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September, 1967
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A SUREGROW PRODUCT DISTRIBUTED BY SCANCO DIVISION S.C.A.N.

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Your fish play safe with TetraMin

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September, 1967
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WHOLE BRINE SHRIMP IN A CAN!

You'd better believe it!
Straight from Norwegian seas come the most delectable brine shrimp your fishes have ever tasted.
Freshwater and marine tropicals as well as goldfish go wild for this food.
It comes in cans and the retail price is just 5/6d. per 42 gram can. Also included are a handy plastic top for use in keeping open cans fresh and clean, and a plastic serving spoon for serving up measured amounts quickly and easily.

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PLEASE DO NOT HOARD THIS NEW MIRACLE FISH FOOD!
Although by the very nature of its sealed tins it can be kept indefinitely, we urge you not to hoard this food as it is in strictly limited supply initially and we would like to think that as many aquarists as possible may have the opportunity of providing this remarkable food for their valuable fishes.
Look for the distinctive blue and orange cans now!

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01-888 7973

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MEMBER P.T.A.

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call and see them.

All fish sold are fully quarantined—we have 90 quarantine tanks—we are not part-time aquarists, it’s a
full time occupation looking after fish properly.

September fish and plant list mail order or personal callers, mail orders add 12/6 carriage, packing
and telegram.

SPECIALS

- Ceylonese Fire Barbs Adults
  - Chocolate Gouramis 1"—1½"
  - Chum Gouramis (Young English Fish)
  - Clown Barbs 1½"—2½"
  - Clown Loaches 1¾"—2½"
  - Cummings Barbs 1½"—2½"
  - Giant Danios 2½"—3½"
  - Heteropneustes Fossiliis 4"—5"
  - Indian Hatchet Fish 3½"
  - Mahseela Barbs 3½—3½"
  - Panchax Dajii 1½—2½"

- 6/6 Each
- 12/6
- 7/6
- 6/6
- 21/6
- 7/6
- 17/6
- 9/6
- 25/6
- 12/6 Pair

GENERAL

- Albino Swords
  - Red Swords
  - Black Swords
  - Tuxedo Swords
  - Blood Red Platy
  - Blue Platy
  - Berlin Platy
  - Yellow Wagtail Platy
  - Moon Platy
  - Siamese Fighters
  - Blue Acaras
  - Brown Acaras
  - Jack Dempsey
  - Panchax Black
  - Panchax Black
  - Snakekin Guppies
  - Large Black Molly
  - Young Orange Dorsal Molly
  - Australian Rainbows
  - Rummy Nose Tetras
  - Three Spot Gouramis
  - Opaline Gouramis
  - Large Opaline Gouramis
  - Apistogramme Ramirezi
  - Apistogramme K tenzi
  - Apistogramme Agassisi
  - Jewel Cichlids
  - Thicklip Gouramis
  - Egyptian Mouthbreeders
  - Pearl Danios
  - Marble Cichlids
  - Severum

- 3/6 Each
- 3/3
- 3/3
- 3/3
- 4/
- 3/6
- 4/
- 3/6
- 10/0—12/6
- 3/6
- 2/6
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- 7/6—12/6
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- 9/6
- 4/9
- 4/9
- 4/9
- 2/6
- 3/6
- 2/6
- 5/6
- 4/

SPECIAL OFFERS

- Young English Silver Angelfish 3/3 Each $8.6—8.20
- Black Neons 2/9$ 3/3—7/6—10—20
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- Glowlights 2/9$ 3/3—7/6—10—20
- Flames 2/1$ 3/3—5/6—14—20
- Harlequins 3/2$ 3/3—7/6—10—20
- Neons 2/9$ 3/3—7/6—10—20
- Penguins 3/6$ 9/6—10.6—20
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- Ludwigia 1/3$ 3/3—1/6—2—8
- Anubias 1/3$ 3/3—2—6—8
- Cabomba 1/3$ 3/3—2—6—8
- Red Cabomba 1/3$ 3/3—3—12—10
- Vallis 1/4$ 3/3—2—6—8
- Malayana Swords 4/6$ 3—10

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- Nymphals Stellata
- Anomongeton crispus Ulvaceous

- Undulatum
- Slate Rock 1½ Ib.
- Miracle Pump and Filters
- Grow Lux Lighting
- New Jewel Aquarius
- Aquariums Made Any Size
- Red—Green—Black—White—Blue—Yellow Gravel 1½ Ib.
- Artificial Plants

Mail Orders.—Please give nearest main line station.
We will send telegram stating time of arrival.
in fact everything for the aquarist

September, 1967

V
KEITH BARRACLOUGH AQUARIST

One of Britain's leading suppliers of

Tropical Fish

OVER 160 VARIETIES OF TROPICAL FISH AND AQUARIUM PLANTS

Outstanding fish this month

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<tr>
<th>Tropical</th>
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<tr>
<td>African Knife Fish, 6&quot;</td>
<td>19/6d. each</td>
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<td>Diamond Tetras (Hem. Pulcher)</td>
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<td>Mormyropus Engystoma</td>
<td>25/- each</td>
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<td>Pranhas, Hollandi &amp; Nattereri</td>
<td>from 130/- each</td>
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<td>Ramirezi Apistogramma</td>
<td>from 3/6d. -- 10/6d. each</td>
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<tr>
<td>Carapo Knife Fish</td>
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<td>Baby Discus</td>
<td>50/- each</td>
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<th>Coldwater</th>
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<td>English Bred stock (outdoors)</td>
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<td>Calico fantails</td>
<td>6/6d. each</td>
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| True Bristol | 17/6d. each |       |       |       |       |       |       |
| Shubunkin, 2" | 12/6d. each |       |       |       |       |       |       |
| Lionheads | 12/6d. each |       |       |       |       |       |       |
| Bubble eyes | 12/6d. each |       |       |       |       |       |       |
| Large ornamental Moors, Fantails, Grandaes, & Lionheads | from 45/- each |       |       |       |       |       |       |
| Japanese Koi carp, superb fish 6" |     |       |       |       |       |       |       |
| Sexed pairs 27/10/0 pair |       |       |       |       |       |       |       |

| Cultivated Aquarium Plants |       |       |       |       |       |       |       |
| Malayan swords | 3/6d. each |       |       |       |       |       |       |
| Madagascar lace leaf corms | 15/- each |       |       |       |       |       |       |

| Cape Fear Spatterdocks | 10/- each |       |       |       |       |       |       |
| King Aponogetons | 10/- each |       |       |       |       |       |       |
| Banana plants | 4/6d. each |       |       |       |       |       |       |
| American twisted Vallas | 18/- doz. |       |       |       |       |       |       |
| Acorus Gremmii | 2/6d. each |       |       |       |       |       |       |
| Large Amazon Swords | 17/6d. -- 25/- each |       |       |       |       |       |       |
| Vallisneria Torta | 6/- doz. |       |       |       |       |       |       |
| Vallisneria Spiralis | 6/- doz. |       |       |       |       |       |       |
| Ludwigia Mullerisi | 6/- doz. |       |       |       |       |       |       |
| Bacopa Caroliniana | 8/- doz. |       |       |       |       |       |       |
| Sagittaria Natans | 8/- doz. |       |       |       |       |       |       |
| Wisteria | 1/6d. each |       |       |       |       |       |       |

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FOR YOUR AQUARIUM GRO-LUX

gives BRILLIANT colour

ensures HEALTH of fish

so SIMPLE to install

send for literature now>>

Research has proved
That a GRO-LUX fluorescent tube installed over an aquarium will greatly benefit the fish.
Plants will grow up and the colours of fish, plants and ornaments are vividly picked out.
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Large Box Cottertrix

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from £0.50

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September, 1967
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FRESHWATER TROPICALS

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BUT QUANTITY AS WELL. ALL FISH ARE TREATED AND FREE FROM DISEASE
BEFORE THEY ARE SENT OUT TO OUR CUSTOMERS.

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And now the Sensational Variety Food 3/-
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Phone: BUC 4708

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Veltail Guppies from 3/8 pair £1.00
Snakehead... 7/6
Adult Silver Fins 3/8
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Liberty 3/8
Speckled 3/8
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Ocelline 3/8 each
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Dwarfs 3/8 each
Large 3/8 each
Large 3/8 each

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Uropharynchus 2/8
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Tigers 3/8 each
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Flossies 3/8 each
Barbus Calabar 3/8
Haplochromis 3/8 each
Clown Barbs 3/8 each

DANIOS
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Glanis 3/8 each
Pearls 3/8 each

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MARSINE FISH IN STOCK
Clowns, Damsels, Triggers, Anemones, Hermit Crabs, Box Fish, Chelonius, Scorpions, Wrass, Batfish.

Minimum order 10-

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Crypta... 3/8 each
Crypta... 3/8 each
Haplochromis... 3/8 each
Anubias... 3/8 each
Anubias... 3/8 each
Bubbaea... 3/8 each
Bubbaea... 3/8 each

Post Paid

Please send S.A.E. for price lists. For wholesale lists TRADE headed paper please. Please address all correspondence as address above.

September, 1967
"The following fish and plants were available at the time of going to press"

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- Cherry Barbs
- Dwarf Golden Barbs
- Golden Barbs
- Tropical Tinfoil Barbs
- Tiger Barbs
- Zebrafish
- Royal Barb
- Veil Tail Barb
- Koi Barb
- Butterfly Barb
- Comet Barb
- Veil Tail Barb
- Lemon Barb
- Sword Barb
- Nigro Barb
- Suberb Barbs
- Ocellaris

CHARRACINS
- Ancistrus
- Belgian Flag Tetra
- Black Line Tetra
- Black Neon
- Black Widow
- Bloodfish
- Cardinal Tetra
- Cardinal Tetra
- Congo Tetra
- Cardinal Tetra
- Plant Anchovies
- Pigeon
- Gloosyc Channa
- Gloosyc Channa
- Golden Barbs
- Green Tetra
- Lemon Tetra
- Minnow
- Neon Tetra
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- Rainbow Tetra
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### TROPICALS

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**SPECIAL Algae eating pond snails 1/- each**

*THE AQUARIIST*
The mosquito fish
by B. Fry

One of the most fascinating tropicales for the enthusiastic hobbyist who likes tiny things and has a tiny tank to spare is the mosquito fish (Nateramria formosa). This perfectly formed and finely marked vipersus cyprinoides from North Carolina southwards to Florida is a giant at one and one eighth inches. And this is the female. The male seldom grows to more than about half that size.

The mosquito fish lives and breeds well at any temperature between the upper sixties and middle seventies (F) with the advantage that although the quite pretty little female gives birth to dark grey-brown babies every so often there is never any fear of a too rapid population explosion; for broods are small and the score or so of fry that comprise a brood are delivered a few at a time over a period of about a week to a fortnight. Usually, a female will have several batches of young in a year. If she does not, this is no fault of the male for he is an ardent and lively little suitor.

With plenty of thread- or miniscule-foiled plants in the aquarium very few, if any, of the babies will be harmed by the parent fish, and their markings will begin to show about after five weeks. Full size is attained in about six months.

The predominant colours are greenish to greyish olive and blackish brown. A blackish brown band extends along the olivaceous sides from the gill-covers to the tail. This dark band is crossed by a number of equally dark bars. The lower sides and underparts are shining silvery white. The dorsal fin in both sexes is adorned in the base with black margined, or crowned, with a faint to glowing touch of red. The tube-like anal fin of the male is hyaline; that of the female is fan-shaped, blackened with black. As a rule, the colours in the male are more intense than they are in the female.

Although H. formosa bears the popular name of mosquito fish this has to do with its pygmy size and not with its feeding habits. In point of fact, it is no exaggeration to say that a mosquito fish can easily choke on a well-developed mosquito- or gnats-larva. It follows, therefore, that all dried and live food given to this species must be on the small side. Among live foods, micro-worms and Grindal worms are particularly recommended. For such a diminutive species H. formosa has quite a long life span—usually about two years.
The Paradise fishes
by Jack Hems

Paradise fishes are the fishes of the genus Macropodus—a genus embracing three distinct species and two sub-species—range in the wild state from Korea southwards to Malaysia and westwards to southern India and Ceylon. They have been known to aquarium keepers for a very long time. As a matter of fact, one species, namely M. opercularis, is of some historical interest, for it was the first tropical fish to be introduced into the home aquarium. This notable event took place in 1867, when a few live specimens were brought to France from China by M. Simon, the then French Consul at Ningpo. A pair or two of these fish spawned in Paris in the following year, and by 1876 the species was firmly established as an aquarium pet in Europe and North America.

