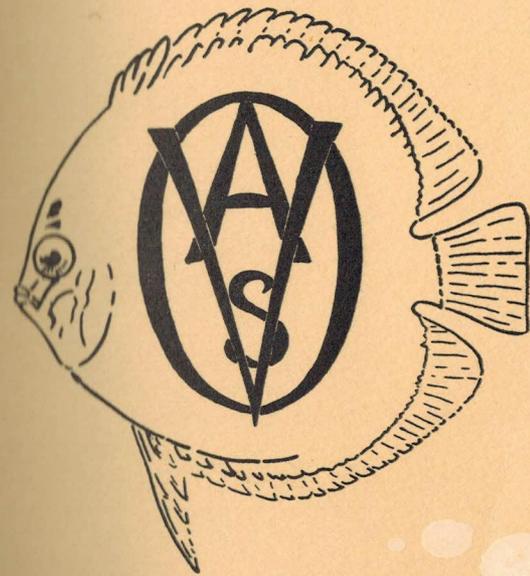


VAS NEWS



OFFICIAL PUBLICATION

OF THE

OTTAWA VALLEY
AQUARIUM SOCIETY

OTTAWA VALLEY AQUARIUM SOCIETY
125 CREBAR AVENUE, OTTAWA 3,
ONTARIO, CANADA



THE OTTAWA VALLEY AQUARIUM SOCIETY

MEETINGS

Junior Society

Thursday, January 15th, 1959 ... 7.00 PM
Thursday, February 19th, 1959 ... 7.00 PM

Senior Society

Thursday, January 22nd, 1959 ... 8.00 PM
Thursday, February 26th, 1959 ... 8.00 PM

Regular meetings are held in ROOM 37,
CHEMISTRY BUILDING, UNIVERSITY OF OTTAWA,
365 NICHOLAS STREET, OTTAWA.

CONTENTS

OVAS.....	Page. 2
Officers and Directors.....	3
IMPORTANT NOTICE ALL MEMBERS.....	4
Membership Fees.....	4
How Does A Fish Breathe?.....	5
Rasbora Heteromorpha.....	9
The Aquarist's Calendar.....	12
African Mouthbreeders.....	13
Water Sprite.....	17
1959 Raffle.....	19
Should We Have An OVAS NEWS?.....	19
JUNIOR SOCIETY SECTION.....	20
Junior Society President's Letter.....	20
The Betta.....	21
Conventional Filters.....	25
Did You Know?.....	27

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Address for Society

Post Office Box 1135, Ottawa, Ontario,
Canada.

Editor OVAS News

Mr Harvey J. Wittenberg
[redacted] Ottawa 3, Ontario,
Canada.

THE OTTAWA VALLEY AQUARIUM SOCIETY

The Ottawa Valley Aquarium Society was founded on the eleventh day of March, nineteen hundred and fifty-four.

The object of this Society is to further the study of aquarium life, the spreading of information regarding it, and the promotion of good fellowship among fanciers of aquarium life.

The Ottawa Valley Aquarium Society consists of two bodies, a Senior and a Junior Society, each operating independently. The Junior Society was founded on the fourteenth day of April, nineteen hundred and fifty-five.

Membership is open to all persons wishing to acquaint themselves with this hobby. Each person may attend two meetings and on the third meeting, application for membership, accompanied by the membership fee, shall be made to the Membership Committee.

The Ottawa Valley Aquarium Society publication "THE OVAS NEWS" is published by the Society, a non-profit hobby organization, and copies made available to all members. Subscription rate for non-members is \$2.00 per year.

The opinions, statements, and view points expressed in THE OVAS NEWS are those of the authors and not the Society.

Advertising rates on request from Editor.

UNLESS OTHERWISE INDICATED, THE CONTENTS OF THE OVAS NEWS MAY BE REPRINTED PROVIDING CREDIT IS GIVEN TO THIS MAGAZINE AND THE AUTHOR OF THE ARTICLE.

This Society is a member of The International Federation of Aquarium Societies (TIFAS).

