May
1968

the Aquarist

and Pondkeeper

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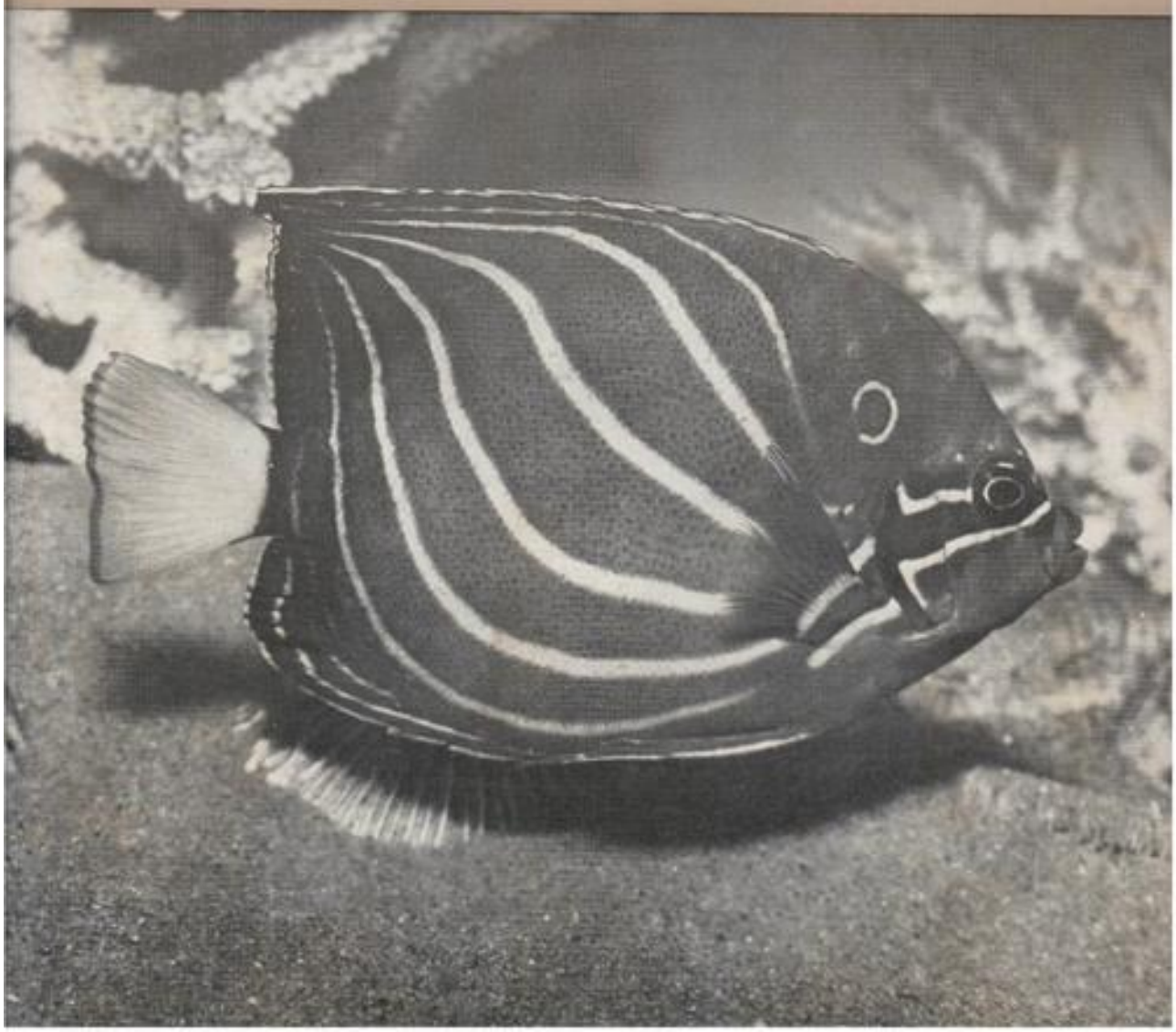
monthly



The AQUARIST
AND PONDKEEPER

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To the Editor:

Standards for marines

WE are interested to note that the Federation of British Aquatic Societies have recently produced a judging points system for furnished marine aquaria. Whilst we are all in favour of beneficial developments relating to the promotion of the marine fishkeeping hobby, we cannot let go unchallenged the fact that, in our opinion, the above document is nothing but a farce and would like to ponder upon the following thoughts:

(1) For how long has this system been on trial by the F.B.A.S. before its adoption by them?

(2) How many marine aquarists (by this we refer to both tropical and native marine) are to be found on the Council of the Federation, or for that matter the Judges and Standards committee who presumably compiled this system?

(3) Have the Federation made any attempt to find out what the marine aquarists in the U.K. feel on this score?

I would now like to answer the above three points on behalf of our Society: firstly, our judging system (and after all who better to set a standard than the hobbyists who keep and exhibit them) was on trial operation as long ago as 1966! Our current system has been in operation since December of that year. It was compiled by our Judges, Shows and Standards committee comprised of six members, all of whom bar one keep solely marine fishes. These officials had the year's previous M.S.A.S. research programme to assist them, and access to the members themselves for their views; . . . yet here comes the rub . . . When we approached the F.B.A.S. with a view to producing one uniform set of standards (apart from having to wait aeons for a reply) and eventually getting them to meet our representatives, they deemed our system "unsuitable".

We feel most strongly that their whole attitude to this point has been one of "Ignore the people who keep them; what do they know any better than us?"

We would be interested to receive answers to the points raised above as it seems another rift has reared its ugly head in our hobby, and this time one that could so easily have been overcome; we tried.

Yours faithfully,

GERALD H. JENNINGS, Director I.M.S.S.

p.p., The International Marine Study Society, Wiltshire.

A brine shrimp hatchery

by R. C. Taylor, C.Eng., M.I.E.E.

FACED with the need for a continuous supply of Brine Shrimps, and after trying some of the simpler methods without much success, I decided the time had come to do some reading and thinking, the results of which are the subject of this article.

There are two readily available types of brine shrimp from San Francisco Bay and from the Utah Salt Lake. They are biologically similar but have slightly different hatching conditions. The source of eggs is not always marked on the container when purchased so some experimentation may be required. I have had most success with San Francisco eggs; if Utah eggs are used it is often recommended that borax be added to the brine in the proportion of 1 teaspoonful to 1 gallon. San Francisco eggs tend to float, Utah eggs to sink. Many and varying recipes have been published. Fig. 1 gives equivalent methods of arriving at a brine solution of a desired specific gravity. 1.025 S.G. is a suitable strength with which to start. This is obtained by 3.75 per cent weight of salt to weight of water, say 2 ozs. to 3 pints or 40 grammes/litre.

A hydrometer reading 1.000 to 1.050 is the quickest check on solution strength and one can be bought for about ten shillings from a Chemical Laboratory Supplier who can be located by reference to the Classified Telephone Directory. Some of the Marine Aquarium requisite suppliers may be an alternative source. A hydrometer is subject to a small error if the solution is not at the temperature for which it was calibrated but this is not likely to be significant over the range of 60-80°F. (15-27°C.). In any case if it is always used at say 75°F. the results will be consistent.

There are various sources of suitable salt or brine. The easiest is to buy Marine Salt from your usual aquarium supplier or by mail order. There is no doubt that this will work. Those aquarists fortunate enough to have ready access to the sea may prefer to boil sea water until a sample cooled to hatching temperature has the correct specific gravity when measured by the hydrometer. I have access to bore-hole brine; this is, of course, the salt from dried-up seas of aeons ago and is complete with trace-elements. Domestic cooking salt is stated to be satisfactory but I have not used it, the same applies to rock salt. Two sources to be avoided are table salt and road salt/sand mixture both of which have chemical additions. If borax is used it should be normal B.P. quality as obtained from a pharmacy.

The time taken to hatch brine shrimp eggs reduces as the temperature rises with a limit of 80°F. giving about 24 hours. A full yield cannot be assured in exactly 24 hours so if a somewhat lower temperature is used a full hatch in 48 hours is probably more practical for fitting in with a scheme for regular daily batches. As the shrimps will live for at least 24 hours after hatching, a 3-day cycle of hatching is practical.

Using three hatchers A, B and C, one is used each day and thus one batch hatches each day. Also, if the cycle is broken by missing one hatch, there will still be some shrimps left from the last batch. After a few cycles, say once a fortnight, the solution is replaced; smell and size of hatch govern the timing.

We have, I hope, established a case for using three units. There is no doubt that a two-unit assembly could be used at 80°F. but at this temperature the life of the shrimps will be shortened and may increase water-fouling, in any case the extra cost is very little as will be seen later. Having decided on a three-unit hatcher, we require an economical way of keeping the temperature at the desired level in a domestically acceptable unit. To meet this requirement I decided to make a box with a hinged lid and to heat and insulate the whole box rather than the individual containers. The cheapest electrical heater is a bulb and provided that the total wattage is kept within the rating of the thermostat, a normal aquarium type of thermostat is suitable. The box was made of ⅝-in. timber and lined with ½-in. foam polystyrene sheet. It is important to do this thoroughly in the interest of electrical economy. Don't forget the door. Using 2 x 25 watt bulbs, my unit is switched on for about 40 minutes and off for 180 minutes when the liquid is 20°F. above ambient; at 1½d. per unit this costs 2½d. per week. If experiments are to be carried out which may be affected by light it is possible to wire the bulbs in series (Fig. 2) which will dim them considerably and if so connected they could be covered with heat-resistant black paint. In this case the bulb-wattage rating will need to be increased by about x3 to give equivalent heating; the thermostat loading will not be increased by this change.

The hatchers are each constructed from a polythene funnel and a circular transparent plastic storage container (with lid). The container must be a good fit into the funnel. The bottoms are removed from the containers using a jig-saw, Abrafile or a hot knife, and the outsides are coated with Sealastic to prevent leakage and preferably given a few turns of P.V.C. adhesive tape after pushing firmly into the funnels. The bottom of each funnel is closed with a cork or preferably a rubber bung which has been drilled to take a 2-in. length of glass tubing. The inside end of each tube has previously been drawn out to a small jet by heating in a gas flame. These give fine streams of bubbles which agitate the water. The air control valves are mounted at the top of the box to prevent contamination by the solution which will run back when the air supply is stopped. The lids of the containers should have a small hole drilled in each to release the air without allowing salt spray to reach the bulbs.

The hatchers are held in position by a narrow shelf with three holes in which the funnels rest and by elastic bands on cup-hooks which hold the containers against a block mounted on the back of the box, Fig. 3. Long air hoses permit the hatchers to be lifted out for emptying without disconnecting the tubes, Fig. 4. A good clearance should

FIG. 1.

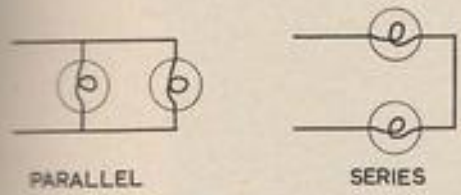


FIG. 2 CONNECTION OF BULBS

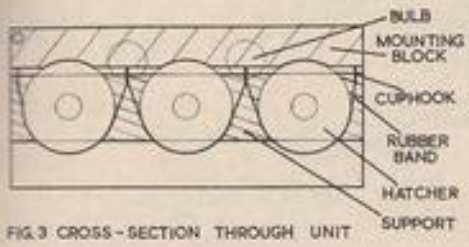
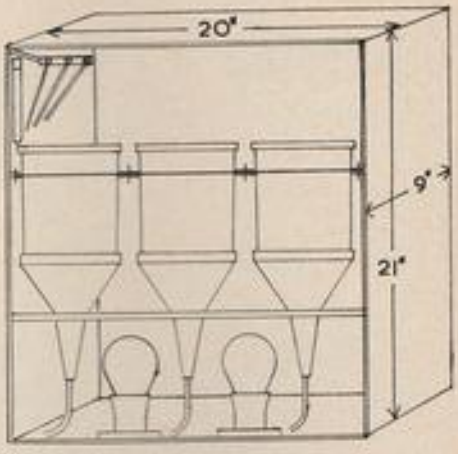


FIG. 3 CROSS-SECTION THROUGH UNIT



FRONT VIEW FIG. 4.
BOX SKETCHED TO SHOW DIMENSIONS

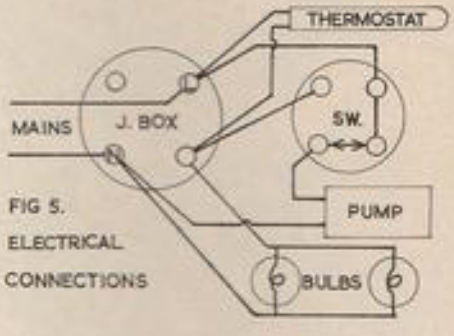


FIG 5.
ELECTRICAL
CONNECTIONS

be left above the hatchers to permit netting the shrimps without moving the fixings. Full dimensions are not given as this depends on the size of containers selected. Electrical connections can be made as shown in Fig. 5. A change-over switch which switches off the air blower and switches on the lamp is convenient as it allows the unhatched eggs to settle before netting and illuminates the hatchers. If a separate air-pump is not used a single air valve in the feed line used ON-OFF is easier to use than to carefully reset the individual valves.

As with all electrical apparatus, particularly in the proximity of brine, great care should be taken. The connections should all be made in a junction box outside the hatcher unit and the lid should be firmly screwed up to reduce the chance of shock to children and others. Non-metallic bulb holders should be used; batten-types with skirts are necessary. If salt spray is found to escape from the hatchers the airation should be reduced or the liquid level should be lowered.

To set up the unit, part fill the hatchers with suitable brine, place a thermometer in one hatcher and switch on the heaters and air. 24 hours later the temperature should

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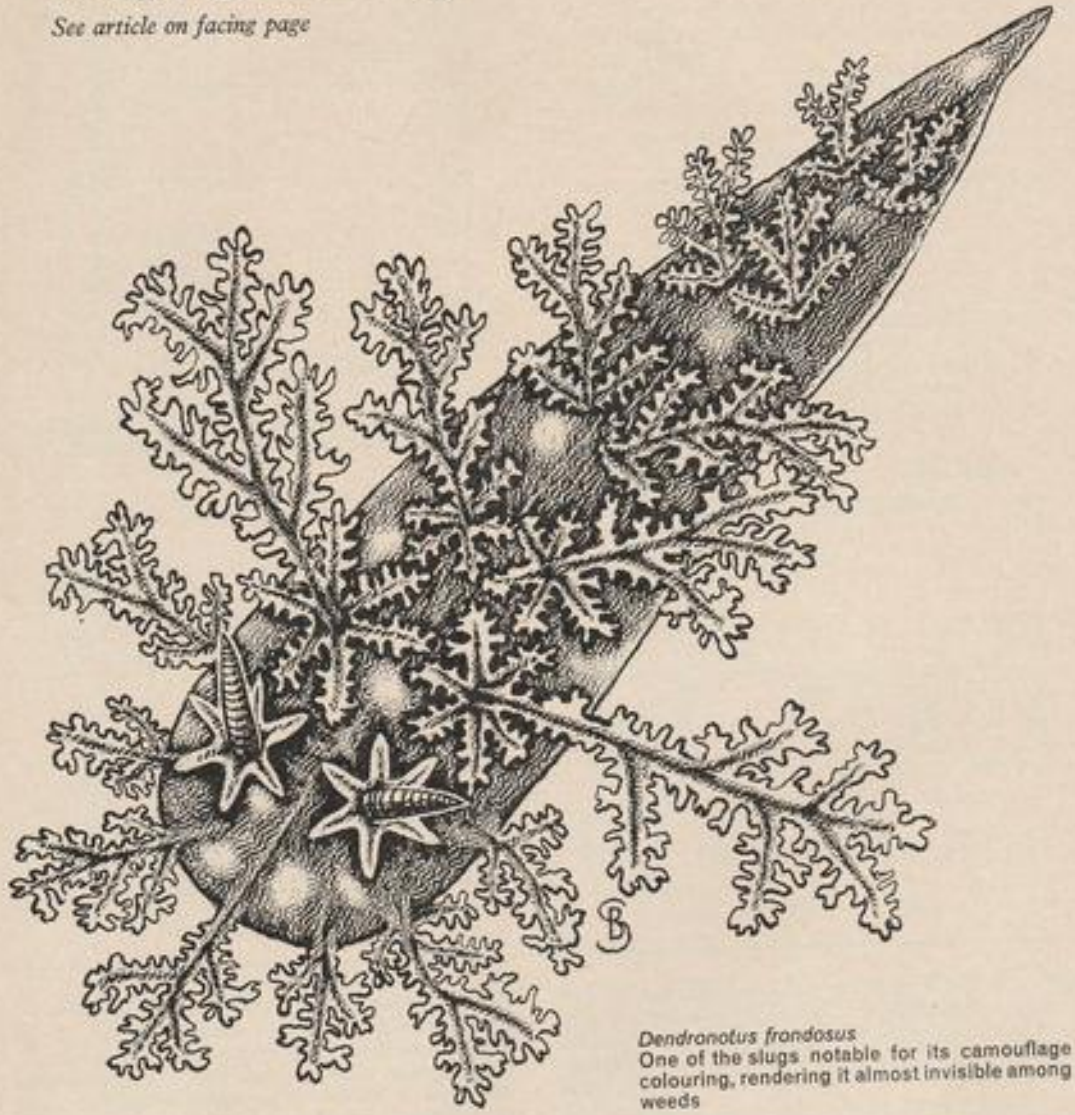
Keeping sea slugs

See article on facing page



Dendronotus frondosus
One of the slugs notable for its camouflage colouring, rendering it almost invisible among weeds

Aolidia papillosa eating an anemone

Why not keep sea slugs?

