown in Figure 4 which shows views from the back of the construction. An identical 1" x 2" piece was screwed to the front piece, 1 inch below its top. These two 1" x 2" pieces formed a sort of railing with which to support a removable 12" x 15" shelf. Next,

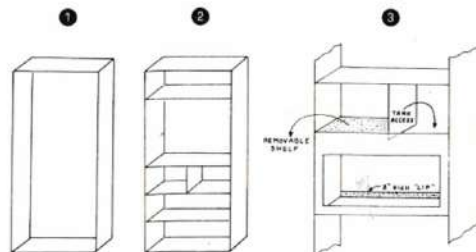
a 30 inch long 1" x 2" "lip" was screwed to the bottom of shelf two (see Figure 3) and to the side pieces.

The final step before finishing was to cut two 12" x 15" doors from 3/4 inch plywood, and to fasten them with decorator hinges as shown in Figure 5. Screwheads, gouges, etc., were filled with plastic wood and the construction was sanded. The doors were painted a copper color; the remainder of the construction was finished in flat black. This, however, is a matter of individual taste. To form a water-tight compartment, 2 inches high, shelf two and the surrounding wood to a height of 2 inches was painted with an epoxy paint. When this dried, Silastic was used on all joints as if glazing an aquarium. Although I used the reflector that came with the tank, an ordinary fluorescent fixture could be fastened to the front piece that frames the tank.

The 12-gallon aquarium was placed on shelf two, right against the frame. Although the water-tight compartment would be useless in case of a massive release (such as would happen if a glass side were to break) of water, it is very effective against a slow leak. This was important to me as books are stored below and can easily be damaged by water if precautions are not taken.

Day-to-day access to the aquarium is via the upper door. There is more than enough "headroom" here for feeding, cleaning filters, adjusting thermostats, etc. On those rare occasions when it becomes

continued on page 70



1. Step one: A simple box is constructed.

2. Step two: Four shelves and a divider piece are now added.

3. Detail of the tank compartment, showing tank access, the false shelf and the lip that forms the water-tight tank compartment.

A NEW CLASSIFICATION OF FISHES, PART I

by ALBERT J. KLEE

UNTIL RECENTLY, THE MOST WIDELY ACCEPTED classification of fishes was that of Berg, published first in 1940. Berg's classification closely followed that of Regan (1929) which, in turn, reflected the basic ideas of Gill (1872 and 1893). Thus, when one really gets down to it, we are talking about a classification system whose roots go back 70 to 90 years. In 1966, a new classification of living fishes, incorporating the most modern concepts available, was published as a joint effort of four very distinguished ichthyologists: Dr. P. Humphry Greenwood of the British Museum of Natural History, Dr. Donn E. Rosen of the American Museum of Natural History, Dr. Stanley H. Weitzman of the Smithsonian Institution, and Dr. George S. Myers of Stanford University. Their "paper", an imposing volume of some 455 pages, appeared under the name, "Phyletic Studies of Teleostean Fishes, With A Provisional Classification of Living Forms" (Bulletin of the American Museum of Natural History, Vol. 131: Article 4, 1966). (By "teleostean" is meant the more advanced types of bony fishes, i.e. no sharks, skates or rays. This would include practically all aquarium fishes with the exception of some very primitive types such as gars, lungfishes, and the Polypteridae of Africa.) We have taken the lead and adopted the Greenwood *et al.* classification as the standard for the magazine. It is time, therefore, for aquarists to familiarize themselves with this very important development.

Unfortunately, classification is not a very easy subject for the average hobbyist. Most of the scientific terms used are real "jawbreakers", and unless a classification relates to the aquarist and the hobby directly, it quickly becomes boring. We propose, therefore, to examine this new classification in a step-by-step fashion, ignoring those parts which have little relevance to the hobby, and emphasizing those that do. For the most part, however, the classification will be examined solely from the freshwater hobbyist's point of view in order to keep the numbers of families involved to a minimum. We intend, at a later date, to devote a special series to the problems of salt water fish nomenclature, classification and identification.

Table I summarizes the Divisions and Superorders of living fishes. In order to provide some indication of both scope and relevance, the number of Orders within each Superorder, the number of Families within each Order, and the numbers of Families that could be considered as "aquarium Families" (i.e. those that contain either a reasonably significant number of aquarium species, species of special interest, or species of considerable aquarium importance) are indicated also. In general,

"game fishes" will not be included except insofar as some may be kept as aquarium specimens. Because this definition is somewhat flexible, the number of such Families given is only an approximate figure in most cases. In any event, it is clear from Table I that aquarists are concerned primarily with Divisions II and III, and the four Superorders asterisked.

Division I contains principally marine fishes, especially those of eel-like form. They do not, therefore, offer much in the way of interest to the majority of aquarists. Division II is another matter, however. This is a somewhat primitive group of fishes of distinct interest to the aquarium hobby. Because of this, the Division is summarized completely in Table II (including the pronunciation of all Family names), and each of its Families is sketched in Figure 1. The aquarium fishes of Division II (which are contained within the Families asterisked in Table II) are specialist's species, found mostly in the tanks of only the most advanced aquarists. Thus, in the Osteoglossidae, we find the aruana; in the Notopteridae, the African knifefishes; and in the Mormyridae, the elephant fishes. It is obvious that the bulk of our aquarium fishes reside in Division III, and this rather extensive assemblage of fishes will be discussed in detail in subsequent installments of this series.

To be continued.

TABLE I
DIVISIONS AND SUPERORDERS OF LIVING FISHES

	Orders	Families	Aquarium Families
Division I			
Elopomorpha	3	22	0
Clupeomorpha	1	4	0
Division II			
*Osteoglossomorpha	2	6	4
Division III			
Protacanthopterygii	4	51	2
*Ostariophya	2	57	37
Paracanthopterygii	5	30	0
*Alberinomorpha	1	16	10
*Acanthopterygii	12	216	22
Totals	30	412	75

TABLE II
DIVISION II ORDERS, SUPERORDERS AND FAMILIES

Superorder Osteoglossomorpha
Order Osteoglossiformes
Suborder Osteoglossoidae
*Osteoglossidae (OS-TEE-oh-GLOSS-EH-DEE)
*Pantodontidae (PAN-TOE-DON-TEH-DEE)
Suborder Notopteroidae
Hiodontidae (HY-oh-DON-TEH-DEE)
*Notopteridae (NO-TOE-TER-EH-DEE)
Order Mormyridae
*Mormyridae (MOR-MY-REH-DEE)
Gymnarchidae (GYM-NARK-EH-DEE)

Figure 1. continued on page 62

Views and Reviews

PARASITES OF NORTH AMERICAN FRESHWATER FISHES by Glenn L. Hoffman, University of California Press, Berkeley and Los Angeles, 1967, 486 pages, \$15.00 cloth-bound.

Everything Glenn Hoffman does, he does incomparably. A parasitologist at the Eastern Fish Diseases Laboratory at Kearneysville, West Virginia, Hoffman has an enormous number of publications on the identification, treatment, etc. of fish parasites. This book is the logical outcome of his personal research and literature collection. This is the first book of its kind for persons interested in this huge subject, and is not likely to be displaced by anything other than future, updated editions.

There are chapters on Public Health, Methodology, Algae and Fungi, Protozoa, Flatworms, Roundworms, Thorny-headed Worms, Leeches, Copepods, and Miscellaneous Parasites. A checklist in the back lists the various parasites reported from each species of fish in North America. There are 61 pages of references to the

pertinent literature, and some are as recent as 1966.

Generally, the chapters begin with a taxonomic review of the parasitic group with a number of technical terms defined. Then, the parasites are listed followed by a taxonomic scheme (not always widely accepted, but useful), and for each entry the host(s) and reference(s) are cited. In a few cases, the reference has been omitted from the bibliography in the back, e.g., Lumsden (1961) on p. 186. In a few cases the author's name is misspelled, e.g., Dollfus (p. 59) and Horsefall (p. 75).

There are a number of other errors, doubtlessly typographical e.g., the turtle *Chrysemys* is misspelled (p. 134); synonymy (p. 187); McLeod is spelled phonetically (p. 226); and there is a run-on sentence on p. 156.

There is a little bit of careless layout work. The table on pages 161 and 162 could have been reset to fall on a single page. Furthermore, a number of the legends refer to figures on subsequent plates, indicating an unwillingness on the

part of the publishers to reset legends. This ought to be corrected in later editions.

Although the nomenclature and spelling of host names in the table at the end is satisfactory, these names were not updated in the text entries under each group of parasites. Thus *Amblystoma* (p. 134) should be *Ambystoma*; *Lebistes* (p. 183) should be *Poecilia*; *Hyborhynchus* (misspelled *Hyborchus*) on p. 201 should be *Pimephales*; *Platycoecilius* (p. 178) should be *Xiphophorus*; *Gasterosteus bispinosus* (p. 230) should be *G. wheatlandi*; *Fundulus diaphanus* (p. 150) should be *F. diaphanus*. In some cases the parasite-host list is incomplete, e.g., there is no entry for *Trypanorhynchus* sp. (p. 365) or *Fundulus* sp.

There are a couple of misleading assertions. A parasite of a guppy is reported on p. 91, and the guppy is assumed to come from Trinidad. I doubt that guppies have been imported from Trinidad for quite some time. On p. 204 the tapeworm *Pellethobothrium* is indicated as synonymous with *Phyllobothrium*.

There is some misleading word usage, e.g., *medulla* (p. 225 and 227) should read *medullary parenchyma*. And, there is some lack of consistency in technical terms, e.g., inflated-expanded-dilated (p. 139, 140); and crura-cca-rami under the Monogenea. On page 198, the word *medium* is used; it should be *median*. In the discussion of the Digenea, the few reports of larval stages from polychaete worms has been ignored. Non-parasitologists will not immediately realize that Sogandares is the same person as Sogandares-Bernal. A reference by Yeatman is incomplete; it should be *J. Amer. Killifish Assoc.* 3 (1):

8-11. On page 226 Bangham's name is inadvertently italicized, as though he were a species rather than a parasitologist. I will make no attempt to list all the typographical errors I found, as these are few in consideration of (1) the size of this work and (2) the fact that this is a first edition. Proportionally, they are not that many.

There are 252 figures, mostly redrawn from the literature, and done very well indeed. Representatives of most of the genera discussed are illustrated, and this will certainly quicken identifications. The keys to the taxa are generally excellent for diagnostic purposes and emphasize Hoffman's remarkable ability to organize a heterogeneous literature.

For whom is this book written? Primarily, the book is a milestone for American parasitologists (the Russians will find it quite useful too). Every hatchery should have one, as well as a man equipped to use it. The knowledgeable aquarist with some training in zoology can get a great deal out of the book, but the average aquarist is something less than this. It does not belong on the shelf of the collector of literature if his scholarship goes no further than collecting. Serious aquarists can make very strong use of the book if some background material is used, and for this I recommend Van Duijn. It is unfortunate that more background material is not included in this remarkable tome, for then the few extra pages would greatly increase the book's public. Perhaps future editions will do this.