THE OTTAWA VALLEY AQUARIUM SOCIETY
1959 OFFICERS AND DIRECTORS

Senior Society Officers

President: Mrs Clare Kroeger
Vice-Pres: Mr Roger Trottier
Secretary: Mrs Barbara Johnson
Treasurer: Mr Phil Curry

Senior Society Directors

Membership: Mr Dan Jeffrey
Programme: Mr Wilf Doucette
Show: Mr Doug Young
Magazine: (to be appointed)
Social: Mr Alan Griffin
Junior Soc: Mr Edgar Parisien

Senior Society Librarians
(To be appointed)

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Secretary: Graham Conway
Treasurer: Richard Brown

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Programme: Chipper Vickers
Show: Gordon Wordon
Magazine: Larry Neumann
Social: Andrew Holdham

Junior Society Librarians

Larry Neumann
(to be appointed)

OTTAWA VALLEY AQUARIUM SOCIETY CONSULTANTS

Area No 1
Area No 2 (to be appointed)
Area No 3
Area No 4

TIFAS REPRESENTATIVE
Mr Edgar Parisien

IMPORTANT NOTICE

ALL MEMBERS OF OVAS

Through the kindness of the University of Ottawa we have obtained a larger room to hold our regular meetings.

COMMENCING JANUARY 1959

All regular meetings (Senior and Junior) will be held in ROOM 37, CHEMISTRY BUILDING, UNIVERSITY OF OTTAWA, 365 NICHOLAS STREET.

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MEMBERSHIP FEES

1959 Membership fees are due. If you are not able to be present at the January or February meetings you may mail your membership fee to:

Senior Society

Mr Phil Curry, [redacted],
Ottawa 3. Phone: [redacted]

Junior Society

Richard Brown, [redacted],
Ottawa 3. Phone: [redacted]

Renewal of membership fees are as follows:

- \$4.00 - Married couples
- \$3.00 - Single membership
- \$1.00 - Junior Society

1958 members (Senior and Junior) will receive a copy of the OVAS News for January and February of 1959. If you have not renewed your membership by February 26th we will have no other alternative but to delete your name from our mailing list.

HOW DOES A FISH BREATHE?
by Dr. G.C. Carl, Provincial Museum,
Victoria, B.C. Reprinted from "Fin Fare"

Answering this question is not as simple as it might appear because we have to go back in history a bit to start near the beginning. All living things (except certain bacteria) require oxygen in order to exist. Every living cell in every organism, plant or animal, must have this substance to combine with other materials to produce heat or other forms of energy or it will quickly die. Fortunately oxygen is very abundant; in the atmosphere it is present to the amount of about 20% by volume but in water it is in concentration only up to about $\frac{1}{2}$ of 1%. Although the concentrations of oxygen in water is so low, as it is used up it is constantly being replaced by more coming directly from the atmosphere or from plants which give off this gas as a by-product. The molecules of oxygen are constantly moving about so that as the supply is reduced in any area more move in to make up for the loss or to even up the distribution. This process is called diffusion and is relatively low.

In very small animals that live in water the liquid inside their cells is very much like water and contains oxygen in the same amounts. As the oxygen is used up by slow burning of food to produce energy more oxygen diffuses indirectly from the surrounding water, passing readily through the "skin" or cell membranes because they are porous to oxygen molecules. In this way these small creatures "breathe" directly without the use of gills or any other "fancy gadgets". This is the case in all infusoria and other protozoa, (which are composed of but one cell), the rotifers, most of the small worms (such as "white
(Cont'd page 6)

worms") daphnia, copepods, and other simple animals up to the size of flat worms.

In larger and more complicated animals the cells in the inside cannot get enough oxygen directly by this diffusion process so oxygen has to be brought to them in some other way. This is accomplished by various means. In some "early models" such as the sponges the water circulates through numerous canals in the animal bringing dissolved air to all parts, but in more advanced types the canals form a closed network of tubes containing a watery fluid we call blood. In this type of system one portion of the tube becomes muscular to form a pump, the heart, to push the liquid around.

But water alone cannot carry enough dissolved oxygen to satisfy all the needs especially in an active animal such as a fish that requires an abundance of fuel so we find that certain substances have been added to the watery blood to make it capable of carrying a great deal more oxygen. The most commonly used substance is a compound of iron called haemoglobin which has a great likeness for oxygen molecules. The haemoglobin is carried inside blood cells that float free in the fluid and since it is red it gives blood its characteristic color. Such blood with the help of the pigment haemoglobin can now carry eighteen times as much oxygen as ordinary water, a vast improvement over the older system.

