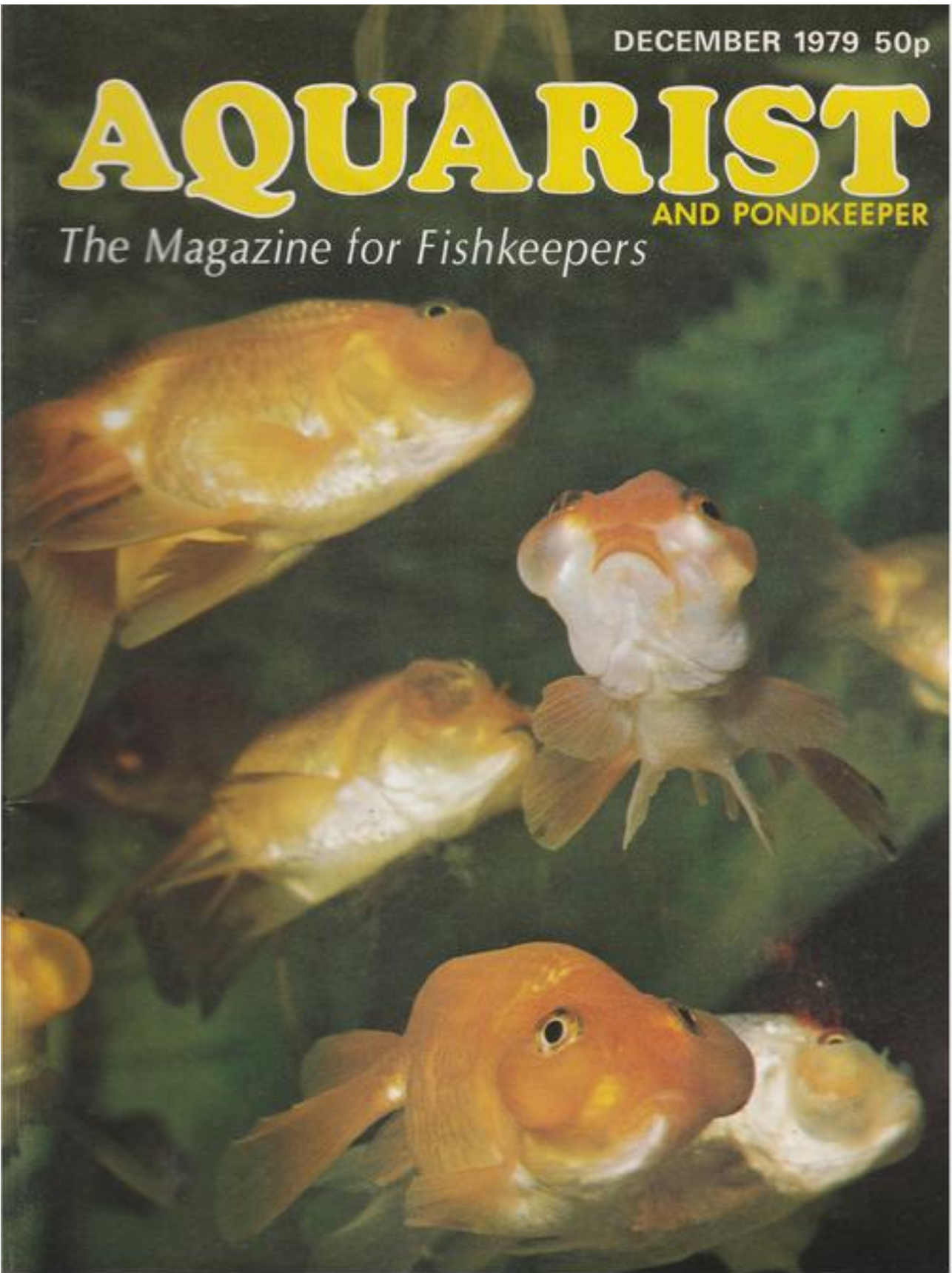


DECEMBER 1979 50p

# AQUARIST

AND PONDKEEPER

*The Magazine for Fishkeepers*





# THE AQUARIST AND PONDKEEPER

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The Editors accepts no responsibility for views expressed by contributors.

# Coldwater jottings

by Frank W. Orme

DECEMBER has arrived once again. All too quick the months pass by—why is it that they pass by so fast? Not only is it the end of another year; it is also the end of another decade, and I am not sure that the passage of either has brought any improvement to the world in general or man's attitude one to another—but that is not a matter for discussion in a magazine devoted to our particular interests.

## Koi and Goldfish

During the past ten years the coldwater fishkeeper has seen an increase in the number of koi and fancy goldfish that have been imported into this country, together with an increase in their quality. Unfortunately many also carried latent disease and, at one time, great concern was shown by both dealer and hobbyist at the number of losses that they incurred amongst these fishes. There are still risks involved, but then there always is when acquiring any new stock, and the wise aquarist exercises caution by ensuring that any new fish is given a period of quarantine before being allowed to join those which are healthy. Quarantine is not infallible but it does help to reduce the inherent risk.

We, and our fishes, have had to contend with extremes of weather conditions—we can still remember that long, long hot summer and the prolonged spell of serious drought with its many restrictions upon the use of water. Then the end of last year and the beginning of this, the great 'freeze-up' that seemed never ending as it dragged on into early spring. During both periods many fishkeepers reported that their fishes had succumbed to the unusual conditions—even our wild, native fishes paid a heavy penalty in some areas. Despite having been lashed by gales and rain storms, suffered arctic-like blizzards, frozen in 'ice-box' temperatures, and sweltered in tropical heat as the sun dried up our reservoirs, our hobby has survived and increased in numbers.

## Electrical Costs

Then there was the rapid increase in the cost of electricity, one of many rising costs, which resulted in many of our friends from the ranks of tropical fish enthusiasts changing over to keeping coldwater fish and helping to swell the membership of the specialist coldwater societies. Of course, the rocketing

price of electricity also forced up the overheads of those hobbyists who bred and raised their own fancy goldfish, which forced up the price of young fish to would-be purchasers.

Perhaps the saddest thing during the past decade was to see the goldfish hobby founder over the attempts of its various factions to have a closer liaison with each other. The various societies showed great enthusiasm when they first formed the national body known as the Association of Goldfish Societies of the United Kingdom. All went well until the wretched problem of trying to bring out a National Standard for Fancy Goldfish was tackled. It was sincerely hoped that a solution could be found to this thorny problem and that the outcome of their deliberations would prove acceptable to all exhibitors and judges—thus replacing the different standards that are in use at the present time; however, it was not to be. As in the past, inter-society politics reared their ugly heads. A reluctance to accept a standard that was not their own was shown by some societies and the original good intent and willingness to co-operate began to disappear. There were resignations and, when it became very apparent that there was no longer any hope of reaching a friendly and mutually acceptable agreement, it was decided to disband. What a great pity it is that the hobby of fishkeeping cannot learn the art of diplomacy—especially as most fishkeepers are usually a friendly bunch, yet it seems it is only too easy for antagonism to be created between individual societies. How foolish it is when our hobby is supposed to give pleasure! Is it too much to hope that the 1980s will be a little more kindly—in all ways?

## Dull Times

December, as with the other cold months of the year, is a dull, rather boring time for those who keep coldwater fish—at least I find it so. There is little, if any, activity in fish-house tanks and outdoor ponds during the period of low temperatures; the water is much too cold to encourage us to dabble in it, apart from which it is not good policy to disturb the fishes unless absolutely necessary. If the day is chilly we make a quick dash out, to make sure that all is well, and make an even quicker retreat to the warmth and comfort of the indoors.

Even so our hands need not be too idle; the opportunity can be taken to overhaul equipment and make sure that everything is in working order in readiness for the coming season. Heaters and thermostats should be checked and a note made to replace any doubtful piece. Airpumps can be cleaned and serviced by replacing air-filters and renewing the diaphragms. Piston type pumps can be stripped down, cleaned and the moving parts lightly oiled. Water pumps that can be taken to pieces will also benefit from similar treatment. It is surprising just how much muck can gather around the impeller of a submersible pump and this will add nothing to its efficiency. Worn parts may need replacing and these can usually be obtained from the manufacturer.

Having given the working parts a really good clean, some can be washed in warm water, they can be treated to a light smear of petroleum jelly, which will act both as a lubricant and help to retard any rusting. The pump can then be reassembled and put away until required in the knowledge that it should not let you down when put to use. No equipment will give satisfactory service unless it is treated with respect and looked after properly. Lack of care will often result in the neglected equipment breaking down just when it is most needed.

#### Connections

Critical attention should be given to electrical connections and cables. Any that are not in really first-class condition should be replaced without delay—if only to ensure the safety of your family and visitors! It is only too easy to put off doing the job, but this can lead to forgetfulness which, in turn, could be the cause of a nasty accident. Always remember that electricity and water, in combination, must be treated with respect. The consequences of a child putting its hand into an aquarium where the electricity is shorting into the water could very easily prove fatal.

Attend to these jobs now and there should be no let-downs when the equipment is needed. The time between replacements will also be extended and, with the high cost of replacing worn out equipment, any saving that can be made by prolonging the life of our various bits-and-pieces is well worth a little time and effort.

As those who have telephoned me will know, almost without exception I have to be called from the fish-house. Therefore I find the winter very frustrating, so far as fishkeeping is concerned, through being unable to spend as much time with my charges as I would like. Always I eagerly await the return of the warmer weather and the breeding and raising of a new season's young goldfish. Coldwater fish breeders will be well aware of the feeling.

In my mind I debate the various crossings that can be made and speculate upon the possible results—shall I use that pair or, perhaps, it would be better

to use that male with the female instead. The mind is seeking the combination that is most likely to produce, amongst the young, that much sought after 'perfect fish.' In a more realistic frame of mind I know that the chances of producing such a fish is most unlikely—but, I tell myself, it could happen. Of course, in the end common-sense prevails in the final selection of the breeding pairs for day-dreams will not improve the quality of the stock.

If the quality is to show a steady improvement it must rely upon a sensible and well thought out breeding programme which entails a system of line breeding based upon a knowledge of the preceding generations. Haphazard crossings and the frequent introduction of unrelated specimens—no matter how good they may be—will not bring about the long term result that is required. A great deal of patience is required, for there will be times that a spawning does not produce the quality that was hoped for—there will be occasions when it will be better to scrap the young than bother with rearing them any further—such set-backs must be taken in one's stride and either another or alternative spawning tried. It may be that the same pair could produce really good young in their next spawning. Fancy goldfish just do not abide by the rules, which is part of the fun of breeding them for you can never be absolutely sure of the result.

Patience is essential when breeding fancy goldfish because set-backs do occur when least expected; but then the joy of seeing strong, healthy, well-grown and well-proportioned young, which you have raised, swimming in their tanks is reward enough and makes one forget the disappointments.

#### Books

I have heard some fishkeepers say that they never bother with books, or magazines, and I must admit I cannot understand why—perhaps because I enjoy reading. Surely no-one can be in the position that there is nothing more to learn and, even if it is possible to reach such an unassailable height of learning, surely it is worthwhile reading of another's ideas and methods even though you may not agree with them. I do not keep tropical fish but that does not prevent me reading the articles which appear in this magazine. A good, well-written book will give lasting pleasure; it will be an ever available source of information and constant refresher of the memory whenever it may be needed; it will broaden the horizon and help to give added knowledge to those who seek it.

I hope that those who are looking forward to receiving a book at Christmas are fortunate enough to have their wish granted.

It only remains to complete this, the last of my jottings for 1979, by wishing each and every reader—no matter what their interest—a most pleasant period over Christmas, and an enjoyable and successful season of fishkeeping during the New Year.

# From a Naturalist's Notebook

by Eric Hardy

Of 133 semi-aquatic plants of marsh and meadow along the Bedfordshire Ouse, 22.8% have been lost since 1950. Of 23 riverside, meadow and marsh sites studied in 1950, 70% have been destroyed or severely damaged, mainly by flood-control by the Water Authority. This is without considering the effects of angling interests. Bedfordshire Natural History Society are pressing their MPs to obtain more consideration for conservation. Some 90% of the Somerset Levels have likewise been altered with only 10% left in West Sedgemoor with much of the original wildlife.