The organization, the comprehensive treatment, the exhaustive bibliography, the parasite list by host — all these combine to hail Hoffman's contribution to the or-

ganization of the vast literature that comprises our knowledge of parasites of North American freshwater fishes. That the parasites in many cases have exotic counterparts is self-evident, and this is of immediate concern to aquarists whose interest is in imported material. No less important is the fact that exotics grown in American hatcheries frequently pick up native parasites. The importance of this book to serious aquarists is thus doubly underlined. Aquarists are fortunate that such a book is now available, especially at such a reasonable price; it is now up to them to educate themselves to its use, and thereby improve the general aquarium literature by recourse to facts and an abandonment of the fancy that has so far plagued the aquarium parasite literature in this country. *Robert J. Goldstein, Ph.D., Biology Department, Emory University, Atlanta, Georgia.*

The following is a guest contribution to *VIEWS & REVIEWS*, written by the Rev. Herbert L. Weaver, Jr., Pastor of the Washington Square Methodist Church of Hagerstown, Maryland. Rev. Weaver has been involved with aquarium fishes since the depression, and is presently engaged in raising show quality veiltail goldfish.

"I have been studying some time with interest a trend that is increasing in aquarium fish breeding. It is a trend that has no foreseeable ending. I am referring to the trend of breeding fish in order to 'improve' the species. You will note that I have placed the word 'improve' in quotation marks. This is done because I wonder if all of the changes that are now taking place are necessarily improvements. In some in-

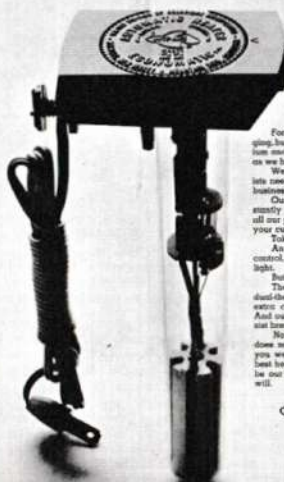
stances they are, but in others the element of doubt comes into play. As far as have been reported in the hobby magazines, the basic criteria used has been: 'Does it please the eye and the pride of the beholder?'. That is, the breeder is concerned with developing a strain that meets his standards of either the beautiful or the bizarre. Thus, the stress has been on either the colors of the fish or the size and shape of the fins. There have appeared on the market platies, swordtails, mollies and guppies with fantastically large and shaped fins. There are goldfish with caudal fins so enlarged that the fish has difficulty in swimming. Along with all of this most of the colors of the spectrum abound in both goldfish and tropicals.

"Now I am not claiming that it is wrong to attempt to achieve variations in color and size, for without such attempts we would be missing many of the beauties we now possess. However, I do question if they are the best standards to use. I believe that every attempt to breed a new variety of fish should revolve about two, not one, criteria. It is about this that I am writing.

"The first standard that I would propose is: Does the resulting fish please the eye of the beholder? Even though this may appear to be in contradiction of what I have just said, it must come first. After all, isn't that one of the principal reasons that we have for selecting any fish? If I am partial to black fish, I am not likely to set up a tank of red ones! I will concentrate on black ones. If I like long slim fish, I will probably steer clear of the typical cichlid. If I like broad deep-bodied fish, I am

continued on page 61

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adversaria

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"When a thing ceases to be a subject of controversy, it ceases to be a subject of interest". William Hazlitt.



To the Editor:

Although mistakes are rather common in the aquarium hobby as far as identification of "new" fishes is concerned, seldom does a fish have the distinction of being complimented with two successive misnomers which lack even the correct generic name. Unfortunately this seems to have happened to a very outstanding catfish which appeared on the aquarium scene several years ago.



Pimelodus pictus

The March 1965 issue of *TROPICAL FISH HOBBYIST* Magazine pictured and spoke of "a magnificent catfish we call *Pimelodella angelicus*" and explained that this was not a correct scientific name but merely a nickname. Subsequent trade use of the name for this rather popular new fish aided in establishment of the name and it stuck rather firmly.

In the "tear out" section of a recent issue of the same magazine in which the desirable idea of updating their large looseleaf volume is undertaken, the fish receives the somewhat confusing name "*Pimelodella pictus* (Mueller & Troschel)".

First of all, even in the excellent TFH photograph the fish does not

"look" like a *Pimelodella* species. The steep profile, location of the mouth, thick barbels and triangular shape of the adipose fin seem more to suggest a *Pimelodus*.

Descriptions of new species are usually honored as far as possible even when the fish is placed in the wrong genus by having at least the last or specific name retained, which in this case is "*pictus*". Ordinarily this would be changed only if the name was already occupied in the correct genus.

Mueller & Troschel in 1848 described "*Bagrus (Sciades) pictus*", a large pimelodid catfish which has a superficial resemblance to *Pimelodella*. This fish has very long

continued on page 63

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Societies at Work

By
HELEN SIMKATIS

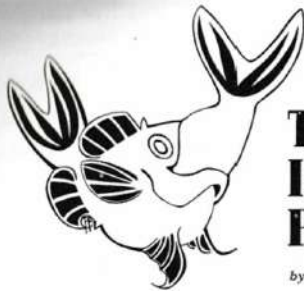
IN AN EFFORT TO INTRODUCE the *American Killifish Association* to newcomers to the hobby, a short piece on the association has appeared in several aquarium association bulletins. The first paragraph of the article will excite the interest of many hobbyists who up to now have considered the killifish fancy a little too far out for them. It reads as follows: "Did you ever stop to think of what it would be like to answer the postman's ring and receive a small package containing a little bit of primitive Africa, mysterious India, or the untamed jungles of South America? Well, it happens to killifish fanciers many times a year! But perhaps the very word "killifish" is a bit strange to you and you may well ask, "Just what is a killifish?" The article goes on to explain the attributes of the colorful little annuals that have attracted the interest of many aquarists and persuaded them to keep many records and numerous little plastic boxes labeled with dates and other pertinent data, and to become pen pals with other fishkeepers so inclined in all parts of the world. Certainly anyone interested in killifishes will do well to join this association that has developed many ways for its members to exchange eggs and information and has by-passed the somewhat formidable disadvantage peculiar to the species encompassed by the fancy that they are seldom found in aquarium shops. Information regarding membership in the society, the publications to which members are entitled, etc. may be had by writing Robert F. Yacano, Membership Chairman, 2778 Oakland Drive Eden, New York 14057.

22

Herb Meyer, in the June issue of *The Tropical Breeze*, published by The San Diego Tropical Fish Society, asks *Killies in Your Community Tank — Why Not?* He admits that those primarily interested in breeding killies should adhere to the theory that killies should be given tanks to themselves. On the other hand, he points out that those merely interested in beautiful species are missing out by not including a few members of the killie group in their community tanks. He goes over the five points that have been generally espoused as good reasons for excluding killifish from aquarium communities, and does a fairly convincing job of exploding them. He then discusses the community tank most reasonably and points out that fishes selected for this type of living should be carefully considered. His observations here are most cogent and we wish that community tanks as a whole represented a carefully planned association of fishes chosen with temperament, size, and characteristics in mind. More often than not, they represent mainly what happened to appeal to their owners at various moments spent in a dealer's shop. His ideal community of an aquarium set up to include killies is as follows: a 10-gallon tank containing 4 silver hatchets, 3 cherry barbs, and one pair each of *Nothobranchius palmquistii* and *Aphyosomion burundii*. (This last species may be referred to as *vestillifer* if you have an old book.) An all-killifish community tank is possible, too, he tells us, and offers a few ground rules. Two males of different species but somewhat similar in appearance should not be selected for your killifish community tank. Each male should have at least two females of his own kind. Fish with diverse breeding habits should be chosen. Otherwise the fry are apt to be undesirable hybrids. He gives as an example a trio of firemouth killies, *Aphyosomion australe*, *Nothobranchius palmquistii*, and *Cynolebias whitei*. Breeding procedures for these species are varied with the exception of the firemouth killies and *A. australe*, but these fishes are so different that it is unlikely that close association would induce hybridization. This is a thoughtfully written article and although we have covered some of the highlights here, it should be read in its entirety by those who would like to set up a community tank including killifishes. In this same issue George Pinter gives close consideration to nets, including size, care, selection, sterilization, and use. We didn't realize so much could be said about this important aquarium tool, but both the novice and the experienced hobbyist will find some pointers here. *The Tropical Breeze* is a thoughtfully produced publication, always containing a surprise or two, plus Guy Jordan's provocative *Scanning The Periodicals*, a review column that is never dull. Write to the San

continued on page 55

23



THIS IS MY PROBLEM

by HELEN SIMKATIS

From: Charles G. Janz,
St. Petersburg, Florida.

I have a serious problem about which I hope you may be able to advise me. In my 10-gallon guppy tank, populated with about 35-40 guppies and one small skunk catfish, every morning upon examination of the tank I find from 1 to 3 dead fish. There is no evidence of any disease on the bodies of the dead fish or the remaining live fish. I have tried the salt remedy, etc., and, as a last resort, stripped the tank down. In less than 2 weeks, my problem had started all over again. I feed my fish two different brands of dried food. I do not have trouble with my other species of fish.

Answer: At first blush, we would guess your problem is due to overcrowding. In that the deaths occur during the night, they may be caused by carbon dioxide poisoning. This is an educated guess; however, it certainly would be advisable for you to reduce the population of this 10-gallon tank by one-half. It is true that many dealers and hobbyists keep as many as 40 guppies in a 10-gallon tank but if the water in your tank is in the high 70's or low 80's, and it contains plants that are not growing vigorously, the oxygen content may be especially low at night. This is an

invitation for bacteria that convert nitrates to nitrites. Your feeding procedure, incidentally, preferably should include some live food such as brine shrimp.

From: Mrs. Joseph W. Powell, Jr.,
Chestnut Hill, Massachusetts

Our favorite fish are a pair of kissing gouramis, whom we love watching. You say in your book that the purpose of their kissing is not known. We have noticed consistently that they kiss feverently after eating and we wonder whether they don't help each other get the food down by blowing or sucking. We have also noted that if one can't find the other, while and after eating, it sucks on a rock—so, they must need some help in getting food down. Also, these two are indeed industrious eaters of algae.

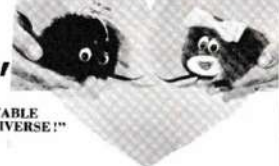
Answer: Students of fish behavior (which you apparently have become) have many theories on why kissing gouramis kiss. Some believe it is an expression of aggression. Hobbyists who have bred the species claim the activity is practiced just before spawning more frequently than it is at other times. This would again indicate that it is a method of expressing frustration. Your observation is just as interesting a speculation as any. But for the present, we must content

continued on page 67

26

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27

THE PERUVIAN LONGFIN

by ROBERT J. GOLDSTEIN, Ph.D.

ONE OF THE MOST FASCINATING GROUPS of all aquarium fishes is native to South America. This group consists of the annual mud-breeding killifishes, family Cyprinodontidae. The distribution of the annual cyprinodonts from this area is primarily in three genera, *Cynolebias*, *Austrofundulus*, and *Pterolebias*. There are other genera, but they are neither large nor well-known to aquarists. These South American annuals are native to areas which are characterized by alternating wet and dry seasons, where, during the wet season, there are extensive areas of land inundated, so that temporary pools are a seasonal occurrence. Many of these regions are much cooler than one would expect for so-called "tropical" fishes, and indeed recent investigations have been concerned with the feasibility of growing the Argentine pearl fish, *Cynolebias bellottii*, in California as an aid to mosquito control. Typically, these annual fishes are not found in lakes and rivers, but in the small, temporary pools, some as small as this page. Sometimes they are found with non-annual fishes which have been swept into these pools during periods of flooding and which, thus separated from their permanent waters, are doomed to an early trip to that great drum bowl in the sky. But our annuals couldn't care less. Life is short, but full.