That M. opercularis still has its admirers (despite its fondness for savaging other fishes) is probably due to its splendid coloration and finnage, its quick and knowing response to its owner, and its ability to stand a temperature range of from about 80°F (16°C) to above 90°F (32°C). And, of course, M. opercularis and its congers are famous for their interesting breeding habits and parental care. These will demonstrate quite freely in the home aquarium, provided the conditions under which they are living are good. Paradise fishes belong to the family Anabantidae. Members of this family—represented by genera in Africa as well as Asia—are characterised by the presence of an accessory breathing organ situated above each gill-arch which enables them to breathe atmospheric air as well as oxygen extracted from the water. It follows, therefore, that an aquarium measuring about 16 in. x 8 in. x 10 in. is large enough to support a pair.

Although they will take the larger grades of dried foods freely, small crustaceans, molluscs, worms, flies, green larvae and tiny pieces of red meat are among the best foods for paradise fishes. Their breeding procedure, as has been hinted at already, is unusual. They mate under a flatish or somewhat domed island of foam, and the many hundreds of tiny bubbles that form this island or nest contain the eggs are blown by the male, though an interested female is not above blowing a few. A male M. opercularis in breeding attire is a lovely sight. He wears the richest colours: greens, golds, blues and reds, some of them sparkling with a beautiful metallic light. A sexually awakened female wears brighter colours too. But another and more positive sign of her fitness to spawn are her bloated sides.

The male manipulates his flowing fins and colours to attract her attention and lure her to the nest. He parades before her with all the splendid posturings of a peacock, or one of those highly trained top model girls. As a rule, she ignores the preliminary posturings and consciously or unconsciously heightens the male's ardour by playing a game of peek-a-boo among the plants. But in due course his persistence wins her over and with a wagging movement of her body she swims under the nest. Without any waste of time, the male wraps his body around her and together they float up towards the nest. As they rise the male applies some pressure on her side and eggs are expelled. The fertilising fluid is poured out by the male during the embrace.

In the main the eggs are buoyant, but those that drift towards the bottom are gathered up in the mouths of...
both parents and spat out again into the nest. This performance may be repeated a dozen or more times before the female is spawned out. The male turns spiteful after spawning is over and divides his time between keeping the female a prisoner in the plants and blowing more bubbles to prevent the eggs falling out of their foamy bed. Unless the spawning tank—a size about 24 in. by 12 in. by 12 in. is recommended—is thick with greenery it is advisable to remove the bruised and torn female from the reach of her mate. At a temperature of about 78°F (26°C) the eggs hatch in about two days.

The male watches over the fry in the nest day and night—all through the night—and any fry that spiral away from the rest of the pulsating brood are caught up in his mouth and returned to the nest. As soon as the fry are seen to be moving about all over the aquarium microscopic live food (or flour-fine dried food at second best) should be given. As a rule, the male will not harm his offspring even after they have reached an appreciable size. Aids to success in rearing the fry of paradise fishes are an even temperature, rather shallow water, and a close, draught-proof atmosphere below the cover glass. Incidentally, anesthetized fry do not develop their accessory breathing organ until a few weeks have passed. But now something about the different kinds of paradise fishes.

The albino paradise fish is a man-made colour variety of _Macropodus opercularis_ which was produced in Germany in the late 1920s or early 1930s. It is less overtly pugnacious (except among its own kind) than the type. Indeed, some
Snakes for the snake pit—Part 2
by M. Peaker, B.Sc.

In the first article of this series I described the design of a snake-pit. In this article I shall describe some suitable inhabitants for this type of reptiliary. The majority of types suitable for outdoor life in Britain are either European or North American. Apart from climatic considerations, length is an important criterion as the walls around the enclosure may perhaps only be three feet high. I do not advocate the keeping of venomous snakes.
snakes, even those of the back-fanged type as not only can their bite be unpleasant to say the least but their presence can impose an unfair risk on the neighbourhood. No venomous forms will therefore be considered. Unfortunately, a number of the less poisonous back-fanged species are sometimes sold by pet-shops without any indication that their bite can be dangerous or extremely unpleasant. The pet-shop manager is usually ignorant of the fact that they are not harmless. Several years ago I saw the Southern European Cat Snake (Teleocephalus fallax) in several pet-shops, all of which had bought them from one wholesaler believing them to be harmless. I understand that the venom of this species can on occasions be dangerous if sufficient quantity enters the wound, especially in a child. Fortunately, most pet-shops sell the harmless Grass or Dice Snakes.

Perhaps the most suitable species are these two types together with another species making up the European membership of the genus Natrix. I once had a reptillary which solely housed these three species—the Grass Snake (N. natrix), the Dice Snake (N. tessellata) and the Viperine Snake (N. maura)—so called because of its supposed resemblance to the Adder (Vipera berus). As there are a number of sub-species of the Grass Snake, these also were represented by three forms—N.N. natrix, hebraica and persa which occur in different parts of Europe. Frogs of various sizes, smooth newts (Triturus vulgaris), tadpoles and small fishes (mainly goldfish runs). All of these were eagerly devoured. The Dice Snakes spent a good deal of time in the water and are most of the fish; the Viperines preferred newts or small frogs and the Grass Snakes larger frogs. Tadpoles were readily eaten especially by smaller individuals. In a large established reptillary, these three species made an interesting and entertaining exhibit.

Some American species of Natrix can also be obtained which can live outside, for example, N. sipedon which occurs in the northern part of the North American continent. From the same region, garter snakes (Thamnophis sp.) are attractive and desirable inhabitants. Some will accept earthworms as food and now that frogs are becoming increasingly more difficult to obtain, any species which will sometimes accept worms is desirable.

The Leopard Snake (Elaphe quatuorlineata) has a reputation as a bad feeder. I have never kept one but I did advise an acquaintance to try baby (pink) mice as food for a newly arrived individual. Fortunately, these were readily accepted. Another European member of the same genus E. longissima—the Aesculapian Snake I have found to be a very desirable species to keep. I have never had trouble with feeding small mice for smaller individuals which can live outside.

The snakes which prefer lizards are not recommended as food is difficult to supply. Occasionally, they will accept rodents. Included in this category are the species of Coronella which includes the rare native Smooth Snake (Coronella austriaca) and the European members of the genus Coluber, the Whip-snakes. Sometimes an individual or two will thrive in a large outdoor enclosure.

The Paradise fishes

continued from page 143

out of breeding time. It is native to Korea and the Chinese mainland down to about Shanghai. M. cinereus cinereus and M. cinereus dayi (a sub-species) are peaceful too. They attain a length of 24 to 3 in. In general they are reddish to greenish brown, with a green sheen on and about the head and two horizontal stripes of green that come and go according to the reactions of the fish to the temperature, lighting, and one another. The pelvic fins are orange red; the other fins are grey to grey-blue with red markings. The middle rays of the caudal fin are elongated, which explains why the fish are popularly known as spike-tailed paradise fish. M. cinereus dayi has more red in the body and fins and is, in fact, a fine-looking fish than M. cinereus cinereus. Although the latter species appears to be confined only to the coastal areas of southern India, M. cinereus dayi is said to range as far as Burma and South Vietnam. Both these spike-tails call for a temperature above 60°F (20°C). Neither produce eggs so readily or so abundantly as M. oceanicus.

September, 1967

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The water cricket
by Bill Simms

Considering how common is the Water Cricket (Velia caprai, or V. cornu) it is surprising how little we really know about this creature. It is one of the many kinds of water-bugs a vague term used to define a number of families of insects that have adapted to water life.

Very little thorough research has been done on many of these water-bugs. For instance, we do not know for certain where the eggs of this present species, the most common of our two water crickets, are laid. It is thought probable that the eggs are laid on plants near the water but not on those actually in the water.

The adult V. caprai is only 7 mm long, so it will be realised that the eggs are very tiny and not easily found. A few have been hatched and grown on and the resultant young crickets have been found to go through five larval stages before turning into the adult water cricket.

These five larval stages take quite a time so that the development from the egg, through these stages to the adult and on to the second generation of eggs, takes a full year, with the mating always taking place in the spring.

Water crickets, like the pond skaters with which they are easily confused, run about on the water surface, using the skin tension of water for a support. They can also dive, however, which denotes the ability to break through this skin tension.

Their food consists of any kinds of small creatures carried along by the water, both alive and dead. Like all other "bugs", the water cricket has a pointed mouth part with which it pierces the skin of its victim, and then sucks out the juices.

In order to catch those of its victims that are alive the water cricket has become very skilful on the water surface, being able to run against the current as easily as in any other direction.

There are two species of water cricket with the size of 6-7 mm., and three more species rather smaller, which come under the name of Microvelia. All these species have approximately the same habits with the exception that the three microvelia tend to keep to the water's edge, whereas the larger two venture over the water at any distance from the shore.

Essay Competition
Another of our prize-winning essays
Caught in the fish net
by Malcolm Wilmore (14 years)

The ping pong ball bounced from the blue bowl into the red and turned into a goldfish.

I had been trying to win a box of sweets by throwing a ping pong ball into a blue goldfish bowl, but now I found myself accepting reluctantly from the fair man, a clearly inedible creature who, seemingly aware that he was unwanted, gaped open-mouthed from his plastic bag.

In our garden was an old sink in which I put the brute but one small goldfish in a white porcelain tank is a lonely
sight and soon a companion was secured for him by an interested sympathiser.

Winter came bringing cold problems. An ornamental goldfish bowl was retrieved from the attic and the fish were installed. Miserably they circled their spotless prison, differing markedly from the friendly mud and dropping foliage of their former environment. I transferred them to a small tank and there they stayed until the following March when they were moved to a larger tank which I had acquired together with some artificial aeration equipment. Urged by my ever increasing enthusiasm for the hobby, I stocked my tank with tench, veal-tailed goldfish and sunfish.

In the garden I had paid no attention to live food as lots of insects fell into the sink; however, once indoors, I had to give them a balanced diet including daphnia and chopped earth worms.

After my large cold water tank, I decided to set up a tropical one. I had a mishap when my neon tetras were sucked into the filter and I had to replace them.

The tank did well until some daphnia apparently brought with it some hook worms causing my fish to dash themselves to pieces on the rocks. This happened whilst I was on holiday and by the time I returned they were all dead. I was very upset about this but I restocked immediately after cleaning out the tank.

My tropical aquarium has now been going for two years without a hitch and I have not lost a fish. The tank is kept at 70°F and is heavily planted with Vallisneria and Myriophyllum. It is lit by a 60 watt lamp. The fish are fed on daphnia, tubifex and fine dried food.

As I have not had egglayers yet I do not trouble with the pH and hardness level of the water. I believe in only disturbing the fish twice a day, at feeding times so as not to frighten them too much.

I am starting an Aquarium Society at school and I am making arrangements for the installation of tropical tanks there. The Society will also help any one who wants to take up this fascinating hobby.

By mid-summer I will have fitted out a tropical marine aquarium and by its end I shall have built a new garden pond to give my first goldfish a happy retirement.

## Getting under their skin

by Peter Dendy

We are apt to take our fishes for granted. We feed them, breed them, raise them, maybe show them, give them away or just ditch them when we feel like it. Some of our fishes may be able to consider themselves fortunate in their surroundings and general standard of living conditions, while it is quite certain that others, if pressed for an opinion, would hold quite the opposite view. I am thinking particularly of those that are ill-housed, overcrowded, under or over fed or merely raised to provide live food for the more favoured big cichlids.

Whenever may be the lot of aquarium kept fishes, nothing will alter their absorbing interest which repays detailed study over and over again if you are prepared to give them enough of your time. Fish play a pretty important role in the scheme of things forming a part of the staple diet of millions and representing one step in the ladder of evolution which produced aquarists, both the good and the bad.

The common shape of fishes is longish with two pointed ends kept apart by the back-bone, but of course the backbone is not only there to keep the ends apart, but also to get in the way when you are eating a kipper. The backbone or the axial vertebral column affords protection for the main longitudinal nerves and blood vessels and forms a foundation for the bony cage-like structure which gives the fish its shape as well as providing an anchorage for muscle tissue and caudal fin etc. The body cavity con-

Continued on page 150

![Diagram of fish anatomy with labels for brain, spinal cord, vertebrae, heart, intestine, anal opening, kidney, eye, swim bladder, stomach, gill, etc.]
Our experts' answers to tropical fish-keeping queries

Many queries from readers of "The Aquarist" are answered by post each month, all aspects of the fancy being covered. Not all queries and answers can be published, and a stamped self-addressed envelope should be sent so that a direct reply can be given.

I have just bought six young moonlight gouramis. How does one tell a male from a female?

A male is distinguished from a female by his brighter coloured pelvic fins, but the characteristic orange-red colour does not become very apparent until a male has reached a fair size.

Recently I acquired two angel fish, but every time I approach their aquarium they dash themselves against the sides of the glass. What can I do to cure them of this nervousness?