It is still necessary however, to have some arrangement for transferring the oxygen from the surrounding water on the outside to the blood which is on the inside. In fishes this is accomplished by the gills which are merely structures for bringing the blood into close contact with the

water. The gills are made up of a great many finger-like processes so arranged that blood is separated from the water by very thin membranes. As both the water and the blood flow past each other oxygen diffuses into the blood stream and becomes loosely attached to the haemoglobin.

At the same time the waste product, carbon dioxide, is released by the blood and diffuses out into the water so that a two-way transfer actually takes place.

When the blood cells arrive at a place in the body where oxygen is needed they release their burden easily and take up carbon dioxide which is carried along until the blood again passes through the gills where this waste product is released and a fresh load of oxygen is taken on. Thus it can be seen that the process is a double shift that continues so long as the animal is alive.

One other requirement is necessary. The water must be kept flowing past the gill filaments in order to bring fresh supplies of oxygen in contact with the membranes and also in order to carry away the CO₂ waste. This is brought about by the combined movements of the gill covers and mouth parts of the fish whereby water is drawn in thru the gill covers and sometimes others inside the mouth keep the water moving in the right direction.

The gill filaments are supported by U shaped bony structures called arches. Usually there are four complete arches and a fifth incomplete arch on each side. Also attached to the arches is a series of comb-like teeth called rakers. These work like a filter preventing food from escaping from the mouth and also possibly protecting the delicate gill-filaments from damage by foreign material accidentally carried by the water into the mouth.

The gills and associated structures of fishes should be of special interest to us not only because of our interest in aquarium fishes but also because these structures appear briefly in the early states of human development indicating that our very early ancestors breathes by gills before the "invention of lungs".

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AN ILLUSTRATION

Two men were arguing. "What's the meaning of tact, Jim?" asked one. "It's - it's -" he began. "Well, what is it?" "Look here, I'll give you an illustration. The other day I went to mend a pipe in a bathroom. When I got inside I saw a woman in the bath. I gave one look, raised my hat, and said: "Beg pardon, sir!" That's tact."

RASBORA HETERMORPHA

by Mr Pieter van der Brugh, Ottawa Valley Aquarium Society.

This beautiful little fish belongs to the family of the Cyprinidae (Carps or Minnows), which belong to the class of the Bone fishes.

The Cyprinidae is the largest family of fishes, and covers more genera and species than any other family. This family is distinguished easily, because the fishes belonging to it have no teeth, and no adipose fin.

This family is found mostly in the tropical regions of the earth, with the exception of South America and Australia. It includes many genera of which the under aquarists best known are the Brachydanio, Danio, Puntius (Barbus), Rasbora and Tanchthus.

Genus Rasbora comprises about 25 species, of which about 10 are regularly found in aquaria. In Ottawa I have only seen the Heteromorpha and the trilineata (scissor tails). This genus is found in the neighbourhood of Malaya and surrounding countries and islands, such as Siam, Surmatra, Borneo.

This genus was first described by the Dutch biologist Bleeker, who lived in the middle of the 19th century, and was an outstanding ichthyologist. (Ichthus, symbol of Christianity).

Most of the fishes belonging to this genus are 5 inches or smaller. The heteromorpha reaches about 2 inches, but is sexually full grown at 1½ inches. It is a quite common fish, which in Malaya is used for fertilizer, notwithstanding its beauty. That the price here is so high, is probably caused by the fact that its import is carefully regulated by the big importers. About 4 times a year 75,000 are imported in North

(Cont'd page 10)

America. Its beauty is derived from its unusual black marking, and its golden glow. It is very difficult to distinguish between males and females. The only sure difference is, that the males have a more pronounced and deeper golden glow below the dorsal fin and along the top of the black triangle.

It can stand temperatures from 70° to 85°, but as this species is very susceptible to ick, changes in temperature should be made very slowly.