The annuals are rapid growers and voracious carnivores. Because they can live where other fishes cannot, they are an important natural control on mosquitoes in South America (and hopefully will be here also). Like other killifishes, they are enthusiastic spawners, producing a number of eggs every day and requiring no "conditioning." These mud-breeders go through a brief act of display which usually consists of gill-spreading and fin-spreading by the male, with or without lateral weaving, and acceptance by the female (which may vary from just hanging around to nibbling on the bottom of the pool). Then they are at it. For some excellent photographs of the spawning act, see *THE AQUARIUM*, June, 1956, p. 190-191. It superficially may be compared to spawning in other killifishes, except that where most killies go horizontally into plants or mops, these fishes dive obliquely into the mud at the bottom of the pool (or aquarium). The pair dive into the mud and, with some quivering and a sudden jerk, a single egg is deposited and fertilized. In the pools, these eggs may be deposited at varying depths, whereas in aquaria this is pretty much up to the aquarist, as to how much substrate he puts into his tank. Nevertheless, these fishes require considerable depth and in aquaria will pile up the substrate into a sizeable mound. Aquarists, incidentally, don't

continued on page 74

28

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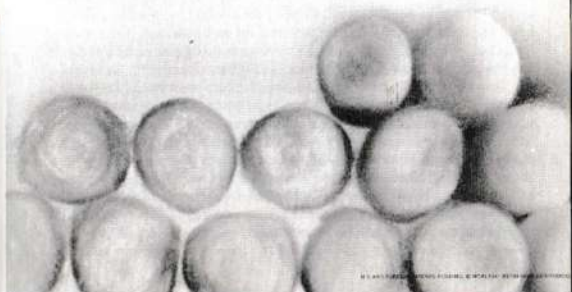
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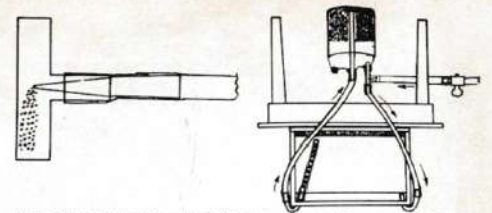
A HISTORY OF THE AQUARIUM HOBBY IN AMERICA PART II

BY ALBERT J. KLEE

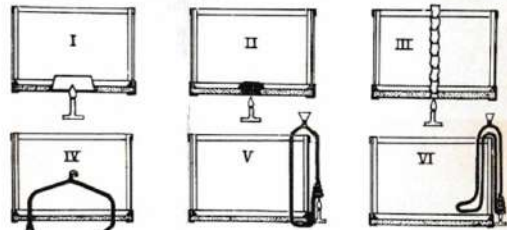
ALTHOUGH AMERICA HAD 8 aquarium societies in 1912, Europe was deeply invested in them. The tiny country of Switzerland had 7, only one less than the United States. Holland had 5, Russia 3, and Belgium, Denmark, Hungary and Sweden had one apiece. But Austria had 22, and Germany 127! This is reflected in the fact that most of our aquarium fishes in 1912 came to us from Germany.

The year 1912 saw several "odds-and-ends" of aquarium equipment developed, including the breeding trap for livebearer fry, and the razor blade-type aquarium glass scraper. The water-driven air pump, costing \$17.50 (or about 850 in terms of today's currency!) and described in our last issue, was available but due to its expense was not widely used. Electric motor-driven air pumps were too expensive and large for use in other than professional hatcheries or in the very largest of amateur fish houses. One simple expedient was to solder an air valve to a 5-gallon oil can, and fill it with air from a bicycle pump. For one aquarium, this air would last half a day. Some aquarists used fancier hydraulic pumps such as were found in saloons for the aeration of beer, but the "bottle system" was most popular of all. In brief, the system employed two glass bottles (usually 5-gallon water bottles), one set on a high shelf (the higher the better), the other on the floor. The bottles were connected by a Rube Goldberg network, air-tight, or glass or lead tubing. By running the water from the upper bottle into the lower one, the air would be driven from the latter into the aquarium. When the upper bottle was empty, the bottles would be exchanged. As airstones, thin discs of boxwood were sometimes used but these soon would rot or fill up. Pumice or sand stone was the preferred material, not unlike the airstones of today.

Although filtration was practically unheard of in 1912, the Treasurer of the Chicago Fish Fanciers' Club, Carl Fossetta, devised the first outside filter, with airlift, known to the American hobby. His equipment is shown in the accompanying sketch. Water was drawn through a perforated glass tube, down a rubber hose to a triple-necked Wolff bottle.



Above: The outside filter, with airlift, devised by Carl Fossetta in 1912. This was the forerunner of the outside filter as we know it today. Right: Detail of the airlift.



Heating schemes of 1913. No. I utilized an inverted pan, set into the bottom of the tank. In No. II, a lead plug was used. The drain pipe (overflow) in No. III was removed, replaced with a nickel-plated brass pipe (constructed in sections to improve heat transfer). Heat was then applied at the opening in the bottom of the tank. Nos. IV, V and VI are examples of water circulating systems (the heat sources were miniature bunsen burners; the tunnels shown were incorporated to reduce the pressure formed).

The Wolff bottle (used by chemists) contained gravel, the filtering medium. The filtered water passed out through an air lift (a detailed sketch of which is shown), up through a rubber hose and back to the tank. (The third neck of the Wolff bottle was used for back-washing the gravel.) In principle, this is identical to the outside filter-air lift systems used today!

Aquarium heating was even more difficult a proposition. This fell into two categories: direct heating and water circulating systems. Direct heating methods commonly consisted of applying heat to an inverted pan in the center of the aquarium, or to a tin or lead block (see sketch). These devices were sealed with aquarium cement, the heat source generally

continued on page 80

30

31

AGENIOUS MARMORATUS, THE SMILING ONE

by BRAZ WALKER

SOUTH AMERICA'S JUNGLE river systems have what is perhaps the most diversified catfish population on the face of our planet. This is appropriate, since most ichthyologists agree that this was the ancestral home of the Silurian forebears from which came the name of the entire order of catfishes, the Siluriformes.

The South American catfish population includes not only tiny aquarium favorites like the various *Corydoras* species, vegetarian sucker-mouths like *Hypostomus* and oddities such as the parasitic Trichomycteridae, but also ruthless, predatory hunters whose gaping jaws can engulf fishes half their size. Most familiar of these aquarium bigmouths belong to the family Pimelodidae which seems to have more than its share, including the shovelnose catfish *Sorubim lima*, the tiger catfish *Pseudoplatystoma fasciatum* and the handsome redbellied catfish, *Phractocephalus hemiliopterus*. Another rather closely related catfish family, the Aogeneiosidae, also has its share of flatheaded swallows.

The Aogeneiosidae are a family of South American catfishes with flat heads and amazing oral capacities. There are apparent similarities to the "shovelnose" catfishes and also a certain likeness to the auchenipterids such as *Trachycorystes*. At the risk of characterizing a lower member of the Animal Kingdom with humanistic traits of which such creatures are incapable, after living with *Ageniosus* for some length of time I seem to detect a mysticism behind his smiling countenance which if less beautiful than Mona Lisa is hardly less intriguing. In spite of the appearance of knowing some delicious fact of which the rest of us are not aware, the "smile" is in fact a secondary result of the deadly purpose for which the entire semicircular and exceptionally broad snout was designed. The entire breadth of the fish's head, which is the widest point on the body, is transversely by a mouth capable of gaping so rapidly into a yawning maw that a vacuum is created which draws a nearby victim inside to his doom.

A. marmoratus or the "smiling catfish" is among the most nocturnal of the catfishes within my experience. The tremendous width of the mouth indicates an appetite to match, but when light is present food can fall directly on his head and remain there until another fish consumes it or a slight change of position causes it to fall off. If rocks, roots, or other

continued on page 73



Ageniosus marmoratus, showing its marbled appearance, forward-placed dorsal fin, and powerful tail.

This overview of the "smiling catfish" shows the mouth that dominates the fish. Note also the butterfly-like appearance of the extended pectoral and ventral fins.



32

33

PEOPLE WHO LIVE WITH GLASS HOUSES

by DIANE SCHOFIELD

"IMITATION IS THE SINCEREST FORM OF FLATTERY," to use an expression which I just coined. The word "Disneyland," ranks right along other words, like Coca-cola and Kleenex, which need no translating, no matter in what part of the world you find yourself. But what if you want to open a "Disneyland" and your name isn't Disney? This admittedly presents problems, but one way to solve it is to substitute your own name. In the case of such an instance just outside of Bangkok, Thailand, you come up with "Timland!"

"Timland" bears only a scant similarity to Disneyland. Whereas in Disneyland you may ride on a Jump Elephant Ride, here in Timland you ride on an elephant which is powered by hay instead of electricity. In short, Mr. Tim has gathered together all of the things which he feels are typical of Thailand: the Thai boxing in which the participants in time to music do a ballet type of dance involving everything but sinking one's teeth into one's opponent; the vicious teeth-gnashing, blade-swishing Thai word play; the weaving of the butterfly wing colors of Thai silk; and the planting and caring for what is considered to be the best rice in the world, Thai rice. There are also two areas which are devoted to one of the most burgeoning industries in Thailand: the export of tropical fish and the old practice of the sport of fighting fish. One of the buildings in Timland contains a very typical Thai structure in which are aquariums housing all of the fish which are customarily exported from Thailand. It is very well done indeed with tropical plants blowing exotically behind the tanks as they move in one of the three seasons that Thailand enjoys: Hot, Hotter and Hottest. Once I heard the climate of Thailand described as being similar to putting a wet electric blanket over one with the controls turned up to "roast." You can see, therefore, that there is no need for walls in the public aquarium at Timland or, needless to say, heaters in the tanks.

A second area is devoted to the fighting of fish. This is a large dirt arena with seats placed around its perimeter. The fish are brought out into the middle in separate jars and then placed together in a large square



The interior of the women's public bath at the Sugeno Hotel in Beppu, Japan, showing the very large display aquariums at its center.

A close-up of a fire eel, *Mastocembelus erythrotaenia*, located in one of the display tanks.

Inside the aquarium are aquaria housing all of the fishes customarily exported from Thailand to other countries.



34

35



The exterior approach to the aquarium at "Timland", just outside of Bangkok, Thailand.

jar where the fight, which often lasts for half a day, is watched avidly. I've heard it said that the Thais will sometimes wager their wives on such a match. Presumably this is an excellent way to shuck off an undesirable one—unless the fish on which you have bet crosses you up, of course!

What is probably one of the most spectacular and luxurious of hotels just opened in Beppu, Japan—The Sugeno. Not only does this hotel have all of the normal things to delight guests, but it also has any number of extras such as an amusement center with pinball machines. But one of the most unusual are two huge public baths. Now, admittedly in Japan, this is not all that different as the Japanese surely must be the most soggy people in the world as they seem to spend every free moment leaping into a bathtub. What is out of the ordinary about the baths in The Sugeno is that they are both (one for women and one for men) built around gigantic aquariums which form a circle in the center of each of these baths. Within these tanks cavort enormous higoi (colored carp) with their flickering flashing red, black and white hues. The entire structure is covered with glass, like an oversized green house, with tropical plantings tastefully placed here and there.