Recently, in my annual week of fieldwork in Norfolk, I stopped to chat with a reed-cutter in the rich plant-haunt of Barton Broad, below Catfield Fenside, when he alleged that a young man temporarily employed on another job there noticed for the first time a fine clump of royal fern and another of the great pendulous sedge, and dug them up to take for friends' gardens. The orange balsam was flowering on several new young plants here in September, where rudd thrive in the dykes and bogmyrtle proliferates along the banks.

## Climatic or chemical changes

In the boggy mires of Dorset's lovely Isle of Purbeck, studies are being made to find if climatic or water and chemical changes are responsible for variations in the rather localised *Sphagnum pulchrum* which, like other sphagnums, may grow more lax in water and greener in shade, to the confusion of identification. Many of these bog-mosses look so much alike that without a good guide the amateur steers shy of specific identifications. Three variations in the commoner *flexuosum* (= *recurvum*) are sometimes claimed as distinct species. Over 60 years ago, J. A. Wheldon's second treatise on these mosses attributed such variations to responses to environmental conditions. R. E. Daniels now suggests it may be directly attributable to the genetic composition of individual plants, or populations, and he is sorting these out by electrophoresis and is culturing plants from different sites under differing conditions. He has found, for instance, that characteristics like fibrils in sharp acute stem-leaves claimed for separating *fallax* as a species rather than variety of *flexuosum* are unreliable, and leaf and branch length cannot be used as they vary with local water conditions.

Stage by stage, historians of our *Sphagnum* mosses,

Wilson in 1855, Dixon in 1897, Horrel 1901 and Wheldon in 1917 ("Synopsis of European Sphagna") increased the number of species by often only a single distinguishing factor. Wheldon in his second treatise ("Collection, Taxonomy & Ecology of the Sphagna" 1917) lamented the lack of ecological information and went to great length to show the effects of changing moisture, climate, altitude and soil on such things as colour forms and anatomy. His second treatise was published locally in Lancashire and is not known to many students.

Apropos my recent reference to *Gammarus* the freshwater shrimp appearing suddenly in rain-pools by Seaforth docks, Mrs. D. B. Mason kindly writes from Salford suggesting the most likely dispersal was that when their rainpools dry up, the dust, plus encapsulated eggs, are blown about by the wind. Many will perish, but a few survivors reach more permanent waters to found a new colony.

## Plankton

Other aspects of the distribution of plankton are being studied in the shallow waters of Loch Leven by M. Hornung, such as the effect on microscopic algal plants by the well known filter-feeding herbivore, *Daphnia hyalina*. Due probably to increased phosphorus from effluents in modern times, large cell species formerly dominant in winter are now dominant in summer. They affect the light-penetration of the water, and the effects of water currents. Chemical changes like the shortage of nutrients cause the major changes, then come changes in sizes of algal species due to a changing balance of *Daphnia* to *Cyclops*.

## Good Value

With book prices soaring from inflation, it is good to see an economical and popular publication which is also most useful to recommend for beginners, in the new Collin's *Handguide to Wild Animals of Britain and Europe* (128 pages, £1.95; £3.95 hardback). This includes all with colour illustrations, not only all the British mammals and reptiles, but most of those of the continent for, unlike many recent field-guides, it includes all south Europe. This include 20 snakes, 21 lizards, skinks, geckoes and slowworms, 4 tortoises and terrapins, 12 frogs, 7 toads, 6 salamanders, and 5 newts. Although there are very limited distribution notes, and the brief text relies much upon the illustrations for guidance, it portrays the much richer

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reptile and amphibian flora of the southern continent than Britain's. It illustrates the red-backed form of the female sand-lizard which I have never seen in this country and has notes on tracks, droppings and other field-clues. It is written authoritatively by Nicholas Arnold, Denys Ovenden and Gordon Corbet. It is one of the best "buys" of its kind for the young naturalist interested in reptiles and amphibians who may holiday on the continent.

The companion volume, on *Wild Flowers*, is a popularised version of our common plants from Marjorie Blamey and Richard's Fitter's widely used pocket guide, but including a good section of illustrations on common rushes, sedges and other waterside plants. This, however, is confined to northern Europe, because of the vast number of plants.

### Fish Response

Fish-keepers as well as biologists notice the rhythmic way in which fish respond to the regular oscillations of their environment, such as light or, outdoors, solar energy. These often set off a train of repetitive physiological events from reproduction to feeding to meet these environmental changes. The adaptation is through rhythmic endocrine gland-control which liberates the chemicals which control their activities, such as pineal and pituitary hormones. Such activity-rhythms are indicated by ultrasonic telemetry studies of heartbeat, even the influence of lunar rhythms, shoaling and feeding rhythms.

In contrast are biological clocks, now autonomous and independent of geophysical time clues but depending upon an inherited internal timing mechanism. These usually persist when a fish is brought into the aquarium away from natural cycles of light and temperature. "Wild wisdom" was the unsatisfactory explanation by Victorian nature-writers. There are thus two theories claiming to explain by experiment the working of autonomous biological clocks. One, by Brown, a Northwest U.S. professor, advocates the exogenous or external cause from rhythmic geophysical forces whose information-input times fish's rhythmic actions. The other, led by Hastings, a Harvard professor, is the converse endogenous or internal cause, that these creatures possess autonomous biological clocks with a true biological timing mechanism.

This phenomena was first observed before the time of Aristotle, one of the earliest of naturalists, and has yet to be explained fully so that we can watch fishes, and other animals, with greater understanding. Modern research like Pengelley's in the U.S.A. began with a bias towards terrestrial animals, because the investigators were not aquarists.

### Fish sounds

What is an "acoustico-biologist"? You guessed right if you assumed it was another fancy North

American name, this time for a student of fish-sounds applying the sophistication of modern electrophysiological research to the subject. Fishes croak, grunt, cough and drum, just as barnacles blurr and mussels crackle in their daily underwater life—if you have the equipment to reveal their sounds, like the Narragansett aquaria on Rhode Island. One acoustico-biologist has taped the sounds of about 300 species, mostly marine. Oystertodfish croak, growl and whistle though their whistling was once thought to be associated only with spawning in spring. Weakfish, silver perch and spot produce a rapid, raspy croak aided by the extrinsic muscles of their air-bladders, and the chain of small bones, the Weberian ossicles, connecting it by a ligament to the ear. Atlantic croakers make a slower drumming and early in the last war mystified defence installations at the entrance to Chesapeake Bay because the U.S. Navy enlisted no acoustico-biologist. Northern puffers grind their protruding teeth to make squeaks and coughs. Striped burrfish also cough, and the clucking, hen-like noises of striped sea-robins sound like finger-nails scraping a drum. Flounders are almost silent. A man had a catfish which came when he whistled it. Minnows have a sound-discriminating ability. Nine marine fishes have pure tone thresholds. Sounds have a directional influence on fish-movements, and fish pick them up on their lateral lines. Fish-corpses doing penance in a museum pickle-jar reveal none of this.

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## READER'S LETTER

### Daphnia Culture

The best method I have devised for cultivating *Daphnia* uses tank mulm or fish excreta, placed in polythene tubs outdoors in the sun and seeded with *Daphnia*. A decent culture develops within a fortnight. To boost the culture I feed a very light dusting of brewer's yeast bought from a health food store. Greenwater also works. *Daphnia* do not require heavy feeding and over feeding sours the culture.

I would suggest that dung obtained from horses, or even cattle, would be dangerous, due to tetanus germs; however, there is no doubt that in large ponds it would work well. I feed my Guppies with one jar every day and my Goldfish fry with smaller ostracods which they relish. The only trouble is the mosquito larvae which develop if the tubs are not kept covered either by glass or netting. However, they are also taken by fish.

J. D. GORDON,  
6 Roanshead Road,  
Easthouses,  
Dalkeith,  
Midlothian, Scotland.

# The European Eel

A résumé of its biology, reproduction & aquarium care

by Jeff Jacobs

THE COMMON or European Eel (*Anguilla anguilla*) is one of the most ubiquitous, most studied, yet most frequently overlooked members of our native ichthyofauna. The details of its life history took scientists over fifty years to unravel; new discoveries are made almost every year about this species, where exceptions seem to be the rule; at any rate, its success in its environment is attested by its distribution; Europe and North Africa; north to North Cape; east to Murmansk, Kola Bay and the Northern river Dvina; south to Morocco and the Canaries; east to the Black Sea (including all the Mediterranean); west to Iceland, Madeira and the Azores. In writing this I will briefly deal with some aspects of its morphology and cover in some detail its life history in the hope that it will be of interest even to people who had never considered the species as an aquarium fish.

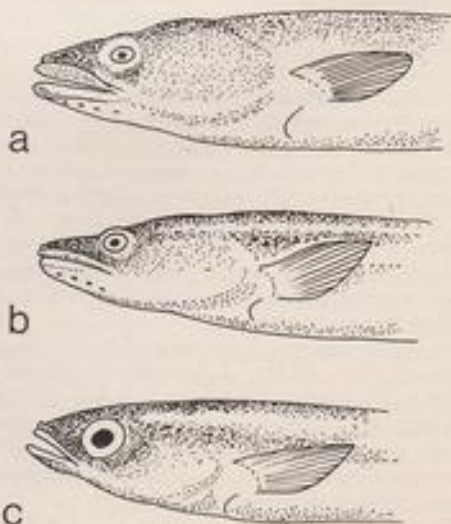
The head is short and narrow, enabling the fish to burrow, and the body is roughly cylindrical, tapering quite sharply at the tail. The median fins are long; the dorsal originating about  $\frac{1}{3}$  of the way along the body, the anal about halfway; both fins continue around the tail, and join each other behind it. Although eels have no externally visible caudal fin (which is replaced by the 'pseudocaudal' formed by the fusion of the anal and dorsal), certain remnants of its bony structure (the hypurals) still persist. Lacking a propulsive caudal, the eel has to rely on the sculling of its pectoral fins and lateral undulations of the body. The ventrals are absent, but the pectorals are inserted a good way behind the snout, since narrowing of the head has resulted in the gill region becoming elongated, and along with the pectoral girdle, being moved back. This results in the pectoral girdle being widely separated from the skull unlike that of most fishes.

The 'yellow eel' is the form of the species usually encountered in our rivers, ponds and coastal waters. Varying in size from three inches to as much as five feet, they are usually dark green or black dorsally, shading to light brown, green or yellow on the flanks, with a sharp transition on the lower flanks to the pale yellow or dirty white belly. A small amount of colour change is possible, but coloration usually remains

constant; any change that does occur may take up to twenty days to complete, which implies that it is hormonally induced (cf. cichlids, for example, whose colour pattern is neurally-controlled, and can change in a few minutes).

The skin, particularly the dermis, is very thick, probably to act as a barrier against unfavourable osmotic changes; it is also provided with many cells producing protective substances. Other cells produce copious amounts of mucus, accounting in part for the eel's proverbial slipperiness; the mucus is protective in function, and perhaps reduces dehydration and conserves heat on dry land. Although the skin is thick, it still allows gaseous exchange to occur; indeed, a large part of the eel's oxygen requirements is met by cutaneous respiration.

Most eel families lack scales, and this is apparently so in *A. anguilla*; however, it does possess them, albeit



Heads of Common eel: A. Yellow eel  
B. Silver eel  
C. Mature eel

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in a rudimentary state—they are irregularly and deeply embedded, and this makes them imperceptible to the naked eye, especially considering that they are covered in a thick mucous coat. The scales do not appear until the young eel is about 16cm long, developing first at the hind end of the fish, above and below the lateral line, then spreading forwards, backwards and vertically up and down. This process takes between two and three years to complete. The lips, throat and pectoral fin bases remain naked.

Teeth only begin to appear visibly in the adult stage at a size of 12-15 cm, on the jaws and vomerine plate (on the roof of the mouth).

Although the gill chamber is very large, the surface area of the gill filaments is only about average for a fish, related to its sedentary mode of life, and hence low oxygen requirements. When travelling long distances in search of prey, or migrating, the gills are amply supplemented by cutaneous respiration. Oxygen uptake by the gills is made possible on land by filling the chamber with air; a slow absorption occurs, replenished every minute by a gill beat (at 20°C). The gills, must, of course, be kept moist to allow this to occur and to prevent their dehydration, so humid conditions are necessary for overland travel.