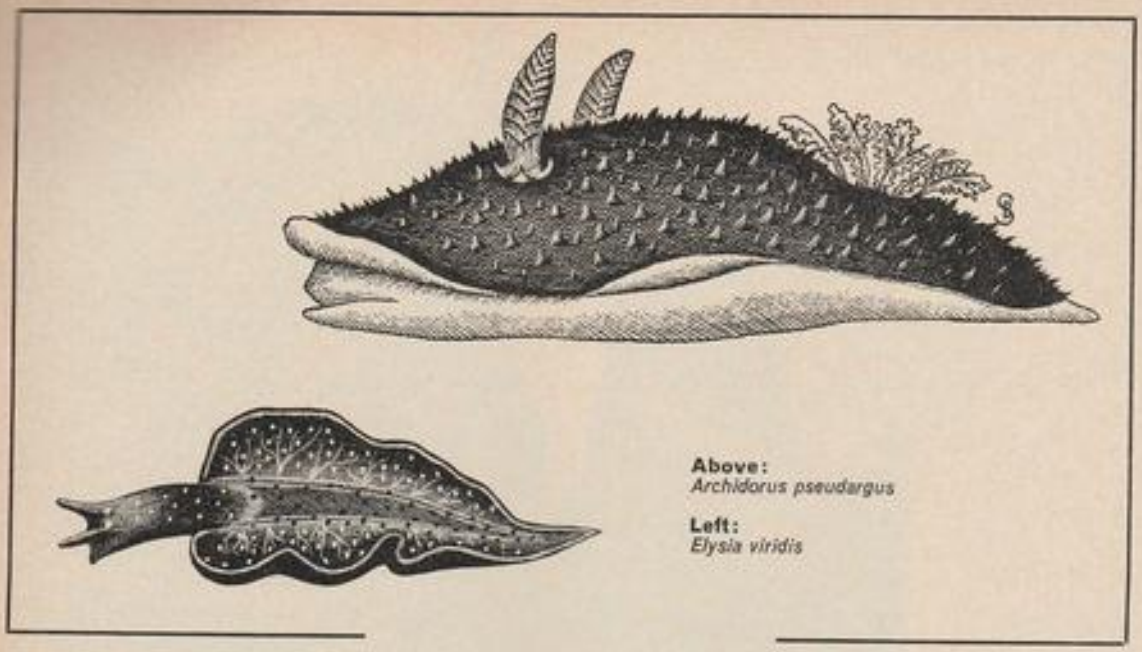
asks Bill Simms

MOST freshwater aquarists have kept snails in their tanks and a few have concentrated on snails alone, with the idea of breeding vast numbers for resale or for research. Little has been done, however, with sea-slugs, some of which are outstanding in their beauty of colouring and form. This lack of interest is surprising for many kinds are easily available on our beaches and they are just as easy to keep in captivity as are other water creatures.

Probably the reason that sea-slugs have not become more popular is the difficulty of seeing them, for of all living creatures these are probably camouflaged better than any others. It is quite easy to stare right at one and still not see it—unless you know what you are looking for. In addition, a few kinds are very small (about ¼ inch or so) and among the debris in their natural habitat these would be hard to spot even if their colours were glaringly different which they are not. But it is worth the effort of trying to find some sea-slugs, and when you have located one it is surprising how quickly you will find some more. After all, slugs and snails are very prolific, whether on land or in the water. Low down between the tide marks is the normal area in which to start your search. Frequently, on the under surfaces of large rocks near the lower tide marks, you will see patches of jelly-like material; some of it orange-coloured, and with many patches of other colours, marking the location of the lowly life-forms that live there. This is a good spot. Another place is among the clustered patches of small seaweeds down near the lower tide mark—the sort of weeds that are always wet because they are not exposed above the tide for too long. Different kinds of sea-slugs frequent these places.

Ordinary beadlet anemones attract a different kind again, and the tiny acorn barnacles, clustered so profusely on rock, still another. Wherever you look there are habitats favoured by some sea-slugs and after the first few have been discovered you will be able to select the type you desire to keep in captivity.

On the breadcrumb sponge, one of the patches of very low life-forms found in various colours underneath rocks,



Above:
Archidorus pseudargus

Left:
Elysia viridis

Why not keep sea slugs?

continued from page 393

will be seen the Sea Lemon, *Archidorus pseudargus*. This sea-slug can be up to 3 inches long so is found more easily than some of the smaller ones.

The sea lemon is usually lemon-coloured, but it has green, pink, and brown markings on it, and the general colour is usually adapted to match the colour of the bread-crumb sponge on which it is browsing—for this forms its main food. From the rear of its back sprout some plume-like gills forming a circle of nine, 3-branched plumes around a hole. The feelers on the front part of the body are quaintly marked—as if formed from many-folded layers of skin, and the eyes are located near the base of these feelers.

At the other extreme of size is the tiny ¼-inch slug called *Elysia viridis*. This creature eats green algae and other green weeds and has the ability to change its colours to match those of the weed on which it happens to be. Sometimes it is greenish and at other times more brown. Dotted all over its body are spots of shining colour—red, blue, and green, while the sides of this slug are drawn out into wide flaps which are thought to help it capture oxygen from the water.

Among a cluster of anemones can sometimes be found *Aeolidia papillosa*, which itself looks very much like an anemone because of the plumes down its back. These plumes look almost identical to those of the anemone and a surprising fact is that they also carry stinging cells as does the anemone. It is thought that the slug acquires these stinging cells through eating the anemone—that they travel through its system to lodge in the plume ends. Be this as it may, this sea-slug, when eating an anemone, is almost impossible to see though it is much bigger than some sea-slugs.

A slug with fantastic appendages is *Dendronotus frondosus*. This 2-inch sea-slug has many branched plumes right down its back which are thought to help with its breathing but which most certainly do help to conceal it when among weeds. Its feelers, also, have some plumes around their base. The colour of this sea-slug is reddish brown flecked with white and, when on the brownish-white coralline type of weed that we so often find in rock pools, it is practically invisible. It feeds on colonies of polyps of various kinds.

Keeping sea-slugs in captivity consists mainly of common sense. They must have well aerated water and this brings up a major point. I have never tried these creatures in warm tropical marine aquariums—mainly because warm water holds less oxygen in suspension than does cold water. Nevertheless, there may be some among them that could adapt to warmer water than they normally live in—though I would think that they would try to keep nearer the surface. It would be a good piece of research to establish this.

Food of the right kind must be provided, and this entails keeping these foods alive in the tank also. Similarly to many other creatures, the smaller sea-slugs are often vegetarians while the large slugs are carnivorous but there are exceptions so care should be taken to supply the right food at all times.

Book reviews

Gouramis in Colour, by Drs. C. W. Emmens and H. R. Axelrod. 3s.

Fancy Guppies, by Drs. C. W. Emmens and H. R. Axelrod. 10s. 6d.

Fancy Platies, by Joanne Norton. 7s. Published by T.F.H. Publications, Inc.

THERE is little need to emphasise the popularity of gouramis among tropical aquarists; for gouramis are good-lookers, flourish well in the average heated tank, are suited to a community life (most of them, anyway), are fascinatingly interesting in their breeding habits, and will live up to three, four or more years according to size. Therefore the publication of *Gouramis in Colour*, by Drs. Emmens and Axelrod, at such a give-away price, should prove of particular value to the beginner or experienced aquarist alike.

After outlining the main differences, anatomically speaking, that exist between regular gill-breathers and the specialised atmospheric air-breathing gouramis, the authors pass on to the question of care and breeding. Some useful information is given on selecting a pair, the choice (in regard to measurements, furnishing, and temperature) of a breeding tank, and the typical spawning procedure and after-care of the fry. Thereafter follows descriptions and breeding techniques, where they vary from the regular pattern, of all 16 species of gourami known to aquarists today. Twenty-seven photographs, some of them in colour, add to the usefulness of the text.

Fancy Guppies, by the same authors, tells all that the tropical aquarist, bitten by the guppy bug, needs to know about the guppy in health and sickness and breeding to a predictable, or something approaching predictable, pattern of size and colour. An interesting point touched on concerns size in the female. "Growth in the females," we are told, ". . . will be fixed by pregnancy, after which they will only grow to about the same total extent, so that an early pregnancy will cause dwarfing of the individual." In short, the largest females are only produced if they can preserve their girlish figures into the first four months of their lives. The scientifically minded and ambitious beginner in fancy guppy breeding is also instructed in the use of methyl testosterone as an indicator of the colours a selected female is likely to transmit to her male progeny, a technique which was first described by the late Dr. Myron Gordon, a brilliant geneticist, some 20 years ago.

Miss Norton's *Fancy Platies* is full of interesting facts about the origin, disease prevention and recognition, breeding and genetics of the various platies. It is packed with good photographic illustrations in black-and-white and colour, and has a useful map showing where the several species of platies are found in the wild.

J.H.

Guide to Tropical Fishkeeping, 2nd Edition, by J. H. P. Brymer. Published by Iliffe Books Ltd. 366 pages, including 286 diagrams plus 19 plates in full colour. Size: 8¾ in. by 5½ in. Price 50s. net. (by post: 51s. 5d.).

First published in 1954, this is the second edition of what has become recognised as a reliable standard work on the subject of keeping tropical fish. Extremely comprehensive in its coverage, it deals at length with such usually disregarded subjects as the properties of water, electrical circuits and their attendant safeguards and contains a considerably expanded section comprising a glossary of biological terms.

The section dealing with classification of fishes is very detailed and the system employed is based upon that in use at the British Museum and includes charts of orders, sub-orders and families and is illustrated by coloured plates reproduced from water-colour paintings.

The text is amply illustrated by line drawings, black and white and colour photographs. Indexing has been thoughtfully planned and separated into four parts covering: general subjects, specific names of fish, popular fish names and a guide to illustrations.

The scope of this book's appeal is likely to be a wide one for it has been produced with both the tyro and the advanced aquarist in mind.

■

Find the fish

by D. Theil

The first is in PINEAPPLE and also in PLUM,

The second is in FILTH but not in SCUM,

The third is in FAIRY but not in GNOME,

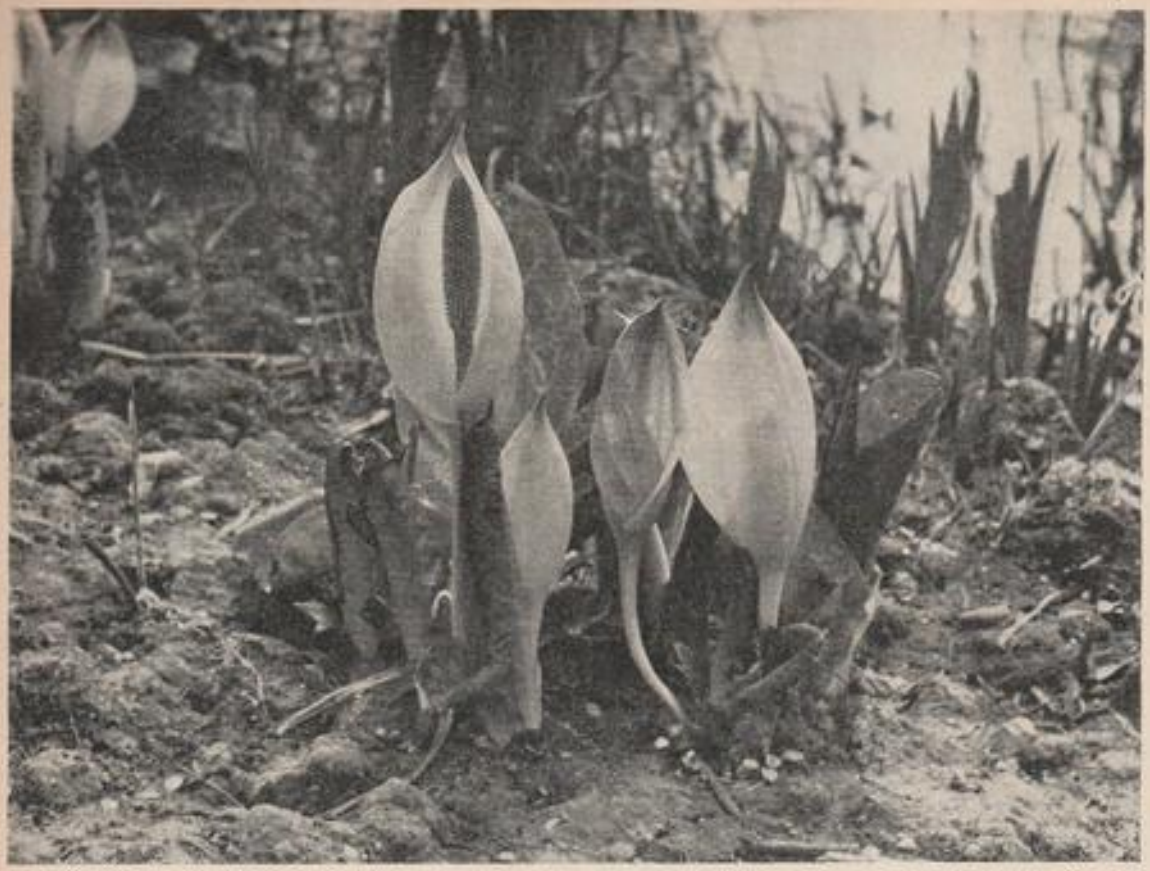
The fourth is in WANDER and also in ROAM,

The fifth is in COMMON but not in RARE,

The sixth is in HELPING as well as in SHARE,

The last is in VASE but not found in URN.

Solution on page 400



Skunk cabbage for the pondside

Charming flowers and foliage . . . not-so-pleasant smell

ONE of the more remarkable members of the family Araceae (Arums) is the skunk cabbage (*Lysichitum americanum*), so-called because the leaves have an unpleasant smell. But the fact that the plant is off-putting if you bend down and shove your nose against it is insufficient reason to exclude it from your pondside; for the skunk cabbage more than makes up for its olfactory failing by being particularly generous with its charming flower and foliage effects.

The typical arum flowers come first, in spring. They open out as gracefully shaped hoods of yellow, with green spadices. Then follow the large paddle-shaped leaves, that may grow up to 4 ft. in length and about 15 in. across.

The skunk cabbage demands a permanently moist but well-drained position out of deep shade. The sort of rooting medium it revels in is a mixture of peat, well-rotted leafmould and loam over a thick layer of rotting vegetation over another layer of crocks—brick ends, clinker, and the like. These will guard against the roots becoming waterlogged.

Nothing precious or easily killed should be planted close to a skunk cabbage because of its overreaching foliage, but the rapidly invasive and robust rompers such as moneywort or ajuga may be started off nearby to provide an attractive and expanding carpet after the skunk cabbage has died down.

by B. Fry

Breeding *Aphyosemion calliurum*

by A. W. Skinner

I WAS busy cleaning out tanks in the Fish House one day when a friend called. He handed me a jar which had a small nylon mop inside. He informed me the mop had several eggs on it from his *Aphyosemion calliurum* and as he had no spare tanks in which to hatch them out would I like them.

Needless to say my wife and I were delighted to have a try at something a little different from our usual breeding procedures. We placed the mop in a small glass tank with about 2 inches of water and floated it in a large tank in which youngsters were being grown. We waited patiently reading up as much information as we could find and gathered it took about 12-14 days for the eggs to hatch. After two weeks we could not see any youngsters in the tank and thought we had failed but we kept peering hopefully and suddenly the wife came rushing to me and said there was a youngster in the tank that looked like a small guppy. Later on that day another fish appeared and we put a tiny squeeze of egg yolk in to give them some food. We continued to feed them a very little egg yolk and in the course of a few more days we had six little fish swimming around. By this time I added some brine shrimp and micro worms to their diet and they were soon big enough to put them in with a batch of young barbs to grow on. By the time the barbs were a reasonable size the *Aphyosemions* were becoming sexable. We took out the males and put them into the male conditioning tank and likewise the females. We left them in these tanks for about four weeks and by this time, with plenty of good variety in food, the females were beginning to look quite rounded.

It so happened at this time we had a lecture at our Society on the egg-laying tooth carps and it was a most interesting evening. The Gentleman lecturing explained how he spawned and hatched out the various types and it really fired our imaginations to have a go with our now quite mature looking fish. The male, incidentally, had coloured up really well and several friends said how much they would like to have some.

The way we went about trying to breed the fish was as follows. A small glass tank was thoroughly cleaned and about 4 inches of fresh tap water added. We sterilized (by boiling) the nylon mop and added this to the water. The tank was then left in our Fish House and the temperature was about 76°F. After it had stood for three days a pair of fish were introduced and we left them to settle in. The following day we fed them with a few white worms and while the fish were in the breeding tank we were advised to feed white worm every alternate day. Presumably less bacteria would develop from this feeding method than any other way. Two days later we took the mop out and were thrilled to find a few eggs on the wool. The eggs are quite hard and if you run your fingers gently through the wool you can easily find them. We removed the eggs one at a time and put them into a square type glass jar with about an inch of water. We then placed the lid on the jar and shaded it from direct light with a sheet of paper. We stood the jar up a little higher than the breeding tank so the temperature was slightly higher at about 78°F. The mop was returned to the breeding tank and we continued to take the eggs off every alternate day and each time put them in a new jar. After eight days we were rather upset to find the female had died and from this we learned it was best to use two females and one male and only leave the adults together for a week, then re-condition them for a couple of weeks.

Anyway, back to the eggs. When we looked at the first eggs removed after 4 days we could see a little black speck appearing and in about 12 days the first eggs had hatched; these were given a little egg yolk in the jar and the following day were transferred into a large shallow dish. As the other eggs hatched out in the other jars we treated them in the same way and by the time all were hatched we had two to three dozen young fry in the dish. We had put a bit of Indian fern in with them so that the tinier ones would have somewhere to hide but as far as we could see they didn't seem to bother one another. This may have been due to the fact that they were well fed on brine shrimp and micro worms and very fine sifted daphnia. As soon as they were reasonable in size we transferred them to a large tank with some other youngsters and grew them up as previously.