One is not supposed to take pictures in such a place but when I furtively brought my camera to do so a man suddenly appeared, shouting the Japanese equivalent of "No, no, no!" This in itself didn't surprise me as I knew the ban on photography—but what did surprise me was that this was the women's bath! ●

36

WALKER: continued from page 5



The tri-color or bala "shark", a fast-moving community tank fish with a flash of crispness and color.

The bala shark does not seem too particular about water conditions as long as they are less than extreme in one way or another, but rather warm temperatures seem desirable. Some individuals are a bit picky about their food, and in fact, healthy specimens appetite is apparently best at close to 80 degrees F. As with other species which are occasionally subject to emaciation, when the condition occurs it is a matter of judgement as to whether the best procedure is to use the higher temperatures in an effort to make the fish more active and hungry while also running the risk of increasing the rate of weight consumption because of the corresponding higher rate of metabolism, or to use normal or lower temperatures in the hope that the creature will simply come out of it on his own through an adjustment in feeding. Frozen brine shrimp or the usual live foods are preferred, and many bala sharks simply will not do well on lesser fare. They sometimes have the appearance of feeding on other foods when in reality they may only be picking at scraps and not actually eating.

Selection of plump specimens of this species is particularly desirable, since this indicates that the fish feeds well. Range of the bala shark is thought to encompass Thailand, Sumatra, Borneo (Borneo specimens are reportedly much larger) and possibly parts of Indo-China. Nichols lists "*Barbus melanopterus*" as a possible but somewhat doubtful species, which may or may not be a reference to *Balantiocheilus melanopterus* since it has been described under this name and also under "*Puntius melanopterus*."

37



Perhaps the most distinguishing feature of the tri-color shark is the black edgings to its fins (except pectorals). This contrasts well with the otherwise lemon-yellow of the bulk of the fins.

The cyprinoid fishes comprise a suborder of about 250 genera and 2500 species, and their diversity of form and adaptability is no less amazing than their numbers. There are grazers, nibblers, grabbers and gobblers. There are pursuers and pursued, slender, corpulent, monstrous and minute. There are the sloth-like and the swift, with clinging sucker mouths to hold fast against the torrent and with toothless, bony jaws whose jagged edges intermesh like the teeth of a steel trap to clamp secure their hapless victims. In southern Asia, near the place of their likely origin, the group reaches its greatest diversity. It is our fortune to reap the harvest of their ranks, not as mere food but living beauty such as the burnt-tail fish from Thailand. ●

EDITOR'S NOTE: When Braz Walker sent us this article, he noted that the generic name of the bala "shark" has been seen in the literature in two spellings, viz., "*Balantiocheilus*" and "*Balantiocheilus*". He used the *-los* ending of the original description, but asked us to look into the matter further.

The genus *Balantiocheilus* (with the *-los* ending) was erected by the Dutch ichthyologist, Pieter Bleeker, in 1859. It was devised to accommodate the species, "*Barbus melanopterus*", that Bleeker had described eight years earlier. The International Code of Zoological Nomenclature states that the original spelling of a name is to be retained as the "correct original spelling" unless "... there is in the original publication clear evidence of an inadvertent error, such as a *lapsus calami*, or a copyist's or

38



The lips of the tri-color shark can be extended and pointed downward to pick food up from the bottom. Because this happens so swiftly, many aquarists never observe this ability in their own specimens.



The tri-color shark, when one reflects upon it, really doesn't resemble a shark in the least. However, its swift motions and streamlined shape sometimes give that impression.

printer's error . . ." Improper latinization (such as forming "*Balantiocheilus*" from the Greek word "cheilos", meaning "lip"), however, is not considered under the Rules as an inadvertent error.

The question is, did Bleeker make a mistake, or did his printer? If the latter, then the ending should be *-lus*. If the former, then there are two types of error that Bleeker could have made. The first is a *lapsus calami* or "slip of the pen" as scientists term it. In this case, the ending also should be *-lus*. Only if Bleeker had latinized improperly would the Rules require that the *-los* ending be retained. But to imagine that a scientist of Bleeker's stature and command of Latin would make such an error is absolutely unthinkable. Indeed, the first person to emend the ending to *-lus* in print was none other than Bleeker himself, in 1865. What the Rules mean by "clear evidence" may be open to some conjecture, but to us, there is "clear evidence" that the error was either due to the printer or to a *lapsus*. Accordingly, by Article 32 of the Rules, the ending, in our opinion, should be *-lus*. AJK

39

THE AQUARIUM QUIZ

O.K. readers now it's up to you. The staff of The Aquarium has spent much time identifying and photographing many unusual and spectacular fish and the thought occurred that you might like to test your skills by trying to identify the six fish that appear on these pages.

If you find this test too hard, too easy, enjoyable, or unenjoyable or if you have any comment at all, we would appreciate hearing from you.

The answer to this quiz appears on pg. 68 of this issue.

Good Luck.



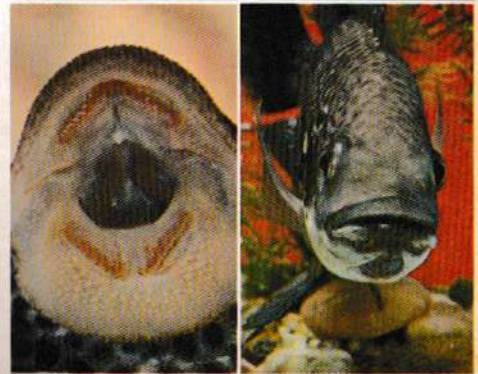
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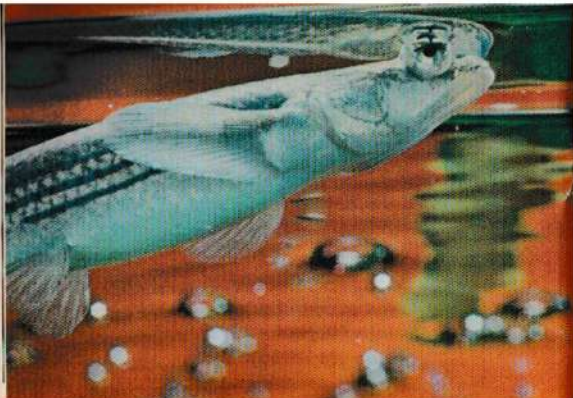
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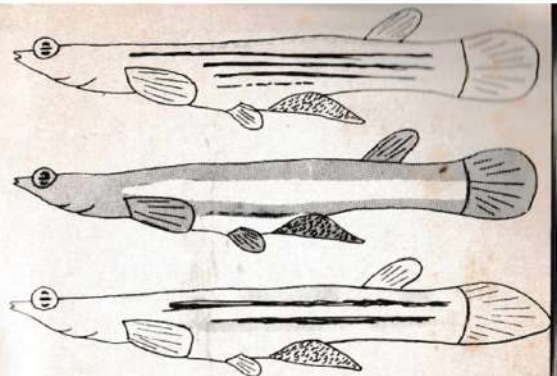
While remaining in the water at all times, when *Anableps* is near the surface it can view objects both in and out of the water simultaneously.

KLEE: continued from page 7

As Harcourt told it, there they found "... a rare fish called Cassoowa, which hath in each eye two sights, and as it swimmeth it beareth the lower sights within the water, and the other above; the ribs and back of this fish resemble those parts of a man, having the ribs round and the back flat, with a dent therein, as a man hath; it is somewhat bigger than a Smelt, but far exceeding it for dantie meat; and many other sorts there be most excellent."

From the description, it is believed that this account is one of the earliest of the four-eyed fishes, genus *Anableps*. Four-eyed fishes have been known to science for many years as a consequence of the peculiar formation of their eyes. Anatomists in particular have been interested and in 1803, the German anatomist, Schneider, very accurately described the structure of the eyes of these fishes. Aquarists, however, are not very familiar with the genus—partly because of their scarcity, partly because of their relatively high cost.

In 1936, Albert S. Pincus collected six specimens of *Anableps anableps* (= *Anableps tetraphthalmus*) along the banks of the Essequibo river in British Guiana and delivered five specimens alive to the New York Zoological Society. Also in 1936, Mr. T. MacDougall obtained several specimens of *Anableps dowei* (variously spelled "dowie" and "dovil") from Vera Cruz, Mexico, and shipped them to the New York Zoological Society. In general, then, *Anableps* is native to Mexico, Central America



1 From top to bottom: *Anableps anableps*, *A. dowei*, and *A. microlepis*.

TABLE I
DIFFERENCES AMONG THE SPECIES OF ANABLEPS

<i>Anableps anableps</i>	<i>Anableps dowei</i>	<i>Anableps microlepis</i>
Series of 3 to 5 dark, narrow stripes on the sides of the body, two or three of which are usually more distinct and complete than the others. Two of the bands are sometimes joined above the vent.	Upper half of body dark brown; below this is a broad yellow band separated from the yellow of the ventral area by a brown band.	Two narrow, longitudinal brownish bands on the sides, separated by a yellow area. In some specimens the bands are very faint or absent completely.

and northern South America. There is another species, *Anableps microlepis*, found from Brazil to Surinam, but it is not known whether aquarists have ever seen it in captivity. Figure 1 and Table I summarize the differences among these three species.

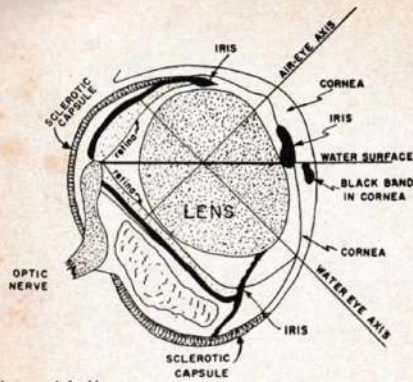
By way of introduction, the word, *Anableps*, is derived from the following Greek roots:

ana—"up" or "upward"

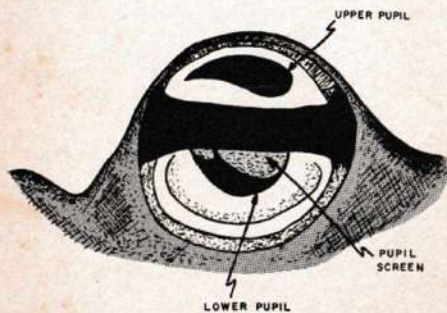
blepis—signifying "look"

With regard to taxonomy, the four-eyed fishes are related to both the killifishes, Cyprinodontidae, and the livebearers, Poeciliidae, and are given their own family, Anablepidae.

The natural habitat of the four-eyed fishes is generally along muddy river banks which are washed occasionally by ocean tides (the New York



2 The eye of *Anableps*.



3 The lower pupil of the *Anableps* eye is shaded by a screen. This prevents reflections from the surface from striking into the lower pupil.

44



Its ability to see within the water and out of it at the same time stems from the fact that its eye is divided into upper and lower sections, each operating independently. A screen is present which prevents surface reflections from striking into the lower pupil.

Aquarium used 6 parts fresh water to 1 part pure ocean water in keeping them—my own specimens were kept in moderately hard water, on the alkaline side). Although they have been taken from streams located miles from any ocean, the water itself was still alkaline. One of the difficulties in keeping *Anableps* in the past stemmed from these unusual brackish and/or alkaline water requirements.