What you need is a thick hedge of plants to separate the open water from the glass ends. Also, plenty of vegetation or near the surface to provide shade. With thickenets of plants to slip into, and protection overhead, the angel fish will feel more secure. In due course, they will settle down in their surroundings and lose a lot of their natural timidity.

What is a variable plant?

The variable plant is just another common name for Niphophorus varius or, as it was once called, Platypoecilius varius from southern Mexico.

Over the last few months I have been raising the green algae from the sides of my aquarium with a small weir of steel wool. When I mentioned this to my dealer he warned me that if I continued in this practice I would soon start losing lots of my fish. I should appreciate your views on this subject.

The fragments of steel wool that break off into the small weir would have little or no effect on the chemical content of the water. The danger lies in bottom-grubbing fishes sucking the metal splinters into their internal organs. We agree with your dealer. Steel wool should be kept out of a filled aquarium.

I have two Malacoma termitek, but they seem loath to accept any live-food I have offered them. What foods does this species prefer?

Thekeeping gouramis are largely herbivorous and flourish best when they can browse on mosses or soft wolly algae, nitella, and the like, supplemented with a fine-milled dried fish and a flake food that floats for a while before sinking to the bottom.

An Apache angelfish I have kept going after some of the other fishes in my aquarium in order to nibble at their sides and underparts. What is the reason for this?

We can only guess that the slime that covers the bodies of some fishes has an attraction for A. apuiscus. Our advice is to remove these sought-after fishes, or the anemones, from the aquarium before harm is done.

What is an anchor worm? What does it look like?

The anchor worm—a parasite that attaches itself to fish—is not really a worm at all but a copepod, that is a member of a sub-class of the Crustaceans. It is the female which does the harm. She attaches herself to a fish and feeds on its blood. The wound made quickly becomes a banqueting table for lesser nasty little organisms. One way of removing an anchor worm from a fish is to spot the parasite with a drop of medium-strength solution of permanganate of potash. But take care that the permanganate does not run into the gills or mouth of a fish. The anchor worm looks like a small leech (about 1 in. in length) with anchor-like appendages at the head. The female produces two egg-sacs at the tail-end of her body. The larvae that develop from the eggs swim around until they in turn find a fish to feed on.

Is it true that water plants will not grow in a tank devoid of fish?

Water plants will grow in any tank, provided the light is right for them and the nutrients are there to keep them going. Ordinarily, the rich droppings of well-fed fishes supply the plants with food, just as plenty of manure grows good vegetables or garden plants. If you remove the fish from an aquarium and introduce a small quantity of loam or clay in their place the plants will go on as before.

Does the frequent feeding of brine shrimps over a protracted period lead to an unattractive environment?

A keepers I met in a dealer's shop told me he stopped feeding brine shrimps on his fish. If you mean does feeding brine shrimps in any quantity alter the chemical composition of the aquarium water, the answer is yes. The smaller the aquarium is and the more lavish you are with the shrimps the faster the change will come about. A slow and reasonable increase in the salinity of the water will not harm salt-tolerant fishes, but those species that do not like salt, and certainly most aquarium plants, will suffer if the salt content keeps mounting up.

Is the firemouth cichlid peaceful enough to live in a community tank?

Individual firemouth cichlids differ greatly in temperament. Some of them seem to go through life quite willing to let other fishes swim around un molested. Others become most active and raise the alarm whenever they see any possible enemy. You should consider this factor if you have a community tank filled with different species of fishes. Firemouths, however, are usually quite harmless in a community tank stocked with robust fishes of about their own size.

Some sticklebacks in a local break are as spectacular in appearance as any tropical fish. Would it be possible to accommodate some of these well-coloured sticklebacks to a heated aquarium?

The stickleback can stand a reasonably high temperature during the summer months, but you must bear in mind that it is a coldwater species and soon weakness and dies if it is denied access to cooler water. A tropical tank is no place for it. Incidentally, the male stickleback is the one with the lovely colours. The female is quite drab.
Coldwater fish-keeping queries answered by A. Boarder

I have read recently in *The Aquarist* that soil can be put in the bottom of a tank. Will this not discolour the water?

If a little soil is placed near the back of the tank base and it is well covered with coarse sand it should not discolour the water at all. Pour the water into the tank onto a piece of flat board so that the bottom is not disturbed. After a couple of days the water should be quite clear and remain so.

I have a pond about 7 ft. long by 4 ft. wide and about 3 ft. deep. I have 3 goldfish in it varying from half an inch to eight inches long. Could I add 2 or 3 other goldfish recommended by Rudi and Otto?

I think that you have quite enough fish in your pond without adding any more. There is no point in stocking a pond to capacity. A few fish will live happier and healthier than a large number in overcrowded conditions. Remember, that if the fishes are to keep healthy and grow, they must have plenty of swimming space. The Rudd will eat most foods as taken by goldfish and the Orfe will also eat the same. However, Orfe are very fond of all types of live foods and will thrive and grow much better if they get plenty of worms, etc. They also like a well-oxygenated water and are soon in trouble if the water gets foul or too warm.

We have a mill pond 50 by 40 yards and about 2-3 feet deep. There are some Roach, Steen Lough, Sticklebacks, and a few Tench and Perch. These fishes are badly infested with fish lice [Argulus]. There have been some before but never on this scale. Can you suggest any means of clearing away these pests?

You have a major problem in so much water. To clear fishes of lice when in a tank or a small pond is an easy task but in your case it is very difficult to cope adequately. If you could catch some of the fishes to keep as stock, then empy the pond and let it dry right out, you could probably clear away all the pests. The Argulids could not survive a drought not could their eggs. The lice only leave a few to lay their eggs and this is when they might be eaten by such fish as Minnows. I think that small Perch would also eat them. A fairly strong solution of permanganate of potash could kill the lice but it would be very difficult to make a solution which could take effect in so much water. If the fishes had lice on them when they were caught these could be picked off with tweezers or if the fish was immersed in a solution of Deterol, a half teaspoonful to a gallon of water, the lice would leave them immediately. The fish must be watched whilst in the solution and returned to fresh water within a minute or two, and at once if the fish turns over. I do not like Sticklebacks with other fishes as they often carry parasites and diseases, but if not fed by any other means could be eaten by Perch. I have often found them in the stomachs of Perch, although their spines might have been thought too sharp. If Minnows were put in the pond to eat the lice, they in their turn could be eaten by the Perch.

I intend setting up a few coldwater tanks and would like to know how large Peacock-eye and Diamond Bass can grow, also Tench and Moors?

The Peacock-eye can grow to six inches but four is about the usual in a tank. The Diamond Bass or Sunfish grows to about four inches. Tench could grow to a foot long or more and weigh several pounds. They should be placed in a pond as soon as they reach four inches long overall. Moors are fairly old when they reach four-inch body length.

I set up a tank 18 x 12 x 12 in., with 7 fancy goldfish. I have had a bad attack on the fishes of fin-rot and have lost several fish. What can have gone wrong?

In the first place I think that any tank under 24 x 12 x 12 in. is much more difficult to keep in good order than one of that size or above. The size of the fish was not given and as the tank should not hold more than 9 in. of fish it is possible that you were overcrowding. Once this happens it is surprising how soon something starts to go wrong. There is one very important point about fish keeping and that is unless fish have sufficient swimming space they will not thrive, this in spite of aerators or filters. Fish in a crowded space are soon prey to any disease which may crop up. They have a natural mucus protective covering which acts as a repellent to many diseases. Once a fish gets slightly out of condition this mucus either becomes weakened or deranged. It is then that germs etc., can get a hold and the fish becomes ill. Obviously if one fish in such a tank becomes infected or infested the trouble can soon spread to any other fish in the tank. Set your tank up afresh and only have two or three small fish. Do not over-feed and all should be well.

One of my goldfish is swollen on one side. What is the cause?

It is probably that the fish is a female which is full of eggs. These fish often show a pronounced swelling on one side more than the other.

I have a bath in my garage I use as a fish pond. Some of the fish have white mould on them and are very sluggish. What is the matter with them?

The fish have a disease called Velvet disease, Oodinium. This is often caused by bad conditions and it may well be that your bath is too small for the number of fish you have in it. You should not have more than half a dozen three-inch goldfish in the bath and you must not give too much dried food or the uneaten food will soon turn the water sour and the fish will die.

I have a pond which has a weeping willow tree hanging over it. The leaves fall into the water and I am afraid they will pollute it. I do not want to remove the tree. Is there anything I can do to keep the leaves out?

Apart from netting the pond when the leaves are falling you will have to use a net and catch them up each day before they sink to the bottom. They are not likely to do any harm until they sink and start to decay.

Could the Peacock-eyed Bass be included in a class for Carp and Minnows?

Sunfish are usually included in the class for any other species or variety of coldwater fish.
Marine queries answered by T. Ravensdale

How does organ pipe coral grow and where does it come from?
Organ pipe coral (Tubipora musica) belongs to the sub-class Octocorallia. It comes from practically all the warm oceans and can be found on practically any reef. It does however take 'root' on almost any object and can even be found growing on dead crab shells or rocks. When alive organ pipe coral is green, the live polyps providing from the tubes of their dead parents.

I understand that Sea fans are the skeletons of live animals rather like coral, is this true?

Sea Fan (Gorgonia flabellum) is not only similar to coral—it is coral. It does not however grow on the coral reefs but anchors onto the floor of the ocean, mainly in the East Indies, on the Continental shelf. When alive this coral is covered both sides by a colony of polyps which can retract into the safety of the skeleton structure formed by the skeletons of its parents.

How large can the Opelet anemone grow and is it a tropical anemone?
The Opelet (Anemonia sulcata) can reach a diameter of eighteen inches and comes mainly from the Mediterranean Sea. It can therefore be regarded as tropical. Opelets can however be found in English waters and these are smaller and, needless to say, coldwater specimens.

Getting under their skin
continued from page 147

raining the vital organs is housed within the bony cage in the lower anterior part of the body.
To survive at all a fish requires to extract oxygen from the water which it does by taking water in through the mouth and passing it backward over the gills and ejecting it again. The gills are broad and flat and a dense red, formed like a fringe, containing numerous finely divided blood vessels. The heart pumps blood to the gills where it passes along the fine blood vessels through which oxygen is absorbed from the water. The blood stream is then distributed to the different parts of the body and the oxygen is used up for the production of various forms of energy, after which the blood returns to the gills for re-oxygenation.
The gills are provided with protection externally by the outer covering of skin which is provided with fine gill rakers to prevent the passage of food through the gills themselves. The gill rakers are in the form of a row of short, stiff rods on the inner face of the gill arches and when food and water are taken into the mouth the gill rakers retain the food until it is brought against the opening of the gullet and is swallowed. Under normal conditions the front of the gullet is kept closed to avoid taking unnecessary water into the stomach.
Food passes down the gullet into the stomach which may be a U-shaped organ or merely a sac of quite small size. The stomach walls contain gastric glands for digestion and vary greatly in character depending on the normal type of food eaten by the particular variety of fish. From the stomach food passes to the intestine in liquid form where the goodness in the food is assimilated and passed for absorption by the blood, which in turn circulates it through the body for the production of tissue and energy. The length of the intestine varies greatly, being dependent on the staple diet of the fish. Species which feed almost exclusively on other fishes are provided with very short intestines, whilst vegetable eaters have a lengthy intricately coiled intestine to provide a far greater area of absorptive surface. The intestine terminates directly at the vent for the expulsion of waste matter.
The heart is situated behind and below the gills and is provided with three or four chambers to take care of the circulatory system of the blood. Fish are provided with an air bladder to control their buoyancy, which is arranged to be neutral in most species. The action of the air bladder is quite delicate and surprisingly quick in effect, which is easily demonstrated.
If a fish is placed in a closed container with a piped connection and the pressure is increased by blowing, the fish will tend to sink for a short while until the compensation mechanism comes into operation and the air bladder restores the equilibrium. When the pressure is released, the reverse will be seen to happen. In some fishes the air bladder is used as a secondary means of respiration and the walls are well endowed with a network of fine blood vessels to absorb the oxygen. Fish may gulp air into the gullet for this purpose particularly if the oxygen content of the water is low. The anabantids also have a dual breathing mechanism as in addition to the gills they are equipped with a labyrinthine organ for storing atmospheric air.

THE AQUARIIST
AQUARIA AND ZOO GUIDE

CHESHIRE
North of England Zoological Society, Zoological Gardens, Upton-Cum-Skegby, Chester, Cheshire. Admission charge to Gardens—Adults, 6d.; children, under 14, 3d. Partly heated. Party terms (parties of 25 and over only): per head. No reduction for parties. Descriptive leaflets. Tropical and temperate fresh water with 179 species of fresh water plants. The main features of the Zoo comprise 13 tanks and a floor pool, and includes coldwater, tropical and temperate marine sections. We endeavour to exhibit marine species such as sea anemones, crabs, prawns, porcelain fish, dragon fish, seahorses, etc., rather than the more common species.