It was once thought that the swimbladder played an important part in aerial respiration, but it now seems that although it does act as a gaseous reservoir, the oxygen it supplies is minimal, as evidenced by the drastically reduced aerial oxygen uptake—serious deficiency begins to occur in 24 hours on land.

The gills also assist adaptation to a marine environment. As the salt concentration increases, they help dispose of excess sodium ions taken up by drinking.

Food intake in yellow eels can only occur at infrequent intervals since, when the stomach is full, it compresses the intestine; when it empties, it is similarly compressed by the full intestine (I did not take any accurate measurements, but my specimens often refused to feed for up to 24 hours after a meal that had visibly swollen their bellies). The gut also plays an important role in osmoregulation, especially in seawater, by supplementing the secretory action of the kidneys.

As an aside, a strange feature of eels' blood is its toxicity; "ichthyotoxin" causes muscular cramp and increases the respiratory and heart-beat rates, and 0.1 ml of eel blood is enough to kill an adult rabbit. To my knowledge, no explanation has yet been found for this curious property.

Turning to the sense organs, little is yet known of the function of the various parts of the brain in *Anguilla*, although we know that it appears to have an inhibitory effect on movement (the tail region seems to induce movement, hence the common knowledge that an eel can be immobilised by wrapping its tail end in a cloth or towel). The brain's optic lobe also



Breeding ground of European eel (solid lines) and the American eel *A. rostrata* (broken lines). The numbers on each line represent the size in mm. of the larvae caught within it. The IOM. boundary for the European eel shows approximate location of its spawning ground.

inhibits activity, as shown by the largely nocturnal behaviour of the species.

The eye has several features unusual in fishes; the iris is relatively advanced, and by expansion and contraction can regulate the amount of light entering, in response to the intensity of illumination.

As would be expected, the eel, being nocturnal, has a more light-sensitive retina than that of diurnal fishes; it apparently lacks colour vision, in contrast to most other fishes studied. Strangely, yellow eels hardly use their eyes, relying mainly on olfaction for navigation and location.

The eel's nostrils are, unusually, spaced wide apart on the snout, probably due to the relatively enormous size of the *olfactory rosette*, which is responsible for the detection of odours. It has up to 100 folds, which is about five times as many as a fish of average olfactory capacity (during early development however, the rosette and nasal cavity are more normal in structure). Another comparison demonstrating the great efficiency of olfaction in the eel is that of the olfactory surface area as a percentage of the retinal area: in most freshwater species it ranges from 14 to 140%; in the eel it is as much as 623%, over four times as great. In fact, an eel was able to detect the scent of roses at a dilution of one part in three million million million ( $3 \times 10^{18}$ ) parts water! (a minnow, also considered a very odour-sensitive species, could only detect the scent in concentrations about ten thousand million times greater).

As in that equally sentient animal, the dog, the possibility has to be considered that olfaction may be used in navigation. Feasible as it may seem, the idea has largely been discounted, especially since eels with blocked nostrils were able to navigate just as well as control animals with unoccluded nostrils.

Of all the senses of the eel, its hearing is probably the poorest, especially compared with fishes possessing the Weberian apparatus (allowing transmission of



vibrations from the swimbladder to the auditory organs), such as barbs, tetras and catfishes, lacking this, the eel can only detect frequencies in the range 36-650 hz (cycles per second; cf. up to 7,000 hz in the minnow, *Phoxinus*).

Unripe gonads in large yellow eels lie along almost the whole length of the body cavity, the right extending further forwards, the left extending further back, somewhat longer and heavier, and containing more ova.

Unripe gonads in large yellow eels lie along almost the whole length of the body cavity, the right extending further forward, the left extending further back, somewhat longer and heavier, and containing more ova.

At 20-30 cm long, the sexes can only be distinguished with the naked eye by the form of the gonads; usually at this stage, germ cells of both oocytes and spermatoocytes are present, so that the juvenile is, in effect, hermaphrodite or intersexual, but eventually one or other sex predominates (however, in 10% of individuals, only female gonads develop). The situation is complicated by the fact that environmental factors can affect the degree of intersexuality occurring.

Sex determination is a controversial and complex process; both genetics and the environment appear to be involved. There is an apparent relation between population density and sex ratio; in crowded conditions, males and/or hermaphrodites predominate, in uncrowded conditions, females are more prevalent. This would seem to imply, then, that competition for food, and the resulting relatively poor nutrition stimulates (or gives advantage to) the development of male characteristics. This conclusion is supported by the fact that males have a slower growth rate and are smaller when sexually mature (although *in vitro* it appears that both sexes grow at equal rates up to 40 cm in length).

Two other environmental conditions may influence sex determination; firstly, the quality (i.e. nutritional value and composition) of the food, and secondly, geographic origin—for instance, eels that reached fresh water via the Tyrrhenian Sea have a higher percentage of males than those that entered from the North Sea. The situation clearly needs further research.

Clues to the early life history of the European eel were found as early as the 18th century, but much effort had to be made before the picture became clear. Let us consider the sequence of events in research, and follow with a brief summary of the reproductive cycle of *Anguilla anguilla*, and conclude with some notes on its captivity.

In 1788, the naturalist Gmelin described a curious, willow-leaf shaped fish of small size as representing a new group of fishes, under the name of *Leptocephalus Morrini*. So it remained until 1861, when Carus recognized these organisms as larval stages; he postulated that they were young ribbon-fishes (*Trachipterus*).

Three years later Theodore Gill established that *L. Morrini* was the larval stage of the conger eel (*Conger conger*), and thus disposed of Carus' hypothesis. The great British ichthyologist Dr. Albert Gunther agreed in 1880 with Gill, but maintained that they were an abnormal form, being in a state of arrested development, and would never mature. This controversy was finally settled when Delage kept several larvae alive for seven months, observing their metamorphosis into conger eels.

Between 1893 and 1896 two Italian naturalists, Grassi and Calandruccio, studied the leptocephali of the straits of Messina, and finally demonstrated that what Kaup had described in 1856 as *Leptocephalus brevirostris*, was, in fact, the larva of the European eel. They also concluded that the eel bred in the deep coastal waters of the Mediterranean, whence larvae were brought to the surface by eddies and whirlpools in the Straits. However, they found neither adults ready to spawn nor larvae smaller than 6 cm in length. The westward trail began in 1904 when the Danish research ship 'Thor' caught a leptocephalus west of the Faroe islands, and an Irish ship found several others outside the Mediterranean. A year later the painstaking and lucid detective work of Dr. Johannes Schmidt started, when he caught hundreds of leptocephali west of the 1,000 m depth line (which indicates the edge of the continent and start of the ocean). In 1909, younger larvae were found beyond the 4,000 m depth line; this implied that the eels' spawning grounds were in the western Atlantic, somewhere north of the Equator; it also showed that they were to be found near the surface, not on the sea bed. In 1912, Schmidt finally refuted the theory that eels spawned in the Mediterranean on the grounds that:

- (a) Vertebral counts of Atlantic eels were identical to those of Mediterranean eels;
- (b) in four years of sampling, only 5% of larvae caught in the Mediterranean had been less than 70 mm long, yet to the west, this figure was 60%, suggesting that eels became progressively more mature as they travelled eastwards;
- (c) near Gibraltar, leptocephali were predominant in winter, while near Messina they were common in spring and summer—this was correlated to the drifting time required for them to travel between the two areas, suggesting that the larvae drift eastwards with the current;
- (d) 'Silver eels' (adults ready to spawn) travelled north in the Mediterranean, i.e. toward Gibraltar, and were caught later in the year than in Messina;
- (e) eels are rare in the Black Sea; if they spawned in the Mediterranean, they would be expected to be abundant there.

Eleven years later, in 1923, Schmidt located an area where leptocephali less than 5 mm in length were to be

found, suggesting that the spawning grounds lay nearby. The centre of the area where all larvae were 10 mm or less in length lay 26°N 56°W, south-east of Bermuda, roughly in the Sargasso Sea. At the same time the spawning site of the American eel, *Anguilla rostrata*, had been located; it was larger, with its centre at 15°N 70°W. The overlap of the two fields was minimal.

The two species were distinguished on the basis of their vertebral counts, that of *A. anguilla* being 110-119 (mean 115.58), and that of *A. rostrata* 103-111 (mean 108.17). Also, it was shown that their respective life cycles were correlated with their geographic distribution. *A. rostrata* reaches the shores of North America in one to two years, whereas *A. anguilla* takes about three years, since the former has a shorter development time and has less distance to travel. So, if it took a leptocephalus three years to develop, it might get caught in the North Atlantic Drift and reach Europe; similarly, if *A. anguilla* larvae took only a year to develop, they would seek out freshwater along the North American coastline—clearly, this does not happen. Furthermore, Bermuda is populated by the American eel, but in the surrounding waters the European eel larvae are predominant. The reason why *A. anguilla* does not colonise Bermuda is because at the time they are passing the island, they are not at the stage where they seek out coastal waters.

Notwithstanding the above, in 1959 a British zoologist, Dr. Denys Tucker, suggested that the two species were synonymous, on the grounds that the differences in the vertebral counts could be attributed to environmental factors, especially temperature 'shock' affecting the developing embryo. He also postulated that the European eel is physiologically unfit to survive the

long journey to the spawning grounds, and that they migrate but die before they get there. The close proximity of the spawning grounds of the two species led Dr. Tucker to conclude that the European eel is a 'relict' population derived from North American parents, the direction of drift and the number of vertebrae (determined by the thermal conditions) depending on which of two spawning grounds they come from.

Tucker's hypothesis claimed parity with Schmidt's since it was based on many carefully considered data, some of which were not available to Dr. Schmidt. However in 1963 Dr. Anton Bruun, a keen and learned student of anguillids, refuted Tucker's ideas on the following grounds:

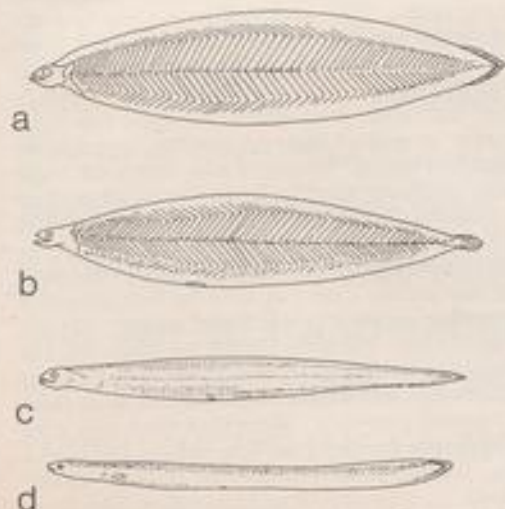
- from comparative evidence, the temperature 'shock' would have been insufficient to produce such a drastic change in the vertebrae number (e.g. in salmonids, such a 'shock' produces a change of only one, whereas the difference between the two mean counts in Atlantic eels is seven);
- the Azores, inhabited by the European eel, is not much further from the Sargasso area than the coast of Canada;
- also, due to a decrease in population density in the most outlying parts of its range, a greater number of females predominates (for reasons, see above,) which are fitter to survive an extended journey (this also occurs in the American eel);
- A. anguilla* has great energy reserves; in a male 39 cm long, 29% of the body weight is fat. Furthermore, artificially matured eels were starved for several months without appreciable loss of vigour.

Another argument against Schmidt's hypothesis, namely, that the European eel could not reach the spawning grounds in time, was refuted by the fact that it begins its journey earlier than *A. rostrata*, and that the average speed of a migrating eel in uninterrupted travelling is 44 km per day (with favourable currents even more); so it could travel 6,000 km easily in less than five months.

The depth of the spawning area was deduced from the occurrence of larval stages; larvae from 0-50 m depth were about 25 mm long, those from 75-200 m depth were between 1 and 15 mm long, and the youngest, with the oil globule not yet absorbed, came from 200-500 m depth. It is unlikely anyway that spawning occurs on the sea bed (which is at about 6,000 m depth), since the temperature there is about 5°C, much too low for the development of eggs and young, which require 16-17°C.