The breeding of this fish is difficult. Experienced breeders have no trouble with it, provided they have the equipment to keep the water in proper condition, that is hardness 0°, and acidity between 5 and 6.4 P.H. Temperature 76-80°. Water not older than a few days. It spawns generally on the underside of the leaves of Sagittaria Cryptocoryne, Ludwigia etc. No Vallisneria because that plant likes limestone, and does not do too well in acid water. In its natural habitat the water is very soft and slightly acid, so as in most tropical waters. The reason is, that the tempo of life is much higher than in the colder regions, and the breakdown of all kinds of organic matter plant etc., ends up in organic acids, which give the soil a high acidity. In Surinam many agricultural areas had an acidity of PH 4-4.5.

The best way to spawn this fish is to use peatmoss and peatmoss filter and on top of that a zeolith filter or an anion-kation exchanger to keep the water acid and soft. Unluckily this kind of equipment is not available here, so I presume it will take some time before we will have a successful spawn of Rasbora Heteromorpha in Ottawa.

Another problem mentioned in the literature, is the fact, that only the young of this species will spawn. Notwithstanding
(Cont'd page 11)

that this fish lives for about 5 years under proper conditions, it is advisable not to try a spawn with fish which are older than 1-1½ years. It is better to raise a number of young and then try to spawn them when they have reached approximately 1½ inch.

The Rasbora is a schoolfish, and it might therefore be advisable to use several males and females in a spawn.

Its breeding habits are highly interesting. It is rather complicated. The eggs are small and get cloudy after some hours, they hatch in about 18-20 hours.

About the number of eggs exists difference of opinion. Some authors say up to 300 per spawn, but I think that a result of about 100 is quite good. When the parents are well fed, all the eggs which are well attached to the leaves will not be eaten, but the unattached eggs disappear fast. The spawning takes quite a time, as generally not more than 5-15 eggs are deposited at a time.

:-:--:-:~

The absent-minded professor entered his bedroom and found an attractive woman in his bed. "What are you doing here?" he asked righteously.

The woman smiled. "Well, I was passing by the house and I thought it was a very nice house, so I went in. Then I saw your picture on the mantel and thought you were a very nice man, so I decided to stay. I went up to the bedroom and thought it was a very nice room, so I took off my clothes. The bed looked comfortable, so I got into it, "Besides", she concluded, "I'm your wife, you jerk!"

:-:--:-:~

HAVE YOU SOLD YOUR RAFFLE TICKETS????

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY

THE AQUARIST'S CALENDAR
"The Aquarium"

JANUARY is a month in which it pays to be specially careful with new fishes. No matter how long some of us have been in the hobby, there is always that terrific temptation to hurry things up a bit when it comes to getting the newly acquired fishes into our tanks. There is no difference between the urges of expert or amateur, the results are the same, in the end it simply spells "trouble".

This is a time of year when many of us are bringing in "strangers" to our tanks, so let us pause a minute and check the temperatures between the container and the tank. Are they equal?

Sudden changes at this time of year, whether they concern temperatures or pH, are well worth investigating and avoiding if possible.

In times past, during mid-winter months, it was customary to move all tanks as far back from drafty windows as possible. This of course cut down the lighting to the point where both plants and fishes suffered unless artificial lights were provided.

Today, by simply fastening a sheet or two of clear, moisture-proof "Cellophane" either directly to the inside of a window frame or to the cold side of an aquarium, the effect is double insulation with no light reduction. In addition the trouble of moving the tank is eliminated. "Cello-glass" is another trade-named commercial product easily obtained, that will serve equally well as a mid-winter insulation.

AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

TURN TO PAGE 4IMPORTANT

AFRICAN MOUTHBREEDERS

by Mr Cecil Armstrong - Valley Aquarium Society, Phoenix, Arizona, USA.

Did you ever raise a brood of African mouthbreeders? This is one of the most interesting and unusual whimsies of old Mother Nature that we have. Now as to the exact scientific classification, there seems to be a little confusion. After looking up the species in Home Aquarium Handbook, The Tropical Fish Book, and Exotic Aquarium Fishes, by Wm. T. Innes, I was no better off than before. The pair of mouthbreeders I had seemed to have only a few of the important points of a certain specie named, and none of the rest. The specie named, was like the Egyptian Mouthbreeders in that it was the female that caught and carried the eggs, but were over twice the size and were not colored the same. Also the Chinese seems to fit in some ways, as well as the large mouthbreeder, except that in the last mentioned specie, the male carries the fertilized eggs in his mouth.