The last time we spawned these fish we did not remove any eggs but after one week took the adults out and left the mop in the small tank. This actually turned out the best spawning we had so presumably the adults did not eat the eggs. Several of our club members are going to have a try at breeding these fish and it is really most interesting. For anyone who has had a lecture on or read about egg-laying tooth carps, I would suggest one of the *Aphyosemimion* group to start with, and I am sure you will be quite thrilled with the results as we were.

New Aquaria at Welling

An outstanding attraction for aquarists has been provided with the opening of "4-ways Tropical Aquatics" at Embassy Court, in Welling, Kent. The official opening on April 10th was a gala occasion, attended by the Mayor of Bexley and many representatives of the district and the trade.

This modern centre for aquarium shopping presents a most attractive setting for the huge variety of fish and plants, and introduces many innovations that enhance the displays.

In our next issue we will be reporting on the scene at the official opening and hope to have photos that will reflect the many attractions of a shop that has tremendous interest for professional and beginner alike.

Breeding African Clawed Toads

by Terry Jennings

FOR many years the Clawed Toad (*Xenopus laevis*) has been used in human pregnancy tests; now it is becoming increasingly popular as a laboratory animal in school and college biology courses, and the aquarist who is able to breed these animals may well find these establishments a profitable outlet for his surplus stock.

In nature, *Xenopus* is confined to the African continent where it is usually to be found in swamps, rivers, ditches and waterholes over the whole Cape Peninsular and further north as far as the Sahara and Abyssinia. It occupies a fairly low position in evolutionary history inasmuch as the species has never learnt to leave the water.

Several characteristics of the adult toads distinguish them as extremely aquatic, including the position of the eyes on the top of the head which enables the toad to see above the surface of the water without the rest of the body being visible. The webs between the toes, which are capped with sharp claws, have become so exaggerated that each foot resembles a half-opened umbrella. The front legs are very small and used almost entirely for conveying food to the mouth once it is grasped. The toad's pointed head assists it in burrowing beneath stones for food which largely consists, in the wild state, of freshwater worms, small crustaceans and aquatic insects. Its very flattened body probably enables it to live almost completely concealed by mud at the bottom of the pond. Further, as a result of thousands of years of total immersion, the toads have developed highly sensory tubular patches on the skin which are believed to detect vibrations of the surrounding water.

Adult Clawed Toads are not very demanding in their requirements for life in captivity. A large tank, an old sink or even a baby's plastic bath are suitable containers in which to keep the toads. In winter they should remain indoors because they prefer a temperature of about 23°C. (73°F.), although they will live quite happily in water which ranges in temperature from 10°C. to 28°C. (50°F. to 82°F.). The toads can leap out of a tank quite easily, so it must be fitted with a secure cover. Two-inch mesh Claritex, obtainable from most ironmongers, is excellent for this purpose but the tank must always be kept in a shady place.

The toads should be fed twice a week, and since they are carnivorous they can be offered scraps of raw meat, liver, heart and even live earthworms. Any uneaten food should be removed from the tank, otherwise it may foul the water. It is best to change the water the day after feeding. Tap water can be used if it is first allowed to stand for a day or so to allow all traces of chlorine to disappear.

I have made no mention of other furnishings for the tank such as shingle, rocks and water plants. This is simply because none of these is essential although they do add to the aesthetic appeal of the tank and its occupants. This, however, has to be weighed against the hindrance these items present to speedy and frequent change of the water.

An adult female Clawed Toad is normally four times the size of an adult male from which it is also distinguished by the presence of labia in the cloacal region, absent in the male. The whole body is covered with mottled markings which become darker against a background of stones or weeds and paler when the toad is placed in a bright light or against a white background. They prefer, however, to be kept fairly dark.

Under their native conditions the toads reach maturity in two years. The breeding season is usually July, but in captivity it can be something of a problem to induce them to breed. A successful attempt was made at Cambridge some years ago by keeping the aquarium very cool for a month, and then warming it up to stimulate the approach of spring, with the added influence of a few seasonable showers produced by means of a bath spray. In due course eggs were deposited singly on stones and water plants, and from these eggs tadpoles were quickly produced.

A more satisfactory method of encouraging Clawed Toads to breed is by injecting both male and female with a hormone preparation which starts off the mating process. This technique is not as complicated as it may seem, but as with many other familiar actions, the use of the hypodermic syringe improves with practice.

A sexually mature pair of toads should be kept at 23°C. in a small tank, about 12 in. × 8 in. × 8 in., fitted with a lid of perforated zinc, for at least a month to acclimatise them to their new conditions. A similar tank will be needed later for the eggs, so that it may be easier to stand both of these small tanks in a larger one containing water which is maintained at 23°C. In this way only one heater and thermostat is needed instead of two.

The injection consists of Pregnyl or chorionic gonadotrophin, which can be obtained from most suppliers of biological equipment. T. Gerrard and Co. Ltd., of Worthing Road, East Preston, Littlehampton, Sussex, keep stocks of both toads and hormone and I have always found these people very helpful. Pregnyl is sold in packs consisting of separate ampoules of the hormone powder and distilled water. A supply of ampoules of two sizes, 100 i.u. and 500 i.u. is needed. Disposable plastic syringes can be obtained from most chemists. A 2ml. syringe is preferable and it is as well to have several size 18 hypodermic needles available. Doctors and hospitals use disposable syringes of this type and can sometimes be persuaded to save the ones they have finished with.

One of the ampoules of distilled water should be broken open and drawn up into the syringe through the needle. An ampoule of Pregnyl of the appropriate strength is then opened and the distilled water emptied into it. The Pregnyl dissolves immediately and can then be drawn up

African Clawed Toad

in solution into the syringe, taking care to get rid of all air bubbles by pointing the needle upwards and slowly raising the plunger until all the air is expelled.

When the injection has been prepared, the first toad should be taken from the tank with a net. Some authorities recommend that the toad be grasped firmly in a dry towel, but I have found these animals so slippery to hold that this method was just not successful. My own answer to the problem was to use a polythene bag, one of the perforated type used for fruit or vegetables is ideal, and the animal can then be trapped in one corner of the bag and injected through the polythene.

One of the animal's back legs should be extended during the injection and the skin of the back of the thigh pierced, with the needle directed towards the line of 'stitch marks' on the surface of the skin. The needle should be kept just beneath the skin and directed slightly upwards so as not to pierce the internal organs. Care is needed when holding the syringe to ensure that the contents are not discharged before the toad's rather tough skin has been pierced.

Two injections are necessary for each toad—a 'primer' injection which prepares the female and induces the production of the black nuptial pads in the male and a second injection is given four days later to induce mating and spawning. For the primer injection 50 units of hormone are needed for the male and 100 units for the female. The whole of one of the 100 unit ampoules dissolved in distilled water will be needed for each female. One such ampoule will serve to inject two males, each being injected with 0.5 ccs. of the solution.

For the second injection, four days later, a 500 unit ampoule of Pregnyl is used. Prepare a syringeful (1 cc.) but inject only 0.6 ccs. into the female and using the same syringe, inject 0.2 ccs. into the male. If more than one pair of toads is injected at the same time (and this is advisable since failures are not infrequent) the remaining 0.2 ccs. of Pregnyl can be used for another male. After use the syringes should be washed out with distilled water and the needles sterilized in alcohol (methylated spirits will do). They can then be used again.

To make it easier to transfer the spawn, a piece of muslin, to which most of the eggs will adhere, can be placed in the tank before the toads are injected. The toads generally go into amplexus about twelve hours after the second injection and spawning continues for several hours. After spawning the toads should be returned to the main tank, bearing in mind that there should be no sudden change of temperature, and rested and well fed for at least a month before another attempt is made to breed them.

The eggs require a good supply of oxygen in the water in order to develop. If they are laid in large masses it will be necessary to transfer some of them into the second small tank using a wide-mouthed pipette for the purpose. A proportion of the eggs are nearly always infertile and these are usually those which have not adhered to the muslin or the sides of the tank.

When the larvae hatch, about three days after the eggs were laid, they at first cling to the sides of the tank or hang from the surface of the water. For the first two or three days the tadpoles cannot feed because they have no mouths but there is still quite a lot of egg yolk in their stomachs which they use as food. When they are four or five days old the tadpoles develop mouths and begin to eat. At this stage they are herbivorous, and under natural conditions eat microscopic algae in the water. In captive conditions it is easier to feed them on dry, powdered nettle leaves which can be obtained from some health food stores and also from many dealers in biological supplies. The amount of food to give each day can only be judged by experience. No more should be given than the tadpoles can clear in twenty-four hours as a surplus will soon start to decay and pollute the water. In any case, the

Continued on page 400

A brine shrimp hatchery

continued from page 391

be checked and the thermostat adjusted if necessary. When the temperature is correct, place a quantity of brine shrimp eggs in one container; the next day place some eggs in the second container; on the third day switch off the air pump and allow 2 or 3 minutes for unhatched eggs to settle. Open the door and using, preferably, a fine circular net, catch the shrimps in the first hatcher taking care not to drop brine on to the bulbs. Dip the net and shrimps in warm fresh water to reduce the salt and feed to the aquarium. Add eggs to the third hatcher, close the door and switch on the air. Repeat daily and a constant supply of live food is assured. Some aquarists prefer to syphon off the shrimps.

It is worth while to experiment with different brands of eggs and observe the proportion which hatch. The effects of different brine strengths and borax addition can be investigated. In these cases it would be best to set up all three units at the same time for direct comparison. If it is wished to grow shrimps to maturity a few, say 5 or 10, could be kept in a jar of brine floating in an aquarium or in a warm spot such as by a central heating stove. Old aquarium water should be used with the usual amount of salt. A small quantity of old aquarium water or green water should be added every few days and perhaps a trace of "Liquifry," yeast or powdered food. I have seen shrimps which have been raised to maturity and have bred freely which were only "fed" with aquarium water, so any foods should be used very sparingly.

The unit described provides a constant source of live food which is appreciated by most fish and essential for some. It also provides the basis for controlled experimentation of hatching conditions. The design may also be useful for hatching some types of fish-eggs. The results of experiments carried out in this apparatus would be of interest and it is hoped they will be published.

Breeding African Clawed Toads

continued from page 399

tanks should be cleaned at least once a week and, later on, more often than this.

The rate of growth of the tadpoles is affected by the temperature of the water, quantity of food given and amount of space available. At 23°C. the tadpoles take from seven to eight weeks to develop from hatching to metamorphosis, although a proportion are always smaller and grow more slowly.

At the onset of metamorphosis, when the tadpoles have grown strongly webbed back legs and their tentacles have begun to shrivel, the amount of water in the tank should be reduced so that they can reach the surface more easily. When the tails start to degenerate, small organisms such as enchytraeids, *Daphnia*, *Tubifex* or *Chaoborus* larvae should be offered. Later the young toads can be weaned onto small pieces of shredded sheep's heart.

The toads always provide plenty of interest for the aquarist and, although it would be foolish to pretend that breeding them is anything less than nerve-racking, there is something rather fascinating about being able to control the breeding behaviour of an animal at will.

Tropical fishkeeping: has it a future?

By T. G. Wall

TROPICAL Fishkeeping is growing in popularity to such an extent that an aquarium in the home is almost as much a part of the scene as a television set. This theme has been the subject of comment on several occasions. Recently, however, I have been analysing the possible cause or causes for this increase in interest.

Is it I wonder, due to the fact that the hobby has been made easier to follow successfully? There are several reasons why this may be so. In these days of rising prices, for example, I find that fish, far from "Going Up," have maintained a level and, in many cases, have actually dropped significantly due, probably, to increased efficiency in transport from abroad. If you find this fact hard to believe, glance through old copies of the *Aquarist*! Equipment, too, has become more varied and sophisticated with very little increase in cost.

The most important improvements, however, seem to have been made in Aquatic Food-Stuffs—the variety and quality of dried foods available having risen tremendously; live foods and their substitutes, too, are much more easily obtained. Few Aquarists nowadays arm themselves with buckets and nets and plod over muddy fields in search of the much prized *Daphnia*! Even *Tubifex*, once a difficult-to-get risky commodity, now comes in freeze-dried form.

So, all in all, the shop-borne aquarist has only to drive to the local Aquatic dealer to satisfy his fishy requirements. Here, too, dealers have increased in number to accommodate the market; almost every village and town has its quota. Visits to aquatic nurseries are now commonplace—even the new motorways help!

Have all these advantages no debit side? Do we miss the safari to a distant breeders' establishment? Do we know anything about the pests and diseases once so common? We do not find leeches, *Dytiscus larvae* and *Hydra* in our little bags of disinfected *Daphnia*! Has some of the fun gone out of searching for a rare variety of fish or plant? Will an "easy-come, easy go" attitude grow within our hobby, resulting in a slump similar to that which occurred just after the last war?

There is no doubt that difficulties overcome give greater satisfaction than mere routine in the long run.

Who knows? Only time will tell.

Solution to "Find the fish"

see page 395

Answer, PIRANHA

"Champion-of-Champions" Contest

Mr. Secretary: Please advise promptly the date of your *Open Show*

THE premier award for fish-keepers will be contested for the second time at the British Aquarists' Festival to be held on 26th and 27th October at Belle Vue, Manchester. The preliminaries for this exciting event are already under way, and we wish to make a special request to Club Secretaries for full co-operation in notifying us promptly of their Open Show date.

This is most important to ensure the smooth running of the national contest, and to avoid disappointing delays in awarding the gold-plated pin to winners of "The Best Fish in the Show" competitions. It is these winners who qualify as entrants for the "Champion-of-Champions" Contest at Belle Vue, and it will greatly assist the organisers if Secretaries will forward the entry form for the "Champion-of-Champions" Contest **within five days after the Show date.**

Secretaries who have not received this entry form are urged to advise us promptly, and a copy will be sent, together with details of the Contest and the gold-plated pin for presentation. Forms have been sent to Secretaries where the Show date is known, but there are many Clubs still to be covered. The closing date for "Champion-of-Champions" entries is 30th September, 1968, but it is important that we have prompt advice of "Best Fish in the Show" winners on the completed entry forms without delay.

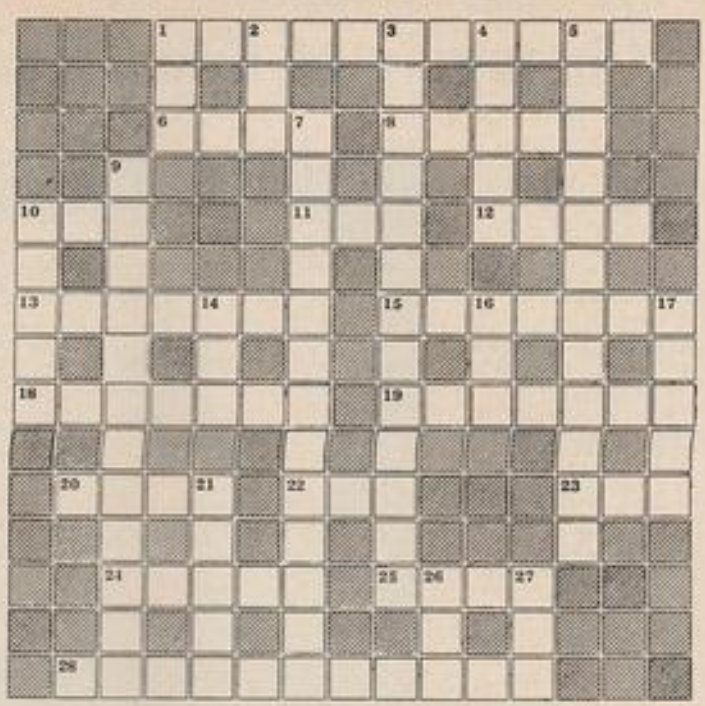
To summarise; will Secretaries please advise us of the date of their Open Show. We will send entry form, full details, and the gold-plated pin for presentation to "Best Fish in the Show" winner.

Complete the entry form when winner is known, and send it within five days to "Champion-of-Champions," *The Aquarist and Pondkeeper*, **Half Acre, The Butts, Brentford, Middlesex.**

One important point that should be made clear: to qualify for entry in the "Champion-of-Champions" Contest, the "Best Fish in the Show" award must have been won at an Open Show (and by this is meant a show open to any member of the public and not by invitation only), and also where show schedules are available. Winners at Table Shows and Table Shows open by invitation are not eligible to enter the "Champion-of-Champions" Contest.

The "Aquarist" Crossword

By G. W. DOWNES



CLUES ACROSS

1. Get confused by a choir and find this Genus of fish (11).
6. Do this for a prolonged period to make sure your coral is clean (4).
8. Found on the ears (5).
10. Definitely marine (3).
11. There is a Tet from way down here, but it isn't mentioned in the song (3).
12. Maybe the Medaka likes this pudding (4).
13. A hidey hole or what you do to get there (7).
15. Small rodents (7).
18. This will cause an effect on living matter, or will tend to cause an effect of some kind (7).
19. Madagascar lace plant's structure (7).
20. Health resorts (4).
22. Spoil and sounds like a woman (3).
23. To do so is human (3).
24. She is around early in the year (5).
25. If this is silver it should be free of alkali (4).
28. It comes in various colours, and can make do coming back with a shilling in a mixed symphony (11).

CLUES DOWN

1. The cock sparrow has a black one (3).
2. A foreigner probably (3).
3. Not a blue fish (6, 7).
4. Nearly stop (5).
5. Avoid using these chemicals in the fish house (12).
7. Sounds like a deceitful, backward fish (8, 5).
9. Does Rover copy this fish when he pleased? (7, 5).
10. It takes all these to make a world (5).
14. Bird (3).
16. Rodent (3).
17. Cut, or make a bird with water (5).
21. Provocative light? (5).
26. Find the total (3).
27. Lair (3).