In order to summarise the conclusions drawn above, we can now briefly document the life history of the European eel.

The eel is one of a number of unrelated fishes that are classified as *euryhaline*, that are equally at ease in



Stages in the metamorphosis of the Common eel (all figures after Norman).

December, 1979

both fresh and salt water (which is not to say that they can survive a rapid transition from one to the other). Fishes which spend all their lives in one or other environment are termed stenohaline. Within the category *euryhaline*, two groups are recognised; the *anadromous* fishes, which spend their lives in the sea and migrate to fresh water to breed, such as the salmon and the lamprey, and the *catadromous* fishes, including the eel, which live in fresh water and return to the sea to spawn.

After having spent 8-10 years (males: 10-18 years for females) in fresh water, fundamental changes begin to occur in yellow eels. In late summer or autumn, they give up their benthic existence and start travelling downstream, often in groups, toward the coast, using the middle depths of the river. The lips become thinner and the snout more pointed. The pectoral fins become long and pointed and turn black. A silvery sheen appears on the flanks and spreads ventrally; the back and upper sides darken until they are almost black (at this stage the eels are termed 'half-silver.' The metallic sheen is not always silvery; it may be bronze or coppery, depending partly on the degree of maturity of the individual, in part on the environmental differences of the particular localities in which the yellow eel stage was passed. The diameter of the eye, and presumably its efficiency, increases (whether this is of advantage in the poorly-lit ocean depths is not known, but it seems likely). Also, a retinal pigment is produced similar to that of deep-sea fishes, i.e. one that especially absorbs wavelengths of light able to penetrate to great depths. The gut diminishes in size somewhat, associated with the cessation of feeding, and the surrounding muscle begins to degenerate. It was once thought that the anal opening closed up, but this now appears to be untrue.

On reaching the sea, the fully metamorphosed silver eels (with the silvery sheen covering all the belly) actively seek out sea water, and gonadal growth starts to speed up. In addition, the chloride-secreting cells of the gills begin to develop; entering coastal waters in autumn, the adults travel, aided by favourable currents, some 40-50 km per day for five months toward the Sargasso Sea region, swimming in the pelagic zone at an average depth of 700 m, until they reach the spawning grounds.

Spawning is thought to occur at a depth of some 150 m. Our knowledge of this chapter of the eel's life history is sparse, since neither eggs nor spawning adults have ever been caught; all that is known is that up to 1.5 million eggs are laid (from comparable data for *A. rostrata*), and that the parents die after spawning is completed, presumably from a combination of exhaustion and old age (which also makes them easy meat for predators).

The eggs are 0.9-1.4 mm in diameter on laying; no data are available on early larval development in nature, but eggs from artificially spawned parents

hatched in 38-45 hours (at 23°C), and survived for five days, during which the larvae grew from 4.8 to 6.2 mm in length; by the third day, the mouth and anus were open and the pectoral fins had appeared.

It will have been noticed that the name 'leptocephalus' is still retained, albeit informally, for the long, transparent larva, shaped not unlike a willow-leaf, with a tiny head; the jaws are armed with sharp canine teeth which enable it to catch the tiny organism believed to be its prey. A curious characteristic is lack of the blood pigment haemoglobin; the leptocephalus probably does not need it, for all its locomotion is performed by the currents, apart from occasional adjustment of position and movements of the head to catch prey. In this way oxygen consumption is reduced to a bare minimum.

By their first summer the larvae have reached some 25 mm in length, having drifted at a depth of about 180 m and a temperature of 20°C they arrive in the mid-western Atlantic west of 50°W. They then travel with the North Atlantic Drift in the uppermost layers to reach the mid-Atlantic and a length of 50-55 mm. When the leptocephali finally reach the continental shelf of Europe in their first summer, they are over two years old and fully grown at between 70 and 80 mm in length.

Outside the 1,000 m contour line feeding ceases and the leptocephali begin to undergo metamorphosis into the next stage of development, the 'glass eel.' By swimming as best they can, they avoid drifting into shallow waters, and begin to lose their teeth, becoming progressively more cylindrical in shape. When this has occurred, internal pigment begins to develop, teeth begin to grow under the skin of the jaws, and the gut shortens slightly (since the larvae have ceased feeding); externally, they are completely transparent, hence the name. The glass eels now begin to enter coastal regions and river estuaries, swimming at night with the current and hiding in deep water during daylight.

Before they enter fresh water, the glass eels must allow time to adjust their physiology to such an environment; having completed this, they then begin to ascend southern rivers in September of their third year, reaching British rivers between October and January. (Progressively later further north; as late as the following summer in the extreme north-east). During this period, there has been no feeding, and a corresponding decrease in length and weight.

At this point, mention should be made of the enormous numbers of glass eels entering our rivers; they are known as 'eel-fares,' and man has used them for commercial purposes. More than three tons were captured in one day from the Severn near Gloucester in 1886. Taking as an estimate that there are 14,000 individuals to a pound weight, it means that there were almost 95 million individuals in this catch (the eel-fares are of short duration though, normally 3-6

days per year)! Notable industries based on this unusual commodity were centred on the Severn, the coasts of the bay of Biscay, and many other places in central Europe, using the produce for human and animal consumption. Production of fodder and adhesives replaced this, and now the majority of the catch is used for re-stocking purposes.

Returning to the newly-metamorphosed larvae, the teeth now erupt on the jaws and vomerine plate, and pigment begins to develop as a caudal spot, progressively appearing on the snout, the back and the flanks behind the anus, finally spreading to the rest of the sides and the head. During this development of pigmentation, the young fish are called *elvers*. The gut now starts to increase in length as they recommence feeding (on tiny animals and small amounts of detritus), and continue their upstream migration swimming near or at the surface.

Between about 8 and 25 cm, the young eels are known as 'postelvers,' and are fully pigmented. The transition to 'yellow eels' is a little arbitrary as regards size; it is normally regarded as the point when the juveniles cease migratory activity at the surface and take up a benthic, sedentary existence. This may occur at as little as 8 cm for eels living on the coast, or as much as 25 cm for eels travelling up long rivers. Whatever their size, the yellow eels establish fixed territories of a very small size, perhaps less than 3 km in diameter; even then, they only stray out at night to the outer reaches of this area foraging for food, returning to a specific 'lair' every morning to spend the daylight hours there. These hideouts are of a varied nature, depending on the substrate, but are always well protected from light; the eels may bury themselves in mud, or burrow under a stone or other suitable object. Often several eels will share the same hideout.

This situation, however, applies only in spring, summer and early autumn. With the onset of winter the eel faces severe problems. In the words of Dr. Anton Bruun: 'The eel is simply the species of Danish saltwater fish which suffers most from severe winters; . . . both silver eels and yellow eels are killed (in immense numbers).' The eel's solution in inclement weather is to leave its usual shelter and find a quiet backwater of considerable depth, where it buries itself in the mud at the bottom, lying torpid until conditions improve, when it returns to its original hideout.

Burial under mud is used in another way by eels; to avoid desiccation during a drought; this causes great problems to fisheries workers draining ponds for restocking. In such conditions eels never seem to use their capacity for overland travel; the primary stimuli for this behaviour seem to be oxygen deprivation, as stated earlier, or unfavourable competition. As long as the atmosphere is humid enough, eels will migrate overland for quite considerable distances (the terrestrial movements of young eels are discarded here, since

they are never more than a few metres from a suitable source of water).

Yellow eels make good aquarium subjects in small to medium sizes; however, any eel at a migratory stage is almost impossible to keep (e.g. glass eels and silver eels), as they will escape or die in the attempt.

First catch your eel; they are not usually available in the retail trade, although an obliging fishmonger or pie and eel shop proprietor may supply live eels between 30 and 60 cm long. Otherwise specimens will have to be caught. In freshwater it is best to angle for them, since searching from them with a dip-net is a difficult and usually fruitless exercise unless large-sized elvers can be found, in which case everything will be made very easy. The size of eel caught will depend on the hook size; the best bait for a small hook is a small, live earthworm, and for larger specimens a large one, or a freshly-killed minnow or Miller's Thumb (*Cottus gobio*) (avoid sticklebacks—rigor mortis sets in very quickly, and the erected spines may lodge in the eel's throat and damage it). Mussel flesh or the like is an acceptable substitute.

On the sea shore, eels may be found at low tide under large stones, usually on sand or very fine shingle, although they can be angled for off rocky outcrops or short piers in water up to 30 m deep. Once caught, they can easily be acclimatised to captivity in freshwater. Specimens are best transported in damp seaweed to prevent buffeting; also take one or two pints of seawater (from offshore if possible) in a well-sealed container. The dilution method I use is erring on the safe side if anything. Place the eel(s) in the seawater, and top up with freshwater 5% of the total volume every day for a week or so; then 20% for another week, then half the next day (some water may need to be siphoned off!), and then change the water completely. I have cut stage one down to three days and stage two down to one day without any visible ill-effects, although the fish seemed reluctant to feed for a day or two.

A sand or gravel substrate is best, so they can burrow; a choice of shelters must be provided, preferably large stones and half-flowerpots. Light is necessary only for observation; although nocturnal, the animals will soon learn to recognise their owner, and appear at feeding time. I have trained some of mine to leave the water for food.

Aeration is essential; although eels will survive in large tanks without it, they never seem completely happy, and seem more eager to escape, swimming around the sides of the tank with their heads or even half their bodies out of water.

Breeding in captivity is, of course, impracticable. Someone will manage it one day, though, I suppose.

My warmest thanks are due to Mr. Gordon Howes, who read the manuscript and made many useful comments for its improvement, and to Mrs. Jackie Scott, who kindly prepared it for publication.



A day-old youngster beside a halfpenny piece.

## LYGODACTYLUS (GECKOS)

### SOME NOTES ON CONDITIONS FOR BREEDING

by A. J. Mobbs

BEFORE COMMERCIALY BRED house crickets became freely available, the keeping of certain species of reptiles and amphibians proved somewhat difficult (especially for the town dweller), due to the unavailability of suitable livefood. This was especially so with regard to the smaller species and not many years ago it would have been extremely difficult to rear young from such creatures as *Lygodactylus*—a small diurnal gecko from Africa.

I have bred one species (namely *Lygodactylus picturata*) to second generation and am well on the way to breeding from the third, none of which would have been possible but for the availability of house crickets.

This species (which as far as I am aware is the only one brought into Britain nowadays) is usually referred to by dealers as the "Black-throated (Day) Gecko"

and given the scientific name of *L. depressus*. However, I have been informed that the species is, in fact, *L. picturata*. No matter what scientific name it comes under, this small gecko can prove an ideal subject for the herpetologist, being extremely easy to cater for and easily bred. As with many of the geckos, fully established males rarely agree and it is preferable to house only one with a number of females. A small colony of say four or five females plus one male can easily be accommodated in a tank 18 in. × 10 in. × 10 in. If breeding is to be attempted, it is best if a fairly artificial approach is taken with regard to cage furnishings. The base of the tank should be covered with several layers of clean newspaper; two or three 6 in. lengths of hollow bamboo cane (about 1 in. in diameter) held together with a rubber band, should

*Continued on page 46*



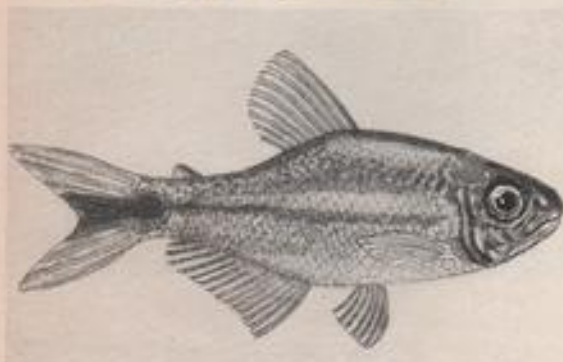
## OUR EXPERTS' ANSWERS TO YOUR QUERIES

### READERS' SERVICE

All queries **MUST** be accompanied by a stamped addressed envelope.

Letters should be addressed to Readers' Service, The Aquarist & Pondkeeper, The Butts, Brentford, Middlesex, TW8 8BN.