So, I am going to give this pair the latin name of *Ti-lay'-pee-a Armstrong-i* and avoid difficulties. Of course you already know that these are members of the cichlid family. This pair of mouthbreeders was for the most of the time a quiet, rather colorless silver-like shade of grey. The male was 6 inches long and the female about 4 inches. Usually both fish would hide or stay in the back of the tank. Then early in the spring I began to notice small saucer shaped holes in the sand. Each time I would restore the sand to normal, the next day I would find a larger hole. Finally one day I found the male mouthbreeder using his lower jaw for a scoop shovel and pushing out a nice round hole in the sand. The sides of the hole are perfectly slanted so

(Cont'd page 14)

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that anything that would hit the side would hit the side would roll down to the bottom of the scooped out part. No regard was made for plants or anything that might be within the circumference of the pit. Anything and everything had to go. As the male would dig these holes he would begin to change color to a very dark brown or grey and the edges of all of his fins would turn a bright orange. He would do a sort of a mating dance or caprice to induce the female over to the shallow pit. Most of the time she would show the usual indifference which would cause the male to chase her around the aquarium at an amazing speed. All of the other fish in the aquarium would take to the outermost reaches and hide, as during these sessions he was the king of the deep, and would allow no other fish to get near the pit he had made for the female. Finally one day the female laid the eggs in the pit; which he promptly fertilized and she quickly picked them up in her mouth. Must have been 100 eggs. For the next 21 days the female ate absolutely nothing. Each day she would swim quietly around with this mouthful of eggs, never dropping one, and making sort of a chewing motion with her
 (Cont'd page 15)

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mouth as though to keep the eggs stirred up or cleaned. As the days passed, her mouth seemed to become fuller, like a child with too much bubble gum. After about 10 days of constant watching I saw the first of the batch; a very large bodied fry with a rather small tail, and a poor swimmer.

Almost immediately on my being seen by the female she rushed over and grabbed the youngster in her mouth. From then on more young fry could be seen each day; however, at the least sign of danger she would rush around and gather all of them up into her mouth like a vacuum cleaner picks up dust. On the 17th day she

(Cont'd page 16)

allowed all of the fry outside. About 70.

Although protected and isolated by being inside of a bowl within the aquarium, the female would attempt to drive off any fish that would come near; then rush around gathering up her brood. It is a frightening sight to watch, knowing the usual habits of fish, and thinking, well, that's the last I'll see of that bunch of fish. But although steadfastly refusing food she touched none of the delicate morsels swimming about her. I finally broke down and removed her from the temptation on the 19th day. Later I left her 21 days. This spawning routine happened in 6 weeks in the same manner, and I had the third spawning six weeks after that.

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WATER SPRITE

Reprinted from "The Boston Aquarium News",
Boston Aquarium Society, Inc.

Water Sprite (*Ceraptopteris thalictroides*) is perhaps one of the most useful and decorative aquatic plants that we have. A clump of the bright green leaves located in the background or at the sides of the aquarium adds that touch of beauty that we need in our aquascape. The rapidity of growth under ideal conditions makes frequent trimming, dividing, and replanting necessary - but the brilliant coloring, and the shelter that the plant provides for small fry more than offsets the work involved in keeping it under control.

Water Sprite grows equally well as a floating plant and is probably a species of floating fern. Used as a floating plant it drops long feathery roots towards the sand-nourishment from the water being obtained through the dangling roots as well as through the soft leaves. Many aquarists prefer a floating bed of Water Sprite to such plants as *Nitella* or *Riccia* in providing shelter for young fishes. It is excellent cover for the young of live-bearers, its mass of leaves concealing them from hungry parents more satisfactorily than do floating masses of the spidery *Nitella*. A two-inch surface cushion of *Riccia* is as good, but *Riccia* is not so rugged and is susceptible to changes in water conditions as well as light and surface heat.