DEVON
Exeter Aquarium, Sea Front, Exmouth, Devon. Admission charge—Adults, 6d.; children, 3d. Open 10 a.m.–5 p.m. every day. No parties. Descriptive leaflets available on request. Descriptive leaflets. There is a marine aquarium section and an exhibition of marine tanks. There is also a marine aquarium section and an exhibition of marine tanks.

Plymouth Zoological Park, Plymouth, Devon. Admission charge—Adults, 6d.; children, 3d. Open daily 10 a.m.–5 p.m. Partly heated. Party terms (parties of 25 and over only): per head. No reduction for parties. Descriptive leaflets available on request. Descriptive leaflets. The Park comprises 20 tanks and a floor pool, and includes coldwater, tropical and temperate marine sections. We endeavour to exhibit marine species such as sea anemones, crabs, prawns, porcelain fish, dragon fish, seahorses, etc., rather than the more common species.

Lancashire
Shanklin Aquarium, Tower Main Buildings, Blackpool. Admission charge—Adults, 6d.; children, 3d. This includes general admission to the tower and the other buildings. Partly heated. Party terms (parties of 25 and over only): per head. No reduction for parties. Descriptive leaflets. There is a marine aquarium section and an exhibition of marine tanks. The main features of the Zoo comprise 13 tanks and a floor pool, and includes coldwater, tropical and temperate marine sections. We endeavour to exhibit marine species such as sea anemones, crabs, prawns, porcelain fish, dragon fish, seahorses, etc., rather than the more common species.

Percy's Gardens—Zoological and Botanical Gardens (including an Aquarium), Chester, Cheshire, Derbyshire. Admission charge—Adults, 6d.; children, 3d. Open 10 a.m.–5 p.m. every day. No parties. Descriptive leaflets available on request. Descriptive leaflets. The Zoo comprises 13 tanks and a floor pool, and includes coldwater, tropical and temperate marine sections. We endeavour to exhibit marine species such as sea anemones, crabs, prawns, porcelain fish, dragon fish, seahorses, etc., rather than the more common species.

LANCASTER
Chorleywood Park, Chorleywood, Hertfordshire. Admission charge—Adults, 6d.; children, 3d. Open 10 a.m.–5 p.m. Partly heated. Party terms (parties of 25 and over only): per head. No reduction for parties. Descriptive leaflets available on request. Descriptive leaflets. The Park comprises 13 tanks and a floor pool, and includes coldwater, tropical and temperate marine sections. We endeavour to exhibit marine species such as sea anemones, crabs, prawns, porcelain fish, dragon fish, seahorses, etc., rather than the more common species.

SUSSEX
Brighton Aquarium, Marine Parade and Madeira Drive, Brighton, Sussex. Admission charge—Adults, 6d.; children, 3d. Open every day 10 a.m.–5 p.m. Partly heated. Party terms (parties of 25 and over only): per head. No reduction for parties. Descriptive leaflets available on request. Descriptive leaflets. The Park comprises 13 tanks and a floor pool, and includes coldwater, tropical and temperate marine sections. We endeavour to exhibit marine species such as sea anemones, crabs, prawns, porcelain fish, dragon fish, seahorses, etc., rather than the more common species.

WORCESTERSHIRE
The Dudley Zoological Society Ltd. (The Aquarium). 21, The Broadway, Dudley, Worcestershire. No admission charge to Aquarium. The Aquarium is open Monday to Sunday, 10 a.m.–4 p.m. (closing after sunset). Partly heated. Party terms (parties of 25 and over only): per head. No reduction for parties. Descriptive leaflets available on request. Descriptive leaflets. The Park comprises 13 tanks and a floor pool, and includes coldwater, tropical and temperate marine sections. We endeavour to exhibit marine species such as sea anemones, crabs, prawns, porcelain fish, dragon fish, seahorses, etc., rather than the more common species.

September, 1967
Discovery of fossil fishes
by Michael Lorant

DR. BOBB SCHAEFFER, chairman and curator of the Department of Vertebrate Paleontology of The American Museum of Natural History, New York, has recently discovered six new kinds of fossil fishes in ancient pond and stream deposits in Colorado, Utah, and Texas; also collected several hundred other specimens of fishes that lived about two hundred million years ago during the last part of the Triassic Period.

The specimens from Colorado and Utah represent the largest single fish collection ever found in a series of sedimentary rocks called the Chinle formation. The Texas specimens are among the finest examples from a rock unit of the same age, the Dockum formation.

In addition to the six new genera, the remains of two previously known genera were found. Only one of these ancient fishes has a living relative.

Dr. Schaeffer, has been alerted to the presence of the fish beds by geologists who were investigating the distribution of uranium ores in the Colorado Plateau. The beds are located in remote areas in Dolores Canyon near Bedrock, Colorado, and in Big Indian Valley, Utah.

The Texas fossils come from a Triassic pond deposit near Big Spring in Howard County.

During the Upper Triassic period, the areas where the fossils were found were part of a vast lowland flood plain with streams and shallow ponds. The climate was semitropical with alternating wet and dry seasons. Many of the fishes were concentrated in drying streams and ponds. At one locality in Big Indian Valley, Utah, the underside of a rock overhang was covered with 25 to 35 fish per square foot.

Dr. Schaeffer describes his fishes as rather small, with characters that suggest most of them were brownish or grubbish. The only large fish is a coelacanth, which probably reached a length of three feet. It is the only fish among his discoveries that has a living relative today.

The most exotic member of this ancient assembly is a deep-bodied creature that has scales only on the front of its body. The absence of scales on the posterior portion probably increased flexibility of this area and provided greater forward thrust.

A character shared by some of these primitive fishes is a bony snout covered with tubercles. One well-preserved skull from Texas shows the pointed tubercles particularly clearly. According to Dr. Schaeffer, they may have been embedded in a fleshy upper lip.

The fish are in all stages of preservation ranging from the actual bone to impression in the rock. Some are complete skeletons but others are represented by isolated skull parts, scales, or fins. Almost all of the specimens were compressed by the weight of the over lying sediments.

In comparing these fishes to Upper Triassic specimens from the north-eastern United States some 1,700 miles away, the American scientist found that two of the genera are identical, while several others are closely related.

The southern aeshna dragon-fly
By F Wilmot

THIS large dragon-fly is one of the “Hawker” species and its main colourings are dark brown and either blue, yellow or green, according to sex and age. There is sufficient of the lighter colouring, however, to make it a brilliant dragon-fly.

The southern aeshna, as its name implies, is common over most of Southern England also the Midlands, but is not found in Scotland or Ireland. It is found in most of Europe, also in parts of North Africa and Asia Minor.

Besides “hawking” over stretches of water Aeshna cyanoe occasionally turns its attention to patrolling lanes and hedgerows, when a butterfly will sometimes be one of its victims. It is also sometimes seen flying in towns, and will even occasionally enter houses.

This dragon-fly is usually on the wing only from early July to early September, but will sometimes be visible (if the weather is suitable) up to late October. The nymph (or immature form) is coloured brown and green, and lives in ponds and other still water. It seems to have no objection to living under crowded conditions, and can often be found in very small garden pools.
What is your opinion? No. IV

By B. Whiteside

I n the second article of “What is your opinion?” I posed problems on (1) how to grow Cabomba and Limnophila, and (2) results obtained by using different forms of aquarium lighting.

From Mr. N. A. Clark of Abbey Wood, London, came the first letter telling of his 36 in. x 15 in. x 12 in. tank which is fitted with a power and an undergravel filter, and which has the water kept slightly acid by using two commercial brands of aquarium liquid preparations every fortnight. Mr. Clark’s aquarium receives a little natural light which is supplemented by artificial illumination each evening for two hours with two 25 watt bulbs. He cannot grow Cabomba although other plants, including water wisteria, grow quite well. Mr. Clark is amazed when he enters his local pet shop and sees tanks with an abundance of Cabomba looking magnificent.

Mr. J. V. Jeffery of Southbourne, Bournemouth, has had little success worth writing about in growing Cabomba or Limnophila (Ambulia). In answer to the second question, Mr. Jeffery has found by experience, that there is no hard fast rule as regards lighting aquaria but thinks that the best place in which to set up aquaria is somewhat where natural sunlight never falls directly upon them. He decided to move his tanks to a fish house, the windows of which he fitted with curtains. He now only opens the curtains when he is working in his fish house. This has cut down the growth of algae and any abnormal growth is the direct result of incorrect top lighting. Mr. Jeffery has experimented with tungsten bulbs of varying wattages for varying periods but finds that results also vary a lot. He also used tungsten strip lighting but found that, although there was a more even distribution of light, the strip lighting gave no apparent benefit to the plants.

Another letter which I received came from Dr. C. D. K. Cook, of The Hartley Botanical Laboratories, The University of Liverpool. Dr. Cook is at present professionally engaged in writing a monograph of the genus Cabomba, and has studied it in its native habitats in South America and in cultivation at The University of Liverpool. He states that in nature Cabomba is a large plant but does not necessarily need deep water. He has found plants growing in water from 6 ft. to 6 in. deep. When mature, the stems are up to 10 ft. long and the plant seems to grow best when the stems struggle in a tangled mat along the water surface although, as Dr. Cook states, this state is hardly desirable in the aquarium as the stems that are rooted in the bottom are almost invariably without leaves.

Dr. Cook continues by saying that in the aquarium, plants of Cabomba must be constantly propagated by breaking off apical parts of the plants when they reach the water surface, and replanting these apical portions in the bottom of the aquarium. He has tried many different methods of cultivation of Cabomba and has discovered that, despite what two famous authorities say, all species grow best in the following conditions: (1) Depth of water: immaterial—he uses a depth of 6 in. to 9 in.; (2) Potting medium: as the plant feeds through its roots, he uses John Innes potting mixture (lime-free) and plastic plant pots. The surface of the compost is covered with between ½ in. and ¾ in. of granite (lime-free) chips to prevent the compost from clouding the water; (3) Water: he uses tap water filtered through peat, which gives a pH of about 5.5. Although, as Dr. Cook says, this is very acid, he finds that the following fish thrive in these conditions, Xiphophorus Hypostomus, Gynacochromis, Puntius, Apistogramma and Acanthophthalmus. He continues by observing that Cabomba seems very sensitive to most dissolved organic salts, and very small quantities of calcium will cause it to become brittle and die; (4) Temperature: a wide tolerance, 18°C (65°F) to 35°C (95°F). He uses mostly 20°C (68°F); (5) Lighting: Dr. Cook finds this is very important. If insufficient light is given, the plants soon become “leggy” and one cannot propagate from “leggy” stems. Natural sunlight is best (in a heated greenhouse—it does not like cold draughts). He has experimented with many kinds of artificial lighting. Gro Lux tubes (in answer to my second question) are the best type of light on the market but they have a rather low light intensity and for best results should be mounted touching and kept about 2 in. above the water surface, i.e. eight 4 ft. tubes for one 12–48 tank. This, says Dr. Cook, is somewhat expensive and he finds that mixing Gro Lux with de lux Warm White is just as effective. He continues by stating that Cabomba will not last more than a few months with tungsten lamps alone.

Dr. Cook has ordered a number of different species of Cabomba from dealers but so far has only obtained C. caroliniana and C. planthamnoides from British firms. He does not believe it is possible to determine the species of Cabomba without flowers, despite what the books say.

Limnophila (Ambulia) he says, is a very good aquarium plant and will grow under a wide range of conditions as long as it gets enough light. As soon as the stems of Limnophila reach the water surface, they should be cut off near the base, or the stems will leave the water and grow in air. In nature, it is a weed of the rice fields and grows most vigorously above the water surface. It is best propagated as a land plant in a tropical greenhouse. L. aquatica is, perhaps, Dr. Cook considers, the best species. He ends by saying that although it is rarely offered for sale under this name, this is the species which one usually gets.

Continued on page 155

September, 1967
Champion of Champions contest

The interest created by the various announcements which have appeared has already highlighted this contest as the outstanding event in the aquarist world this year. All entries for the contest will come from the winners of the "Best Fish in the Show" award at the Open Shows. The "Champion of Champions" contest will be held at Belle Vue, Manchester on the 28th-29th October.

A list of those so far eligible for entry at the time of this issue going to press, appears on page 159.

The awards which will be presented to the winners are shown below.