### TROPICAL QUERIES



*Astyanax mexicanus*

**Is it true that a small characin is found swimming in the wild state in the U.S.A.?**

*Astyanax mexicanus* is native to the freshwaters of parts of Mexico (hence its trivial technical name) and many Texas streams that flow into the Rio Grande.

**Can the fronds of the water fern called *Ceratopteris thalictroides* be eaten as a vegetable with no untoward effect?**

According to Mrs Frances Perry's classic work entitled *Water Gardening* (Country Life Limited, London, 1938), 'The fronds of *C. thalictroides* are . . . eaten as a vegetable in the Indian Archipelago.' Mrs. Perry also says that the foliage of the floating fern (*C. pteroides*) is 'occasionally gathered by the natives, and cooked and eaten as green.'

**Would the Japanese weatherfish get on all right in a tropical tank?**

The Japanese weatherfish (*Misgurnus anguillicaudatus*) can endure a wide range of temperature, but I do not advise its being introduced into an artistically set up aquarium. It likes to burrow into the sand and generally turn the compost over. This results in cloudy water and the uprooting of plant life. Weather-

by Jack Hems

fish, European or Asiatic, are best kept in a tank with no other fishes present, with a few inches of fine grit or sharp sand on the bottom and plants that will grow in the floating state such as *Elodea densa* or *Ceratophyllum demersum*.

**On a trip to the seaside, I noticed some very fine waterworn pieces of stone lying on the sea-washed foreshore. Would these naturally polished and interestingly moulded stones be suitable for my decorative aquarium housing a collection of tetras and Asian barbs?**

Leave such stones for the enjoyment of the crabs and cockles. They are almost always so impregnated with salt that it takes an age of soaking in many changes of freshwater to rid them of their excessive salinity. Then again, such stones are usually too soft or too calcareous to introduce into a tank of acid-loving fishes. Stones that gradually crumble to dust create a permanent haze and if they are calcareous into the bargain, they will send the pH of the water to a high level not at all suited to the general run of aquarium fishes.

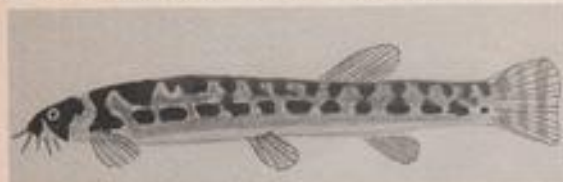


*Danio devario*

**Can you give me some information on *Danio devario*?**

This cyprinid from northern India attains a length of about 4 in. It was quite a popular species between

the two World wars, but was never very easy to obtain. It is prettily marked with three blue stripes that extend from about the middle of the body to the caudal peduncle and thence to the bifurcation of the caudal fin. The general coloration is silver, yellow and green. It is a peaceable species that eats anything and is not faddy about temperature provided it is maintained in the middle sixties to the middle eighties (°F).



*Acanthopthalmus shelfordi*

**Would an elephant-nosed fish (*Gnathonemus petersi*) settle down all right in a tank housing a few of the worm-like loaches including *Acanthopthalmus shelfordi*?**

*G. petersi* will not molest your loaches, for it is by nature an inoffensive fish which minds its own business. It does, however, require plenty of shelter among lime-free rocks and thickets of plants. At night, or alternatively in a poor light, *G. petersi* will nose about the bottom for food. It flourishes best on a mixed diet of whiteworms, very small or chopped earthworms, gnat larvae, live *Daphnia* give a few changes of water (to ensure cleanliness: they are often taken from dirty ponds) before being introduced into the aquarium, and well-washed *tubifex*. Make certain your mormyrid is eating well before you buy it. Also, check the temperature of the dealer's tank. Elephant-nosed fish are very sensitive to an abrupt change of temperature. And one more word: An elephant-nosed fish does best with a few of its own kind than alone among a lot of strangers.

**What size tank do I need to accommodate two *Distichodus sexfasciatus*?**

As this species can attain a length of about 10 in. it is advisable to allow it ample swimming space in a tank about 48 in. x 15 in. x 12 in.

**I have seen some fish in a dealer's tank labelled *Curimata*. Can you tell me something about this handsome-looking species?**

Species of *Curimata* are characins from Northern Brazil. There are several species known to the cognoscenti and all appear to be inoffensive. They do have a failing, however, and that is their addiction to nibbling plants. This indicates that greenstuff must be included in their diet. The fish attain a length of more than a few inches and prosper best in peaty acid water.

**I have been told that the albino form of *Cichlasoma facetum* is suitable for a community**

**tank. Is this correct?**

What is certain is, that the albino or pinkish form of *C. facetum* does appear to be less of a bully than the type, though even the type, with brassy to yellowy brown sides adorned with a number of vertical dark bars, is not overtly aggressive. If it is your intension to establish a community tank, including the albino *C. facetum* among several other species, then see to it that the tank is fairly spacious and is furnished with non-calcareous pieces of stone to afford havens of rest or temporary refuge from outbreaks of erratic behaviour.



*Aphanis iberus*

**Please give me some information about a fish popularly known as the Spanish minnow?**

The Spanish minnow or *Aphanis iberus* is an oviparous cyprinodont native to Spain and the High Plateaux of Algeria. It reaches a length of about 2 in. and is more at home in hard and alkaline water than in soft and acid water. It is an attractively coloured fish, with a greenish blue body, darker above than lower down where it imperceptibly melts into yellow. The sides are adorned with a number of narrow vertical bars, of a prettier and more vibrant greeny blue than that of the body. The caudal fin is dark blue, with some bars and white spots. The dorsal and anal fins are dark with light spots. A temperature range in the middle sixties to middle seventies (°F) is quite suitable. Live food such as whiteworms, gnat larvae, and the like, suit it well.

**In one of your back numbers, I read that a reader keeps several corydoras catfish in her tank to prevent detritus settling on the bottom. Can you confirm that corydoras can stop a build-up of detritus on the bottom?**

Readers of aquarium magazines often make wild and nonsensical statements. Firstly, detritus is the sandy dust brought about by the rubbing together of rocks or gravel. Secondly, I fail to see how several corydoras catfish in a tank can stop soft stones crumbling away or—for that matter—prevent the crumbling away of waterlogged wood. If the writer of the piece about detritus confused this with silt, then catfish can do nothing to prevent the accumulation of mud or silt on the bottom. In point of fact they add to it. What about their own excreta?

THE AQUARIST

I use an air pump to aerate my 24 in. x 15 in. x 12 in. aquarium. The tank is stocked with livebearers, barbs and tetras. Would it do any harm to the fishes if I kept the air pump switched off during the daytime and evening in order to obtain some relief from its distracting rattle?

Provided your tank is not overcrowded with fish, then switching off the air pump for a goodly number of hours in every twenty-four will not cause any harm. Plenty of submerged plants growing under a good light should help to oxygenate the water. You did not mention the number of mixed species living in your tank. I would call it overcrowded if more than 15 fishes of about full grown neon tetra size inhabit it.

I should like to learn as much as possible about the care and breeding habits of angel fish. Can you recommend a reliable source of information?

Yes, send 60p. to this office for a copy (post paid) of Dr. F. Ghadially's *Angel Fish—King of the Aquarium*. This well-written and informative booklet is one of the best ever written about the genus *Pterophyllum* popularly known as scalare or freshwater angel fish.

Brown algae is clouding the glass sides of my 3 ft. aquarium. It is tenanted by a couple of *Aequidens rivularis*. What steps can I take to eradicate it?

Remove the algae from the glass sides with a razor-blade scraper. After it has settled on the bottom employ a regular sediment remover or siphon tube to take it out of the aquarium. Now increase the strength and duration of artificial lighting. But here a word of warning: unless you introduce plenty of plants that will grow floating such as *Riccia fluitans*, the Indian ferns technically known as *Ceratopteris thalictroides* and *C. pteroides*, or warmwater grown *Elodea densa*, you will soon be troubled with excessive green algae.

Browsing in a secondhand bookseller's shop, I came across a book called *The Complete Aquarists Guide to Freshwater Tropical Fishes*. It struck me as being a useful book but parts of it, I noticed, were printed in a foreign language. Can you give me the name of the publisher of this book, for perhaps there is a version printed throughout in English?

The book you mention was published in an English edition several years ago by Ward Lock & Co. Any good bookseller should be able to help you.

I bought some cabomba a week or two ago but it is going into a rapid decline. My aquarium water has a pH of 7.4 and the hardness is 130 ppm. The lighting over the tank is bright. What is wrong?

Cabomba demands acid water with a very low mineral content. The aquarist will never be success-

ful with cabomba if he places it in hard and alkaline water. Observe what happens if you pass your aquarium water through a filter filled with pure moss peat.

I should like to try my hand at keeping the geckos described in a recent issue of your magazine, but what could I feed them on when winter weather puts paid to livefood ordinarily found in a garden?

Get in touch with Mr. E. Whitehead, Buckland Close, St. Brannock's Hill, Braunton, Devon. Mr. Whitehead conducts a livefood service for keen herpetologists. Alternatively, you may be able to get by on flies hatched from anglers' maggots, woodlice enticed to congregate under planks covered with some old sacks to keep out excessive cold and earthworms taken from ground kept reasonably open and well-supplied with garden or kitchen vegetable refuse. Part of this ground should be kept free of frost by a covering of old linoleum or boards.

I would be pleased to receive some details of the maximum size, feeding habits, general behaviour and special likes of *Botia macracantha*.

The clown loach attains a length of 8 in. or more. It is not faddy about its food but thrives best on a diet of small or chopped earthworms, whiteworms, well-washed *tubifex*, shredded red meat and a high class flake food. It is a fish that shows itself to view at odd moments of the day. The rest of the time, it spends in thickets of plants or among fissures in rockwork. It often assumes strange postures, say, propped against the side of the aquarium glass in a head- or tail-downward position. A not too-abrasive grit or sand is best for it and a temperature in the upper seventies or low eighties (°F.) is advised.

I took possession of a 6 in. oscar and placed it in a 3 ft. tank. For the first day or two, the fish behaved quite normally but now it appears to have lost all buoyancy and is too heavy to rise off the bottom and stay at the surface. To reach the surface, this oscar goes to a great deal of trouble and then, after a moment or two, it sinks slowly to the bottom. What is the matter with this fish?

Your oscar has swim-bladder trouble. Lower the level of the water so that it merely covers the dorsal fin. Then raise the temperature a few degrees (°F.) above normal. If the fish is taking food, feed it on chopped earthworms, raw red meat, or thin slivers of uncooked cod or fresh haddock. Add about a teaspoonful of non-iodized salt—ordinary kitchen salt—to every gallon of water in the tank. The return to normality is often slow. If, however, no improvement is seen after about a fortnight, it is often kinder to put the fish out of its misery.



## THE CASE OF THE MISSING CATFISH

by David Sands

A MAN WHO openly proclaims to be working on the classification of religions (based on the same principles as classification in zoology!) has to be worth listening to. Dr. Fraser-Brunner, (his name comes from Scottish clan and Swiss ancestors), emphasised religion and its classification was not the subject for which he is best known, but part of an anthropological study that has interested him for many years.

Away from any hussle bussle of the F.B.A.S. *Aquarist and Pondkeeper* fish show, I led Dr. Fraser-Brunner into the inner court gardens at Alexandra Palace. We sat amongst the gardens by the edge of an ornamental fish pond which had seen better days for it now contained only the ghost of a lily plant! This was my first meeting with Dr. Fraser-Brunner, and all my questions were in relation to his work on the genus *Corydoras* published during his pre- and post-war days at the British Museum (Natural History). He is one of the few people alive today to have worked with the pre-war director of the museum Dr. C. Tate-Regan, a legendary figure amongst early twentieth century ichthyologists.

In his seventies, Dr. Fraser-Brunner is now in retirement from his last post as Curator of the Royal Zoological Society of Scotland's aquarium at Edinburgh, sound in mind, and almost in body but for a "nuisance" of a hip. He had spent time since 1960

*C. melanistius melanistius* (Regan 1912)



Dr. A. Fraser-Brunner

working on new designs for public aquariums, such as that at Penang and a new conception of creating a natural view of the coastal coral reefs (by building the aquarium actually on the reef and encouraging the marine life to stay by feeding). This idea has been adopted at Eilat in Israel and in Japan.