SOLUTION
on page 407

Rainbows in the garden pool

by A. J. Yorke

IT is evident that nowadays more and more people are discovering the joys and advantages of having a garden pool not least that these prove to be a highlight of any garden and require hardly any attention once plants and fishlife have become established. Unlike the garden, these do not require digging and weeding and unless one is one of those persons who actually like backache, it is the ideal solution to the problem of what to do with all that space available after the lawn has been laid and the greenhouse erected.

The pool, once constructed, is usually stocked with goldfish and planted with a water lily or two and that is that. Now I have no quarrels with water lilies or goldfish, and for the small, unambitious pool these are the limit of endeavour. However, with the range of easy-do-it-yourself kits now available for the construction of pools of all sizes and shapes and the availability of all sorts of fountains and waterfalls, I think it an absolute waste to limit oneself to goldfish. The number of native fish that would thrive and prosper in the larger pools are many and if one really wants to experiment, why not introduce trout. Admittedly, the trout that does best in pools is the Rainbow, which hails I believe from the U.S.A., but it has been established in Britain long enough for us to regard it as being as much a native as the goldfish.

The acquisition of the trout is easy enough as any of the many fish farms that abound will gladly sell off a few yearlings and these would seem to be best for the purpose. Averaging five to seven inches long, they are both active and hardy. It is true that one cannot keep goldfish with them, nor some of our native fish, as the trout is a notorious bully, but it compensates for all its anti-social habits by being one of our most interesting specimens.

If one is fortunate to have a pool with a natural and pure supply of spring water, one has no real problems but there is no reason why one should not keep them if one has a fountain or waterfall as part of the pools attractions. There is a fallacy that the trout must have running water, but this is not strictly correct. It must have clear, well oxygenated water, reasonably free from weeds (although water lilies are ideal as they provide shade which these fish enjoy very much), and of slightly cold temperature. One would not expect to have to lavish any more attention on them, however, than one has to do if one keeps a tropical aquarium.

I kept five of these fish for some months in an ordinary pool without any equipment at all, and they died only due to the water becoming really overheated during a very hot summer and then I believe all but one choked on blanket weed which suddenly appeared and multiplied at a fantastic rate. The one died of over-eating, and this is one of the habits of the trout one must watch. They are not only bullies, but confirmed gluttons.

As I have pointed out at least two of its vices, one would well ask perhaps why I recommend these fish at all which seem to require some coddling in any case. The reason is quite simple. They are interesting active fish which provide much entertainment (one can even eat them for dinner if one is not repelled by eating one's pets), and are really beautiful creatures to keep.

They enjoy leaping out of the water and when they do, and the sun is shining, they are virtually living bars of silver and spectrum shades. When one sees them lying dead on the fishmonger's slab one cannot possibly gain any idea of their beauty when alive. Apart from the perch, I know of few other native fish of equal beauty. There is, of course, a further warning and this that the pool should have banks or wire netting around it, as at feeding times they become extremely enthusiastic leapers. And they often land up on the banks of the pool. If one wishes they could, no doubt, be trained not to leap (a sheet of transparent polythene, raised at the edges to allow air to enter, would soon teach them that leaping is folly), but I think personally that they are more interesting if allowed to jump for their dinner.

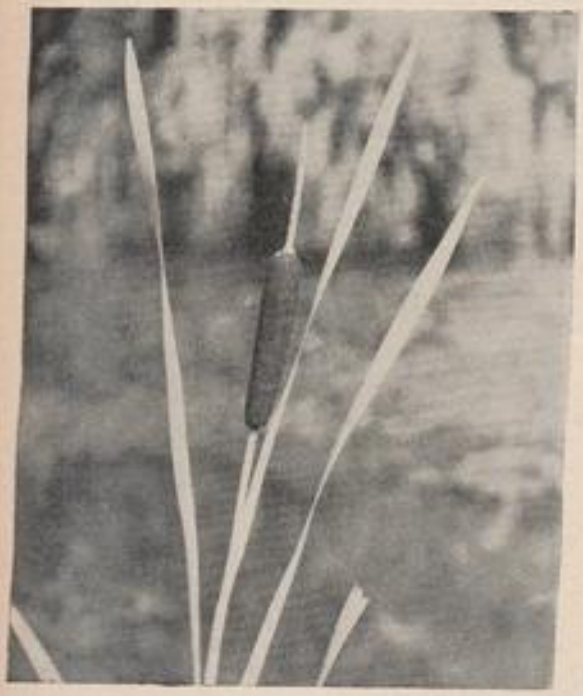
I used to suspend a piece of raw meat over the pool on a straight pin attached firmly by twine to a twig and the trout used to enjoy leaping up for this, propelling themselves out of the water with accuracy by their extremely muscular tails. It is interesting to note, by the way, that if one tries to reach something that is lying at the bottom of the pool, it is invariably some distance away from the spot we think it is. The trout, from the other end of the scale, of course, seems to have overcome this for it rarely, if ever, misses the suspended morsel, which shows that it must have made some calculations before it leaps.

Know your A

• An "Aquarist"

Callitriche (at left)
Commonly known as Water Starwort in reference to star-shaped leaf clusters terminating the stems. The flowers are very insignificant being small and green and unobtrusively situated in the axils of the leaves.

Typha latifolia (Great Reedmace, wrongly called Bullrush)
Found growing both in water and by water in swampy ground, this is the largest of our native aquatic plants, its flower stems often reaching ten feet in height and bearing the cigar-shaped female in florescence.



Utricularia vulgaris (Bladderwort)
A rootless submerged aquatic plant equipped with tiny bladders for the purpose of trapping prey such as small *Daphnia*, cylops, etc.

AQUATICS

Pictorial Feature

Cabomba caroliniana
An American native, this attractive, bright green submerged aquatic is a popular aquarium plant but under certain conditions thrives in outdoor pools when the whorls reach four or five inches in diameter.

Myriophyllum verticillatum (Whorled Milfoil)
A very attractive native submerged aquatic which enhances the coldwater aquarium but can also be utilised in the tropical tank.

Azolla filiculoides (Fairy Moss)
Originally introduced from the U.S.A. as an aquarium plant, this attractive little floating aquatic escaped to natural waters and has succeeded in completely covering some disused canals.

Our experts' answer to tropical fish-keeping queries

Rasbora daniconius

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.

Please give me some information about a fish called *Rasbora daniconius*.

R. daniconius is found over a wide area of southern and south-eastern India, Ceylon, Burma and Malaya. In its natural state it attains a length of about 6 in., which is twice the size it reaches in the aquarium. It is peaceful by nature and settles down very well in a community tank. It takes any dried or live food freely and flourishes best at a temperature of about 75°F. (24°C.).

I have just bought a 4 ft. aquarium and the dealer who sold it to me said that two heaters would be required to keep the water at the correct temperature. I should appreciate your views on this subject.

A heater near each end of the tank will give a better distribution of heat than just one in the middle. The heaters should rest in a horizontal position on the compost and be wired in parallel. For your tank we suggest two 75 watt heaters.

Is it a fact that if I keep guppies and mollies in the same aquarium cross-breeding will take place?

On rare occasions female guppies have produced fry fathered by a male molly. But the likelihood of such an event occurring in your aquarium is remote.

How does one sex the beacon fish?

In mature fish the male is less bulky than the female and the anterior tip of his anal fin shows a white marking.

We do a lot of entertaining and I always become worried when our sitting-room becomes hazy with tobacco smoke. Is there any way I can protect my fishes against nicotine poisoning?

Keep the aquarium well-covered and switch off the pump (if you use one) until after your visitors have gone and the tobacco smoke has cleared. We must point out, however, that it takes a really heavy concentration of tobacco smoke to harm the occupants of an aquarium.

What conditions do you recommend for the chocolate gourami (*Sphaerichthys osphromenoides*)?

It is advisable to keep the chocolate gourami on its own or with sedate-swimming fishes that will not worry it in any way. Soft and acid water and a temperature in the upper seventies (°F.) suits it best. Small live food is preferred.

I should very much like to know who first thought of illuminating an aquarium by artificial light.

We have no idea who first thought of illuminating an aquarium by artificial light, but the practice certainly dates back to Victorian times, when tanks housing a collection of coldwater fishes were lighted, when necessary, by gas. There is no question, however, that we owe much of our success in keeping fishes and plants in a healthy state under electric light to a Mr. Arthur J. Sweet, of Westinghouse Electric and Manufacturing Company, U.S.A., who studied and wrote about the subject some 40 years ago. One writer described Mr. Sweet's findings as "the most important contribution yet made to the science of aquarium culture."

I would appreciate any help you can give me with regard to the cultivation of a water plant called *Barclayia longifolia*.

The successful cultivation of this plant, that is beautiful in flower and foliage, depends on the following: a compost low in calcium, soft and acid water, a temperature in the upper 70's or low 80's (°F.), and a reasonably bright light. A suitable compost may be made up from roughly equal parts of ordinary yellow clay, riddled peat, well-washed coarse sand and crushed horticultural charcoal.

Recently I found one of my pearl danios drifting on its side among the floating plants. Seemingly it cannot swim on an even keel and is too buoyant to leave the surface. What is ailing this fish?

Your fish is suffering from derangement of the swim bladder. Usually this is brought about by the fish taking in too much of a dried food that swells after contact with water or to an abrupt change of temperature. Some fish, even within the same species, are more susceptible to temperature change than others. It is not always possible to cure this trouble, but do try keeping the fish in very shallow water (a glass pie-dish half-filled with water and floated in the aquarium makes a satisfactory hospital tank) for about a week. Supplement this treatment with a raise in the temperature of about five degrees (°F.). If this raise is brought about gradually it will not harm the other fishes

in the aquarium. If the sick fish is still interested in food, see that it is given chopped red earthworms, well-washed tubifex worms, brine shrimps, or live *Daphnia*. If no improvement is noticed at the end of a week, it is kinder to put the fish out of its misery.

Sometime ago I purchased an unnamed aquarium lily which has produced plenty of leaves. Recently a baby lily has grown from the centre of one of the leaves. Is this an abnormality in the plant or does the lily belong to some rare non-conforming genus?

We believe you have a plant of *Nymphaea daubenyana*, a true water-lily which produces baby plants from the centre of mature leaves. When the parent leaf is in an advanced stage of decay the baby plant should be started off on its own in rich compost in shallow water. At one time this wonderful little lily was quite common, but of recent years it appears to have become increasingly scarce.

May grasshoppers be fed to tropical fish?

Grasshoppers make a useful change in a fish's diet. The difficulty is in catching sufficient of them to justify all the trouble.

I have bought some disc-shaped characins that my dealer told me must have greenfood. Besides chopped water plants, what other greenstuff could I feed to them?

Fresh bruised lettuce and scalded spinach and tender young nettle leaves are suitable.

Coldwater fish-keeping queries answered by A. Boarder

I have a garden pond with some medium-sized goldfish in and have obtained some Golden carp. Can I put these in with the goldfish?

The carp will not harm the goldfish in any way. If the fishes should spawn it is possible that some of the youngsters could be crosses between the carp and the goldfish. Few, if any, of these might change colour from the original bronze.

I have kept goldfish for many years and would like to know if there is any visible physical difference between male and female?

If the fish are examined from above it is probable that the females will show a distended belly. The males are usually slimmer if they are of the same variety. This is because the milt of the male (soft roe), does not take up as much space as the eggs (hard roe), of the female. Also, in or near the breeding season most males show small, white, raised dots, like little pimples on the gill plates and often on the front rays of the pectoral fins.

I have a tank which is about 70°F., is it possible to keep tropical fishes with goldfish in this tank?

It is quite possible to keep tropicals with goldfish. Many can stand a temperature from about 65°F. to 75°F. Such fish as White Cloud Mountain Minnows and Guppies do not mind this temperature and some of the varieties of Platy can also thrive in such warmth. The only point to watch is that if fed well the goldfish could grow very quickly and the tank then becomes over-crowded.

I am installing a fibre glass pond in my garden, 5 ft. by 3 ft. How many fishes and what kinds shall I introduce?

Half-a-dozen 3 to 4-inch goldfish will be enough. They will then have space in which to grow.

Could you kindly give me a recipe for making a good aquarium cement, with as simple ingredients as possible as I live in East Africa?

A good old-fashioned recipe is: Two parts by weight of whiting putty, one part red lead, with gold size added to make it into a workable consistency.

How do fish know when the tide is going out?

Those fishes which feed or swim in the area between high and low tide realise that the tide is going out when the water pressure above them decreases. They could also tell by the vibration if nearby waves were breaking on rocks. Most large fish do not often feed very close in but occasionally get stranded in rock pools.

Would grass snakes harm the goldfish in my pond?

Grass snakes can eat goldfish or any other fish. I have known a medium sized grass snake swallow a fully grown frog.

Why is it that some of my young goldfish in the pond have failed to change to gold?

Some strains of goldfish change colour early in life whilst others may take two or three years. Some may never change and if such fish are left in the pond to breed with others it is very probable that each year fewer fish will change.

My goldfish in a tank have died off but I had given them a Dettol bath. Why did they die?

It is quite impossible to say why the fish died except that fish should not be given a Dettol bath as a cure-all. This is only used very carefully by experienced aquarists as a cure for flukes and fish lice. Goldfish do not die without cause and there would have to be something wrong with the treatment. Usually over-crowding and over-feeding are the main causes of failure.

If I put Tubifex worms in a bucket would they live and breed?

The worms would have to be fed on decaying vegetation and there is no reason why you should not keep them.

Solution to Crossword (see page 402)

Formula for business expansion

Mr. Neville Carrington's plans for export drive

AN almost casual suggestion back in 1952 was the spark that lit the take-off for a business which today reaches into 69 countries. Let's make it a round figure of 70, for Japan will soon be on the list of buyers and users of "Liquifry," the fish food in liquid form on which the business of Inter-pet Ltd. was founded.

It's a small product—little larger than an average tube of toothpaste—but it has an enormous sales impact. Over 300,000 tubes were sold last year, and when current plans for a big export drive get into gear that figure will be dwarfed. Looking at a sample tube on the desk of Mr. Neville Carrington as we talked in his office in Dorking, it was interesting and indeed invigorating to realise that here was a demonstration of the "Backing Britain" policy in action. Whilst the product itself might be insignificant by comparison with major exports, the people behind the product are imbued with the right measure of enthusiasm and enterprise so essential to the success of the policy in national terms.

Away from business, Neville Carrington finds time to follow his life-long hobby among his fish tanks at home, supervised by his small son.

But to get back to the casual remark; it was made by Mr. Carrington's father, following one of the many meetings he had addressed to aquarium societies. In speaking to his son on topics that had arisen at the meeting, he said: "Why not a *liquid* fish food?" That was 18 years ago, and it represented a somewhat revolutionary idea, one that could have been quickly dismissed and forgotten. The question, however, posed a challenge for the son, who was at that time well into a career in pharmacy and chemical engineering. More by way of an exercise, he took up the challenge and produced the formula for a liquid fish food—then returned to his studies, and dropped the idea back in his father's lap.

Mr. Carrington, senior, was a pharmacist and lost no time in translating the formula into a product. It was a minor activity at that stage, little more than an extension of his hobby of aquarium keeping. His three pharmacies kept him more than busy, but it was not long before the reaction to the new product began to claim a lot of his time. Of its own merit, and without benefit of much publicity, it captured a considerable and steadily expanding market.

Meantime, his son was shaping a future that had its aim in industrial chemistry. Starting at college in 1952, Neville Carrington graduated Bachelor of Pharmacy before going to St. George's Hospital to complete his training as a pharmacist, then on to a post-graduate course in chemical engineering, in which he came out in top place. Then followed his Doctorate of Philosophy in Pharmaceutical Engineering—on tableting—and with it a realisation that he had had his fill of academic pursuits. He joined Macleans, started on toothpaste (was the shape of the tube a portent of things to come?) and during the next five years was product manager on toiletries, engaged in research and development. Subsequently he became manufacturing manager at the new Maidenhead plant.

On the death of his father five years ago, Neville Carrington took over the pharmacies and the small activity in aquaria supplies, and began to apply his experience in big business to the task of enlarging his own. He soon realised that his interests lay more closely to aquaria than to the British Pharmacopeia, and he expanded and developed the range of supplies for aquarists and pondkeepers. He is at the moment negotiating the sale of the third and last pharmacy, to leave him free for the next challenge—that of putting his products into more and bigger markets overseas.

The Inter-pet management team (from left) Mr. Carrington, Mrs. Gillian Woodall, Mr. Maurice Martin, Mr. Peter Penfold.

He believes there is a big potential as yet untapped, and by way of illustration he showed me a letter from an East German firm seeking information on "Liquifry". His approach to the challenge is typical of the man; the same thorough application to a problem as when he tackled the formula for a liquid fish food. He took his cue from a comment made during the post-devaluation comments on export prospects, which stated that British manufacturers were at fault in not coming up with new products. In his own field, Mr. Carrington saw the logic of this and recognised that most manufacturing was on too small a scale to allow for research and development. There just wasn't time—nor facilities. So Neville Carrington is doing something about it.

He has reorganised his business by bringing in new management personnel and planning larger premises for production. One of his former colleagues at Macleans, Mr. Maurice Martin, has been with him for the past two years and has just been appointed general manager. Mrs. Gillian Woodall who joined the team early last year has been appointed Marketing Manager, and the post of Production Manager has been taken up by Mr. Peter Penfold who joined the company last August. With Neville Carrington, they make up a team of young, enthusiastic and knowledgeable business-builders and they have already made a considerable impact. In the production field, negotiations are in progress for a 7,000 sq. ft. factory near Manchester, allied to other developments in the south. In this way Neville Carrington has planned to provide himself with more time for research into new products, giving him more access to more and wider markets.