The eye of *Anableps* is, of course, very interesting. Each eye is divided by a dark band into upper and lower sections. As Robert Harcourt indicated, the lower eye is adapted for vision in water, the upper for air. Furthermore, each pupil is divided into two parts by an ingrowth of the iris (see Figure 2). Human eyes have two pairs of lenses since, for distant viewing, a lens must be well in the back of the cornea, and vice versa for close viewing. With only one pair of lenses, *Anableps* accommodates both near and far objects by virtue of egg-shaped lenses—the long axis of each is simply directed into the water, the short axis into the air. The position of the eye provides that it receives light rays through both axes at the same time (see Figure 2). Since the air-eye is not equipped with tear glands to keep it moist, *Anableps* must dip its head below the surface of the water frequently.

The lower pupil is shaded by a double shade formed by the projecting parts of the iris (Figure 3 shows the lower pupil screen in its normal position). It is believed that this double screen prevents surface reflections

45



4 A view of the ventrum of a female *Anableps*, showing the forlicula scale (arrow).



5 Top: Side view of *Anableps*, showing the gonopodium. Below: A look at the ventrum of the male. This is a sinistral male, i.e., the gonopodium can only be swung to the left.

from striking into the lower pupil. Thus, the screen prevents the water-eyes from looking anywhere but downward, perchance to detect predators. Then too, the air-eyes are fine adjuncts when swimming in muddy waters, and when one vision must not interfere with the other.

But even if *Anableps* didn't sport these strange organs of vision, it would still make the aquarist's hall of fame on the basis of mode of reproduction alone. It is not that the bringing forth of its young alive is odd (although the fact that *Anableps* broods usually number only 1 to 5 young at a time, and that the young are about a third the size of the parents is cause for some eyebrow lifting!) but rather the stringent requirements which have to be met before copulation can take place. The genital opening in the female *Anableps anableps* is covered by a special scale called a "forlicula". This forlicula is located on the keel of the fish and is hinged on one side, i.e. either on the right side or the left, varying from one individual to the next (see Figure 4). As a result, the approach by a male must be made on the appropriate side of the female. Unlike the male guppy, however, which can turn its intromittant organ (gonopodium) either to the left or to the right equally well, the male *Anableps* can only turn his in one direction, i.e. left or right only (see Figure 5). Thus, to permit sexual union, a "right-handed" male *Anableps*

46



Four-eyed fish are suitable for the community aquarium provided that one remembers that "big fish eat little fish, eat littler fish, etc." Either keep them alone or with gentle fish of their own size.

must mate with a "left-handed" female, and vice versa! (Some authors say this is not so far as the female is concerned. It is true that both "left-handed" and "right-handed" males have been seen making overtures to a single female, but the opening in the female is under the forlicula and either to one side or the other. It is difficult to see how true union could take place if the approach was not from the correct side.) Females of *Anableps dowei* and *A. microlepis* do not have a forlicula scale but their openings are situated in a groove or fold of which the scales of one side overlap those of the other. The effect, therefore, is quite the same.

The first *Anableps* I had an opportunity to scrutinize carefully were in the hands of a dealer. Unfortunately, both fishes (he had a pair) jumped out of their tank one night, and were discovered the next day dried out and quite dead. As a result, when I obtained a pair of *Anableps anableps*, they immediately were placed in an 8-gallon aquarium which had a snug-fitting cover. Some aquarists have had little trouble in this regard but my advice is to take these simple precautions. Collectors of these fishes in the wild have made reference to spectacular jumps of specimens in order to avoid capture.

Surprisingly, there is no difficulty whatsoever in feeding *Anableps*. As a matter of fact they scoop floating dry food from the surface of the water faster than the average housewife can scrape crumbs from a piece of burnt toast. In feeding from the surface, *Anableps* arches its back, poking its head partly above the water. The few attempts that were made to force these fishes to feed from the bottom were unsuccessful, although some aquarists have managed it.

In community aquaria, they are quite amicable although one must



This photograph clearly shows how *Anableps* is able to look directly down while in the usual horizontal position. In this way, it can detect predators attempting to approach it while at the same time looking for insects on the surface of the water.

remember that these are rather large fishes (about 6 to 8 inches at maturity) and, as such, are capable of swallowing smaller fishes. My pair at a length of 2 inches did not molest fishes the size of adult zebra danios, but baby guppies disappeared rapidly. In general, the fish is found stationary at the water's surface but at feeding time, it splashes much water in its attempts to be first.

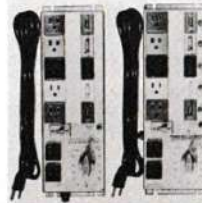
The gonopodium of the male *Anableps* is, like that of other live-bearers, merely a modification of the anal fin. It is quite bulky, however, and scaly (see Figure 5). Under ideal conditions, female *Anableps* will deliver young about twice a year. Obviously, there is no danger of a "population explosion" with the four-eyed fish! The very large new-born young (nearly two inches long) are peculiar in themselves. Some fishes such as the sailfinned fish (*Polypterus*) are born with a number of exposed blood vessels about the gills (actually these organs are external gills), but *Anableps* is even more unusual. A feature of the embryo is its abdominal pouch or bag, containing the intestines (of *Anableps*). The surface of this pouch is covered with numerous blood vessels into which enters the food supply drawn from the portion of the egg remaining with the embryo inside its membranous egg envelope. After the egg envelope ruptures within the ovarian cavity, the blood vessels are absorbed and the bag walls become thinner. After the embryo has nearly completed its prenatal development, the intestines gradually withdraw into the abdomen and the pouch shrinks, shrivels up and is absorbed or otherwise destroyed. This leaves a cleft, however, and the fry is born with its ventral area open in the form of a slit extending from gills to vent. The viscera are not exposed, however, and the slit closes in a few days. Finally, it is covered by scales and obliterated.

In the new-born *Anableps*, the eyes are normal at first. The division by the dark horizontal band into upper and lower sections takes place only several weeks after birth. The parents are not cannibalistic, perhaps due to the great size of the young and, like their parents, the fry (if you can call them that!) will take foods normally reserved for full-grown fishes. Truly, *Anableps* is a remarkable fish, perhaps the most remarkable of all aquarium fishes. You would have to work some to convince me otherwise! ●

48

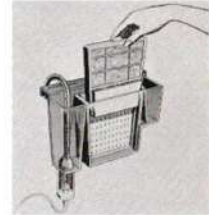
WHAT'S NEW?

The descriptions in our New Products Department are written by the staff of *The Aquarium* magazine, based upon information received by us from the manufacturers of the products mentioned. Firms are encouraged to keep us informed of any new products they may develop. The entries in this Department do not necessarily constitute endorsements since we do not evaluate quality, reliability or economic aspects of these items. However, we may occasionally comment upon a new product's relevance to the aquarium hobby and provide suitable background information whenever it might be helpful to the reader. Exaggerated, misleading or false claims wind up in the appropriate place, i.e., the "round file".



NEW HEAVY-DUTY ELECTRICAL outlet boxes featuring a built-in timer have been developed by Waber Electronics, Inc., 2000 North Second Street, Philadelphia, Pa. 19122. In addition to the timer, the units are provided with five color-keyed outlets, each with its own pilot light and on-off switch. A master on-off switch controls the entire box. Two models are available; one turns the power on at the end of the pre-set time, the

other turns it off. Prices range from \$24 to \$30. Aquarists obviously should find these units to be of great use in their fishrooms, and they promise to reduce the "octopus" tendency of such areas to sprout haphazard switches and wires.



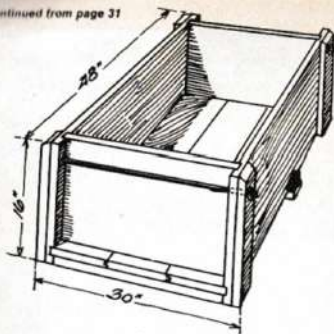
A new filter — "FILT-R-IFIC" — featuring a sort of "air conditioner" type of replaceable filter cartridge has been introduced by National Aquarium Supplies & Accessories, Inc., 60 South Essex Avenue, Orange, New Jersey 07050. Separate cartridges are furnished for the charcoal and the fiber. The flow of water through this new design is quite unusual as it is based upon a horizontal flow-through path, rather than upon the more conventional vertical path.

Singo, Inc., 11 Cypress Drive, Burlington, Mass. 01803, has placed their model MK1 "Aquarium Ozone Injector" on the market. An interesting feature of the product is its built-in filter with replaceable cartridge. Its price is quoted as \$39.95.

continued on page 64

49

REE: continued from page 31



A wooden tank circa 1913. Not having access to epoxy cements and paints, the aquarist of 1913 was forced to build these very bulky, massive structures held together by tie rods.

being a small bunsen burner (oil lamps were also used). Metal-bottomed tanks, of course, could have heat applied directly to their bottoms. Since many of the tanks in existence at the time had drain pipes (e.g., running water tanks, used mostly for goldfish), the drains could be replaced with nickel-plated brass tubes and heat applied from the bottom opening.

The water circulating schemes were nothing more than miniature hot water systems, run on exactly the same principle as a house hot water system (see sketches). Nickel-plated brass was used to form the conductor; a spiral was formed in this at a point outside the tank to which the heat was to be applied directly (bunsen burner or oil lamp). A far easier way for aquarists to heat their tanks was to partially immerse an electric bulb in the aquarium; the method worked, however, only for those aquarists whose homes had that new-fangled invention, electricity!

Because heating was so difficult, the recommended temperatures at which to keep aquarium fishes were lower than we are accustomed to today. The "standard" temperature was 68°F, with special cases as follows: dwarf gourami—61°F; *Gambusia* and the guppy—59°F; African killifishes—71°F; barbs and danios—65°F; chanchito—61°F; *Geophagus*, *Tilapia* and *Cichlasoma*—65°F; *Callichthys*—61°F; *Pimelodus* and *Otocinclus*—71°F. Most aquarists of today would have conniptions at these recommended temperatures!

The use of copper in the aquarium hobby was introduced in 1912 by Harry F. Peters, of Philadelphia, one of the early goldfish breeders

50

This is the Bubble-Up Filter.
We now make 3 models
that work with any air pump in the world.
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First, we now make the most complete line of aquariums and accessories in the world. And we have been for over 25 years. We know what all hobbyists want, where they're looking for, and our research department is constantly developing new and better products.

It is the most powerful than any other, and attached to any air pump it does a King size job! It cleans the water. It saves oxygen. It intensifies the pumping action of the air pump by producing bubbles. It always gives a sparkling clear aquarium.

Today, thanks to an ever-increasing demand, it's available in 3 efficient sizes to fit a complete size-range of tanks. As for our air pumps... well, that will have to wait for another ad.

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in America. He used a bath, duration anywhere from 15 minutes to several hours, made by adding a tablespoonful of stock solution (i.e., 120 grams of copper sulfate to a pint of water) to a quart of water. This rid goldfish of certain gill parasites and marked the beginning of the use of copper in the hobby. This is also an excellent time to mention two firms of the period, still doing business today. The oldest is the Auburndale Goldfish Co. of Chicago, Illinois; the second oldest is the Nippon Goldfish Co. of San Francisco, California. (A third firm, the Aquarium Stock Co. of New York City, was in existence prior to the establishment of these two firms; however, the conversion of the Aquarium Stock Co. into a bona fide aquarium dealer did not take place until 1917.) The Auburndale Goldfish Co. advertised in *The Aquarium* of 1912.