Fraser-Brunner was an early pioneer in amateur aquarium keeping and after the war was editor of *The Aquarist and Pondkeeper*. He is a Vice-President of the F.B.A.S. His name is linked with several original descriptions of well-known species of *Corydoras*, in particular, *Corydoras reticulatus* which he described to science in 1938, before the last world war interrupted his work.

I was intrigued, because the original type specimens of *Corydoras reticulatus* had been reported lost. (Type specimens are preserved and held in zoological museums for future reference and are usually those on which the first description is based).

Dr. H. Nijssen, curator of fishes at Amsterdam university and an authority on this genus of tiny "armoured" catfish from South America, had examined a preserved type specimen of *Corydoras reticulatus* at the British Museum. He discovered the measurements of the specimen did not tally with Dr. Fraser-Brunner's original description.

Last year I had photographed this specimen to illustrate how faded pre-war type material would reveal stark differences against an actual living specimen. My hope then, was to clear up a few identification problems with the large *Corydoras* genus but it only provided a point that aquarists rely on few characteristics for identification i.e. colour pattern, body shape: whereas **ichthyologists** have many other characteristics to assist them.

The formalin bottle containing Fraser-Brunner's *Corydoras reticulatus* had an accompanying note made by Dr. Nijssen which stated the specimen differed from Fraser-Brunner's original description and therefore was a replacement for the original which must have been lost.

THE AQUARIST

Dr. Nijssen examined all the type specimens of *Corydoras* held in museums throughout Europe and America as a requirement for the revision of the genus he was completing with his co-author Mr. I. J. H. Isbrücker. This revision has, so far, taken fourteen years and has meant the examination and comparison of hundreds of specimens; Fraser-Brunner's *Corydoras reticulatus* was one amongst many.

In the Friday afternoon sun at Alexandra Palace I asked Dr. Fraser-Brunner how his original type specimens could have been mislaid and his answer belonged more to a plot from a Conan-Doyle story than to ichthyological history.

His description of *Corydoras reticulatus* as a new species in 1938 was based on his own living aquarium specimens (many other species such as *Corydoras arcuatus* Elwin 1938, *Corydoras leopardus* Myers 1933 and *Corydoras sychri* Weitzman 1961 have also been described from aquarium specimens)—living specimens he recognised to be an adult male and female of an undescribed species.

Descriptions of new species from imported specimens have created many problems, as such specimens lack the important locality information. Certain species of *Corydoras* are known to vary within populations—in fact *Corydoras reticulatus* is now known to be a classic example of this variation, with some specimens



*C. leopardus* (Myers 1933)

having open network markings and a dorsal spot, while others have fine network lines and a complete absence of any dorsal marking.

Dr. Fraser-Brunner did say he realised his mistake in not having preserved his living holotype and paratype for future reference. At that time he had frequently been visited by, and had visited, a German aquarist and mentioned to him that he would have to kill the "fine fish". The German argued against killing them, instead he would take them to a well-known German fish breeder (the Germans could breed many fish that others found difficult) and once spawned, they could be returned for preservation.

*C. melanistus brevisrostris* (Fraser-Brunner 1947)



Neither could have planned for the next event which led to the second world war and the division of Europe for six years and so the specimens were never returned.

After the war Dr. Fraser-Brunner searched through museum collections of *Corydoras* until he found a small specimen of *Corydoras reticulatus* labelled under another name, so he used it as his holotype! So, the mystery was now solved and between my examination of the specimen and its beginnings, thirty years had passed.

During Fraser-Brunner's time at the British Museum he also described two other species of *Corydoras*—he named *Corydoras melanistius brevisrostris* in 1947 as a subspecies of Regan's *Corydoras melanistius melanistius* 1912. Dr. Nijssen has discovered that his *Corydoras wotroi* which was described in his revision of the Surinam representatives of *Corydoras* 1967 was identical to Fraser-Brunner's *Corydoras melanistius brevisrostris* and so the name *Corydoras wotroi* is now invalid and is a synonym of Fraser Brunner's fish. (A synonym is a new name given to a species already described—when the duplication is discovered the first author takes priority according to the rules of zoological nomenclature.)

Fraser-Brunner also described *Corydoras funnelli* 1947—the third and final species he was involved with. It is now known this is a synonym of *Corydoras leopardus* Myers 1933—Dr. Fraser-Brunner laughed and told me he knew that information years ago and had pointed it out. By speaking to Myers' colleague in America he offered his measurements of *Corydoras*

*funnelli* and asked them to be compared with *Corydoras leopardus*; the comparison proved both were in fact one species.

Back to present day, the Dutch ichthyologists, Nijssen and Isbrücker, have recently (June 1979) published a bulletin as the opener to the complete revision of *Corydoras*, which lists the genus as ninety-five valid species and sub-species described between Blochs' *Corydoras punctatus* in 1794 and Nijssen and Isbrücker's *Corydoras ornatus* in 1976.

After several hours, our conversation amidst the gardens sadly came to a halt but I realised Dr. Fraser-Brunner will be remembered partly for his fleeting affair with these popular catfish which are now common to aquarists community aquariums, throughout the world. I say partly, because he has worked on a great many other subjects; but the case of the missing type specimens forms an interesting part of ichthyological history.

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continued from page 39

be placed to the rear of the tank. These will be used as a retreat and to give that little extra privacy a piece of cork bark can be placed over the bamboo. One or two smooth pieces of rock can be placed around the tank; these will give the geckos something on which to climb and add to the appearance of the set-up.

*Lygodactylus* lay their eggs in a communal "cache," the favourite place for my breeding colonies always being under the bamboo tubes. It is preferable to remove the eggs to an incubator, first placing them in a small plastic box to which has been added a layer of sand, thus preventing the eggs from moving about. A small wad of moist cotton wool should be placed in a corner of the box to supply the humidity so essential if the newly hatched young are to slough correctly.

Fully mature *Lygodactylus* females usually lay two eggs which are joined together; young animals may lay a single egg. If kept at a constant 80°F., it usually takes the eggs approximately 8 weeks to hatch. As soon as the hatchlings can be seen to be moving about freely, they should be removed to a small clear plastic container; one 6 in. x 4 in. x 3 in. is ideal for about four youngsters.

Adult *Lygodactylus* average some 2 in. in length; newly hatched young are only 20 mm. overall length! Being so small, one is limited as to the type of livefood

one can supply. I have found that at first they can be fed almost exclusively on newly hatched house crickets. As the youngsters grow, so the livefood supplied can be augmented with such things as small spiders and flies.

*Lygodactylus* take at least 12 months to become anywhere near adult size. Youngsters will commence to breed at 12 months of age, but may not attain full adult size until they are some 18 months of age.

The basic diet for a breeding colony should consist of suitably sized house crickets, plus as many wild insects and spiders as one can supply. The flies which can be obtained from "pinky" maggots are also relished. Breeding females require a constant supply of calcium and the easiest method is to offer ground cuttlefish bone (as supplied to cage birds) in a small shallow dish. Water for drinking must be available at all times.

The sexes are identical in coloration but females which are supplied with calcium usually have prominent calcium deposits situated each side of the neck. Fully mature males are usually a little larger than the females and when in breeding condition, two small swellings appear at the base of the tail.

*Lygodactylus* require a daytime temperature of at least 80°F.; this can be reduced to around 70°F. at night.

## OUR READERS WRITE

### Quarantine

As a regular reader for a number of years and a keen Aquarist I must comment on the "July" Issue of *Aquarist & Pondkeeper*.

I am a veterinary surgeon specialised in fish disease, I studied at the Unit of Aquatic Pathobiology in Stirling and have acted as a consultant on fish disease on fish farms in Kenya and in the U.K. I am also involved with local aquarists, shops and importers.

Mr. Roy Pinks' "Commentary" column in July raises issues which must be clarified.

Proposed legislation to quarantine fish imports is intended to protect existing fish stocks in this country against virus diseases like I.H.N., V.H.S., S.V.C., and since the field of fish disease is still developing any other diseases not yet elucidated. We cannot afford to turn loose more diseases like I.P.N. among our rivers and fish farms. This country has a healthy and growing fish farm industry which we should attempt to nurture.

I would like to clarify and correct some of the points raised in Mr. Pinks' article:

1. It is defeatist to rely on waves of protest inducing importers to bring in and sell better quality fish. With costs of quarantine to face they will be forced to import healthier fish or accept uneconomically high mortalities.

2. Quarantine would not be simply entrusted to the importer to implement. It should involve him following controlled guidelines, recommendations for design of facilities etc., and involving a regular inspection.

3. No one is suggesting that white spot or fish lice could or should be controlled by quarantine. Both of these are already endemic and easily dealt with. White spot at least provides an example of how stress can turn carriers into clinical cases and hence how a period of quarantine could operate in inducing disease to show itself.

4. The example of shubunkins riddled with warts, holes and sores is however an excellent example with entirely the wrong conclusion drawn. That it is an uneconomic proposition to try and treat such fish is probably correct and hence they should not have been imported and certainly not distributed. This type of circumstance is one of the best arguments

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for imposing quarantine since the warts and sores are found as major symptoms of two virus diseases of the carp family—the former of carp pox and the latter of the economically very important notifiable disease Spring Viraemia of carp.

5. A travelling inspectorate such as that mooted would be impossible to provide—both in terms of adequately trained manpower and funds to pay that manpower. An insufficiently trained inspectorate would be more dangerous than none at all since it would lead to a false sense of security.

It should also be considered that introduction of quarantine would have certain advantages for aquarists.

1. Higher quality fish available for obvious reasons i.e. economics would prevent importation of poor stock.

2. Better prices paid to the aquarist for home produced fish, this should lead to more home produced and hopefully healthier fish being available.

3. The presence of healthier stock on the market should reduce the numbers of beginners learning the hobby.

P.S.

Should you require any further clarification on any of these points please contact me and I shall do my best to help.

Legislation is still in a state of flux and veterinary surgeon members of the B.V.Z.S. fish group are deeply involved with this.

P. W. Scott.

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## PRESS RELEASE

### Phillips Vegetable Diet

PHILLIPS FISH FOODS are pleased to announce a new addition to their well-known range of scientifically formulated foods. Phillips Vegetable Diet is a nutritious flaked food specially prepared for all herbivorous or plant-eating fish, such as mollies, and it makes a useful addition to the diet of other species as well.

Phillips Vegetable Diet contains alfalfa, kelp, carrot and spinach together with wheat flour and fish meal enriched with vitamins, minerals, essential amino acids and trace elements.

Phillips Vegetable Diet is presented in an attractive green-toned drum bearing a colourful sailfin mollie illustration and containing 40 grams of the food. The retail price is 68p.



## *Aphyosemion filamentosum*

Population from Ikeja, Nigeria

by Allan Brown

*Aphyosemion filamentosum* is a very attractive killifish from the coastal regions of West Africa from Togo to the Niger Delta. The population illustrated here comes from Ikeja, near Lagos, Nigeria.

*A. filamentosum* is included in the *A. arnoldi* group along with *A. robertsoni* and *A. rubrolabiale*. The name "filamentosum" is derived from the filaments which are apparent on the first rays of the anal fin.

The males should reach a total length of 52 mm. and the females will be slightly smaller at 45 mm. When the males display, either to each other or to the females, their fins extend and their colours may be fully appreciated. At this time the anal, caudal, and dorsal fins extend to touch each other and the pattern of each can be seen to continue into the adjacent fin.

While males will spar, this is done by display rather than by engaging in aggressive fighting. Some minor damage may occur initially within a group while a "pecking order" is established, but there should be no serious damage. Therefore a group of *A. filamentosum* may be maintained in one aquarium. They would probably be suited to life in a "community tank" provided that the other inmates were not aggressive.

Many killifish breeders feed their fish exclusively on a mixed diet of live foods such as *daphnia*, *tubifex* worms, and white-worms. *A. filamentosum* will also accept freeze-dried blood-worms. When purchasing stock the aquarist should enquire which food they are accustomed to. They may adapt to dried foods but care must be taken to ensure that the fish are feeding.

Aquarium hygiene is very important and over-feeding must be avoided. Excess food must be removed before it decays because bacteria and pollution will weaken the fish making them susceptible to disease.