The plan is already well under way. A stand has been taken at the German Pet Fair in Wiesbaden this summer, following on a similar promotion recently at the Hilversum Pet Fair in Holland. It is a highly competitive but steadily expanding market and the Inter-pet team are determined to carve out a substantial share of it. They believe they have the right products and will soon have more.

The liquid fish food has long been bustled for sales figures by other Inter-pet lines, as their handsomely-illustrated catalogue shows. "Liquifry" has been joined by many other foods, including the freeze-dried varieties; there are pumps, heaters, cleaners, filters, lamps, thermometers, and a host of other accessories; from brushes to garden pools, from breeding traps to booklets, the range is comprehensive; and naturally enough, having regard for the pharmaceutical background of the Company's chief, there are remedies in variety.

An outstanding section of the Inter-pet range is that of aquariums. They started manufacturing their stainless steel models in 1965, a type of aquarium that has done much to enhance the appearance of installations and eliminated the troubles associated with corrosion. The task of overcoming the annoying, often disastrous, consequences of leakage involved a great deal of trial and error, man-hours and money—but the results in terms of sales have been highly encouraging, and the stainless steel aquarium is now standard equipment.

Is he himself a keen aquarist, or still at heart a chemist and business-man? The question, as might be expected, brought from Mr. Carrington a claim to enjoy the best of both worlds. He has been keeping fish since childhood, encouraged by his father, and his first tropical tank in 1942 was a 12 in. by 8 in. by 6 in. model heated by a bulb in the plaster base, and containing a prized collection of a few guppies and two plaster fishermen. Today, he has a fish-house at his home in Dorking, and follows his father's example by lecturing frequently to Societies (though business commitments have curtailed this activity to some extent) and by writing and broadcasting. Recently, he was guest speaker at the Convention of Scottish Aquarist Societies in Glasgow, and was interviewed by B.B.C. in the "Town and Around" programme. His two young children show promise of keeping up the family tradition, with an already healthy interest in their own collections and the ability to identify most of them.

Here then is a business that reflects the widespread interest in fish and pondkeeping, the expertise of the people who serve and supply it, and—in this case, at any rate—the determination to push British goods to a foremost place in markets around the world. It was a stimulating experience to share in the atmosphere of enthusiasm and confidence that I felt on my visit to Inter-pet at Dorking. As an example of a planned, purpo-eful approach to this business of backing Britain, it is a pattern that could well be studied with advantage by all manufacturers and exporters. My own feeling is that it won't be so very long before Mr. Carrington and his colleagues and staff are operating under the well-deserved title of Inter-pet International.

W.J.Y.

Leporinus Fasciatus

Fishes of the genus *Leporinus*

by Jack Hems

THE genus *Leporinus*—a division of the family Anostomidae (until quite recently the anostomids were included in the family Characidae)—is widely distributed over most of South America east of the Andes. It is represented to ichthyologists by about twenty species, and to aquarists by about seven species. None are small fishes: they range in nature from about 5 to 14 in. or more. Not unnaturally, the larger species make an important contribution to the diet of the native population.

The body is elongated, more rounded in all parts than compressed, and covered with scales of moderate size. The dorsal and anal fins are placed roughly midway between the sharply conical head and the narrow tail. The caudal fin is well developed and is quite deeply forked. An adipose fin is present. The generic name of *Leporinus* is in reference to the rabbit-like snout. The mouth is small. It is characteristic of anostomids to swim in a head-downward position; some only slightly off the horizontal; others at an angle of about forty-five degrees. In the wild state they inhabit clear rivers and streams where they move about unhurriedly, feeding on or near the gravelly bottom on a mixture of animal and vegetable matter.

One or two species have bred in captivity, but little is known about the spawning procedure other than that during the nuptial drive the female scatters her eggs in the plants. Furthermore, nothing is known about how to tell the sexes apart; for differences in coloration or shape of the fins in the different species appear not to exist, or at any rate are not to be found described in the various reference books.

We must bear in mind, though, that in some fishes all the usual signs of sexual maturity concomitant with normal growth and proper development—even the reproductive faculty itself—are lulled into quiescence or abolished permanently by the restrictions imposed by aquarium life. Yet for all that it is heartening to know that a number of aquarium fishes that once bred rarely or not at all (the angel fish and the neon tetra, for instance) will do so reasonably freely today. The explanation for this is, of course, that the more we become interested in a species or group of closely related species, and the longer we have them around for study and experiment, the more we learn about their ways and special needs.

Because of their fondness for green food, an aquarium for any of these fishes is best furnished with plastic plants and some slivers of non-calcareous stone. In general they do not appear to be faddy about the quality of water they are placed in, or the temperature, provided the former is neither pronouncedly acid nor alkaline, and the latter is kept within a range of from 70°F. (21°C.) to 80°F. (26°C.). What is important, however, is a good-fitting cover glass; for all species of *Leporinus* are accomplished jumpers, and when in the mood they can project themselves through a narrow aperture. Therefore, apart from the consideration of green food in their mixed diet, little else is required to satisfy their requirements except a tank suited to their size.

Among the species most likely to turn up in dealers' tanks are *L. fasciatus*, *L. affinis*, *L. frederici*, *L. melanopleura*, *L. maculatus* and *L. striatus*. *L. affinis*, *L. fasciatus*, and *L. frederici* have been kept by tropical aquarists for a long time, since 1913 to be precise. In the wild state they attain a length of about a foot. The first two are very much alike: clay-yellow to gold, with several black vertical bars on the sides. The fins are dusky to clear. *L. fasciatus* has more and narrower bars than *L. affinis* and richer yellow colouring throughout. Both species range from the Orinoco in the north to the La Plata in the south.

L. frederici ranges from the Orinoco to the Amazon basin. The ground colour is greyish melting into brassy yellow to yellow-gold posteriorly. Numerous black vertical bars and some conspicuous black spots adorn the sides. The fins are clear, except the adipose fin, which shows a black

Continued on next page

Waterlife pests and friends

Fairy Shrimps

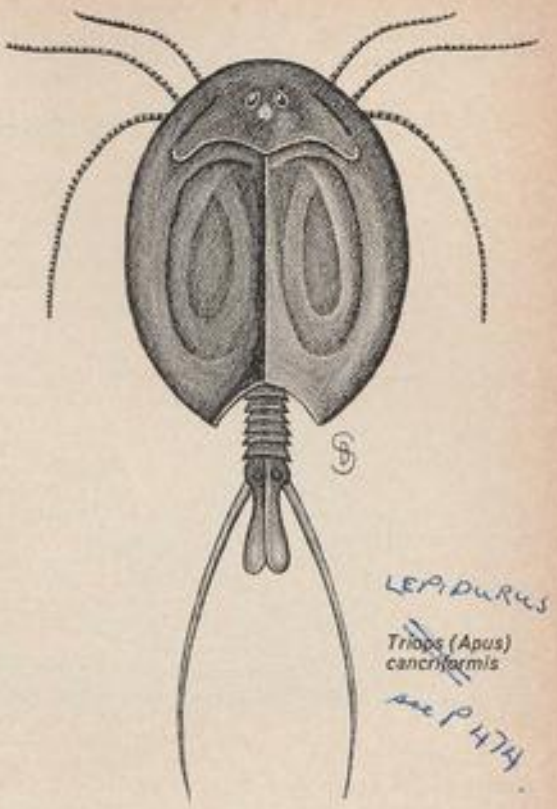
by Bill Simms

THE aquarist who comes across one of these fairly rare creatures would do well to set up a small shallow aquarium with plenty of mud from the pond where it was found and install it there. Although fairy shrimps can occur almost anywhere, it is not often that they are found and this is one of the instances when an amateur can do most valuable work.

There are two, and possibly three, species of the Fairy Shrimps, *Euphyllopoda*, known in Britain, and one of these, *Triops (Apus) cancriformis*, is very occasionally found. It lives in shallow freshwater pools and nearly always in pools that dry up from time to time.

This *Triops*, illustrated here, grows to about four inches long and therefore should be easy to spot; but it has a habit of crawling along on and in the mud so can easily be overlooked. It is one of the kind that has a hard carapace covering most of its body. The other two are without any carapace, and are only about half-an-inch long.

Continued in next column



They swim along upside down and look very much like ordinary freshwater shrimps, so that it is possible that they have been overlooked for this reason.

Being larger, the *Triops* fairy shrimps are carnivorous so live on water creatures such as small worms, and insect larvae. Any that are kept in captivity should therefore be easy to feed, particularly by aquarists, who are used to handling such things as blood-worms. In addition to their crawling habits these large fairy shrimps can swim well—either upside down or the right way up.

Male *Triops* fairy shrimps appear to be very rare in some seasons so that females reproduce without their aid at times. The eggs are carried about for some time by the female in a special container, and then deposited in the mud. They are very hard shelled and it is essential for some species that these eggs are dried out—or even frozen—before they will develop.

Aquarists who have hatched out brine shrimps will have met one of the two smaller fairy shrimps—or a close cousin—for it is *Artemia salina*. This small shrimp is found on the Continent in salt marshes and lakes. The remaining small fairy shrimp, *Chirocephalus diaphanus*, is found more often in the south and west of Britain, and where found might be worth collecting as fish food.

If any readers find the larger *Triops* Fairy Shrimp I shall be very pleased to hear about it. Address your letters to Bill Simms, c/o *The Aquarist*.

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genus *Leporinus*—continued

edge, and the anal fin which may or may not show some dark markings.

L. melanopleura is indigenous to the river systems lying between the Amazon and the La Plata. It is very elongated in outline and marked with a green to greenish brown stripe, that extends from the snout to the tail. In general the body is coloured yellowish brown, darker above than below. Posteriorly it inclines to reddish spotted with black. The fins are yellow to clear with maybe some darkish spots. In the natural state the fish attains a length of some 7 to 9 in. It was introduced to tropical aquarists in 1926.

L. striatus occurs in the northern half of South America. It made its début as an aquarium fish in the middle 1930s and is brown on the back and sides, shading to yellow on the underparts. Four or five dark green stripes extend from the head to the tail. The middle stripe is bolder-looking than the rest. For the most part the fins are colourless. The species grows slightly larger than *L. melanopleura*.

L. maculatus. This is one of the more recently introduced species. It ranges in the natural state over the greater part of South America. It has bred in captivity. Perhaps this is owing to the fact that it does not grow very large in its native waters—it does not appear to exceed 5 in.—and is therefore less likely to suffer from arrested development when it is bounded by four glass walls. It is a prettily garbed fish, with lots of roundish blotchy black markings on light greeny brown sides.

Goldfish breeding:

The importance of pure water

by A. Boarder

WHEN rearing young goldfish and their varieties the importance of pure water cannot be over-emphasised. By this is meant that the water is not foul and charged with bad gases. Once the water loses most of its oxygen the fishes will go off their food. Goldfish will eat very heavily as long as there is plenty of oxygen in the water but once foul gases are in excess the fish are unable to digest their food and so cease eating. A state of affairs which can become very dangerous then arises. Any food which is offered, especially dried food, will not be taken and so can soon start to pollute the water. This in turn makes matters much worse and the fish will not eat at all.

It is not only that uneaten food will turn the water sour but the waste matter voided by the fishes will also tend to upset the balance of the water. It may be thought that aeration and filtration will clear the water and keep it pure but this is not so. Aeration can help by providing more oxygen but if there are too many foul gases in the water even this will not make the water pure. Filtration can remove floating particles from the water but it will not remove harmful matter in liquid form.

It can be noticed that if fishes are feeding well in a tank one day and are given a little too much in consequence the following day, the fishes may be off their food altogether and if any more is given the condition of the water becomes worse and trouble can ensue. At least once a week it is necessary to change some of the water for fresh. It is of little use removing a quantity of the water and filtering it to return it once more to the tank. The best method is to discard the water taken out and fill up with fresh. If it is found that the fishes have gone off their food, not only should some of the water be changed but no more food, especially dried types, should be given for at least two days. It must not be thought that goldfish must be eating all day and every day. They can go for long periods with no artificial feeding. Even after a month of apparent neglect no difference in the condition of the goldfish will be noticed except that their condition may have improved and also that of the tank. Many aquarists have complained to me that their goldfish tanks become badly infested with Algae but they could cure this condition by withholding all artificial food for a week or even more.

I have a small tank with three small goldfish on a window sill. I wanted the back glass to become covered with green Algae and so it was left uncleaned. After a time a nice covering developed but once it got thick I noticed that it was gradually disappearing. I then saw that the goldfish were sucking all the Algae off and eating it with gusto. They soon completely cleared the glass and have also removed any Algae left on the water plants.

The fantail goldfish which I have written about in previous articles are making wonderful progress. By four months of age they had all turned from the original bronze to gold, or red. By the time they were five months old they were as large as my fantails have been in previous years when they were three years old. This was, of course, the result of warming the water in their tanks. When the youngsters were about four months old I reduced the temperature of the water to 68°F. Aeration was still supplied but the fish had been spread out more into four tanks. I then had four fish in each of three tanks and the three larger ones were in a tank by themselves. The tanks are the concrete ones which I described the making of in a previous article. The depth is only nine inches and this is a good point when rearing young fish. Deep water is not required and in fact is not as good as water which, being shallower, is able to keep better oxygenated.

These tanks have no gravel or compost of any kind on the bottom. The plants I use are Hornwort (*Ceratophyllum demersum*), and Duck weed (*Lemna Minor*). The Hornwort makes no roots at all and so does not need compost. Although it is a coldwater plant and would usually die down in the winter, it grows splendidly in warm water and could be used with benefit in any tropical tank. In a pond out of doors it would shrink up to small brown horn-like pieces but with the warmth I have been able to provide it has flourished exceedingly well and does a good job in the tanks. It appears to have the power of attracting any floating matter to it, and so tends to keep the water in good condition. The advantage of using this plant is that it is very easy to give the tanks the weekly servicing. Each week I clean the bottoms of the tanks with the aid of a foot long half-inch glass tube attached to three feet of rubber tubing. Once I start the suction going I can run the end of the glass tube all over the bottom of the tank and watch all the sediment being drawn up and discarded. The tanks are then filled up with cold water. On an average I estimate that almost a gallon of water is changed by this means.

The use of Duck weed on the surfaces is to provide a permanent food for the fishes which will not pollute the water but will tend to improve it, as the roots are taking waste matter from the water. Any hungry goldfish will eat the Duck weed, which like the Hornwort would normally die down considerably in the winter, will grow and multiply in the warm tank.

The eighteen goldfish which hatched are still in perfect condition. Those in the cold tank are hardly two inches long over all and are still bronze, whilst the 15 in warm water are about four-and-a-half inches long and fully coloured. The females are bloated with eggs and I have no doubt that they will breed before long. There is no doubt that by using warmth, fancy goldfish can be grown on very quickly but the cost of doing this can become very high. I have had four 100 watt heaters in the tanks and as the tanks are in a cold frame out of doors which is only kept frost proof, it can be imagined that plenty of electricity

has been used. The cost of food would have been very high if I had not supplemented the flake food with all types of cereal, live and vegetable foods. The rate of growth of these fish has surprised me very much as having had to judge breeders coldwater classes over the past 20 years I would never have thought this was possible to get five month old fancy goldfish as large as normal three year olds.

In about the beginning of March, I shall gradually reduce the temperature of the tank water by adjusting the thermostats. I have two working in one tank in sequence to avoid any over-heating by the failure of one of them. The quality of the 15 better fish appears to me to be very good and at least a dozen will be good enough to join my breeders in the pond later on in the year. One important point has come out of my breeding of this strain of fantails and that is the vigorous health of the youngsters from this last spawning. I have been breeding with this strain since 1937, and at no time have I added any fish from outside this strain. Some of the old ones have died off to be replaced by youngsters. One would have thought that this inbreeding would have weakened the stock, but I have seen no evidence of this up to now.

I have often tried to obtain fantail stock of a quality comparable to mine but have never been able to find any good enough apart from some which enquiries proved were from my own stock. My experiments with warm water and aeration for hatching and rearing these fantails have given me a great interest and the results have far exceeded my anticipations. I hope that by the time I write my next article on them I shall be able to report that some of them have spawned.

The results

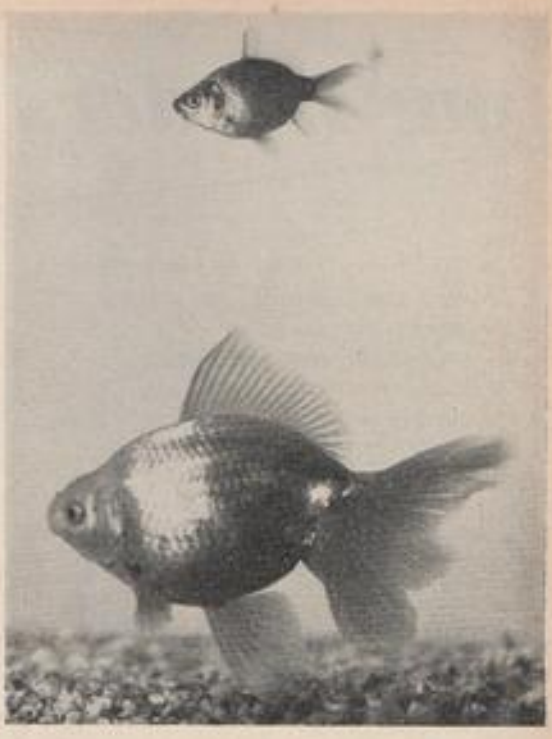
Later report from Mr. Boarder

THE two fish shown together are of the same age. My fantails spawned on 3/9/67 and water temperature was kept at 70°-72°F, for three months. Aeration was also used. After one month three fry were taken from the warm tank and placed in water about 45°F. By 30/10/67 one or two fry in warm tanks started to change colour, and by the middle of December all the fish in warmth had changed colour. The three fish in cool water show no signs of changing colour at six months of age.