In May of 1913, a group of goldfish fanciers split from the Philadelphia Aquarium Society to form the Philadelphia Goldfish Fanciers Society, the ninth aquarium society to be formed in the United States. George B. Smith was its President, Harry P. Peters (not Harry F.) its Vice-President, and Joseph E. Bausman its Treasurer. The "old-timers" could not suffer to see the almost complete takeover of the Philadelphia society by the "tropicals" enthusiasts. Still, the break was amicable as most of the goldfish people retained membership in the parent society as well.

As we noted in the last issue, *The Aquarium* ceased publication with its February 1914 issue, but another magazine was launched one month before the demise. (1914 also marks the publication of the first work in America devoted solely to tropical fishes—Walter Brind's "Domesticated Fish".) In January 1914, *Aquarium News and Notes* appeared on the scene, published by the Aquarium Society of Philadelphia. Because the difficulties experienced by *The Aquarium* were well known, the Philadelphia group decided to go ahead on its own. Further, the Philadelphia Aquarium Society was rapidly expanding its interests and activities in the tropical end of the hobby, as well as receiving recognition of superiority in matters pertaining to goldfish. The following is taken from the very first issue:

"Philadelphia has become the Mecca of goldfish lovers. Visitors from Canada and many parts of the United States have honored us in the past year. In the last two years we have found our place in the goldfish world and others have found US. Why is this? It is due directly and indirectly to the establishing of the magazine, "The Aquarium". Before its advent we knew practically nothing of the fish in other cities, and our own reputation was limited to the idea that we are a slow town with a fast baseball club. The magazine has gotten us acquainted with members of the other societies. One of our members has called on all other societies, including the group in San Francisco. The calls have been returned, and with interest. We know in what point others lead and others know where

52

source of supply, we, nevertheless, hope to show them all something about breeding, and in the near future it is likely we will do considerable direct importing on our own account."

It is clear that modesty was not one of the virtues of the Philadelphia fraternity! True to their prediction, however, Philadelphia turned out some of the finest breeders of tropical fishes the country has ever seen. Modesty, however, was justifiable with regard to *Aquarium News and Notes*, for it nowhere matched the quality of layout, scope and interest of *THE AQUARIUM*, nor, for that matter, the old *Brooklyn Aquarium Society Bulletin*. Walter Lee Rosenberger was its editor, and although its primary emphasis was upon goldfish, there was a respectable number of articles pertaining to other fishes as well, although mainly of the native variety. The magazine understandably devoted a good amount of space to society affairs and although no advertisements were allowed nor were issues or subscriptions sold, the magazine was printed via letterpress and featured a limited amount of line drawings and photographs; hence, it had the appearance of a "commercial" operation (or, as my colleague, Mrs. Simkatis might say, a "slick"). Accordingly, we consider it number five in our history of aquarium magazines in America.

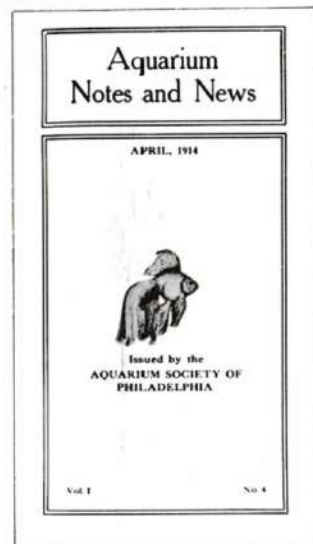
Although the publication was essentially of a serious tone, an occasional bit of humor appeared, as witnessed by the following:

Success With Fish

I know a man who managed once a fine aquarium,
And asked for hints on his success, and so he gave me some.
"I keep my shad in shadow, and my sun-fish in the sun.
My trigger-fish most carefully I fix upon a gun.
The bass in baskets you will find, the carp in carpets rolled.
And jellyfish preserved in jars will never, never mold.
I keep the skate on ice, of course, my perch on perches perch.
And when the day is fine, I send my angel-fish to church.
I file away my file-fish so I know just where they are;
My swordfish in a scabbard lies, and thus escapes a mar.
My sea-horse and my barnacle are always in the stable.
And signs like these I keep in sight as well as I am able.
"Please do not stir the sturgeon up, and do not poke the pike;
And kindly do not maim the limpet by a careless strike.
Pray, do not whale the gentle whale, nor rock the rockfish small,
And do not fly the flying fish, it would not do at all.
Please do not muss the mussels up, nor saw the sawfish slim;
And do not smoke the pipe-fish—it would make an end of him.
Please do not light my lamprey." These are just the hints you wish.
Because I follow them myself, I have success with fish".

To be continued.

54



The front cover of *Aquarium Notes and News*, published by the Aquarium Society of Philadelphia from 1914 to 1918.

we lead—goldfish.

"This fall we had two large delegations from Brooklyn and New York over, and a dandy lot of folks they were. Will Innes had fifteen to table at his home and then they took in as many of the representative fanciers as time allowed, visits being made to the homes of Messrs. Peters, Dorsey, Haldeman, Peck, McMichael, Barrett, Coles, Wm. Paullin, and the office of Messrs. Innes and Sons, where there is a tropical aquaterrarium.

"Philadelphia, too, has learned about tropical fish almost entirely through the work of *THE AQUARIUM*, and while we are now at this end of the game and not so favorably located as New York as regards the

53

SOCIETIES: continued from page 23

Diego Tropical Fish Society, P. O. Box 4156, North Park Station, San Diego, California 92104 for information regarding the society and its publication.

The pearl gourami (*Trichogaster leeri*) receives excellent coverage from Kay Hartley in the June issue of *Tropical News*, published by the Sacramento Aquarium Society. This gentle gourami has never had enough songs sung about its beauty, its peaceful disposition, and its innate good manners. Author Hartley recommends a 15-gallon tank for breeding the species, continuing floating plants, and favors the water temperature at 80 degrees F. Separation of the pair is advised with a good feeding program initiated a week or so prior to bringing the pair together. The tank should be covered and curtained off. She keeps the tank lighted as soon as the male begins to make a bubble nest, and does not turn it off until the spawning has taken place and the eggs can be seen, at which time she removes the parents. She keeps the tank in darkness until the eggs hatch. She wards off velvet by hanging a 12-inch piece of copper wire in the tank. In 48 hours the eggs are hatched and the fry are free-swimming in about five days. The fry are fed at one corner of the tank for it is imperative that the glass aquarium cover not be removed in that a variation between the air and water temperature could cause the death of the fry during this critical period. Once free-swimming, the fry may be exposed to light. Infusoria is a first food and when the babies are from two to three weeks old, newly hatched brine shrimp is offered. Both infusoria and brine shrimp are administered during the period when a portion of the youngsters remains too tiny to accept brine shrimp. This is an excellent reference piece for those who would like to work with the pearl gourami. Write to the Sacramento Aquarium Society, P. O. Box 1204, Sacramento, California 95806 for information regarding *Tropical News* and the publishing society.

Leola Wilson fills us in on *Corydoras* in her *Corydoras Are Contrary or Don't Give Up*, Hazel in the May issue of *The Fish Fancier* (published by the Houston Aquarium Society). She began with two pairs of albino *Corydoras* set up in a tank especially for them. When no spawning occurred after a substantial enough time went by, they were asked to move over for several *Corydoras aeneus*. Spawning took place the evening of the day the new tenants moved in. Spawning is a "community affair", we are told and after it takes place, the adults are removed from the tank. The eggs hatch in 3 days and the "kittens" are ready for newly hatched brine shrimp 3 days later. Write to the Houston Aquarium Society, Inc., P. O. Box 391, Bellaire, Texas 77401 for information regarding the society and *The Fish Fancier*, its of-

55

ficial publication.

Maryann Stevenson tells us about *Snails — The Good Guys Or The Bad Guys?* in the June issue of the *News Bulletin*, published by the Northeastern Indiana Aquarium Society. It seems that the writer's incentive for researching snails was that she wanted to eliminate them from her tanks but the more she studied them, the more impressed she became with their place in the aquarium. First she goes into the undesirable features of snails, the initial objection being, of course, that they multiply rapidly. Also they are apt to devour new shoots on plants; if a large one dies, it can foul a tank; and they have no place in an aquarium being used to spawn egg-layers. On the other hand, the list of reasons for keeping them cannot be discounted. Among these are the following: they are good indicators as to the condition of gravel and oxygen content of aquarium water; a pond snail destroys hydra more efficiently than the gourami; some snails are useful in making infusoria; they will clean a plant of green algae as well as doing a very good cleanup job on algae-covered plastic plants; young snails are good food for large sichlids; and they eat surplus food in small tanks. We haven't covered all the points in their favor here, nor have we digested all the little known facts about snails Author Stevenson has discovered as a result of her research. This is an excellent piece on snails although we wish the author had dropped names more frequently when she was listing the attributes of the various species. Next month she promises to tell us how to get rid of snails and give us recommendations on which ones to keep. Perhaps then she will do the name-dropping we missed in this piece. The *News Bulletin* is well-produced and easy to read. Information regarding it and the publishing society may be had by writing Editor Sandra Dentzer, 1655 W. Third Street, Fort Wayne, Indiana 46808.

The May issue of the *Betta Breeder's Newsletter* may be the last one as Gene A. Lucas, publisher and Editor of the *Newsletter*, is contemplating devoting his efforts to *Flare*, the publication of the International Betta Congress. Author Lucas's contributions to aquarium literature have been many and regardless which medium he selects for his writing, as long as he remains in the field, his audience will be satisfied, we are sure. In this issue of the *Newsletter* he relates his experience with wild specimens of *Betta splendens*. The fish were flown to him from Vietnam via Airmail Special Delivery, the collector being his brother of the Green Beret Special Forces. There were 23 specimens in all and all arrived alive. Two died subsequently as a result of jumping out of their containers. They were uniform in color showing "vertical 'submissive' banding" in both sexes and had two or

56

more horizontal stripes. They did not resemble the bettas we have grown used to and were very colorless despite the green iridescent color that was evident to some degree. Normally the fins were carried clamped in a way that the author thought at first indicated disease. Some time later, he observed a couple of males in aggressive display and the picture changed dramatically. The iridescent color became "neon green" against a stormy black. As soon as they became aware of Gene's presence they resumed their "dull, relaxed color." He has been successful in breeding them and plans to show them at the next International Betta Congress, which by the time this column reaches print will have taken place. In another piece, Author Lucas offers a report on *Meprobamate And The Betta*. Meprobamate is a tranquilizing drug that gave promise of subduing the aggressive nature of male bettas. From this report we gather this type of drug has failed in making it possible to keeping several males together without fear of their mutilating one another. We know that betta buffs will not give up in this area, and one day one of them will come on some method to turn the male bettas on and off at will. Of course, we are dreamers — you have to be to be in the hobby. *Betta Breeder's Newsletter's* future is doubtful but its publisher's is not. Gene Lucas is a devoted champion of *Betta splendens* and can be reached by writing him (Gene A. Lucas) Drake University, c/o Department of Biology, Drake University, Des Moines, Iowa 50311.