Most killifish prefer soft water but will tolerate

### *A. filamentosum* (female)

other water conditions in a "show tank" where they are not expected to breed. Broken pieces of seashell in aquarium gravel will harden the water and this is best avoided for all *Aphyosemion* species.

Breeding *A. filamentosum* is straightforward, and a minimum of equipment is required. The ideal spawning set up for a pair or trio, would be in a 12 in. x 8 in. x 8 in. deep tank (30 cm. x 20 cm. x 20 cm.).

Water conditions are not too critical. *Aphyosemions* are bred successfully in most types of tap water though a soft and slightly acid water is preferable. I have successfully kept and bred this species in water of 2°DH and 7.0 pH. Tap water should be aerated for a couple of days to allow any chlorine to be released into the air. Rainwater is excellent, and is probably the best water. It must be clean and not collected from a newly concreted area or similar surface which would harden it. A 10% water change each week helps to keep the fish in good condition.

A 1 cm. layer of peat will provide a spawning medium over the base of the tank. Ordinary garden moss-peat, with no additives, is suitable after it has been boiled to remove excess acid. Killies generally like slightly acid water but most peat would be too acid if used unboiled.

Subdued lighting is preferred and if the tank is well lit a thick top cover of plants will be beneficial. A retreat must be provided for the females and as there is no gravel for plants to root into, peat fibre or Java moss, or roots of floating Indian fern are suitable. Given these conditions the males and females will show themselves for most of the time.

The water temperature should be maintained at 75°F. (24°C.).

If *A. filamentosum* are kept clean, and well fed on livefoods, they should spawn readily on the peat layer on the base of the tank. The egg are between 1 mm. and 1.3 mm. in diameter and do not have any sticky threads.

At least once each month the peat should be collected and dried between newspaper until just damp and then stored in polythene bags for 2½ to 3 months at 24°C. I have found 2½ to 3 months to be the best period to store the eggs as most of them will hatch at this stage. Beyond three months the hatch rate has decreased the longer the eggs have been stored and at six months the results have been very poor.

If the peat is examined at 2½ to 3 months the bright rings of the eyes may be observed within the fully developed eggs. Other eggs may show development without the golden ring and some may even be clear. At this stage the peat containing the eggs may be placed into a tank and covered with 2-3 cm. of water at 24°C. Some infusoria added to the water will assist the eggs to hatch and also feed the fry.

for the first two days of their lives. After two days the fry should be syphoned into a bare tank and fed brine shrimp, microworm, and any other suitably sized live food. In a bare tank any uneaten food is visible and may be easily removed before it pollutes the water. A couple of snails may be introduced to scavenge and clear the tank of this waste food. (Airline tubing is ideal for syphoning fry or waste from fry tanks.) The peat left in the hatching tank should be strained through a net and may be redried for a further month if eggs remain in it. If a large spawning tank is used the quantity of peat required to cover the base would be too great to conveniently store for a couple of months particularly if collections are made monthly.

The fry grow rapidly and should be able to take foods such as chopped *tubifex* and chopped white-worms at the end of the first month. By this time they can be expected to have reached 13 mm., and slight coloration may be visible in the anal fin of some males. At two months the larger males should have grown to 30 mm and be fully coloured. As yet they will not have any extensions to the caudal fin. The fish are capable of spawning at 2½ months but it will be three months before the males begin to grow the caudal fin extensions; the size at this time should be 40 mm.

*A. filamentosum* (Ikeja) will live and spawn for two years in an aquarium although egg production

at two years is relatively low. J. J. Scheel (ROTOW 1968, p.210) refers to *A. filamentosum* as 'an annual rivuline species'. The rainfall record listed below indicates that at Lagos, which is less than 20 miles from Ikeja, there is usually some rainfall in each month of the year. This, together with the observations that *A. filamentosum* (Ikeja) will live and spawn for two years in an aquarium suggests that *A. filamentosum* (Ikeja) may not be a true annual. Perhaps they inhabit waters which do not completely dry up annually but only during occasional droughts.

Future work may reveal that *A. filamentosum* (Ikeja) eggs will hatch after being stored in water.

**SUMMARY:** *A. filamentosum* (Ikeja) is a very beautiful fish and because it is easy to breed and maintain it may be recommended to any aquarist who is making a first attempt at dry-storing killie eggs.

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*A. filamentosum* (male)



## COLDWATER QUERIES

by Arthur Boarder

**I hope to build a pool, 15 x 8 x 2½ feet, solely for keeping Koi. The pool is to be fed by a constant stream of water from the mains. The base will slope down to a sump where the waste will collect and then be pushed up a pipe to waste by incoming water. What is your opinion of this?**

From your sketch the idea looks all right but it will not work in practice. The fresh water running in will just overflow from the top of the pond and will have no effect on that at the bottom. You would have to insert a pump suction tube at the lower part of the pond to force out the waste matter and if the rate of water entering the pond was less than that being pumped out, the pond would soon empty.

**I can keep fishes very healthy in my pond but I seem to have no success with an indoor tank. I try with Fantails, Red-caps and Moors but cannot keep many for more than six months. What am I doing wrong?**

It may be that your fish have been bred under warm conditions and then when transferred to your cold tank they become unwell. You may have tried to feed them before they have become used to the colder water. It is a mistake to feed fishes soon after they have been put in a tank, and a few days should elapse before this is done. The keeping of fishes in a tank is very different from doing so in a pond. Usually the pond fishes have much more swimming space and the water is open to fresh air all the time. The amount of water in the average tank compares badly with the amount in a garden pond where there may be a tenth of the amount of fishes to that in a tank. It is surprising how soon uneaten dried food can upset the water and even a couple of days uneaten food on the bottom can start to turn foul. In a pond there appears to be plenty of other life, such as water lice, etc., which will clear up the waste food. Where these creatures, and many others, come from to enter a pond is sometimes a mystery, but nevertheless they are usually there.

**What are Pearl scales and are they suitable for a community tank?**

Pearl scales are so called because of the peculiar shape of their scales. Instead of lying flat, they are curved and so stand out from the body of the fish.

These fish are usually Fantail types and are quite suitable for a community tank and are also able to spend the winters in an outdoor pond.

**Which is the best size gravel for a coldwater tank?**

I find that what is sold as washed river grit is the best. The gravel should not have pieces in it larger than about an eighth of an inch in diameter or it might block a siphoning tube. It is also not wise to have very fine sand, as this will pack down too tightly and make it difficult for plant roots to enter.

**After a heavy thunderstorm I found one of my golden Orfe had jumped out of the pond and was dead. Was this unusual and was it the noise of the thunder which caused this to happen?**

Orfe will sometimes jump out of a pond when they are spawning but if this had been the case it is almost certain that you would have seen a lot of commotion in the pond with the fish chasing. It may also have been because the water had become lacking in oxygen. During a storm, pond water appears to lose a quantity of oxygen and I well remember finding my Orfe in trouble in the early morning after a bad storm. Some recovered when put under the water tap, but one or two were too far gone.

**Do you know of any attempt to transform the common Stickleback into a colourful aquarium fish?**

I know of no such attempts and would deprecate such a move very strongly. The Stickleback is a fine, colourful little fish, especially the male in breeding condition. Apart from the Perch and the Pike, I consider that it is better coloured than any of the British coarse fishes.

**I have a concrete pond which has been made about fifteen years. I now find that the internal rendering is becoming soft and appears to be coming away. The pond is of a very irregular shape with various ledges and so I do not think a liner would be effective. Have you any ideas?**

As you think that it would not be a good idea to use a liner, you might be able to re-line it with a fine mixed concrete. You would have to clear off all the soft lining and dry the pond. You could then make a

strong mixture of fine sharp sand and cement. One part cement to three parts sand. Sift the sand to remove any soft lumps of fine sand or large stones. Treat the old concrete with a special coating, available from a builder's merchant, so that the fresh mixture will adhere to the old. Without this treatment it is probable that the new mixture will not 'wed' with the old. See that all traces of free lime are removed before re-stocking.

**Is it normal to find a number of bubbles on top of the water in a coldwater tank every morning?**

It is not normal and is a sign that something is wrong with the conditions in the tank. There is not enough oxygen in the water for the fishes and so they mouth at the surface trying to get oxygen, and so leave the bubbles. There are several reasons why the condition has arisen. First it may be that the tank is over-stocked with fishes. There should not be more than an inch length of fish, disregarding the tail, to each 24 square inches of surface area. However, if this is the case then there may also be bubbles found during the daytime. If the water is warm it will not hold as much oxygen as when it is cold and so an overhead lamp on for several hours a day, could warm up the water and so force out some of the oxygen. Another reason may be that the tank is over-planted. It may seem strange that it is possible for a tank to be over-planted, but although this may be all right during the daytime, at night it is a very different matter. Water plants give off oxygen during the day but at night they cease to do so and give off carbon dioxide. Therefore too many plants can be a danger at night time. It is difficult to say with certainty how many plants should be in a tank, but I suggest that not more than about a third of the tank space should be occupied by plants.

The next frequent cause of trouble is over-feeding. Although goldfish will not over-eat, the food they do not eat can soon turn foul and pollute the water. The safest way to feed the fish is to offer a very little at first and if this is not taken soon, no more should be given that day. Another reason for lack of oxygen is if the tank has been set up for many years and the base compost has become too foul. The time for this to happen depends on the size of the tank, the number of fishes and how they have been fed. Although a set-up tank can last for many years without being emptied completely, a lot will depend on how the fishes have been fed. In such a case the tank should be emptied and all the compost thrown away and a fresh start made.

Your pond is very small and I am surprised that you have two water lilies and other plants in it. The limit for stocking the pond with fish is to have 15 inches of fish, not counting the tail. A very small pond is difficult to keep in good order and great care with feeding is essential. A little too much on even one day can start the water to become slightly foul. This upsets the fish and then the food is not eaten. More food given only makes matters worse. The water snails will not keep the water clean.

**You have often recommended the water plant *Lagarosiphon major* as a very good one for the pond or tank. I have never seen this plant advertised and wonder if it goes by another name?**

The plant was originally known as *Elodea crispata*, but has been known by the above one for some years. I do not know when the change occurred but in her excellent book, "Water Gardening," Frances Perry give the new name and the book was revised in 1947. It is also stated that the plant is not hardy, but I have grown it out of doors for many years. It is an excellent oxygenator and will send out stems for a long distance in the pond. In a tank it can be pruned back so that it branches well. The stems are thickly covered with recurved dark green leaves and these give the stem the appearance of an elongated cone.

**How old do Koi need to be before they will breed and do they require shallow water?**

It is not the age of a fish but the rate of growth which will determine this. It is the condition of the fish and the water in the pond which can make all the difference as to when Koi will breed. I see no reason why Koi should not breed when they are from nine inches long over all and a friend of mine has seen much smaller Koi joining in the spawning chase with others. They certainly prefer to spawn in shallow water as do most of the other coldwater fishes we keep. A bunch of fine leaves plants should be anchored at the edge near the surface to receive the eggs. Any other type of substance, such as fine plastic string will also do as a nest.

**I have a few goldfish in a garden pond and have noticed that a couple of them have white fungus-like matter round their mouths. What is this and what is the cure?**

This sounds like Mouth Fungus. It can eat away the mouth if it is not soon cured. Hold the fish in a wet cloth and dry the mouth as much as possible.

I held out a wet T.C.P. (a tan coating of white) after this before replacing the fish into water, will tend to keep the T.C.P. from being washed away too quickly. You may have to repeat the treatment for a few days.

I have two small water tanks. I have three four goldfish in each. The water is going wrong?



# THE GENUS *Telmatochromis*

## SOME DESCRIPTIVE NOTES

by Jeff Jacobs

THE CICHLID FISHES of the genus *Telmatochromis* are confined (endemic) to Lake Tanganyika, East Africa. Of the five species described, four have been imported to date, namely, *T. bifrenatus*, *T. caninus*, *T. temporalis* and *T. vittatus*. Of the fifth species, *T. burgeoni*, very little is known, even to the ichthyologist.

To my knowledge, only *T. temporalis* (the species with which I am best acquainted) and *T. bifrenatus* have reached the United Kingdom. *Telmatochromis vittatus* and *T. caninus* are common aquarium fish in the USA and Germany, the former also in Sweden.