The larger fish are 4½-5 in. long over-all and the small cold reared ones only about 1¼ in. long. The small ones are still the original bronze.

It is interesting to compare the photo of the single fish with an illustration of one of my fantails which was taken in 1947. This is the one shown on the cover of my book, "Coldwater Fishkeeping," and is also depicted inside. Although no new fish have been introduced into my strain for 30 years the quality of the fantails does not appear to have deteriorated at all and some of the young bred late in 1967 would compare very favourably with those of mine which used to win up to 1950.

The larger fish are as large as I would have expected my fish to be after three years of the usual cold treatment I usually reared my fish under, which proves how fast they will grow under warm conditions. The temperature of the warm tanks has now been lowered to 65°F, and will gradually be dropped to normal outside temperatures.



Above: Two fish of the same age. Spawning took place 3/9/67, and the photograph was taken in March, 1968. Fry kept at 70–72 deg. F., and three small ones moved to cool water 7/10/67

Below: Fantail hatched 7/9/67; photo taken March, 1968

our readers write

Readers are invited to express their views and opinions on subjects of interest to aquarists. The Editor reserves the right to shorten letters when considered necessary and is not responsible for the opinions expressed by correspondents.

Address letters to The Editor, *The Aquarist*, **The Butts, Half Acre, Brentford, Middlesex**

Worksop Open Show

IT has always been the aim of the Worksop Aquarist and Zoological Society to stage a really first-class Open Show. During each of the past five years, we have put on a successful show from the point of view of the number of entries, but we have never yet been satisfied with the hall which we have been able to hire.

This year, however, we have been able, through the consideration of the Notts. Education Authorities, to secure the use of a hall which, to our minds, is the Aquarist Societies' dream place. The venue for this year's show is the North Notts. College of Further Education, situated in Blyth Road, Worksop, and is one of the most up-to-date buildings in the North Midlands. We are being allowed the use of the Main Hall, dining room and kitchen facilities.

Our whole Society is in raptures at the thought of what we can achieve in the way of accommodation and space, not only for the benching of fish, but also for the comforts we can provide for all fellow aquarists present.

Our Open Show is on Sunday, 12th May, 1968. Schedules will shortly be sent to all society secretaries, and we are hoping to see around the "600" mark there.

Yours faithfully,
J. DERNIE.

Wanted—Single pairs of Killiefish

AT the moment I am trying to obtain, with great difficulty, single pairs of killiefish. I have travelled round many aquarists in search of these lovely fish, but either they are absent in the shops or they are very small, and I have to try to get these fish to a good size.

I have purchased two of the most beautiful of the Aphyosemions (*Australe* and *Coeruleum*) which I got for a very reasonable price. I obtained these two pairs from a well-known East End aquarist.

I was wondering if anybody had had the same trouble as me, and would any dealers who take an interest in these fish, please write to me. I implore you, please help me to find these fish.

Yours faithfully,
V. PROBERT,
6 Telden Close, Hatch End, Middlesex.

Where are those fighters?

AS a once enthusiastic, but now badly frustrated fighter fancier and breeder, I was more than a little interested in Mr. T. G. Walls' article "Leave the poor fighters alone!" Although it's about six years since I did any serious breeding of the splendid splendens, I still have great pleasure in being asked to give talks on Siamese fighters to Aquarium Societies in the Glasgow area.

I agree completely with Mr. Walls' contention that the fighter is *not* a community tank fish, and that any decent specimen is worthy of a small tank on his own, and I emphasise this point during the course of my talks.

However, having said that, I must add that other statements by Mr. Wall fill me with some surprise and a great deal of envy. He mentions, for example, about setting out "to purchase something similar to those gorgeous creatures illustrated in the coloured pages of books and magazines . . . sometimes at considerable expense." It's years since I have had the opportunity of purchasing one of "those gorgeous creatures" even at "considerable expense," because I haven't seen a decent fighter for sale in a dealer's shop for years. That's why I've labelled myself earlier as a badly frustrated fighter fancier and breeder.

Mr. Wall is also fortunate in being able to go to an open show and see some magnificent exhibits in the fighter class, because they appear to be rarities up here. He mentions five colour varieties being recognised by the F.B.A.S., most of the fighters here seem to contain *all* five colours in the *one* fish!

There *are* some breeders here breeding good line-bred fighters but as I've said they are rarities. I stopped breeding them myself because I felt the red strain I was breeding was degenerating, because of the lack of good fresh stock being available. I should like to restart again, and if Mr. Wall or any of your readers or any dealers have top class fish available I would be greatly interested and grateful if they would contact me.

Yours faithfully,
ROBERT GARDINER,
264 Talla Road, Wellington,
Glasgow, S.W.2.

News from AQUARISTS' SOCIETIES

THE members' show of the **Horsforth A.S.** which was held in March was run completely by the junior members and they made a very good job of the entertainment. There was a slide and tape quiz given by Master J. Dugdale, one of the younger members. This was followed by an older member, Master N. Holmes, telling of his troubles making an outside fish pond, and of the pleasure he gets out of it now it is completed. The last lecture was given by the junior editor, Master P. Kirby, who invited the people present to put questions to him which he answered to the satisfaction of all there. A musical interlude was well rendered by Master P. Sunderland and Master S. Elstub also entertained. In charge of all this entertainment was Master A. Jobbins. The show was attended by 37 people and 64 fish were entered.

At this members' show statuettes were presented instead of the usual cups. The winners were as follow: Best in Show, Mrs. B. Helm. Anabantids: 1, Mr. Ather; 2, R. Hampson; 3, Mrs. P. Hall. Cichlids: 1 and 3, Mrs. B. Helm; 2, R. Hampson. Catfish and Loach: 1, Mr. Ather; 2, R. Hampson; 3, Mr. Lancaster. Livebearers: 1, Mr. Ather; 2, Master N. Holmes, 3, K. Kirkbright. Barbs: 1, J. Callaby; 2, Mrs. B. Helm; 3, Mr. Bowland. A.O.V.: 1 and 3, R. Hampson; 2, Mrs. J. Dickinson. Characins: 1 and 3, R. Hampson; 2, Mrs. J. Dickinson. J.A.O.V.: Master P. Kirby 2, Master J. Callaby; 3, Master H. Plews.

* * *

AT the first of the March meetings of the **Wakefield and District A.S.** several films were shown to the members on Tropical fish. A competition was also held for the best drawing for a Stand for the Belle Vue Show. To encourage this the committee will award a prize to the most practical entry. The furnished jar competition winners were as follows: 1, G. Balby; 2, D. Fox; 3, A. Cotton. A.O.V.: 1, R. Hitchen; 2, G. Balby; 3, C. Archer. A.O.V. Novice: 1, A. Walker, 2, D. Fielding; 3, M. Townsend.

The Society now has a number of illustrated quizes which are available to any society. Anyone interested in booking these please contact the Secretary, Mr. F. Cooke, 21 Jacobs Well Lane, Wakefield, W. Yorks. Meetings are held on the second and fourth Tuesday in every month at the Central Youth House, Zetland Street, Wakefield, at 7.45 p.m. and young and old are most welcome. For old-age pensioners there is a special reduced rate for membership, and equipment.

* * *

THE **Tadcaster and District A.S.** is holding an Open Table Show on 7th July at the Roman Catholic School, St. Joseph's Street, Tadcaster. Details may be obtained from the Show Secretary, R. M. Faircliffe, Stutton Grove Lodge, Stutton Grove, Tadcaster.

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AT the recent annual general meeting of the **Warrington A.S.** the following officers were elected. Chairman, Ron Tench; Secretary, Howard Bennion, 24 Crofton Road, Runcorn; Treasurer, Miss Sandra Worrall; Show Secretary, Jom Higham, 42 Hood Lane, Warrington (Tel. 36939); Fish of the Month Organiser, Kevin Hamblett. The retiring Chairman, Pete Norris, thanked members for contributing to the year's activities and acknowledged the hard work undertaken throughout by the Committee. Fish of the Month Annual Awards: 1, B. Beswick; 2, B. Worrall; 3, R. Tench; 4, K. Hamblett; 5, P. Norris.

Plaques were awarded to the winning members by President, A. Higham. The introduction of lapel name-tags added to the homely atmosphere of the room at the White Hart Inn and made for easy mixing between members old and new. Although the attendance was down to fifty the Society looks like having another good year with a strong Committee and an anticipated surge in membership following the good fortune in obtaining such a good venue. Any prospective members or visitors requiring further information can obtain it by contacting any of the Society's officials.

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AT the annual general meeting of the **East London Aquarist and Pondkeepers Association** held in February the following officers were elected for the ensuing year. President, P. Campkin; Vice-Presidents, R. A. Taylor, P. Arnold, F. Petto Chairman, F. Vicker; Vice-Chairman, A. Field; Secretary, Mrs. P. Harris, 86 Leigh Road, East Ham, E.6; Treasurer, A. Harris; Show Organiser, J. Smith; Show Secretary, G. Green; Social Secretary, J. Boss; Librarian, P. Hines; Bulletin Editor, R. Dodkin; Press and Programme Secretary, W. Corby; Equipment Officer, C. Sweeting. Committee: J. Brydon, Mr. and Mrs. S. Armitage. Auditors, Mr. and Mrs. F. Arnold. The Society holds its meetings on the first and third Friday of each month at the Ripple Road School, Barking, at 8 p.m. New members are welcome and any further information concerning the Society may be obtained from the Secretary.

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AT the annual general meeting of the **Woking and District Aquarists Society,** Mr. Alec Stacey was re-elected as Chairman. Other officials of the committee were elected as follow: J. Lugger, Treasurer; Roy Bannister, 37 Colts Foot Drive, Burpham, Guildford, Surrey, Secretary; H. C. Brock, Show Secretary; Mrs. A. Lindsay, in charge of fund-raising activities; N. Landon, Newsletter Editor; Mrs. S. W. Hodgetts, Publicity.

Formed just over twelve months ago, the Society has made excellent progress with an ever-increasing membership. Meetings are held on the first and third Tuesdays of each month in private rooms at the "Prince of Wales" Public House, St. John's, Woking.

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THE Annual Convention and Open Show of the **Midland Association of Aquarists' Societies** is being held this year on SUNDAY, 12th MAY, at LOUGHBOROUGH TOWN HALL. The OPEN SHOW is staged in the Corn Exchange (benching commences at 12 noon until 3 p.m.), followed by the CONVENTION in the Victoria Room. Full particulars and Show Schedules from the Show Secretary, Mr. F. Hopewell, Loughborough and District Aquarists' Society, 61 Morley Street, Loughborough, or the M.A.A.S. Secretary, Mr. A. E. Allsopp, 50 Cubley Road, Hall Green, Birmingham.

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DURING March, members of the **Brighton & Southern A.S.** were given a particularly interesting lecture by Mr. D. Soper of Burgess Hill, Sussex on the use of vitamins and their effects on the various parts of the fishes body. He explained how he had used vitamin E in particular to promote reproduction and showed in what form this had to be prepared and the dosage required. Mr. Soper mentioned which vitamins were to be found in each food which was suitable for use in the aquarium and how a deficiency of any special vitamin could be made up. He went on to show members various substances which he had found beneficial to his fish in bringing them into breeding condition and in promoting growth and colour. An interesting evening was brought to a close by various questions from members.

At a meeting earlier in the month a table show for Characins was held which was well supported with a total number of entries of 22. It was very pleasing to see several new members taking awards which were made as follows:—1, J. Milne (Pencil fish) 2, D. Shoulders (Bleeding Heart) 3, A. Riley (Cardinal), 4, Mrs. B. Elms (Black Widow). The Society were fortunate in having Messrs. Armitage and Marks from Portsmouth A.S. to judge the fish and in their summing up commented that the fish were in good condition and were pleasantly surprised to see so many entries on the bench.

Any person interested in joining the Society should contact the Secretary, B. Shelton, 45, Coventry Street, Brighton, and will be assured of a warm welcome at any fortnightly meeting.

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A LECTURE was given by Doctor Burgess, well-known Zoologist and Marine Biologist, of Humber Laboratories, on the life of Frank Buckland the early pioneer into Fish Hatcheries, to the **Hull A.S.** An attendance of over fifty enjoyed the talk. The Table Show for the Fish of the Night was "Carps and Minnows" which was won by A. Peacock with a Giant Danio; he was also second with a Red Tail Black Shark. This rapidly growing Society extends a warm welcome to all visitors. The meetings are held every first and second Wednesday of the month and the Secretary is J. Mitchel, 94 Etherington Drive, Hull.

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THE **Blackwater A.S.** had a full attendance for the February meeting. Mr. Graham Ledley of the **Stone Aquarist Club** held the attention of members with a first-class lecture on Aquatic Plants and this was followed by a slide show on plants. The Table Show was for Tetras, won by Mr. Young, second being Mr. Yellop and third Mr. Paignton. The Society was entertained for the March meeting by Mr. Yellop of the Petshop Maldon, who gave a talk on breeding Barbs. The Table show was of Livebearers other than Guppies, the result being as follows: 1 and 2, P. Clayton; 3, R. Mills. Three new committee members were elected: R. Davis, G. Hocklem and R. Warren, and four members of the Witham A.S. also attended.

It was agreed that the Society should seek permission to furnish a tank in the Old People's section of St. Peter's, the local hospital. Any person in the Maldon area who wishes to join the Society can be assured of a warm welcome. Meetings are held at the Royal Oak, Hayleigh, Maldon, at 8 p.m. on the third Wednesday of each month. The Secretary is D. G. Kempen, 47 Hall Estate, Goldhanger, Maldon, Essex.

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THE details of the recent Annual General Meeting of the **Derwent Aquarist Club** were as follow. After the chairman had commented on a very successful year the following officers were elected: Chairman, S. Yeomans; Secretary, D. Gates, 21 Mount Carmel Street, Derby; Treasurer, T. Swinburn; Librarian, W. Gwynne; Committee, N. Gates and R. Johnson; Auditors, F. Reader and W. Phillips.

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AT the **New Forest A.S.** March meeting the main item of the evening was a quiz compiled K. Hinton and presented by A. Williamson. The results of the table show, judged by C. Knapp, were: A. V. Platy; 1, Mr. Lee; 2 and 4, A. Williamson; 3, D. Haze. A.V. Mollie: 1 and 4, D. Haze; 2, K. Newton; 3, R. Travers.

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AT the March meeting of the **Enfield and District A.S.** Mr. K. Nutt gave a very interesting lecture on breeding Gouramies. The Table Show was for two classes, Cichlids and Gouramies. Results, Cichlids: 1, K. Pallett; 2 and 4, M. Rhodes; 3, T. Mann. Gouramies: 1, T. Mann; 2, J. Gorten; 3, H. Seymour; 4, H. Seymour.

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THE open show results of the **Tropical Aquarium Breeders** were as follow: Guppies: 1, Mr. & Mrs. Kirkby (Stretford); 2, J. E. Jackson (Stretford); 3, W. Berning (Stockport). Mollies: 1, F. Woodward (Blackpool); 2, R. Preston (Belle Vue); 3, W. Ellis (Valley). Swords: 1, R. Grimshaw (Sunnybrow); 2, Miss B. Kaye (Huddersfield); 3, A. Esteve

(Huddersfield). Platies: 1, J. Hill (Ashton); 2, Miss B. Kaye (Huddersfield); 3, E. Greenwood (Gorton & Openshaw). Small Barbs: 1, 2 and 3, P. Gregory (Osram). Large Barbs: 1 and 2, K. Parkes (Merseyside); 3, G. Hamnett (Huddersfield). Cabeo and Shark: 1, F. Mulla (Merseyside); 2, N. Kirkby (Merseyside); 3, R. Preston (Belle Vue). Small Characins: 1, F. Mulla (Merseyside); 2, K. Torkington (Belle Vue); 3, M. Tonge (Oldham). Large Characins: 1, J. Murray (Belle Vue); 2, K. Parkes (Merseyside). 3, J. Robinson (Merseyside). Small Anabantids: 1, D. Rishyard (Leigh); 2, J. Williams (Osram); 3, L. Kaye Huddersfield). Large Anabantids: 1, A. Beddinton (Stretford); 2, F. Mulla (Merseyside); 3, R. Preston (Belle Vue). Fighters: 1, A. Beasley (Osram); 2, F. Woodward (Blackpool); 3, G. Allen (T.A.B.). Angels: 1, D. Grundy (Leigh); 2, G. Roberts (Burnley); 3, J. Williams (Oldham). Dwarf Cichlids: 1, D. Thomalla (Merseyside); 2, M. Tonge (Oldham); 3, M. & D. Glossop). A.O.V. Cichlids: 1, R. Moorcroft (Merseyside); 2, K. Parkes (Merseyside); 3, D. Frazer (Oldham). Rasboras, Danios and Minnows: 1, J. Boardman (Leigh); 2, W. Booth (T.A.B.); 3, P. and H. (Gorton & Openshaw). Toothcarps: 1, P. and H. (Gorton & Openshaw); 2, S. Roberts (Burnley); 3, A. Beasley (Osram). Corydoras: 1, P. and H. (Gorton & Openshaw); 2, N. Kirkby (Merseyside); 3, I. Watson (Belle Vue). A.O.V. Cats: 1, A. Wickie (Stretford); 2, F. Mulla (Merseyside); 3, L. Kaye (Huddersfield). Loach: 1, W. Parking (Huddersfield); 2, W. Taylor Osram); 3, F. Mulla (Merseyside). Female Livebearers: 1, L. Kaye (Huddersfield); 2, P. and H. (Gorton & Openshaw); 3, J. Hill Ashton). Female Egglayers: 1, L. Kaye (Huddersfield); 2 and 3, P. and H. (Gorton & Openshaw). A.O.V. Tropicals: 1, A. Bebbington (Stretford); 2, A. Wickie (Stretford); 3, R. Moorcroft (Merseyside). A.V. Coldwater: 1 and 3, Mr. Eadon (Sheffield); 2, K. Prescot (Belle Vue). Junior Livebearers: 1, A. Middleton (Gorton & Openshaw); 2, R. Iggulden (Macclesfield); 3, Master A. Kay (Huddersfield). Junior Egglayers: 1, L. & J. Allen (T.A.B.); 2 and 3, P. Hodgekinson (Gorton & Openshaw). Pairs (Livebearers): 1, P. & H. (Gorton & Openshaw); 2, Miss B. Kaye (Huddersfield); 3, F. Woodward (Blackpool). Small Pairs (Egglayers up to 3 in.): 1, A. Beasley (Osram); 2, P. Gregory (Osram); 3, R. Grimshaw (Sunnybrow). Large Pairs (Egglayers): 1, G. Hamnett (Huddersfield); 2, W. Ellis (Valley; 3, W. Booth (T.A.B.). Breeders (Livebearers): 1, W. Berning (Stockport); 2, A. Beasley (Osram); 3, W. Chapman (Valley). Breeders (Egglayers): 1 and 3, A. Beasley (Osram); 2, A. Chapman (Valley). Society gaining most points: Merseyside. Best fish in the show, L. W. Parkin.