Award to winner of THE CHAMPION OF CHAMPIONS CONTEST

The winner of the 'Champion of Champions' contest will be awarded a Hall-marked 9ct gold lapel pin in the shape of The Aquarist badge inscribed—'Champion of Champions'. Laurels support this badge to differentiate between the 'Champion of Champions' and the 'Best Fish in the Show' awards. A cash prize of twenty guineas together with an inscribed plaque will also be awarded.

The first prize in the contest will be an oxidised silver-plated plaque mounted on a hand made Indian Rosewood back, a cash prize of 20 guineas and a solid gold pin as described above.

Second prize. An oxidised silver-plated plaque mounted on a hand made Indian Rosewood back together with a cash prize of thirteen guineas.

Third prize. A plaque similar to that of the second prize and a cash prize of seven guineas.

The plaques are inscribed with the name of the recipients and the position gained in the contest.
The blind cave characin

by Michael St. John

In one sentence, the blind cave fish is unusual but inexpensive, completely amiable to all but the smallest fish in a community tank and comparatively easy to breed and raise.

An attractive fish, Aequidens jordani is silvery-pink in colour and has an adipose fin which is typical to many of the characins. A. jordani is thought to have evolved from Astyanax mexicanus when some of the latter got lost in some dark Mexican caves where the use of eyes was no longer needed. Where the eyes once were, there now remains only two empty sockets. But don't for one moment feel sorry for him. A. jordani has such highly developed senses of touch and smell that he rarely bumps into anything and makes an excellent scavenger by systematically scouring the bottom of the tank for food missed by the other inmates.

Spawning is a fairly simple affair. I use a 12 or 15 gallon tank with a double layer of marbles, or one of the other recognised egg-saving devices, as the breeders will eat every exposed egg. Plants are not needed. I have found that water which has an approximately neutral pH and a fairly high DH at about 75°F to be very satisfactory.

With a maximum length of about 3½ inches, the blind cave Characins are easy to sex, the females being much plumper than the males. A well-conditioned pair, at least 2½ inches long, should be placed in a dark or dimly-lit aquarium. They might circle each other for some time but will eventually come together and as they rise to the surface, the female expels her eggs and the male fertilizes them.

Providing the fish are removed as soon as spawning is completed, there could be as many as 800 eggs left. The same fish should be ready to breed again in a month.

Within 72 hours hatching is complete and after six days all the fry should be free-swimming. They grow fast on a first food of "liquitex" for egglayers and after three or four days on this they will readily take newly hatched brine shrimp.

One slight setback: growth is seldom uniform but I have found that sorting the fish by size easily overcomes the problem and in four or five months the fish are ready for the dealers' tanks.

What is your opinion? No 4

What is your opinion on the following two questions for the next article—(1): How do you deal with the problem of unwanted snails in your aquarium? and (2): What success have you had in breeding some of the more "difficult" kinds of fish such as zeons, cardinals etc.?
Breeding of the lake Malawi cichlids
by Jack and John Cooper, Joint Show Secretaries, Mid-Herts. Aquarist Society

LAST year, by mutual consent, we decided that our 1966 holiday would be the year that we would make a grand tour of as many dealers’ establishments as possible, to try and find some unusual fishes to attempt to breed with—just something that had not been heard of before, so that we had to start from scratch when trying to get them to breed—no text books to give the right line.

What a hope. I thought to myself but on a visit to a well-known dealer in Birmingham who deals mostly in marines, I saw some fishes that were so colourful to look at that I turned to my son and said “More marines I suppose”, but on enquiring from the ‘governor of the establishment’ was informed that these were the new Lake Malawi cichlids which had just been imported from Germany and gathered that as far as we was known, these fish had not been breed at that date. Oh! what a chance! Maybe the price is best left out of the picture; but I assure you that two very happy men left this establishment with two pairs of these fish in two different species, namely Pseudotropheus trewavasae and Pseudotropheus auratus.

Right, now we had the fish, what was likely to be their spawning habits? Would it be in the usual cichlid fashion? But first things first—your fish must be happy as it is our contention that a happy fish is much more likely to spawn, and as we have found that cichlids normally like flower pots to spawn in we put two in each tank, one at each end. These the fish took to immediately and seemed to settle down fairly easily. So far so good; now what about the water? Let’s try hard alkaline water with an additional small amount of sea salt to bring up the mineral content, the reaction of the water was pH 7.2 hardness 230 p.p.m. with a temperature of 78°F.

Pseudotropheus trewavasae
These fish are about four inches long. The male is a beautiful electric blue with a vivid red dorsal fin. The female in comparison is rather drab, being a mottled tan brown with some black.

We found that this pair were very peaceful towards each other and did not dig up plants. By the end of December 1966 we had spawned this pair of fish twice resulting in a first brood of sixteen and a second brood of thirty six. These fish are mouth-breeders and incubated their eggs for 32 days.

Pseudotropheus auratus
These are a completely different “kettle of fish”, being
both extremely aggressive and avid diggers and will not tolerate plants. If any are introduced into the tank they will immediately uproot them.

Of all the new Malawi cichlids we think that these are the most beautiful of them all, the female being predominately bright yellow with jet black longitudinal lines, with a black edge to the dorsal fin; whilst the top half of the caudal fin has numerous black spots with the lower half a clear deep yellow. The male when in breeding condition is similarly marked with the exception of the lower half of the body which is a very dark navy blue with a single pale yellow spot on the tip of the anal fin, similar to the other mouth-breeding species.

Unlike the \textit{tremaruae}, we were not able to leave this pair together and their 36-inch tank was divided in half with a glass partition allowing the fish to become accustomed to each other without any damage being done. The tank was set-up with numerous rocks and a flower pot in each compartment and with a gravel base. The water reaction was left at pH 7.2 and hardness 230 p.p.m. with a temperature of 78°F. The fish were conditioned on tubifex worms, white worms, daphnia and scraped beef—what appetites!

When it was noticed that the female appeared full of roe we removed the glass partition and awaited results, only to see the hen bullied to such an extent that the male would surely have killed her if we had not separated them. About two hours afterwards we noticed the female, with her ovipositor slightly down, trying to get to the male and the male on the other side trembling violently with his body slightly curved as though displaying to his partner. The partition was immediately removed and this time harmony reigned with the male continually displaying to his partner, periodically trembling violently on a steep incline he had made with the gravel, after a few minutes the female swam to this incline and started to make a typical cichlid laying run with the male following close behind—but NO eggs—next time round—success—eggs appeared, about five in number; these were opaque fawn in colour and about \(\frac{1}{4}\) of an inch in diameter. They were immediately fertilized by the male with the female following close behind, gathering the eggs into her mouth. Ten or twelve runs occurred in this manner and by the end of the spawning the female's mouth was really bulging with eggs. The male then started to get very aggressive again and so had to be removed.

The incubation period took 23 days, during which time the female refused food completely. When the youngsters appeared they were exact replicas of the female and approximately a quarter of an inch in length. Unlike the youngsters of the \textit{tremaruae}, the young \textit{auranus} showed no inclination to return to their mother's mouth, in fact, when she approached they scattered. For the first two days the young were fed on newly hatched brine shrimp, progressing to chopped tubifex and white worms and within a fortnight they had almost doubled their size. At the time of writing this article 55 youngsters of \textit{Pseudotropheus auratus} seem to be progressing very well.
The White Cloud Mountain Minnow

by Jack Hems

A pair of White Cloud Mountain minnows.

One of the smallest members of the largest and most widespread of all freshwater fish families—the Cyprinidae (carps)—is the White Cloud Mountain minnow. This little fish is elegantly shaped, charmingly coloured, active, hardy and peaceful. In addition to these desirable qualities, it has a life-expectancy of about three years and breeds freely. In fact, if a pair of White Cloud Mountain minnows are given a spacious, densely planted and snail-free aquarium to themselves, they will deposit eggs every so often at most times of the year.

The fry, that look like animated slivers of blue-green luminescent glass, dart to and fro in the middle and upper levels of the water and pick up enough infusorians (some always exist in a thickly planted aquarium) and miniscule dried food to tide them over for the first few weeks of their lives. Henceforward most of the food introduced for their parents will prove acceptable and growth is rapid.

From this you will gather that the parent fish are not dedicated cannibals. As a rule, they take little or no interest in their fry. But they will eat some of the eggs within easy reach. The fry themselves are more of a problem for the larger ones will worry—maybe devour—some of the smaller ones. The answer to this, of course, is to remove large fry to another tank every now and again and leave the smaller ones to grow on in peace (that is if you wish to build up a stock of White Cloud Mountain minnows). But more about the subject of breeding later.

In the natural state Tinfoilby anemonae—to give this species its scientific name—inhabits the relatively cool streams that gurgle or tumble or meander sinuously about the uplands just beyond Canton (the White Cloud Mountains, China). Be this as it may, captive specimens thrive well in any small body of still water provided it is well-aerated and kept free from swirling particles of sediment. Another thing, water that is slightly hard and alkaline suits this species better than water that is soft and acid.

Of even greater importance than the quality of the water is temperature: this should be maintained in the sixties or lower seventies (°F). For excessive heat, say, in the eighties (°F), especially if it is prolonged, leads to increasing lassitude, wasting, and premature death. Feeding is no problem at all; for almost anything alive or dried and is small enough to be swallowed is taken. Food is usually taken before it reaches the bottom; rarely from the bottom.

The general colour is brown on the back shading to milk white with a faintly silvery sheen on the belly. A dark olive band above which a greenish blue to greeny gold stripe (the colour of this stripe varies according to the strength and direction of the light entering the aquarium) extends from the eye to the root of the tail, where it terminates in a black spot on a vivid red ground. This glowing colour is also present on the base of the forked caudal fin. The lobes of this fin, and the anal and ventral fins, are a nondescript yellowish white. Sometimes,
Award to winner at OPEN SHOWS

The illustration shown is the gold-plated pin awarded to the winners of the "Best Fish in the Show", particulars of which have been published in recent issues. As it is possible that some winners have not received a pin, they are requested to apply to the secretary of the Open Show where they won the award, for the appropriate form. If in difficulty these forms are obtainable direct from The Aquarist, The Butts, Brentford, Middlesex.

Upon receipt of the completed form an award pin will be sent direct to the winner.

Up to the time of going to press the following have been presented with the award.

- Name
- Club
- Species of Fish
- Open Show

- N. Atkinson
- International Marine Study Society
- Tropidophages argus
- Spaldwick
- Lancashire A.S.

- I. Ruston
- Essex A.S.
- Red Helio Swordtail
- Freeman A.S.

- Mrs. J. A. Duncan
- East Dulwich A.S.
- Giant Australian Rainbow
- Hertfordshire A.S.

- K. Parke
- Horselydown A.S.
- Turquoise Barb
- Londesborough A.S.

- Mrs. F. Parke
- Trowbridge & Dist. A.S.
- Moonlight Gourami
- A. & P.S.

- J. Stiff
- Portishead A.S.
- Lepomis Gibbosus
- Taunton A.S.

- E. H. Dorr
- Workse A. & Z.S.
- Rasbora
- Taunton A.S.

- E. M. Barlow
- Weymouth & Dist. A.S.
- Red Dusty
- Taunton A.S.

- D. Sibley
- Cheltenham A.S.
- Alburnus Clarus
- Taunton A.S.

- A. Mayson
- Workse A. & Z.S.
- Cichlidspes severum
- Taunton A.S.

- R. J. Thorne
- Hounslow & Dist. A.S.
- Cichlidspes severum
- Taunton A.S.

- A. Phillpott
- Eton Loos A.S.
- Cichlidspes severum
- Taunton A.S.

- J. Robinson
- Torbay A.S.
- Black Moor
- Torbay A.S.

- K. J. Harvey
- Devon A.C.
- Parc
- Torbay A.S.

- L. Andrews
- Workse A. & Z.S.
- Piranha
- Torbay A.S.

- A. Matthews
- Bradwell A.S.
- Silver Shark
- Torbay A.S.

- J. Russell
- Brean A.S.
- Rambutan
- Torbay A.S.

- F. Brown
- Bristol A.S.
- Ancistrus Lautchris
- Torbay A.S.

- D. C. G. Loxton
- Aylesford A.S.
- Tiger Cat Fish
- Torbay A.S.

- C. W. Saxon
- Tewkesbury A.S.
- Bette Ickesand
- Torbay A.S.

However, the anal fin has a good dash of red in it. The perky dorsal fin is red at the top and yellow at the bottom. The pectoral fins are clear.

In regard to size, the White Cloud Mountain mimnow which, for the record, was first introduced to aquarium keepers in 1938, attains a length of about 1½ in. In mature specimens, the male is straighter in outline (more streamlined) than the female. Furthermore, he is slightly the brighter coloured of the two. All the same, young fish, and some adult fish not in the best of condition, are far from easy to sex (for the beginner, anyway).