Water Sprite does well in slightly acid water - from about pH 6.6 to about pH 6.8. Below pH 6.6 and in neutral or alkaline water it grows more slowly and its leaves tend to be narrower and less prosperous. It needs a strong top light fairly close to the surface and the protection of a cover

(Cont'd page 18)



O V A S
JUNIOR
SOCIETY
SECTION

Editor:
Larry Neumann

PRESIDENT'S LETTER

By the time you read this letter you will already have been introduced to the new Directors at our January meeting. If any of you should like to act as assistants on any of these committees, would you please get in touch with me.

If you have spawned fish, and I am sure you all have, why not write an article about your success for the OVAS News. It would be greatly appreciated. Articles should be given to Larry Neumann our Magazine Director.

Would you all please remember to bring your membership fees for the coming year to our February meeting at the latest. After this you will be taken off the mailing list for the OVAS News and the meeting notices until you renew your membership.

I hope you are all selling as many raffle tickets as possible. The success of this raffle will benefit your Society.

Now is the time of year to look for new members. If you know of any new hobbyist, bring him or her along as a friend to a meeting and see if you

(Cont'd page 21)

can't persuade them to join our Society. Don't forget the jar shows. A very easy way to win a dollar. Why not bring an entry to the next jar show - a Black Tetra.

Ian Woods
Ian Woods.

:-:--:-:~:-:

THE BETTA
by C.E. McDowell, "Colorado Aquarist" -
Colorado Aquarium Society, USA.

The Betta is a fish which has been in and out of the picture since 1840, when we have the first written acknowledgement of it. To date several varieties of Betta; such as, Betta Bleeker, Betta Breder and the Betta Splendens are known. We have more knowledge of the Betta Splendens, the one most commonly used in America.

The spawning of Betta Picta Bleeker, the fighting fish of Java, is similar to that of other mouth breeding fish. When a male and a female are first put together, the female makes small balls of green algae the size of the head of a safety match. At first the male pays no attention, then later he seems to play ball with her, catching the ball in his mouth and then spitting it out. This is probably the beginning of the courting as later they embrace in a rocking and rolling motion. During this time one large egg is emitted from the mouth of the female. The male picks up the eggs placing them in his anal fin which he holds curved in a trough-like shape. Afterwards he rolls the eggs into the mouth of the female who goes through the same motions as with the algae. A minute or so later she spits out the eggs

(Cont'd page 22)

towards the male, both fish seemingly standing in the water head to head at about 45 degrees. The male spits out the eggs one by one at the female and she spits them back. About an hour later the male may be found, his head enlarged, in a slating position. By electric light you can observe the eggs in the middle of the throat sack.

The Betta Brederi was named for Charles M. Breder, Jr., of New York. The color of these fish are mixed browns and grays and the scales on the sides of the male are blue spangles.

The Betta Pugnax is very similiar, only smaller with a more slender body. Their breeding habits are the same as the Picta Bleeker. The Betta Brederi was found 60 miles northwest of Singapore. The fish were found in 76 degree water. The pH was neutral and there were no plants, only tufts of green algae. This is a mouth breeding fish that does not fight but lives in small communities in the shelter of the rocks. The reason for his being a mouthbreeder is because the water is so swift they would be carried away if they spawned in a bubble nest. The eggs hatch in three days.

The Betta Splendens is the fish termed, the Siamese fighting fish, because it was found in Siam. The Siamese for it is Bla Kat Khmer, which does not mean fighting fish, but biting fish. In Siam these species range throughout the country in lakes, ponds, canals and sluggish streams. The Betta in wild state reach a length of 2 inches for the male. The female is slightly shorter. Beginning in 1850 Siamese domesticated and cultivation. In Siam the fighting is licensed and under control of the Government.

An outstanding peculiarity of the fish

(Cont'd page 23)

is its dependence on atmospheric air. It cannot obtain through its gills dissolved oxygen in sufficient amount. It has an accessory respiratory apparatus for utilizing air. Above the gills there is in each side of the head, a cavity lined with vascular eipthelium, the absorptive surface being increased by several projecting laminae.

Bubble blowing is strongly developed in the male fish. At the time the bubbles are made there is a viscid mucous secretion of the mouth or pharynx which strengthens and makes more lasting the walls of the bubbles and tends to keep them in a mass. They serve as a nest for the eggs and a cover for the newly hatched young. The male constantly renews the nest.