In an article he entitles *Exotic Tropicals for Fun*, appearing in the May issue of *Aqua-Focus* (published by the Aquatic Researchers of San Antonio), Harry O. Specht, M. D., offers some cogent words of advice to the newcomer to the tropical fish hobby. He begins his piece by saying he ventured into the avocation of fishkeeping some thirty years ago and "it remains as stimulating and interesting as the day I acquired my first tank of tropical fish." After pointing out that the Tampa Bay region contains the largest number of tropical fish farms or hatcheries in the world, assuring hobbyists of a constant supply of subjects, he advises the beginner to read a good book. His choice is Wm. T. Innes's *Exotic Aquarium Fishes*, 19th edition, which he points out can now be purchased for \$2.99. He then discusses the attributes of the various available aquariums and favors the stainless steel-framed tank as a best buy. From there he goes into location of the tank in the home, lighting, filtration and aeration, and stresses the importance of keeping the aquarium covered. Choice of species, plants, and feeding are also discussed briefly. This is the type of article that should reach beginners and seldom does, in that most hobbyists are through the novice stage before they join an aquarium society. In this same

issue R. W. Andrews focuses his attention on the old aquarium favorite *Aphyochorax rubripinnis*, commonly referred to as the blood-fin. He gives a good word picture of the species and likes it best in a shoal in an aquarium providing ample swimming space. Maintenance and breeding are gone into in the detailed manner which is the hallmark of his writing craft. In another piece Mr. Andrews calls our attention to the effort a group of British scientists have made to preserve *Crenobia alpina*, a rare worm that is only found in springs near Ashwell, Herts. When word got around that a water company was planning to pump water from these springs, zoologists and biologists with backing from the Cambridge University Zoology Department went to bat for the tiny creature (not larger than a grain of rice). *Crenobia alpina*, it seems, has the distinction of having avoided extinction since the Ice Age. The water company, abashed, and understandably so, when it learned of the faux pas it was about to make, changed its plans. And so, *Crenobia alpina* will continue to live in the springs near Ashwell, and if certain scientific gentlemen have their way, will continue to do so until the next Ice Age, and after that, who knows? Ray Hampson, in his monthly feature called *The British Scene*, tells us that research is being conducted at the University College of London on killifish.

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58

Aphyosemion, *Nothobranchius*, *Cynolebias* and related genera are receiving special attention. Aquarists are invited to participate by offering records on individual fish in a given batch. The records should include such information as the date of birth and death of each individual along with data on the temperature of the water in which the specimen was maintained and a description of the general conditions to which the fish were subjected. Those interested in the project should write to Mr. A. Comfort, M.B., D.S.C., M.R.C. Group of Ageing, Department of Zoology, London University College, London W.C.1., England. *Aqua-Focus* is published by the Aquatic Researchers of San Antonio, and is a potpourri of incidental intelligence usually related to fish and fishkeeping and always fascinating. Write to Editor Leona V. Bradley, *Aqua-Focus*, 301 Blanco Road, San Antonio, Texas 78212 for information regarding the society and its publication. ●

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KLEE: continued from page 15

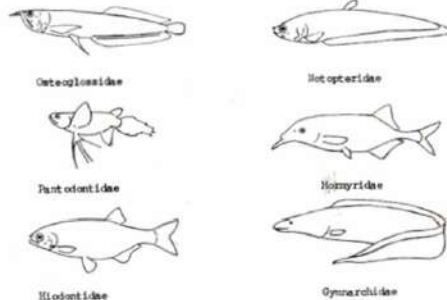


Figure 1: Families of Osteoglossomorpha

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VIEWS & REVIEWS: continued from page 18

not going to raise danios. This is natural. So, when we attempt to use genetics to create a new variety of fish we usually do so along lines which please us. This is as it should be. However, it is just at this point that I raise my question. Is it not true that most breeding is done with this, and this alone, in mind? Has not the visual satisfaction of the viewer been the sole aim? Is this goal not too limited and ultimately harmful to our hobby?

"It is here that my second standard has its place. That is: Will the resultant fish be superior to its parents? By superior I mean not merely in appearance, but in function as well. For example, let us take the lionhead goldfish. In order to meet the highest standards, this fish must be bred without any sign of a dorsal fin. To many a person this fish is attractive, with

its roly-poly body and its odd cranial growth. And, this is purely a matter of taste. But, have you ever watched the grotesque efforts it must make in order to swim? The absence of a dorsal fin so distorts its movements that for all practical purposes it is a cripple! In an aquarium with other goldfish it has difficulty competing for food. As an object of adornment the lionhead may pass all tests, but practically it is less of a fish than its normal-shaped kin. Top-sail platies and the more extreme-finned varieties of guppies are victims of the same distortion.

"After all, a fish is a living creature, designed to live and reproduce in the water. Every component is designed to enable it to live fully in this environment. Whenever we tamper with the size or shape of any part, we may be lessening the

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fish's efficiency and so be doing it an injustice. Therefore, I believe that before we set out to create any new variety we should first consider: Will it be any better or worse adapted to its environment than the original? Will its swimming ability be enhanced or thwarted? Will it have difficulty spawning? Has it been made more sensitive to light (such as in the case of some albinos)? Will its change of shape or excess finnage be a burden?

"Many of the new varieties are, indeed, beautiful. Some of them are a distinct improvement over the old. I, for one, would not want to do without many of them. But before we begin tampering with genetics I strongly believe that we must not only look towards our own pleasure, but also towards developing a fish that can better

function as a fish than can its predecessors."

We have recently received a press release from San Francisco Fish Farms, Inc., a portion of which we quote directly from as follows: "A. W. Werry, President of San Francisco Fish Farms, Inc., has vigorously denied the validity of Axelrod's patent on freeze drying for Miracle fish food products. As is generally known in the trade, freeze dried fish foods have been offered for years prior to Axelrod's patent application. Werry states that his company will prove that the Axelrod patents cannot cover the well known freeze drying process in general, and as specifically applied to freeze dried fish foods, the patents are equally without merit."

ADVERSARIA: continued from page 20



Sciaedus pictus (Mueller & Troschel)

barbels with alternate light and dark rings and is of quite dissimilar and darker coloration than our subject. The caudal is also less forked in *Sciaedus* and the two could hardly be confused. However, it is probable that "*pictus* (Mueller & Troschel)" refers to *Bagrus* (*Sciaedus*) *pictus* since apparently this is the only time Mueller & Troschel used "*pictus*" as a specific name.

Pimelodus pictus Steindachner

was described in 1876. "Silvery below, becoming brownish above; indistinct darker markings on the back. Dark spots on the bases of the dorsal rays, membranes of the dorsal transparent, the tips of the rays brown, a brown spot between the first and second rays in one of the specimens. A brown spot at the tip of the adipose fin. Two dark spots at the base and two or three brown bars on the lobes of the caudal; other fins plain white." This description of the color of *Pimelodus pictus* appears in Eigenmann & Eigenmann's SOUTH AMERICAN NEMATOGNATHI. In preserved specimens black sometimes fades to brown. Considering this, our fish compares admirably with this color description. Other characteristics such as length of barbels, etc. seem to agree with the photograph.

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Eigenmann describes the pectoral spine of *Pimelodus pictus* as "strongly serrated (toothed) on both margins." Such serrations act in the same manner as the barb of a fish hook or harpoon, causing the fin to snag in whatever it penetrates and making withdrawal difficult. I recall that while photographing this fish some time ago, one of the pectorals became so badly entangled in the net when removing the fish from the photographic aquarium that it was necessary to cut the net free. Even then it was impossible to completely remove the net from the fin without injury, and for several weeks afterward a piece of the net remained attached.

Apparently several color variations have been sold as "*Pimelodella angelicus*". I have personally seen three which had all been sold under

this name but differed in the size, location and intensity of the spots and the tail-stripes. *Pimelodus clari* varies widely in color throughout its wide range from Panama southward. Some of these "color varieties" may be this species.

It appears that "*Pimelodella pictus*" is not a *Pimelodella* at all but should instead be correctly called *Pimelodus pictus*. I have checked a dead specimen and all measurements are in agreement with Eigenmann's description. *Braz Walker, Waco, Texas.*

WHAT'S NEW: continued from page 49

Something different in the novelty aquarium line has been announced by the Aapal Company, 3240 Gentilly Blvd., New Orleans, La. Termed the "Rainbow Multi-Vision Aquarium", the tank is a



many-sided plexiglas two-piece production, aquarium and base. The former is 9" tall and 17" wide at its largest point, and holds up to 2 1/2 gallons of water. It is designed to reflect objects both within and outside. For example, with two fish in it, you can see up to 32 reflected images of them, depending upon the angle from which they are viewed. The price of the unit is \$5.95.



Douglas Filtration Systems, Inc., 148 Winckles Street, Elyria, Ohio, has introduced two new medications, "Tropicaine Liquid" and "Tropicaine Powder", based upon formaldehyde. In the early days of the hobby, formaldehyde was widely recognized as being extremely effective in the treatment of certain

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fish diseases. Unfortunately, like with copper, its use was dangerous to fish life and definitely not for the inexperienced. Douglas, however, has apparently found a way to mute the undesirable side-effects of formaldehyde without interfering with its primary mission. In addition, the active ingredient is released slowly, not suddenly in one huge dosage, so as not to create shock or other adverse actions. The liquid form is designed for direct application in the aquarium water, the powder form for application to glass wool and charcoal filters.

PROBLEMS: continued from page 26
ourselves with speculation only because really no one except a kissing gourami has the answer.

From: W. C. Drier, Norfolk, Virginia.

I have recently purchased an

Osteoglossum (Aruana). In the books I have it receives only a brief description. Can you furnish me with further information about this species?

Answer: *Osteoglossum bicirrhosum* is popular among hobbyists who like oddball fish. Besides having a bizarre appearance with its large scales and bony tongue, it is probably the most graceful fish in movement we have in species maintained in the home aquarium. It grows rapidly and any owner that wishes to keep the fish over a number of years should provide it with at least a 50-gallon tank. It likes live food but will take lean chunks of beef, green or canned shrimp, etc. It, however, requires lots of food. It has been known to spawn in captivity, laying brilliant orange colored eggs 1/4-inch in diameter (the fish is a mouth breeder). We have heard that this species has obtained 23 inches in length in a home aquarium. Be careful when feeding this

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conversation piece—he or she is apt to jump out of the tank in high glee over any tidbit you may be offering. If the fish doesn't get out of the tank but falls back into the water, you and your floor are in for a shower. Aquarists who have an aruana, become very attached to it for this species has personality and no matter how many other fish its owner may have, this fellow is the subject of most conversations. Incidentally, Texas aquarists must obtain a permit to keep this fish, as it is one of the species regulated by that state's fish and game department.

From: Charles Grasley,
East Lansing, Michigan.
I have a question, which no source seems to adequately answer, concerning a black moor. I have had this moor for about one year and I would judge his age at about one-and-a-half years. He is about 4 inches long and fairly heavy. My question, however,

has to do with his coloration. He is slowly turning white. I noticed this change beginning about six months ago. It began by the white on his belly slowly coming up his sides. Several weeks ago, I noticed that around the gill slits and the eyes and over the nostrils had turned a waxy yellow.