But to return to breeding. That is, breeding to order. For the ordinary hobbyist, a tank measuring 10 in. by 10 in. by 10 in. is ample large enough. The water need only not reach above half-way up the sides. Plants such as Java moss (Vesicularia dubyana) or nitella, anchored to the bottom, are ideal for offering what protection is necessary for the eggs. Light should be bright, preferably sunny.

Before placing the fish in the tank, separation of the sexes for about nine days to a fortnight is recommended. For separation, combined with a diet rich in live and/or meat food, invariably brings them into the pink of condition. This is indicated by the fuller and more satiny appearance of the female and the brighter colours of the male. The temperature for conditioning and spawning is should average around 72°F—74°F.

The actual spawning procedure is quite simple. The male drives the most-distressed female into the plants or into an algae-fosted bottom corner of the aquarium, and there, to the accompaniment of twitching fins and close pressings of bodies, some eggs are laid. The couple repeat this performance at frequent or infrequent intervals over a period of several hours, or days. While this is happening, place a mesh bag of live food should be introduced into the tank. This helps to turn the attention of the fish away from their eggs. As soon as spawning is over, the parent fish should be removed to another tank. Make certain, however, that the fish are not subjected to any change of temperature. It seems hardly necessary to add that a spawned-out female is easily recognised by her flatter sides and underparts and diminished colours.

Incubation of the eggs takes up to three days. The newly hatched fry, so small that you have to strain your eyes to see them, cling head-up to the sides of the aquarium and the plants. But before a week is out, they become free-swimming and need plenty of food. Although the fry thrive fastest on microscopical live food (Infusoria), flour-free dried food may be offered as a substitute. As they grow, introduce such things as micro-worms, tiny Daphnia, and brine shrimps into their diet.

Under good conditions, the fry reach full size in about six to nine months. For the first few months of their lives they display colours which, for their brilliance, rival even those worn by a neon tetra. Moreover, then, T. albimacula is a most praiseworthy little fish.
The Higoi carp—for larger ponds
by A. Boarder

The Higoi is a fine fish for the larger pond as it can grow to a large size compared with goldfish. These fish can become very tame and can become accustomed to feeding from the hand. In many large ponds or small lakes some fine specimens may be seen. Under good conditions Higoi can grow to eighteen inches long and weigh over four pounds. In general shape these fish are rather similar to the ordinary goldfish but differ mostly by having four barbels, arranged in two pairs. The body is somewhat longer than that of a goldfish and the finnage is also rather more developed.

The usual colour is red or yellow although some are found with varied colours including blue. Some strains have some very attractive colours. Although some fishes have the colours rather similar to a shubunkin they are completely scaled and not calico as in the shubunkin.

Small specimens can be kept in a fair sized tank or in a small garden pond but as they can make rather rapid growth under good conditions it is advisable to include these fish in a medium pond if it is realised that they may one day grow too large for such a pond. However, their rate of growth is controlled considerably by the swimming space available as well as the food they are given.

The Higoi carp breeds in a similar manner to the goldfish and needs to be a fair size before doing so. The feeding habits are according to the usual carp methods and they are omnivorous. The general rules for feeding goldfish will apply to these fish; they will eat the usual dried foods as well as many live foods such as garden worms and Tubifex. The Higoi is hardy in this country but it will appreciate a well oxygenated water during the winter especially when the surface is frozen over. During the winter they become almost torpid, moving around and feeding very little. They are not a fast swimming fish but resemble the common carp in their lazy actions.

I have no knowledge that standards have been provided for this fish under the newer standards but a set of standards was given in the 1947 issue by the Federation of British Aquatic Societies. Under these standards the fish was to have a minimum body length of six inches excluding the caudal fin. This compares with the three inches for common goldfish and two for most of the short bodied fancy goldfish.

Under these standards points are allotted as follows: Body, 20; barbels, 5; dorsal, 6; caudal, 5; pectorals, 3; pelvic, 3; anal, 3; colour, 30; condition 15 and deport- ment, 10. It can be seen from the above that great stress was placed on the colour as this was practically the only...
feature which was likely to vary very much in various fish.

The Higo (Cyprinus carpio var. auratus), is on the whole a very worthwhile fish to include in any pond with a minimum size of about 20 by 10 feet and a depth of not less than 2½ feet. Many fine specimens can be found in the large ornamental lakes of country mansions.

The common Carp (Cyprinus carpio), is also often kept in ponds but as it is mainly bronze it does not show up to advantage, especially in a deep pond or one where the water is rather green with Algae. The Crucian carp (Carassius carassius), and the Mirror carp can also be kept in the garden pond but both can grow fairly large and like the Common carp they are not likely to be seen very often although on warm days they can be found browsing near the surface or just under water lily leaves. The Mirror carp has a few very large shiny scales on the body which make this fish rather more attractive than the other carp but unless the water was clear these special markings might not be seen.

A newer type of fish for the ornamental pond has come from Japan. This is the Koi carp and a type is known as the Nikishi-koi carp. I have not had personal experience with these fish so far but have seen pictures of them. They certainly look very attractive and I do not doubt that they will become very popular when more are available. Whether they will be quite hardy I do not know at present as it is rather early days to be sure. I think attempts are already being made to breed them in this country and no doubt we shall hear a lot more about them later on. They appear to be fairly normal in shape but it is in their colours where they are so striking. The usual goldfish varieties colours can be found but as well as the reds, whites and blues some have brilliant gold or silver colourings. This gold must not be confused with the so-called gold of the goldfish which after all is not gold at all but a kind of reddish-orange, but some of the Koi carp have the proper shining gold as for the actual metal. It is possible that most of these imported fish have been bred under rather warm conditions and so if any are purchased I suggest that care is taken to ensure that the pond water temperature is not much lower than that of the water in which they have been kept.

I expect that in a year or two there will be standards for these fish and we may see some fine specimens on the show bench. Meanwhile they will be shown in the class for any other variety or species of coldwater fish.

Sea of delight for hotel diners

All first-class hotels in Hong Kong boast of a panoramic view of the Colony’s famed “fragrant harbour”. And the Miramar is no exception. But this wasn’t enough, the management felt. So, in typical Chinese fashion, they ordered a huge glass tank, filled it with exotic tropical fishes and hung it on the ceiling of their penthouse restaurant, the Ondine Room. This, explained the management, is to create an atmosphere of an underwater paradise. Some paradise. It had cost the hotel something like HK$100,000 (£6,250 Sterling). Shaped like a huge diamond, the tank has a circumference of 30 feet, 5 feet deep and contains nine tons of water. So it is at the Ondine Room today—a “sea of delight” to dine in anytime.
Cabomba—A tropical aquarium plant

Mr. B. Whiteside’s article in the March issue of The Aquarist interested me considerably because I, like him, tried unsuccessfully for years to grow Cabomba.

While the conditions he has outlined for the successful growth of this beautiful plant in aquaria are probably ideal, I have over the last few months succeeded in almost the same conditions both here and I had previously found unsuitable.

This I attribute mainly, if not entirely, to the change from Tungsten bulb to Gro-lux.

I have two aquariums sized 42 in. x 18 in. x 10 in. and 18 in. x 10 in. x 18 in. Both are planted with Cryptocoryne, Water Hyacinth and Cabomba. The larger of the two being set up about three years ago.

Gravel: Untreated
Lighting: Large aquarium 56 in. x 30 watt Gro-lux tube; Small aquarium 18 in. x 15 watt Gro-lux tube.
Duration: 12 hours
Water: Hardness: 17° GH
pH: 7
Temperature: 75°F
Feeding: Live food only

I do not use filters but every two weeks I syphon one third of the water and refill direct from the “Ascot”.

Yours faithfully,
M. J. SHERLATT

The Hendon Congress

I would like to inform your readers, through the medium of your journal, that it is with pleasure that we again announce that Hendon will be raising another Congress. A Congress that we believe will be as successful as those we have held in the past. The venue remains unchanged (i.e., Whitfield Secondary Modern School, Claremont Road, Hendon, London, N.W.2). The date will be Saturday evening, 11th November, 1967, and will start at 6.00 p.m. We have chosen this date with some forethought; (a) it does not seem to clash with any other national aquatic gathering; and (b) it is the same day as the Lord Mayor’s Show. We felt that the many friends we have outside the London area may wish to enjoy a full day by seeing the Lord Mayor’s Show in the morning, visiting the many fish establishments in the afternoon and rounding off the day by coming to see us and our show.

It is with great excitement that we announce that our speaker for this year’s Congress is none other than Colonel Jorgen Soel of Copenhagen, Denmark.

I am sure the Killifish Associations (that now happily abound in our sceptred isle) will agree with us that Colonel Soel is the uncrowned king where egg-laying toothcarps are concerned. We have had a private preview of some of the pictures he will show. They are of the same high professional standard as those of Arend van den Nieuwenhuisen—who was a guest of ours in recent times, and, we hope we do not upset anybody by saying we have never seen better photography. Pictures aside, Colonel Soel is an expert in his own right. Among other things he will be telling us about a recent expedition he led to Central Africa, the keeping and breeding of egg-laying toothcarps. There will, again, be something for all. I should add that Colonel Soel speaks English fluently.

We hope again to have many of the important personalities in the hobby attending, and they will be available to discuss the various aspects of fishkeeping. There will also be the opportunity to renew friendships with some of the other aquarists who regularly attend this aquatic occasion.

Refreshments will be available for early arrivals and again during the long interval. Previous visitors to our Annual Congress need no introduction to the facilities available; easy to reach, good refreshments, and ample parking space for cars and coaches.

We are sorry that we have had to raise the admission to 5s, but because of the cost of our speaker’s air flight and the various other expenses that seem to increase every year we felt that we would not break even this time if we left the admission charge unaltered. Juniors will of course be admitted at half price. We hope you all feel that a speaker of such eminence is worthy of the increase we have had to make.
Colonel Schell's services will not be available again outside this Congress and we urge you not to miss this unique opportunity.

Please drop me a line if you are interested. We suggest you let us know in advance if you wish to attend.

Yours very truly,
KEITH PURBICE,
Hon. Sec.

Worm-Breeding

HAVING read The Aquarist for a considerable number of years I still find the many and varied subjects extremely interesting.

I do, however disagree with the article by B. Whiteside in the July issue regarding the breeding of white, grinald and white worm. I acknowledge that even the most unusual occurrences do happen from time to time in isolated cases, but my own experience, on three quite separate occasions, and incidentally all by accident, micro worms were seen in both grinald and white worm containers and in a month neither white nor grinald worms were in evidence, only micros.

This proved to me that the conditions were superb for the latter and what happened to the grinald and white worms I just do not know. I feel sure that other readers will have other comments to make of their experiences, so please let us have a few more readers' letters.

Yours faithfully,
V. ROBINSON

With-it Stickleback

HAVING just read the article on sticklebacks in the July issue of The Aquarist I feel I must write and tell you of my own experience. Last year my two young sons spent most of their summer holidays constructing a wild pond in the garden. Quarrying completed, my husband lined the pond with a double layer of Visqueen 1000 and the boys stocked the pond with plants and sticklebacks from the local river.

Spring showed that we had two lovely males and several large females. The males, of course, promptly divided the pool into halves, with odd skirmishing in the centre.

The largest and most noticeable male chose to make his nest on the slope of the pool and proceeded to have a thorough spring clean; no odd bits near his domain; all was clean and shining. Whenever I glanced into the pool there he was in full view of the cat but bearing a charmed life building the nest to end all nests. The water level in the pond started to drop slightly but still the nest building went on, now even nearer to the surface. Soon the hose was running at a steady trickle to keep the nest under water at all, and still he kept building. A few days more found us shopping for a fibreglass pool in a desperate effort to rescue our wild pond.

The trouble became obvious as soon as we emptied our pond. The days of mammoth effort were explained by the small square of Visqueen Mr. Stickleback had chosen for his roof, a piece virtually a complete square. How he did remove that I in, square is a mystery but do it he must have, for his nest was right over the hole. There was no leak when he started building and certainly no-one moved his nest, cut out a piece and gave it to him; then put the nest back. The odd point of it all is the fact that any fry hatching would have had sole access to the water which had reached the second layer of plastic, a layer which only had a tiny hole which I made during the original lining, and that well up the edge.

Our fervent dad is still guarding his nest in its new pond, and let's hope he can't chew fibreglass or its back to the river for him!

In closing I would like to ask your advice on getting rid of blue green algae. It is only in the end tank of three placed on a window sill is it true, but all 3 tanks are backed with a thick layer of plastic. Removing the plastic foam only made matters worse, and even when completely blacked out the soft mass continues to spread.

I have emptied the tank, scrubbed it out thoroughly with hot water and set it up again with new plants and gravel, forming the plants themselves into a light shielding row, and getting them well established before putting the tank back, in fact for months I have tried everything I can possibly think of, short of giving up and moving the tank and that, through lack of space I cannot do.