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THE annual general meeting of the **Eastbourne A.S.** was held recently, the following committee being elected: Chairman, M. Saunders; vice-chairman, A. Clark; treasurer, M. Rudman; secretary, C. George; show secretary, R. Rogers; P. Sommers and Mr. Harris.

A great deal of the proceedings was taken up in discussing the setting-up, stocking and maintenance problems of the Grotto for the coming season, and of the production of an illustrated guide which would be made available to the public visiting the Aquarium.

Members at the first meeting in March organised by their new committee enjoyed a plant identification competition and a talk on the plants used, and members were informed about the programmes that had been planned, which included lectures on tank glazing, fish breeding, setting up aquaria, marine aquaria, slide shows on aqua-diving, cichlids, etc. A cheerful welcome awaits any fishkeeper in the area who would like to come along to the monthly meetings held the first Monday in the month at the societies' clubroom, Blue Grotto Aquarium, Royal Parade, Eastbourne. All further information may be obtained from secretary, Colin George, 6 Hurst Road, Eastbourne. 32325.

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THE March meeting of the **Newport A.S.** took the form of a slide lecture on the 1967 British Aquarists' Festival held at Belle Vue, Manchester, for which the projectionist was Mr. Ivor Phillips. An additional slide lecture was provided by Mr. G. H. Jennings, director of the International Marine Study Society, who was paying a brief visit to South Wales.

The judges of the evening's table shows were Messrs. Norman Counsell and Ilric Townsend, secretary and treasurer, respectively of the Cardiff A.S. Results were: Anabantids: 1, M. J. Parry; 2, A. J. Payne; 3, E. Myer. Mollies: 1, Master A. Berry; 2, J. Overland; 3, Mrs. M. Payne. Junior table show, Egglayers: 1 and 2, Master J. Walker; 3, Master A. Berry. Livebearers: 1 and 2, Master J. Walker; 3, Master A. Berry.

The society is pleased to announce that its president, Mr. Ralph Harris, is now well on the road to recovery following a long illness, and it was possible for Mr. Harris to attend his first meeting for nearly two years, recently.

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MEMBERS of the **Pontefract and District A.S.** were shown a number of first-rate books at the March meeting. These have been donated to the society library recently. The results of the monthly table show was as follows: Catfish: 1, D. & B. Cohen; 2, Town & Tranter; 3, Goodall & Piper. Loach: 1, Town & Tranter; 2, F. Gates; 3, D. & B. Cohen. Egglayers (Pairs): 1, D. & B. Cohen; 2, Goodall & Piper; 3, Town & Tranter. The classes were judged by J. Thompson and M. Lawther, who also took part in an open discussion on breeding and selling tropical fish.

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AT the first annual general meeting of the **Association of Manchester and District Aquarist Societies,** the retiring chairman, M. Fidler, announced that he would not be available for re-election owing to increased business commitments. Mr. Fidler spoke of the progress made by the Association in its first year of existence. The formation of the Northern Show League had proved very successful and the initiation of an ichthyological course at Glossop had aroused great interest, it was hoped that this idea could be enlarged in scope. The publication of a three page list of programme aids should be of great assistance to Association members and further additions were already in preparation. The following officers were elected: Chairman, E. Price; vice-chairman, Mr. F. Mulla; secretary, W. Kelly, 31 Siddeley Street, Liverpool 17; treasurer, K. Parkes; show secretary, A. Fernley.

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APPROXIMATELY 40 members and guests were entertained at the March meeting of the **Bournemouth Aquarists Club.** The programme consisted of a film show, which was the main item of the evening. The first film, entitled, "Fish and the Seine net," showed the use of this type of net in the fishing industry. Some excellent underwater photography was seen as the marine laboratory scientists filmed the net in action. The second film, called "Basting bluefins" was in colour, and showed the fishing of the Bluefin Tuna for sport. It also dealt briefly with the life cycle of the fish.

The table show of the month was judged by J. V. Jeffery, and the results were as follows: Danios, Rasboras and Minnows: 1, D. Hagg, 81 pts.; 2, Mr. Coombes, 79 pts.; 3, R. Travers, 71 pts. Owner Bred Pairs: 1, Mr. Coombes; 2, Mr. Watkins; 3, Mr. Wise.

A raffle was also held during the interval, and during the remaining time, members were invited to write questions on slips of paper, and these were answered at random by various people.

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THE Annual Open Show of the **Bethnal Green A.S.** will be held on Saturday, 7th September at the Bethnal Green Evening Institute. Schedules will be available at a later date. The officers for the current year are as follows: Chairman, A. Collings; Secretary, L. Smith; Treasurer, J. Hayes; Show Secretary, J. Day; Assistant Show Secretary, A. Millhouse; P.R.O., D. Trainis. The club meets every Tuesday night at 7.45 p.m. at the Bethnal Green Evening Institute, and new members are welcome.

THE annual general meeting of the **Alfreton and District A.S.** was held at the Arts Centre, Alfreton recently, when all the following retiring members were re-elected: Secretary, A. Dooley, 169, Bichwood Lane, Somercotes, Derbyshire; Treasurer, S. Dooley; Show Secretary, S. Hill; Committee, D. Gould, Miss M. Lindley and J. Robinson. The Society's Annual Points Trophy was awarded to S. Hill, with J. Wright runner up, and D. Gould third.

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THE **Reigate and Redhill A.S.** announce the following changes in their Committee: New Chairman, A. Burley; Vice-Chairman, N. Packman. The position of Assistant Show Secretary has been taken by S. Perhan, and O. Taylor is an additional Committee Member.

Recent Club activities have been a Table Show against Croydon A.S., and in March a highly successful auction evening with Croydon and South Park Aquatic (Study) Societies as guests.

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THE Annual Open Show of the **Hendon and District A.S.** will be held on Saturday, 11th May. The venue will be the club's normal meeting place, i.e., The Brotherhood Hall, Edgware Road, West Hendon. Applications can be obtained from the Show Secretary, Mr. Joe Gorman, 431, Honeypot Lane, Stanmore, Middlesex.

The Society recently held its traditional Annual Dinner and Dance and the attendance was just short of 100 and, as in the past, it was considered as successful as ever. Hendon is fortunate to have a number of trophies and on this social occasion the two most prized awards were given to the respective winners by the President's Lady. The Treman Trophy was awarded to Keith Purbrick and the President's Trophy to Mrs. Sheila Finch.

The Society was fortunate recently in having Mr. Don Walker to speak to the members. His lecture on the keeping and breeding of egg-laying tooth carps was enthusiastically received and, without exception, all went away much wiser in the keeping of these fishes. But his experience does not stop there. A first hand account was given on his breeding experiences with Dwarf Cichlids.

Anybody interested in fish keeping is welcome and for the information of any prospective new member the Society meets every Thursday at 8 p.m. The venue is the Brotherhood Hall (200 yards from Schweppes"), Edgware Road, West Hendon, London, N.W.9. The Secretary is Mr. Keith Purbrick, 3, Holme Way, Stanmore, Middlesex. "Hands Across the Sea." Hendon have been honoured by the enrolment to its membership of Mr. and Master J. Bradbury, of Johannesburg, South Africa and can now speak with pride of having members in four continents.

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AT the first March meeting of the **Bradford and District A.S.** the speaker was Mr. Horace Foden, one of the members. As is Mr. Foden's practice, he took the stage with no notes whatsoever and proceeded to entertain in his normal manner. Talk ranged from fish-houses, plants, setting up tanks for best plant growth, spawning behaviour and all manner of things fishy. Altogether it was a very interesting, educational and amusing evening. Table Show results: Livebearers: 1 and 2, W. Fletcher; 3, Mr. Kennedy. Comet Platy. This was the first of the shows to count for the Thornley Memorial Trophy.

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THERE were 164 entries at the first annual open show of the **Keighley and District A.S.** Best fish in the Show award and A.Y.A.S. diploma was won by Mr. Taylor of Aireborough. The judges for the show were Mr. Gordon Holmes of Bradford and Mr. Cherry of Skipton, who commented on the very high quality of fish on show and congratulated the Club on the efficient way that the show had been organised.

The results were as follows: Guppies: 1, Mr. Todd (Keighley); 2, J. Melvin (Keighley); 3, Mr. Thompson (Mixenden). Swordtails: 1, Mrs. R. Robinson (Aireborough); 2, A. White (Keighley); 3, J. Monk (Aireborough). Mollies: 1, Mr. Burnap (Keighley); 2, A.

White (Keighley); 3, Mr. Chields (Halifax). Platies: 1 and 2, Mr. Megson (Aireborough); 3, Mr. Fletcher (Bradford). Barbs up to Nigger: 1, Mrs. Batty (Swillington); 2, P. Reynolds (Swillington); 3, Mr. Todd. Barbs over: 1, Mr. Iveson (Aireborough); 2, A. G. Whyte (Halifax); 3, Mr. Kennedy (Bradford). Characins (under 3 in.): 1, Mr. Winter (Mixenden); 2, Mr. Kennedy (Bradford); 3, Mrs. R. Robinson (Aireborough). Characins (over 3 in.): 1, A. G. Whyte (Halifax); 2, J. A. Whiteley (Aireborough); 3, Mr. Winter (Mixenden). Carps and Minnows: 1, J. A. Whiteley (Aireborough); 2, Mr. Naylor (Aireborough); 3, Mr. White (Keighley). Sharks and F. Foxes: 1, Mr. Fletcher (Bradford); 2, Mr. Barrett (Aireborough); 3, Mr. Duckett (Skipton). Fighters: 1, Mr. Taylor (Aireborough). A. V. Anabantid: 1, Mr. Longbottom (Mixenden); 2, Mrs. R. Robinson, (Aireborough); 3, Mr. Smith (Keighley). Dwarf Cichlids: 1, Mr. Barrett (Aireborough; 2, Mrs. Whitfield (Keighley); 3, Mr. Iveson (Aireborough). Large Cichlids: 1, Mr. Taylor (Aireborough); 2, A. White (Keighley); 3, Mr. Kennedy (Bradford). Catfish: 1, Mr. Barrett (Aireborough); 2, P. Reynolds (Swillington); 3, Mrs. R. Robinson (Aireborough). Loaches: 1, Mrs. R. Robinson (Aireborough); 2, B. Megson (Aireborough); 3, A. White (Keighley). A.O.V.: 1, Mr. Barrett (Aireborough); 2 and 3, P. Reynolds (Swillington). Breeders (Livebearers): 1, Mrs. Batty (Swillington); 2, Mrs. R. Robinson (Aireborough); 3, Mr. Kennedy (Bradford). Breeders (Egglayers): 1, A. G. Whyte (Halifax); 2, R. Lister (Aireborough); 3, Mrs. R. Robinson (Aireborough). Pairs (Livebearers): 1, G. Monk (Aireborough); 2, Mrs. R. Robinson (Aireborough); 3, T. Cummins (Keighley). Pairs (Egglayers): 1, Mr. Brown (Mixenden); 2, Mr. Taylor (Aireborough); 3, Mr. Fletcher (Aireborough). Novice A.O.V.: 1, Mr. Place (Aireborough); 2, J. Place (Aireborough); 3, Mr. N. French. Juveniles (under 16): 1 and 2, Master White (Keighley); 3, Miss Fox (Skipton).

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OFFICIALS of the **Worksop Aquarist & Zoological Society** elected for 1968 are as follows: President W. Kirk; chairman, G. Sibson; hon. show secretary, A. Mawson; hon. treasurer, J. Dernie; news editor, B. Waplington; hon. secretary, Mrs. H. Dernie, 89 Sparken Hill, Worksop, Notts.

Arrangements are well in hand for the open show on the 12th May at the College of Further Education. This will prove a splendid venue and the society extends a welcome to all aquarists and their families. Schedules are available from officials.

A full programme of table shows, inter-society shows and club activities has been drawn up and members look forward to an interesting and successful year.

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INTERESTING and informative talks on "Fish house construction" by K. Appleyard; "Setting up tanks," "rearing fry" and "Correct feed" by R. Nicholls, and "Selective purchase" by E. Nicoll, were all well received by members of **Thurrock A.S.** at recent meetings. Also, at each meeting a table show has been held, results are as follows: Guppies: 1, D. Durrant; 2, D. Hornsby; 3, F. Harkins. A.V. Mollies: 1, 2 and 3, K. Appleyard. A.V. Barbs: 1, H. Juson; 2, D. Durrant; 3, K. Appleyard. Platies: 1, M. Martin; 2, P. Hinkley; 3, P. O'Bryan; 4, H. Juson. A.V. Fighters: 1 and 2, Mr. Durrant; 3, H. Juson; R.L.T.C's: 1, K. Appleyard; 2 and 3, P. Hinkley.

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THE return half of the challenge match between **Bristol A.S.** and G.S.G.B. will be held at Bishopston Parish Hall, Gloucester Road, Bristol, on Sunday, 5th May. The visitors will name the classes, all coldwater, and this should be a good contest.

The open show is at the same venue with classes for most freshwater fish. The dates are 27th and 28th September and schedules will be available from May onwards from Mr. R. Berry, the show secretary, of 120 Fouracre Crescent, Downend, Bristol.

THE March meeting of the **West London Fancy Guppy Section,** was the most successful so far with over 90 fish entered for the monthly table show. Membership is growing steadily and new members and visitors can be assured of a warm welcome.

Anyone interested please contact J. Thorn, 10b The Grove, Isleworth, Middx. 01-568 0727 or M. Richardson, 20 Naylands Drive, Uxbridge. Ux. 33935. The Association meets on the third Sunday each month at the Community Centre, Clifton Road (opposite Fire Station), Isleworth, Middx., at 3 p.m.

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THE March Convention of the **Federation of Scottish Aquarist Societies** was held recently when the N.E.L. A.S. was the host society. The convention was addressed by Dr. T. N. Carrington of Inter-Pet Supplies, and the subject of his address was "Modern techniques in fish keeping." The results of the table show were as follows: Any other species: 1 and 2, A. Watt (Alloa); 3, G. McLenchie (Falkirk); 4, A. Sinclair (Renfrewshire) Platies: 1, T. Cochrane (Alloa); 2, J. Munro (Edinburgh); 3, G. McLenchie (Falkirk); 4, G. Mitchell (Dundee). Swordtails: 1, T. Cochrane (Alloa); 2, H. Finlay (Perth); 3, S. Allan (N.E.L.); 4, P. Smythe (Weirs); H.C., D. Jamieson (Lanarkshire). Barbs: Barbusconchonius (12 entries): 1, R. Wilkie (Edinburgh); 2, R. Cooper (Kirkcaldy); 3, C. Murray (Weir); 4, A. Sharp (Lanarkshire). Barbus tetrazona: 1, W. Fleming (N.E.L.); 2, A. Watt (Alloa); 3, A. Louden (Weir); 4, A. Mcdonald, jnr. (Lanarkshire). All other Barbs (A): 1, A. Christie (Lanarkshire); 2, L. Payne (N.E.L.); 4, A. Christie (Lanarkshire). Barbs (B): 1, P. Haggarty (Lanarkshire); 2, I. Jack (Falkirk); 3, A. Mackay (N.E.L.); 4, W. Fraser (N.E.L.). Sharks: 1, D. Jamieson (Lanarkshire); 2 and 3, J. Drummond (Weir); 4, H. Christie (Lanarkshire); H.C., R. Ferguson (Falkirk); C, D. Towns (Dundee). Egglaying Toothcarps: 1, A. Watt (Alloa); 2, R. Jarvis (Edinburgh); 3, W. Pook (Fintry); 4, K. Jenkinson (Whitburn). Siamese Fighters: 1, J. Turner (Kirkcaldy); 2, J. Smith (Lanarkshire); 3, S. Naismith (Lanarkshire); 4, T. Cochrane (Alloa). (a) Trichogaster Leeri: 1, J. Graham (Ayrshire); 2, J. Turner (Kirkcaldy); 3, J. Graham (Ayrshire); 4, G. McLechnie (Falkirk). (b) Trichogaster Trichopterus: 1 and 2, J. Thomson (Lanarkshire); 3, W. Fraser (N.E.L.); 4, J. Fairly (Whitburn). (c) All other Gouramies: 1, 2 and 3, J. Turner (Kirkcaldy); 4, J. Langlan (Scottish). Large Cichlids: 1, J. Langlan (Scottish); 2, F. Sinclair (Renfrewshire); 3, C. Greig (N.E.L.); 4, P. Haggarty (Lanarkshire); H.C., J. Drummond (Weirs). Dwarf Cichlids: 1, E. Watson (Lanarkshire); 2, P. Haggarty (Lanarkshire); 3 and 4, F. Sinclair (Renfrewshire); H.C., J. Turner (Kirkcaldy); C, P. Haggarty (Lanarkshire). Nominated pair, White Cloud Mountain Minnows: 1, Lanarkshire A.S.; 2, Scottish A.S. Aquarium Plants: 1, P. Mcnaughton (Dundee); 2 and 3, R. Parker (Whitburn); 4, G. Thompson (Lanarkshire). Breeders Livebearers (A): 1, A. Bett (Perth). Breeders Livebearers (B): 1, A. Bett (Perth); 2, H. Kerr (Edinburgh); 3, D. Jamieson (Lanarkshire); 4, Mrs. R. Goodwin (Scottish); H.C., Mr. & Mrs. Love (Lanarkshire); C., J. S. Thompson (Lanarkshire). Breeders Guppies: 1 and 2, Mr. & Mrs. Love (Lanarkshire); 3, F. Sinclair (Renfrewshire); 4, S. Allan (N.E.L.). Breeders Egglayers (A): 1, P. Haggarty (Lanarkshire); 2, A. Watt (Alloa); 3, F. Sinclair (Renfrewshire); 4, L. Payne (N.E.L.). Breeders Egglayers (B): 1, E. Watson (Lanarkshire); 2, D. Young (N.E.L.); 3, A. Watt (Alloa); 4, E. Watson (Lanarkshire); H.C., G. Ried (Alloa.) Total number of entries 337.