When the male fish has built a bubble nest, introduce a female ready for spawning into the aquarium either with or without a separating glass. The Betta should be spawned in as large an aquarium as is available, in old aquarium water with a fair amount of settlings. The water should be deeper at one end than the other so that the water pressure on the small fish will not be too great. For best results the pH of the water should be neutral or slightly acid, but it is possible to spawn in alkaline water. Bettas like a temperature of 78 to 82 degrees, but can be spawned in lower temperatures. If no partition is used in spawning, the fish should be watched to determine if there is going to be a fight before the courtship starts. If a glass partition is used the two do some courting through the glass. Some of the sand under the partition should be removed so the female may enter where the male has a bubble nest. To spawn successfully one must have a pair that have proved themselves good parents. After the courtship they

(Cont'd page 24)

will start spawning. At short intervals the eggs are extruded in small batches. Both the fish gently take them in their mouths and blow them into the nest. When spawning is over the female should be removed. They will hatch in a period of thirty to fifty hours depending on the temperature. The young remain in the bubble nest until the yolk-sacs are absorbed and the fins are developing.

If they stray before they are old enough, the male carries them back. As soon as they are free swimming, the male should be removed.

The main reason fish are not in spawning condition is that they have not had sufficient good food. They have a distinct preference for live foods or fresh substitutes such as, whiteworms, earthworms, baby guppies, live daphnia, or mosquito larvae. If live food is not available, scraped shrimp, fish or lean beef should be used.

After a successful spawning the principal hazard still remains. That is, the enormous losses which occur within the first two or three weeks. This is usually due to starvation which is often caused by insufficient room for the maintenance of ample infusoria. The babies are very small, but in two or three days when they start eating they must have a constant supply of food. Infusoria culture should be started about the time the eggs appear. Crushed lettuce leaves in a jar of old aquarium water will make a crop in about three days. Small drippings should be given at least two or three times a day. New cultures should be started so the supply will keep coming, until they are big enough to take daphnia.

Another hazard is confronted when they change from water breathers to air

(Cont'd page 25)

breathers when they are about six weeks old. It is most important that the aquarium be kept covered with glass at this time. Any scum or oily film on the water is dangerous. Once past this change they are as good as raised.

Live food is best but occasionally they have been carried over the early weeks on a diet of the yellow of hard-boiled eggs, prepared by passing it through a cloth and shaking it up in a bottle of water until it is fine dust. A few drops are fed with an eye-dropper. This is also good for other fish. A number of people gain a livelihood during the dry months by breeding mosquitoes and selling their larvae to owners of fighting fish in Siam.

To sum up, a large rearing tank containing old water, a constant supply of micro food through the early weeks, sufficient temperature and a glass cover are the four main points to keep in mind.

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CONFENTIONAL FILTERS.

by Wm. T. Innes "The Aquarium"

Under certain conditions aquarium filters undoubtedly do good. In addition to removing a great many floating particles from the water, they aerate it both by splashing and contact with air from the pump. Furthermore, good filter charcoal also absorbs objectionable gases and odors. All these things count heavily when an aquarium is fully populated, or, as often happens, over populated. If, under these conditions, fishes are liberally fed, the need of a filter becomes acute.

What some people fail to think of is that any scavenging apparatus has a limited capacity, whether it be a vacuum sweeper or

(Cont'd page 26)

Did you know that a good solution in which to disinfect plants is made of 1 oz. of powdered alum to 1 gallon of water? Allow plants to soak 20 minutes and rinse thoroughly under running water for 5 minutes before introducing them into a tank.

Did you know that egg-laying fish that you try unsuccessfully to breed should not be placed together for another try at breeding for at least two weeks? Fish should be conditioned before trying again.

Did you know that in a tank of both male and female Betta splendens that the male can always distinguish the females from other males by the fact that the female will always turn sideways when swimming toward the male? It is by this action that he distinguishes the females and behaves accordingly.

Did you know that in conditioning bubble nest builders for breeding that male and female should not be kept where they can see each other until they are both conditioned? If separate but in sight of each other it is not unusual for the female to drop her eggs prematurely or in some cases even absorb them into her body tissues.

(Source: "All About Breeding Tropical Fishes" by E Schneider)

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