Yours faithfully,
MRS. VERA DRAKE.

Aquarist Literature Wanted

I AM working towards establishing an International Aquarists' Library and among items essential to our magazine collection are old copies of The Aquarist and Pondkeeper, Water Life, Fishkeeping etc. I shall be pleased to hear from anyone who possesses any copies of the above and who wishes to sell them.

NEAL TETTLER,
Secretary, American Goldfish Society,
62-56, 99th Street,
Rigo Park,
New York 11374.

P.S. If possible start with January 1967 issue of The Aquarist.

Book review

The Observer's Book of Pond Life by John Clegg published by Fred. Warne & Co., Ltd. at 6/-

The wonderfully comprehensive range of this series must be familiar to everyone and the handy pocket size coupled with the astounding low price (an increase of only a shilling over current prices for books in this series more than twenty-five years ago!) makes them a very attractive acquisition. The volume under review is aimed at the water-life lover and to browse through its pages (over 200 of them) and enjoy its 32 colour and 16 black and white plates is the next best thing to donning a pair of waders and striding in amongst the water-boatmen and crayfish.

Very readable, concise in its descriptions but yet not skimpy, this book is both a reference for identification as well as a key to habitats and the reader would be advised to obtain two copies—one for the shelf and one for the pocket when on watery excursions for it's much too handsome a little book to subject to the constant thumbing by the pondside at the eventual expense of its attractive appearance.
Going marine Part 8—Ozone in the aquarium

by T. Ravensdale, F.B.I.S., F.A.M.S., A.M.Z.S.

Ozone in the coral fish aquarium is practically universal nowadays and yet many enthusiasts are not only ignorant of its theoretical properties but of its use and adaption. They know that it should be fitted into the air stream but not at what strength or period. In short they know it must be used but not how or why.

Ozone can be used in many ways and strengths and the best usage of it can only be decided by the individual, for all aquarium societies are different. First and foremost the aquarist should realize that Ozone is poisonous. The difficulty is in deciding what the Ozone should be allowed to kill and how much intensity is required for the job. In order to be able to assess this it is first necessary to know exactly what Ozone is. Without defeating the description by being over-technical and omitting many important aspects, Ozone can be best understood in its natural form.

The World is surrounded or encased in a 'shell' of Ozone which prevents many elements from leaving the atmosphere. It actually stabilizes the whole system itself by acting as a barrier which prevents any drastic changes in our Planet's make-up. Without this Ozone belt the earth would be constantly changing form in many ways and life would probably not be able to stand such upheavals.

Technically speaking Ozone is an active form of oxygen gas produced by the ultra-violent rays emitted by the sun. As this gas nears earth it is de-concentrated at each atmospheric level until, at the surface, it occurs only at the rate of .05 parts per million. Electric storms, however, allow greater amounts of Ozone to reach the ground and this can be detected by the human nose. That strong, fresh, healthy smell which follows a thunderstorm is in fact Ozone. Ozone air conditioning units are simply 'burning up' the bacteria in the air and the reason one cannot smell the powerful odour emitted by the animals in the London Zoo's Elephant house is because Ozone units installed there have 'burnt up' the bacteria causing the smell. Ozone, however, artificial or otherwise, does not differentiate between wanted and unwanted bacteria and our only primitive means of assessing to a mild degree that we are not destroying wanted bacteria is to simply go easy on the strength used. Until the day comes when we will be able to differentiate between the good and the bad we must simply 'burn' them all together and hope for the best.

Ozone will kill all bacteria, spores and viruses regardless and is the most powerful oxidising agent known to man, and this should not be forgotten. It will not cure damaged parts on a fish but will aid the healing of injuries by preventing infection from taking over and allowing the damaged cells time to repair without opposition. Foods may also be sterilised by the use of Ozone. A surgeon 'washing' his hands under a black lamp is simply 'ripening' in Ozone.

A mild strength of Ozone may be run continuously through the aquarium air supply. This will increase the height of Radox Potential and render the water similar to that of a coral sea which is raked by tropical sunshine for long hours each day. Ozone is best supplied to the aquarium via a piston pump and not a vibrator type.

There are three Ozonisers available and all are made by Messrs. Sander of West Germany and marketed by South Coast Aquatic Nursery of Coldbrook. They give proportionally ten, twenty-five and fifty milligrams of Ozone per hour. The first model is not adjustable and preference should be given to the latter model which is well worth the extra money. A further three types are also available and can supply up to 1,000 mgs. per hour, but compressors are needed for these units and they are therefore only suitable for professional aquarists. Wear is negligible as all units are fitted with water repellant electrodes—useful in the humid atmosphere of a fish house.

Ozone application
(a) Water clarification
Turbid or murky water is usually due to an excess of bacteria. This can be alleviated by the use of Ozone at full strength, regardless of model used, for up to three hours. It should however be used in conjunction with a reactor tube or the dead bacteria will be stirred up.

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by the movement of fishes and render the water murky again. This operation is best performed without fish in the tank at all.

(b) Live food sterilisation
All foods should be sterilised and this is done by simply running Ozone through the food container for ten minutes or so at full strength.

(c) Ailment cures
Many diseases can be cured by the careful use of Ozone but fishes should be protected from the Ozoneised air stream by a reactor tube, especially if periods of use exceed thirty minutes per day.

(d) Epidemic prevention
Most of the common marine fish diseases run through a stock like wildfire and the continuous use of Ozone can prevent the outbreak of epidemics, but in this case a reactor tube must be used. The tube not only keeps the Ozone from direct contact with the fishes but acts as a skimmer for the removal of dead bacteria killed by the process.

Ozone reactor tube
This simple but effective instrument collects the ‘burns’ bacteria into a tube and lifts it into a skimming cup where it can easily be removed and disposed of. It must be fitted so that the water inlet holes are one inch below the surface. Air bubbles from the stone at the bottom of the tube must fill the whole width of the cylinder and must be turbulent, bubbling at full blast.

For bacteria to form at all the water must be organically overcharged and this condition cannot exist where Ozone is present. Epidemics are therefore most unlikely if Ozone is used in the described manner continuously. New specimens however should never be placed into the community aquarium without being first subjected to strict quarantine. No efforts to keep coral fishes will succeed if quarantine is omitted.

Ozone strength
It is extremely difficult to determine exactly how much Ozone to use but I have personally found that, with my water and conditions, one half a milligram per hour per gallon of water is sufficient for normal use. Therefore, a 24 in. x 12 in. aquarium requires five milligrams per hour and a twenty gallon tank needs ten milligrams per hour. An unhealthy attitude from the fishes is followed by an immediate change to one milligram per hour per gallon and an increased air supply, but great care should be taken not to increase Ozone if that may be the cause of the distress although it is unlikely.

New fishes should not be placed directly into an aquarium high in Ozone content immediately after quarantine. Turn down the Ozone slowly a few days before introduction. When it is at nil the new fish may be introduced and the Ozone supply gradually increased by one milligram per day until the normal strength is reached.

September, 1967
TERMS of an AGREEMENT BETWEEN the FEDERATION of BRITISH AQUATIC SOCIETIES (F.B.A.S.) and the GOLDFISH SOCIETY of GREAT BRITAIN (G.S.G.B.) as FINALISED on 19 JULY, 1967.


"It is agreed that—

"Each organisation will support the effort in their aims and aspirations for the furtherance of better fishkeeping and the welfare of the aquarium and pondkeeping hobby.

"One universal set of Standards for Goldfish is best for the hobby and the Standards as laid down by the G.S.G.B. meet this requirement. The F.B.A.S. will incorporate G.S.G.B. Standards with their own and the F.B.A.S. will formally withdraw their own Goldfish Standards in favour of those of the G.S.G.B.

"The G.S.G.B. will place their panel of Judges at the disposal of the member societies of the F.B.A.S. on the same terms as at present exist for F.B.A.S. Judges. The G.S.G.B. agrees to the use of the existing F.B.A.S. Coldwater Judges providing they use the G.S.G.B. Standards in the spirit that is intended and without reservations. Where distance, cost and smallness of the Show do not justify an official Judge, key Judges may be used providing G.S.G.B. Standards are operated.

"Adequate quantities of the G.S.G.B. Standards being available for distribution, the F.B.A.S. agrees not to publish these in whole or in part. When a reprint is necessary, the matter will be a subject for negotiation. Meanwhile, copies will be available to the F.B.A.S. at a discount.

"To safeguard the mutual interests of both parties at any future time, should it be found necessary to terminate this agreement, this can be brought about by twelve months notice on either side.

"It is further agreed that—

"G.S.G.B. Standards and Judges will be used at competitive Goldfish Shows staged by the Goldfish Society. Open Shows staged by other Societies under F.B.A.S. auspices will be judged by G.S.G.B. Standards by G.S.G.B. Class A Judges and existing F.B.A.S. Coldwater Class A Judges. Organisers of these Shows may include classes for Comets and Veiltail Moors. Closed Shows organised by these Societies may be judged by G.S.G.B. Class A and Class B Judges and F.B.A.S. Coldwater Class A and Class B Judges. The F.B.A.S. will continue to appoint Class B Coldwater Judges.

"The F.B.A.S. and the G.S.G.B. agree that Goldfish Standards will be available for Coldwater Fishes other than Goldfish and will jointly collaborate to this end.

"The F.B.A.S. will be competent to raise matters relevant in this agreement with the G.S.G.B. and if required such matters will be jointly considered. The converse also to apply.

"And further it is agreed that—

"The G.S.G.B. will produce a Standard for the Comet for publication by the end of 1967 and will recommend to the F.B.A.S. a Standard for the Veiltail Moor which the F.B.A.S. will publish by the end of 1967. If popular demand warrants it the G.S.G.B. will subsequently include it in its 'Popular Varieties'.

"Clubs and Societies requiring a Goldfish or Coldwater Judge may make a personal approach to any Judge or Judges on the published list. The G.S.G.B. will appreciate being advised of such bookings. The G.S.G.B. will nominate a Judge if requested. Judges who are both 'Goldfish' and 'Coldwater' will be so indicated on the published list.

"It is recommended that this agreement shall operate from 1 January, 1968."

Cutting glass
by B. Fry

CUTTING glass—the lighter weights, anyway—should not be beyond the skill of the average aquarist. The essential requirements are a cutter (the ordinary wheel cutter, which costs about 3s. 6d. will give just as good a performance as the much more expensive tool fitted with a diamond in the head), a wooden straight-edge to serve as a guide, and some paraffin or thin machine oil to dip the wheel of the cutter into before use. It is necessary, too, to provide a perfectly smooth, flat surface covered with several sheets of newspaper to rest the glass on. Wetting the straight-edge and the newspaper will help to prevent any sliding away from the glass.

The right degree of pressure on the wheel when making a stroke is all important. If the pressure is too light the sharp edge of the wheel will not bite into the glass. On the other hand, if the pressure is too heavy and, worse still, jumbling, the glass will crack. The wheel must, repeat must, be drawn forwards with the right degree of pressure from one edge of the glass to the other. And see that you make one quick scratching stroke.

To break the glass where needed place it so that the scratch protrudes just beyond the edge of the bench or table. Then press down sharply. The glass should break evenly all along the scored line. Apart from learning how to handle the cutter correctly, breaking the glass without cracking it comes more easily with practice, and several trial strikes and breakings on old pieces of glass is advised before you start to glaze a small tank or vivarium or renew a badly fitting or broken cover glass.
RECENT highlights at North West.ImageAlignschip are: A.S. meetings have been a talk and film show through the courtesy of the Hon. Sec. Mr. G. A. Brown. Mr. G. G. Brown, a very interesting talk on fish photography and combined this with a film show of some of the pictures he had taken. During the latter part of the evening Mr. G. G. Brown showed pictures of some of the rare varieties of Livebearers being produced in America.

At the July meeting Mr. S. F. Swallow suggested the society's chairman gave a very interesting talk on keeping and breeding Livebearers, which was followed by a question and answer session on some of the members' problems.

Mr. Keith B. Wells, last year's Table Show winner, is again holding this year's event.

THE Table Show of Leamington and District A.S. is being held on July 28th at Auchinleck, 5 The Cottage, Leamington Spa. The judges will be Mrs. J. B. Smith, Mrs. J. E. Hill, Miss S. G. L. Lucas, and Miss S. J. B. Smith. The entries are as follows:

-Members of the Newport A.S. were among the prizes at the annual dinner of the Leamington A.S. held recently. Mrs. W. J. White was awarded the trophy for the Best Livebearer. Mr. R. B. Martin received first and second awards in the Guppy Breeder's Class, with Mr. T. T. Brown in third place, and Mr. E. F. P. Morgan (Pendlepool grad) in fourth place in the Livebearer class.