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MEMBERS of the **Huddersfield Tropical Fish Society** have had a busy time in recent weeks. In addition to their Annual Dinner the Open Show followed very quickly, the results of which are given below. Trophies competed for over the year were presented at the dinner, the details being as follows: Anabantids: 1, F. Ledger; 2, Joint Mrs. Robinson and A. Hudson; 3, L. Kaye; Cichlids: 1, J. Woodhead; 2, P. Booth; 3, A. Hudson; Livebearers: 1, F. Ledger; 2, Joint J. Wike and J. Blaimires; 3, A. Kaye; Characins: 1, Miss B. Kaye; 2, K. Kinder; 3, Mrs. Robinson; Barbs: 1, A. Kaye; 2, B. Kaye; 3, F. Ledger; Catfish-Loaches: 1, J. Boswell; 2, J. Blaimires; 3, Joint P. Booth, S. Kaye. Juniors: 1, S. Kaye; 2, E. Bone; 3, Joint A. Kaye and B. Kaye. Ladies: 1, Mrs. Bone; 2, Mrs. Robinson; 3, Miss B. Kaye. Breeders: 1, J. Boswell; 2, A. Kaye; 3, F. Ledger. A.O.V.: 1, D. Woodhead; 2, F. Ledger; 3, P. Booth. Coldwater: 1, P. Bone; 2, Miss E. Bone; 3, A. Kaye.

Open Show particulars: 581 entries from 32 competing societies. Results: Guppies: 1, A. Mawson (Worksop 2) Mr. Todd (Ind.) 3, J. Allen (Nottingham). Mollies: 1, J. H. Dernie (Worksop); 2, J. Whiteley (Aireborough); 3, W. Ellis (Valley). Swordtail: 1, M. & P. Bone (Huddersfield); 2, R. Batten (Featherstone); 3, A. Reeves (Huddersfield). Platies: 1, B. Megson (Aireborough); 2, B. Kaye (Huddersfield); 3, S. Harrop (Ossam). A.O.V. Livebearer: 1, J. & H. Dernie (Worksop); 2 and 3, L. Kaye (Huddersfield). Large Barbs: 1, K. Parkes (Merseyside); 2, M. & D. Glossop; 3, K. Parkes (Merseyside). Small Barbs: 1, F. E. Gregory (Ossam); 2, A. Beasley (Ossam); 3, B. Middleton (Thorne). Characin (under 3 in.): 1, A. Mawson (Worksop); 2, K. Turkington (Belle Vue); 3, B. Kaye (Huddersfield). Characin (Over 3 in.): 1, A. G. Whyte (Halifax); 2, J. Whiteley (Aireborough); 3, J. Boswell (Huddersfield). Carps and Minnows: 1, J. Whiteley (Aireborough); 2, P. and H. (Gorton); 3, Mr. Baden (Sheffield). Danios and Rasboras: 1, P. and H. (Gorton); 2, F. E. Gregory (Ossam); 3, D. Thomalla (Merseyside). Sharks and Flying Foxes: 1, J. Tunney (Stocksbridge); 2, F. Mulla (Merseyside); 3, C. Holdsworth (Bradford). Siamese Fighters: 1, Mr. and Mrs. Cohen (Pontefract); 2, A. Beasley (Ossam); 3, R. Taylor (Aireborough). A.O.V. Anabandos: 1 and 2, J. and H. Dernie (Worksop); 3, Mr. Whitelock (Tadcaster). Dwarf Cichlids: 1, H. Cranswick (Featherstone); 2, D. Thomalla (Merseyside); 3, M. Tonge (Oldham). Large Cichlids: 1, R. Moorcroft (Merseyside); 2, K. Parkes (Merseyside); 3, M. and D. (Glossop). Angels: 1, C. A. Jones (Blackpool); 2, C. Scarth (Cleveland); 3, M. Trace (Ashton). Toothcarps: 1, H. Cranswick (Featherstone); 2, A. Wood (Barnsley); 3, P. and H. (Gorton). Catfish and Loach (Small): 1, J. Robinson (Merseyside); 2, S. Allen (Nottingham); 3, J. Walker (Sheffield). Catfish and Loach (Large): 1, W. Parkin (Huddersfield); 2, J. and H. Dernie (Worksop); 3, L. Kaye (Huddersfield). Breeders Livebearer: 1, J. and H. Dernie (Worksop); 2, A. Beasley (Ossam); 3, J. Tunney (Stocksbridge). Breeders Egglayer: 1, A. Firth (Bradford); 2, J. and H. Dernie (Worksop); 3, F. Buxton (Barnsley). Pairs Livebearer: 1, M. and P. Bone (Huddersfield); 2, A. Mawson (Worksop); 3, J. Monk (Aireborough). Pairs Egglayer: 1, F. Buxton (Barnsley); 2, M. and D. (Glossop); 3, D. Thomalla (Merseyside). A.O.V.: 1, P. Moorhouse (Bradford); 2, A. Mawson (Worksop); 3, A. Firth (Bradford). Common Goldfish: 1 and 2, Mr. Eadon (Sheffield); 3, Miss S. Robinson (Huddersfield). Fancy Goldfish: 1, P. Moorhouse (Bradford); 2, Mr. Eadon (Sheffield); 3, P. Moorhouse (Bradford). A.O.V. Coldwater: 1, Mr. Eadon (Sheffield); 2, Tranter and Town (Pontefract); 3, A. Kaye (Huddersfield). Juveniles: 1, A. Kaye (Huddersfield); 2, Master Moorcroft (Merseyside); 3, Master Preston (Belle Vue). Ladies: 1, Mrs. Cohen (Pontefract); 2, Mrs. Gregory (Ossam); 3, Mrs. Preston (Belle Vue). Furnished Jars: 1, D. Shields (Halifax); 2, G. Scarth (Cleveland); 3, D. Shields (Halifax). Best in Show: P. Moorhouse with a Knife Fish. J. Marsden Trophy for Best Pairs: F. Buxton (Barnsley).

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NEW SOCIETIES

The **Newtownabbey A.S.,** Co. Antrim, has been formed recently and anybody interested is invited to write to: Robert McDonald, 31 Doonbeg Drive, Rathcoole, Newtownabbey, Co. Antrim, N. Ireland.

The Wolverhampton and District A.S. which lapsed on the formation of the B.K.A., has now been re-formed as a general society with permanent headquarters at 8 Worcester Street, Wolverhampton, and have over 20 members. New members and old friends are welcomed and meetings are held at 8 p.m. on the first and third Tuesday of each month. All enquiries should be sent to the Hon. Secretary, C. O. Barsby, 13 Queens Court, Pallings Park, Wolverhampton.

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A new society has been formed in Staffordshire called the **Hawbush and District A.S.** The secretary is R. Claridge, 24 Chelford Crescent, High Acres, Kingswinford, Staffs.

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It is hoped to re-form the **Peterborough & District A.S.** Will those interested, please contact Mr. D. Worlding, 21 Cumberland House, St. Mary's Court, Peterborough.

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The **Rhonda A.S.** has recently been re-formed with the following Officers being elected: Chairman, Mr. P. Oliver; Treasurer, D. J. Davies; Secretary, G. W. Pinkham. Show Secretary, E. Jeffries. The Society meets at Porth County Grammar School for Girls fortnightly, and anyone interested is most welcome and should contact the Secretary at: 34 Bronllwyn Road, Gelli, Pentre, Rhondda, Glamorgan.

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On 24th February the **Ealing and District A.S.** was inaugurated and numbers about 20 members. The meetings are held monthly on the first Tuesday in each month at the Northcroft Community Centre, 71a Northcroft Road, W.13. The Secretary is R. G. Barrett, 9 Grove Court, The Grove, Ealing, W.5.

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The **Royal Oak A.S.** has been formed at Newport, the secretary being P. A. Williams, 58 Goedings, Green Meadow, Cwmbran, Mon, NP4, 4SB. The meetings are held at Mariner House, Newport, at 7.30 p.m. on the first Tuesday of each month.

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SECRETARY CHANGES

Creswell and District A.S.: F. Staniforth, 3 Faraday Close, Creswell, nr. Worksop.

Erith and District A.S.: Mrs. G. M. Roberts, "Homelea," 55 Rowan Road, Bexleyheath, Kent.

AQUARIST CALENDAR

4th May: Freelance A.S. Third Open Show at The London College of Printing, Elephant and Castle, London, S.E.1. Details and entry forms can be obtained from Show Secretary, Mr. A. Howes, 26, Rubens Street, Catford, London, S.E.6.

4th May: Trowbridge and District A.S. Open Show.

5th May: Derby Regent A.S. Open Show at the Engineers' Club, Osmaston Road, Derby.

12th May: Leigh A.S. Open Show at the Leigh Rugby Union F.C. Beechwalk, Pennington, Leigh. Secretary, D. Grundy, 96, Manchester Road, Tyldesley, Manchester.

12th May: Annual Convention and Open Show of the Midland Association of Aquarists' Societies at Loughborough Town Hall. Full details and Show Schedules can be obtained from P. Hopewell, 61, Morley Street, Loughborough or the M.A.A.S. Secretary, A. E. Allsopp, 50, Cubley Road, Hall Green, Birmingham.

12th May: Worksop Aquarist & Zoological Society Annual Open Show. Venue to follow.

18th May: Bridgend and District A.S. First Open Show.

18th May: Kingston and District A.S. New Open Show date (previously held in September).

18th May: Reading and District A.S. First Open Show, All Saints' Hall, Downshire Square, Reading. Schedules are available from Mr. B. Grant, 20, Dover Street, Reading.

19th May: North Warwickshire A.S. First Open Show at The Settlement, Kingstanding, Birmingham. Schedules and other information can be obtained from The Secretary, Lew, Hale, 880, Kingstanding Road, Kingstanding, Birmingham, 22C.

19th May: Merseyside A.S. Open Table Show at Montrose Athletic and Social Club, 5 Richmond Terrace, Liverpool 6.

25th May: Keynsham and District A.S. Open Show at Charlton Road, Keynsham in Bristol. Schedules are available from J. D. Brown, Show Secretary, 76, Pearl Street, Bedminster, Bristol, 3.

2nd June: Barnoldswick, Earby and District A.S. Open Show at the Ambulance Hall, New Road, Earby. Details now ready from J. Wiseman, Secretary, 10, Dickens Avenue, Barnoldswick, nr. Colne, Lancs.

8th June: Catford A.S. Open Show. Particulars may be obtained from Mr. K. Owen, 196, Langley Way, West Wickham, Kent.

8th June: Llantwit Major A.S. Annual Open Show. Details available from Show Secretary, J. Sanders, 26 Sandfield Road, Aberrerdig, Bridgend, Glam.

8th June: Southampton and District A.S. Open Show at St. Deny's Hall, Southampton. Hon. Show Secretary, Mr. D. A. Gibbs, 57, Wavell Road, Bitterne Lodge, Southampton.

9th June: Thorne A.S. Open Show in Thorne Grammar School. Details from T. Dickens, 29, Northeastern Road, Thorne, nr. Doncaster.

15th June: Bracknell and District A.S. (hosts), Three Counties Annual Open Show, Victoria Hall, Bracknell. Show Secretary, Mr. K. Phillips, 40 Pondmoor Road, Bracknell, Berks.

15th June: Yeovil and District A.S. First Open Show at Grass Royal School, Yeovil, Details from Show Secretary, Mrs. T. Gillard, 42, Crofton Ave., Yeovil.

16th June: Brighton and Southern A.S. Annual Open Show, Marmion Centre, Marmion Road, Hove. Show Schedules are available from R. Browning, 34, Rowan Close, Portslade, Sussex.

16th June: Lytham A.S. Annual Open Show to be held at Lowther Pavilion, Lowther Gardens, Lytham, Lancs.

16th June: Swillington A.S. Open Show, Swillington Primary School, Swillington.

16th June: Creswell and District A.S. Open Show at the Drill Hall, Elmton Road, Creswell. Show Secretary, R. Harper, 60, Rogers Avenue, Creswell, Worksop.

23rd June: Leamington and District A.S. Third Annual Open Show at Trinity Hall, Trinity Street, Leamington Spa, Warwicks. Schedules from Show Secretary, Mr. Bishop, 15, Wellington Road, Leamington.

23rd June: The Tyneside Aquarists' Open Show, Central Hall, Gosforth. Schedules are available from R. Skoyles, 189, Fossway, Walkergate, Newcastle-on-Tyne, 6.

23rd June: Alfreton and District A.S. Annual Open Show. George Hotel, Chesterfield Road, Alfreton. Schedules may be obtained from Mr. S. Hill, Show Secretary, 35, South Street, Riddings, Derbyshire.

23rd June: Bradford and District A.S. Open Show at the Textile Hall, Bradford.

23rd June: Cambridge & District A.S. Open Show at the Guildhall, Cambridge.

23rd June: Salisbury and District A.S. Annual Open Show.

27th-29th June: Bristol Tropical Fish Club. Further details available shortly.

7th July: Tadcaster and District A.S. Open Table Show at the Roman Catholic School, St. Joseph's Street, Tadcaster. Details from R. M. Fairchiffe, Stutton Grove Lodge, Stutton Grove, Tadcaster.

7th July: Cheltenham & District A.S. Annual Open Show, Ambulance Headquarters Hall, 86, Gloucester Road, Cheltenham.

13th-14th July: Romford and Beacontree A.S., Dagenham Town Hall. All enquiries to Mr. J. M. R. Pyne, 3, Ashvale Drive, Granham, Essex. Phone: Upminster 28435.

14th July: Medway A.S. Second Open Show at St. John Fisher School, Chatham. Secretary, Mr. K. Brown, 5 Allison Avenue, Gillingham, Kent.

14th July: Bournemouth Aquarist Club Annual Open Show at Kinson Community Centre, Pelhams Park, Kinson. Show schedules and entry forms available after 1st May from Show Secretary, Mr. J. V. Jeffery, 30 Braemar Avenue, Southbourne, Bournemouth.

27th July: Croydon A.S. Open Show to be held at the Stanley Halls, South Norwood, London, S.E.25. Further information may be obtained from the Secretary, Mr. D. H. Crowley, 180 Harrington Road, South Norwood, S.E.25.

3rd.-10th August: Portsmouth A.S. Open Show at the Portsmouth Community Centre, Twyford Avenue. Schedules available from Mr. W. Ryder, Show Secretary, 493 Commercial Road, Portsmouth.

11th August: Rainworth and District A.S. Open Show at the Showroom of E. Taylor and Sons (Southwell) Ltd., West End Garage, Southwell, Notts. Hon. Secretary, Mr. K. Clifford, North Stoke, 45a, Linden Street, Mansfield.

14th-17th August: Midland Aquarium and Pool Society Annual Open Show, Bingley Hall, Birmingham.

31st August-1st September: Harlow A.S. Open Show.

7th September: High Wycombe A.S.

7th September: Yate and District A.S. Open Show.

7th September: Bethnal Green A.S. Annual Open Show at the Bethnal Green Evening Institute. More details will be available later.

7th-8th September: Roehampton A.S. First Open Show in conjunction with Wandsworth Borough Council.

8th September: Warrington A.S. First Open Show.

14th September: Hounslow and District A.S. Annual Open Show at the Youth Centre, Cecil Road, Hounslow.

15th September: Reigate and Redhill A.S. Provisional date, venue to be fixed. Show Secretary, Mr. I. Stamp, 10, Benhams Drive, Horley.

21st September: Amersham and District A.S. Annual Open Show. Secretary, Mrs. Veronica Keating, 62, Townsend Road, Chesham, Bucks.

21st September: Newport A.S. Sixth Annual Open Show at the Duffryn Junior High School, Stow Hill, Newport. Details from the show secretary, Mr. M. J. Parry, 45, Western Drive, Gabalfa, Cardiff.

29th September: Hucknell and Bulwell A.S. Annual Open Show.

26th-27th October: British Aquarists' Festival Belle Vue, Manchester.