Answer: Very often moors (all moors are black) lose their black and become golden. This is not an uncommon change. It is caused by the gradual destruction of some of the black chromatophores. ●

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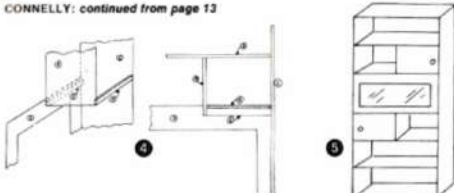
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CONNELLY: continued from page 13



4. Details of the false shelf. 1-Left side piece. 2-Shelf one. 3-Front piece that frames the tank. 4-Divider piece, protecting 3 inches below the top of the front piece. 5-1" x 2" railings to support the false shelf. 6-The false shelf in place.

5. A schematic showing the completed construction, with doors and tank in place.

necessary to gain access to the other half of the aquarium (changing bulbs, repositioning a rock, cleaning glass, etc.), the books on the false shelf are removed and the shelf lifted out by pushing up from below after reaching over from the door side. Since removing the books is a bother, I have since replaced them on the false shelf with an objet d'art which is



A photograph of the finished bookshelf aquarium.

more conveniently moved.

All of the electrical equipment (pumps, switches, etc.) is concealed in the cabinet below. Further, there is room left over for storage of food, rags, charcoal, and all of the other paraphernalia characteristic of the hobby. But beyond the advantages accruable to "neatness counts", the whole effect is simply striking. In the evening, when the only light in the bookcase corner is that from the tank itself, all eyes are upon it. The combination of books and fish seems to enhance both hobbies equally well. ●

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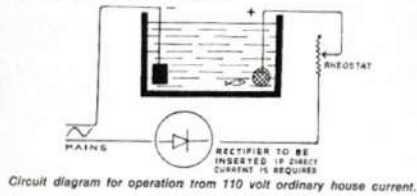
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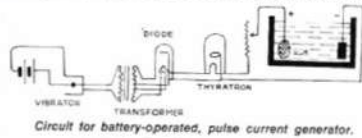
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71

Because the diagrams for An Electric Fish Net For Your Aquarium (August 1968-Vol. I-No. 10) were misplaced and could not be included in the August issue, we are publishing these diagrams now. Our apologies for this inconvenience.



Circuit diagram for operation from 110 volt ordinary house current.



Circuit for battery-operated, pulse current generator.



The author's experimental tank

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WALKER: continued from page 32

shelter is available, only a sizeable disturbance can rout him out, and as soon as more shelter is located it's back to his wide-eyed siesta.

This is definitely a fish-eating fish, and only after long and careful trial was it finally converted to chunks of beef heart. If the preference for living fishes such as minnows is obliged, an all-night hunt takes place which surprisingly seldom ends in an overstuffed belly as is the case with some big-mouthed catfishes. In contrast to the swift grace of the tiger catfish or other shovelnosed pimelodids, the hunt is a rather clumsy affair which seems to be aimed toward sustenance rather than greed even in the presence of abundance.

Because the Ageneiosidae possess only a vestigial swim bladder which is so small as to be of no practical value in helping them stay afloat, swimming is more difficult for them than for some of the more buoyant aquatic hunters. This could possibly account for the apparently less gluttonous nature when compared with other Siluriformes whose oral capacities match. When numerous bite-size fish such as minnows are present, *Ageneiosus* may upon occasion begin the hunt in rather enthusiastic pursuit as soon as the lights are off, but the more "normal" procedure is to cruise slowly about the middle and upper levels of the aquarium for a time making an occasional lunge at his prey.

Most catfishes are to a great extent dependent on the barbels or "whiskers" which are the trademark of the clan to help them in locating their food. The Ageneiosidae on the other hand possess only one pair of rather ridiculous-looking maxillary barbels which look a bit like Charley Chan must have looked as a teen-ager. Because of their size and the less than acrobatic agility of their possessor, it is hardly conceivable that the tiny appendages could be of much value during the hunt.

With patience it is possible to adjust this fish (*A. marmoratus*) to feedings of beef heart. This should be given in the form of large but ingestible chunks and should be dropped just in front of the fish's snout after lights are out at least until it is accustomed to this unnatural diet. Because of the seemingly indifferent nature of the fish, toward feeding unless conditions are to its satisfaction and since the appetite seems rather easily satisfied in its requirements for capacity, the sizes of *Ageneiosus* species are smaller than most other big-mouthed predators. For most, lengths of over one foot are rare even in nature although specimens of 1 1/2 feet are recorded for some species.

This and its relatives are fishes for the collector or for others who take satisfaction in unusual fishes which may remain for the most part out of view. The unusual habits and appearance of these sedentary creatures has its own fascination, and if kept with other fishes which cannot be swallowed and whose habits are complimentary a harmonious situation should result. ●



A male *Pterolebias peruensis*.

GOLDSTEIN: continued from page 28

use mud; this is difficult to work with. Ordinary peat moss is used. The peat moss (any brand will do) is boiled and rinsed under the tap before being placed in the tank or drum bowl or gallon jar, depending on the size and number of fish. In nature, the eggs remain viable long after the pools have dried up. Indeed, the pools may be dried and cracked and apparently devoid of any moisture. Nonetheless, there is sufficient moisture for the eggs, which may survive longer than a year. As a matter of fact, just how long the eggs will survive under these conditions is not known; it is possible that some species may survive for several years. In many cases, this period of drying, in nature, seems essential for normal development of the embryo. Eggs incubated in water may hatch prematurely, and the resultant fry often cannot maintain equilibrium in the water due to failure of the swim bladder to develop fully.

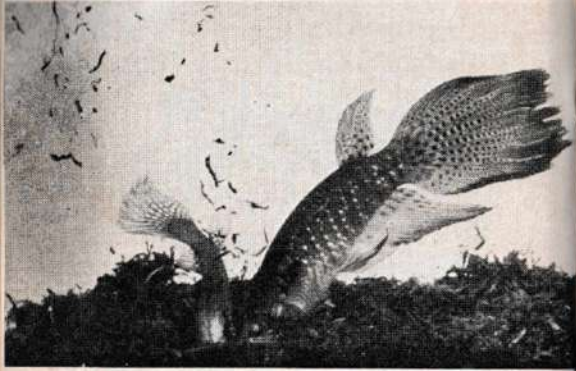
The genus *Pterolebias* contains several species, unknown to most hobbyists except for those who are well-read and members of the AMERICAN KILLFISH ASSOCIATION. The species which have been available at one time or another are *P. longipinnis*, *P. zonatus* (easily the most beautiful), *P. "maculipinnis"* (the newest one available) and *P. peruensis*, the Peruvian longfin. *P. bokermanni* has been described, but I have never seen it reported as having been introduced to aquarists. Most of the members of the genus (I haven't seen them all) are panchax-shaped or pike-shaped, with long, flowing fins, *Betta*-style. Aquarists can tell the species apart by their markings. The Peruvian longfin is a variable species, with different populations exhibiting different tail markings. In the August, 1955 issue of this magazine, an article by Rosario LaCorte is illustrated with a photo by Dr. Innes in black and white on p. 237. This male has a band on the lower part of the caudal fin, and is apparently the variety which I have been keeping. In my variety, the lower band is orange, with a black margin. The color plate, also by Dr. Innes, illus-



1. A pair of *Pterolebias longipinnis* preparing to spawn in a layer of peat moss. The female swims slightly ahead of the male. It is she who picks the site.

trates a very different type of tail. The fish are generally brownish, and the male has brilliant green highlights on the gill covers and in the iris of the eye. The sexes, therefore, can be told at a glance, even in specimens which have had their tails chewed off.

In August of 1965 I purchased several specimens from a local shop. They apparently were imports, as the price was quite low (\$1.75 a pair). I kept them in a tank with peat moss on the bottom, and collected and dried the peat on October 1, 1965. Periodically, and impatiently, I checked the large, clear, yellow eggs for development. The eggs were so large and numerous that I had no trouble finding them. I observed no development in my eggs for six full months. In the seventh month some eggs rapidly developed embryos, and I then submerged the whole batch of peat moss in soft, cool water. This resulted in a hatch of 15 fry, all of which I raised, and all of which were females! I then redried (that is, after hatching) the peat moss and tried again at nine months when I could no longer find very many yellow, clear eggs. When embryonated, they are difficult to find, as the dark eggs (blackened by the fry) blend very well



2. The female is halfway down in the peat. The male, who has been waiting for the right moment, is now entering the peat himself.

with the peat moss. This time I hatched and raised about 40 fish, mostly *males*. The obvious conclusion is that *some* females develop faster than all other fish, regardless of sex. But since this is an observation based on a small number of individuals, I do not present this as gospel, merely as my impression. By the way, none of the fish, at six or at nine months hatching time, were "belly-sliders" (defective swim bladder development). And so, I recommend a nine-month drying period for the eggs of this species . . . as gospel!

Growth is rapid, in typical killifish style. I feed brine shrimp nauplii and microworms from the start. The fish begin to sex out at one month of age when slightly less than an inch long. Some are very slow growers. Thereafter I feed blended beef heart, blended fish, and BiOrell. They do very well on BiOrell, better than most other killies, and eat it ravenously. *Pterolebias* should be fed more than once a day, and always look like they are starving, except right after a meal when their bellies round out. Of course, they look like they are starving two hours later.

When they were two months old, I moved them to larger quarters



3. This instant was captured with split-second timing. The motion of the male's fins and the whirling of the peat give an indication of the speed with which this takes place.

for mass spawning and growth. Because I believe that they are an imported stock, I want to keep the strain just as it is, rather than select for any particularly desirable traits and thereby have something whose origins cannot be determined. I think that selection should be deferred until there are plenty of these fish around and the wild types are well-known.

Now, at four months of age, I am having my first real trouble with them. I have plenty of eggs, so I will not complain if I lose them. The trouble can be described the following way. Their appetites slacked off, and many of them became more ragged than would be expected from occasional fin-nipping. Many have difficulty keeping their tails down, and swim as though they had air bubbles in the tail sections (which of course they do not). Several developed an opaque white spot at the top of the iris, which expanded and swelled until the entire eye was encircled and puffed. Many have died following these (one or the other) symptoms. They hardly touch their beef heart or shrimp any more. On some, the body becomes "lumpy" and light areas appear. Frequent water



4. Having been submerged completely for about one minute, the male emerges first and waits for the female, whose head is just appearing.

changes and pH and hardness changes make for no improvement. They struggle for *Daphnia* and have great difficulty in swallowing large ones, but can handle mosquito larvae adequately. Still, they look awful.* I suspected *Ichthyophonus* (also known as *Ichthyosporidium*) and treated with 2-phenoxyethanol (50 cc of a 1% solution per gallon), but the peat moss seems to take it up. I have not yet tried them in a tank without peat moss but with the drug. I say that the peat moss takes it up because the drug acts as a powerful anaesthetic on small cichlids, and the small cichlids in the peat-moss-containing tanks appear to be unaffected, while those in other tanks konk right out within a half hour.

It is unlikely that the fish are declining from old age, and I suspect that it is either a disease or they develop a dietary requirement for something in living food which I did not supply in time. At any rate, the *beaucoup* eggs in my coffers insures that *Pterolebias peruensis* will not disappear from my tanks or the tanks of my friends. ●

* A friend, Gene Chesley of Arizona, informed me that he had apparently the identical problems with *Pterolebias zonatus*.

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