-Cheltenham Open Show open was on July 25th at the Cheltenham, 28 Church Gardens, Cheltenham, for A.S. members and guests, to be held at the Cheltenham, 28 Church Gardens, Cheltenham, for A.S. members and guests.

-Mr. M. J. Parsley was awarded second prize in the Show Class, with Mr. J. G. W. Walker finishing third, and Mr. J. G. W. Walker finishing fourth in the Show Class.

-The results of the Table Show, held on July 28th, were as follows: A. C. Goddard, 1st; P. E. Morgan (Pendlepool grad), 2nd; P. E. Morgan (Pendlepool grad), 3rd; and P. E. Morgan (Pendlepool grad), 4th.

-The winners of the Show of the Brighten and South A.S. were as follows: A. C. Goddard, 1st; P. E. Morgan (Pendlepool grad), 2nd; J. G. W. Walker (Cheltenham grad), 3rd; and J. G. W. Walker (Cheltenham grad), 4th.

-There were fifty members present at the July meeting of the Stratford-on-Avon A.S., and the entertainment for the evening was an interesting lecture on "The Climax of Our Fish for the Aquarium" given by Mr. Waterman. The usual Table Show followed with the following results: Chicken (Jennie); 1st: Mrs. M. J. Waters, 2nd: Mrs. M. J. Waters, 3rd: Mrs. M. J. Waters, 4th: Mrs. M. J. Waters, 5th: Mrs. M. J. Waters, 6th: Mrs. M. J. Waters, 7th: Mrs. M. J. Waters, 8th: Mrs. M. J. Waters, 9th: Mrs. M. J. Waters, 10th: Mrs. M. J. Waters.
THE first meeting of the Hall A.S. in July was taken up with preparations for the Hall Show. A tape was accepted by the members and approved on "Poohs and Paddocks." The pro tem. secretary, Mr. Scully, fortunately being unoccupied, was given the heavy pressure of work on the show. At a subsequent meeting, requests for chairs, etc., were made; the secretary and assistant show secretary were elected. Mr. J. W. Turner was elected show assistant for the remainder of the year. Mr. Mitchell, as assistant secretary, and Mr. H. H. Andrews as show secretary, were elected.

OFFICERS for Bradford and District A.S. has proved its capabilities of producing first-class shows. The recent show at the Crown and Sceptre, on 8th August, was a great success. The results being: Broaders, First Class; Briers, Med; and Judges, First Class. The judges were: Mr. J. M. Martin (Bradford), Mr. J. H. Andrews (Leeds), Mr. J. W. Turner (Leeds), Mr. J. T. Tietemeyer (Leeds), Mr. J. S. Clapham (Lancaster), and Mr. J. S. Clapham (Liverpool).

THE Annual General Meeting of the Mildenhall Aquarium League was held recently when five clubs were present. These were: Atherstone, Coventry, Leamington Spa, Rugby, and Northampton. A new feature this season will be the inclusion of Mildenhall Aquarium and Pool Society, their application for membership being carried unanimously. The meeting was held as follows: September, Rugby; October, Leamington Spa; November, Atherstone, Coventry; December, Mildenhall Aquarium and Pool Society, Rugby; January, Northampton; February, Atherstone. The officers are: President, Mr. J. S. Clapham (Leeds); Secretary, Mr. J. S. Clapham (Leeds); Treasurer, Mr. J. S. Clapham (Leeds); and Judges, Mr. J. S. Clapham (Leeds), Mr. J. S. Clapham (Leeds), and Mr. J. S. Clapham (Leeds). The judges were: Mr. J. S. Clapham (Leeds), Mr. J. S. Clapham (Leeds), and Mr. J. S. Clapham (Leeds). The judges were: Mr. J. S. Clapham (Leeds), Mr. J. S. Clapham (Leeds), and Mr. J. S. Clapham (Leeds).

The society's Annual Open Show is to be held on 2nd September at The Royal Wrexham, Burscough. This will include a group show organized by the Three Counties section of the Federation of the British Aquarium Society. Details are available from Mr. C. Pike, 18 Ashley Drive, Wrexham.

JULY was a busy month for the Runcorn A.S. The first meeting was a Table Show for Livebearers and Latz, with the winners of the first and second prizes being: 1st, Mr. J. H. Andrews (Leeds); 2nd, Mr. J. S. Clapham (Leeds); and 3rd, Mr. J. S. Clapham (Leeds). In the second the placings were: 1st, Mr. J. H. Andrews (Leeds); 2nd, Mr. J. S. Clapham (Leeds); and 3rd, Mr. J. S. Clapham (Leeds). The winner of the second prize was Mr. J. S. Clapham (Leeds). The judges were: Mr. J. S. Clapham (Leeds), Mr. J. S. Clapham (Leeds), and Mr. J. S. Clapham (Leeds).

The judges were: Mr. J. S. Clapham (Leeds), Mr. J. S. Clapham (Leeds), and Mr. J. S. Clapham (Leeds).

THE first meeting of the Hatton Green School A.S. was held recently. In giving his report on the past term, Mr. R. Green, who is the secretary, stated that the society's meetings have been very encouraging. In referring to the second Junior Open Show, he said that it was important for a small society to stage an open event and a great deal of useful experience had been gained by those taking part in such an event. One of the distinctive features of the aquatic society is its ability to arrange its own affairs, and this ability will stand the society in good stead for the future. The secretary, Mr. R. Green, is thanked for his hard work on the show. The meeting was held as follows: September, Rugby; October, Leamington Spa; November, Atherstone. The judges were: Mr. J. S. Clapham (Leeds), Mr. J. S. Clapham (Leeds), and Mr. J. S. Clapham (Leeds).

AT the Annual General Meeting of the British Aquarium Society, Dr. R. Green, Chairman, Dr. R. Green, Secretary, and Mr. R. Green, Treasurer, reported on the progress of the society. The society was thanked for its hard work on the show. The meeting was held as follows: September, Rugby; October, Leamington Spa; November, Atherstone. The judges were: Mr. J. S. Clapham (Leeds), Mr. J. S. Clapham (Leeds), and Mr. J. S. Clapham (Leeds).
A publicity officer has been appointed by the Federation of Scottish A.S. He is Mr. W. G. White (Streatham), 135, Gipsy Lane, Borehamwood, Herts.

There is a change of venue and meeting date of the Bracknell and District A.S. Annual Open Show which will now be held on the first and third Mondays in each month at the "Advent" Cinema, Pembroke Square, Windlesham Road, Bracknell, Berks.

Aquarist's Calendar

3rd September: Harthill A.S. Annual Show, Middlesex Hall, Park Road, Harthill, Essex. Secretary: Mr. E. H. May, 132, Finborough Road, London, S.W.4.
4th September: Valley A.S. Second Open Show, Longford Hall, Rivington, Lancs. All details from the Secretary, Mr. J. F. S. Wright, 57, Fordham Road, Hove, Sussex.
5th September: Portland A.S. Annual Open Show, Newquay, Cornwall. Details from the Secretary, Mr. J. E. S. West, 94, Victoria Road, Newquay, Cornwall.
6th September: Northwich and District A.S. Annual Show, Westhorne Hotel, Northwich, Cheshire. All details from the Secretary, Mr. E. W. S. Wood, 12, Silver Street, Northwich, Cheshire.
7th September: Huddersfield & District A.S. Open Show, Huddersfield, Yorkshire. All details are obtainable from Mr. D. N. Wood, 10, Woodrow Road, Huddersfield.
9th September: Federation of Scottish Aquarists' Society Convention, 2nd Annual Show, Inverness, Scotland. All details from the Secretary, Mr. D. McIntyre, Oldfields, Bathgate, Edinburgh, Scotland.
10th September: Edinburgh & District A.S. Annual Open Show, Meadows, 18, Dunbar Road, Edinburgh, Scotland. All details available from the Secretary, Mrs. B. Johnson, 13, Torryburn, Edinburgh, Scotland.
13th September: Medway A.S. Open Show, St. John Fisher School, Lower Cowden, Ashford, Kent. Schedule is obtainable from Mr. C. A. Crowther, 41, Lower Cowden Road, Ashford, Kent.
14th September: Heywood and District A.S. Open Show at Labour Club, Bridge Street, Heywood, Lancashire.
15th September: The Fishers Hall, Victoria Street, St. Albans, Herts. All details are available from Mrs. H. A. Cooper, 14, Pondsfield Crescent, St. Albans, Herts.
16th September: East Anglian A.S. and Pondkeepers Association Annual Open Show, Nursery School, Eaton Ford, Cambridge. Details available from A. A. Green, 70 Burton Avenue, Rush Green Road, Romford, Essex.
17th September: Goldfish Society of Great Britain Open Championship, Chelmsford. Tickets can be obtained from Mrs. P. W. White, The Grange, High Road, Chelmsford, Essex.
18th September: Northwich A.S. Annual Open Show, 102 Fulham Road, Fulham, London, W.6. All details from the Secretary, Mr. E. H. May, 132, Finborough Road, London, S.W.4.
19th September: N.E.L. Aquarists Society, Secretary, Mr. R. W. Wolf, 90 Warmwell, East Kilbride. All details are available from the Secretary, Mr. R. W. Wolf, 90 Warmwell, East Kilbride.
20th September: Dorking and District A.S. Third Annual Open Show. Venue details, etc. to be announced later.
21st September: Fur, Feather and Aquarium Show organized by the Borough Council of the London Borough of Hackney, King's Hall, Lower Clapton Road, E.5. Hon. Secretary, Mrs. J. E. S. West, 94, Victoria Road, Newquay, Cornwall.
22nd September: Leeds and District A.S. Open Day Show. Details available from the Secretary, Mr. R. E. Wright, 6, 24, Northfield Avenue, Leeds, Yorkshire.
23rd September: Mr. J. E. S. West, 94, Victoria Road, Newquay, Cornwall.
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6a, King's Road, Reading
Telephone: Reading 53632
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Greasby, Joe., F.R.H.S.
Burdon Road, Fisheries, Mobberley, Nr. Knutsford
Tel.: Mobberley 3272
W. C.T.P.A.A. R.A.

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Truro Aquaria & Pet Shop
23, New Bridge Street, Truro
Telephone: Truro 2506

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North Hill Nurseries, Tavistock Road, Plymouth
Telephone: Plymouth 66653
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Noah's Ark Aquarium
Charminster Car Park, Weymouth
Telephone: Weymouth 3038
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Durham

The Fish Bowl
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Telephone: Sunderland 71026
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Metcalfe, G. R.
187, Northgate (near Minorles Garage)
(On original A1 road) Darlington
Telephone: Darlington 5991
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Essex

Goodmayes Aquarium
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Telephone: Goodmayes 2594
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Skilton, C. J., Aquarist
139, Galleywood Road, Chelmsford
Telephone: Chelmsford 56878
C.T.P.A.A. All Day Saturday

Stan's Aquarium
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Telephone: Southend 0789
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Gloucestershire

Cheltenham Aquaticis (Prop. Mr. B. R. James)
10 & 11, Suffolk Parade, Cheltenham
Telephone: Cheltenham 24909
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Telephone: Portsmouth 20047
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Pompeo's Pet & Aquatic Centre
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Telephone: Southampton 56995
R. C.T.P.A.A. R.A.

Wingate

7, Market Street, Winchester
Telephone: Winchester 2459

Hertfordshire

The Pet Shop (R. S. Colton)
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Telephone: St. Albans 55507

Kent

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125, Canterbury Street, Gillingham
Telephone: Medway 52049
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Kingfisheries Aquarium
138, Croydon Road, Beckenham
Telephone: Beckenham 5716
E.C.D. Wednesday (All day) R. C.T.P.A.A.

Sherwood Pet Stores
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252, Sherwood Park Avenue, Sidcup
Telephone: Bexley Heath 7217

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Telephone: Eitham 5859

South Western Aquarists
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Telephone: Chiswick 6549 WR. C.T.P.A.A. R.A.A.

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192, Wellingborough Road, Northampton
Telephone: Northampton 34610

The Pet Shop
120, Kettering Road, Northampton
Telephone: Northampton 58841
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OXFORDSHIRE
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1, Broad Avenue, Cowley Road, Oxford
Telephone: Oxford 41825
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Telephone: 4607

Thameside Tropicals and The Pet Shop
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43, Melbourne Road, Coventry
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573, Bristol Road, Birmingham (29)
Telephone: Selly Oak 1482
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Machines. M. Hamming
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Telephone: Worcester 22005

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Kennedy's Pet Store & Aquarium
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Telephone: Leeds 70703

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<td>Hygrophila</td>
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<td>Ludwigia</td>
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<td>Vallis</td>
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