I will describe *T. temporalis* and *T. bifrenatus* in detail, and on the other species, append notes which may prove of value should they be imported in the future.

*Telmatochromis* is one of the Tanganyikan genera (among others such as *Tropheus*, *Julidochromis* and certain *Lamprologus* species) that have some measure of ecological equivalence with the mbuna of Lake Malawi; they both occupy similar niches among the rocky shores, feeding there on the rich epilithic algae and organisms associated with it. (A prominent feature of *Telmatochromis* is the type of teeth, adapted for scraping algae from rocks and extracting animals from crevices). The similarity ends when reproduction is considered; all *Telmatochromis* species are 'cryptic' substrate spawners, that is, they build their nests among the cracks and crevices of their rocky habitat, out of sight. In this way, the problem of brood protection has been overcome in L. Tanganyika in an entirely different (but equally successful) way from the mouth-brooding mbuna of L. Malawi.

For the purposes of identification the genus may be divided into two groups, those with cigar-shaped, elongate bodies of small size (*T. bifrenatus* and *T. vittatus*), and those with bulky, deep bodies of larger size (*T. caninus*, *T. temporalis* and *T. burgeoni*).



*T. temporalis*

### *T. temporalis* Boulenger, 1898

This interesting, undemanding cichlid was first imported into the UK, to my knowledge, in 1972, a surprisingly late date considering its abundance throughout the rocky, isolated shores around the Lake.

My quartet of juveniles were acquired from Colin Enright, whose method of breeding these fish is somewhat unique; four adults, left to their own devices (apart from a very occasional feed) in a 6 x 2 x 2 ft. tank, maintain a production line of fry. At least 100 fry are usually to be found, varying in size from alevins to juveniles 3 cm. long. Hence, I was able to pick my specimens from a very wide selection.

After a couple of months in a 48 x 15 x 15 in. tank, coupled with heavy feeding of flake, oxheart and coley, the fish had reached lengths of 7.2, 6.6, 5.7 and 4.5cm respectively, and were, I judged, sexually mature.

The largest three (males, judging from their behaviour) were a light brown overall, darkening to amber as the mood took them. The fins had dark brown rays and greyish lappets; the dorsal fin with a lemon-yellow margin, and a white sub-marginal stripe. The caudal had a broader yellow distal margin, on which is superimposed a clear stripe, thus dividing it into two discrete parts, and the anal

fin is grey, with the distal tips of the spines black. The ventral (pelvic) fins are elongate and recurved; the outermost (i.e. first) ray is edged with blue-white. Otherwise the rays are grey, the lappets steel-blue. The pectoral fins are clear, their bases black. A dark brown, usually prominent, stripe runs from the posterior margin of the eye, over the operculum to behind and above the pectoral fin origin. Another brown band runs, at an angle of about 10° from the horizontal, from the posterior eye margin to almost below the end of the dorsal fin. Yet another band runs longitudinally from the upper edge of the operculum to a position under the middle of the dorsal fin. A series of comparatively large dark brown vermiculations occur on the nape, occiput, cheeks and snout (cf. *T. caninus*). A vertical black spot, usually forming a vertical band, is present on the caudal peduncle. A curved blue lachrymal stripe is usually apparent. The upper lip is steel-blue, the iris yellow.

The smallest specimen (the putative female) was much darker overall (burnt amber), with less prominent markings.

Interspecific aggression was virtually nil; they and the other occupants (subadult mbuna, *Belontia signata* and small catfishes) virtually ignored each other. Among themselves, however, matters were very different. The largest putative male occupied one end of the tank, and the other two the opposite end (these latter were, as a result, unable to establish definite territories, and spent much time bickering with each other). The tank was well-furnished with slate, and no damage resulted from quarrels. The loser of a given fight would give an appeasement display somewhat like that of *Tropheus* spp.; the body forms an S-shape, and then the fish rolls through an angle of 30° from the vertical and flees.

The putative female showed very little aggression and occupied a dugout underneath a piece of slate in the largest male's territory. The latter continued his attacking forays on the other two males, while the other occupants were freely allowed in his territory. The female, however, was less tolerant in the vicinity of the presumed nest. Each iris had now turned electric blue, and her body had darkened considerably. At this point I removed all the other species, leaving the four *T. temporalis* and two *Otocinclus affinis* catfish.

The next day (day 1 in my notes), the female had excavated quite a deep pit under the slate, and, in four hours of observation, never strayed more than 5 cm. from it. The male, meanwhile, had begun far more harassing on the two celibate males, and they were removed for their own safety on day 4.

An enforced absence prevented my return until day 11, when I found the female had jumped out of the tank and died. The specimen was only slightly desiccated, and dissection proved my con-

clusions regarding the size difference, etc. of the sexes to be correct.

Fearing the worst, I concentrated upon other tanks, until, on day 24, about ten fry were observed in the vicinity of the nest. They were approximately 11 mm. in length, with light grey swollen bellies, so had fared well in my absence. The back and near flanks were darker, with several light brown patches. This colouration admirably camouflaged them among the gravel. All fins were clear and colourless; in particular the pectorals were prominent, being almost as large as the head. Movement was by hops and dashes of 2 cm. or so, propelled mainly by the pectoral fins. Long spells of inactivity were interspersed with these dashes, and picking at the rich growth of algae and detritus present (I presume they were only interested in the microorganisms present in it). They rarely strayed more than 20 cm. from the nest, and wanderers were usually spat back by the harassed and hungry-looking male. He was later removed, as I was unsure of any fry-eating tendencies in this species (however, I would wager that this species make excellent parents, given the chance).

Day 27 saw more than twenty fry consuming fine flake, brine shrimp and Liquifry. They were largely substrate-confined, where they presumably felt safer. I noticed an apparent preference for the areas of green algae, compared with the brown and blue-green kinds.

A heater failure during that night saw the male's lone vigil end in failure; all the fry died, but this only slightly detracted from the pleasure of observing the reproductive behaviour of this species.

I had estimated the time of spawning as day 3, based on 7 days allowed for incubation, hatching and metamorphosis at 78°F. and 18 day's growth. At the time of death the fry were approximately 16 mm. long. I was unable to acquire another female, so the remaining trio were subsequently sold, by which time the male parent was almost 11 cm. in length—this appears to be about the maximum for the species.

One interesting observation made by Steve Wolstenholme, and many others, which I confirm, is that this species grows twice as fast when fed predominantly on a good-quality flake food than when fed meaty or live foods; a setback for those aquarists who favour 'natural food' for their fishes.

I should like to take this opportunity to end once and for all the dialogue concerning the almost mythical *Lamprologus petricola*; this fish, which has almost certainly never been seen alive outside Africa, is easily distinguishable from *T. temporalis*. The former is almost entirely black, including the fins, a condition never approached by *T. temporalis*. There are many other characters which may be used to differentiate these species; however, the above should suffice.



*T. bifrenatus*

*T. bifrenatus* Myers

This species reached the U.K. a little later than *T. temporalis*, and appears to be quite rare in the wild, although this is probably due more to unsuitable collecting methods than a true paucity of numbers.

The body is pale grey overall, somewhat darker dorsally, shading to white on the belly. A dark grey band runs longitudinally from behind the head to the middle of the lateral line. Another runs from the tip of the snout, through the lower margin of the eye, across the pectoral origin to the caudal, where it ends in a more or less distinct spot on the peduncle and proximal rays. This band is joined below and behind the eye by another running from the posterior end of the upper jaw. On the flanks, the middle line is hatched with oblique strokes.

The unpaired fins are all edged with black distally; the soft dorsal bears a few small spots and flecks. The lappets of these fins are pale yellow-white, and the bases of the dorsal and anal are dusky. The pelvics are white-edged, the pectorals clear and colourless.

There appears to be the usual (for *Telmatochromis*) size difference between the sexes. I believe the smaller specimens to be female, contrary to the case in *Julidochromis*, species of which are externally similar to *Telmatochromis*.

Once again, we must thank Colin Enright for information concerning the reproduction of these fish. An American commercial breeder advised him to use tank furnishings with extremely small entrances (in this case a ceramic pepper pot); presumably, in the wild they select the smallest of crevices for nesting. As a result, direct observations on the details of spawning and incubation are scant. A pair of 5 and 3 cm. length produce up to 100 fry at irregular intervals and exercise the usual parental care.

Growth in this species is very slow, probably linked with its small size; a 7 cm. specimen is exceptionally large. Maturity is reached at about 3 cm. for both sexes.

*T. vittatus* Boulenger, 1898

The second species of small, cigar-shaped *Telmatochromis* has often been confused with *T. bifrenatus*. It appears to be confined to the southern half of the Lake, again probably a reflection of collecting activities rather than its true distribution.

The body colour is similar to that of the above

species, but with a more silvery sheen. A black lateral band, somewhat wider than that of *T. bifrenatus* runs from the snout to the upper part of the caudal peduncle. Another runs from the occiput, along the base of the dorsal fin to its posterior end, encroaching upon the proximal rays.

The fins are whitish; the caudal and anal, like the dorsal, have dusky bases. The dorsal and anal also have thin black margins and their soft portions are lightly spotted.



*T. vittatus*

It can be easily differentiated from *T. bifrenatus* since it has a much more blunt head, shorter jaws and lacks the oblique strokes on the midlateral band. *Telmatochromis vittatus* also reaches a larger size, over 10 cm.

I have no data on reproduction, but am sure that the talented Swedish aquarists have bred it, and that spawning follows the pattern of the other species mentioned here.

*T. caninus* Poll, 1942

This is the largest species of the genus, old males reaching a size of over 14 cm., the females about 8 cm. Within the Lake it has a wide distribution among the rocky shores.

Males are light grey-brown (very variable), with a red-brown to black band running at an angle of 15° from the eye to the posterior edge of the operculum, then vertically down to the pectoral fin origin. Old specimens develop a prominent nuchal hump.

The lappets of all fins are grey, the vertical fins being spotted with white. The dorsal margin is black, with a yellow-orange submargin. The distal pelvic rays are blue.



*T. caninus*

Females are much darker overall, and very similar to *T. temporalis*. The eye-pectoral band is always black, the iris golden.

Both sexes have blue-grey lips and branchiostegal membranes and many white vermiculations on the snout, nape and occiput. There is a black line

from the upper jaw to the lower part of the operculum and an irregular blotch at the top of the operculum (at the posterior end of the head).

This species is easily distinguished from *T. temporalis* by its less sombre colouration, more bleak-like jaws and the extent of the cephalic vermiculations (absent from the cheek in *T. caninus*, but many more on other parts of the head, extending past the dorsal fin origin onto the back).

Reproduction is much the same as for *T. temporalis*; *T. caninus*, being larger, produces up to 120 fry at one spawning. It seems that there is more friction between the parents than in the other species of the genus.

I should stress that in both *T. temporalis* and *T. caninus* body colouration is very variable in the males; distinguishing between them on this basis alone is very difficult.

## PRESS RELEASE

### WERTHER PACCAGNELLA HEADS O.F.I.



AT THE FIRST official management Council meeting of O.F.I. Ornamental Fish International Wholesalers' Organisation, held in Bologna, Italy over the weekend of 16/17th June, attended by delegates from seven member countries. Signor Werther Paccagnella, of Euraquarium, Bologna, was unanimously elected President of this powerful group.

The major part of the two-day meeting was taken up agreeing a new 25 page constitution/statute, which had to be fully understandable in all European languages. The Italian lawyer, in conjunction with Madame Paccagnella and Dr. De Santis, had created a statute of extremely high standard, wide reaching, yet precise details. With this in mind plus the economic advantages of the Italian base, it was decided to adopt the statute as amended, and establish the Secretary General's office with Madam Paccagnella in Bologna.

December, 1979

It was agreed after final acceptance of the statute, that official translations into German and French, should be acquired, in addition to the English and Italian already possessed. Election of other officers followed, and five vice-chairmen were elected:

Herr Willie Remke	Germany
Mr. Malcolm Hardy	Great Britain
Messeur Sidoli	France
Mr. Bjarne Manley	Denmark
Mr. M. B. Ruysbroek	Holland
Mr. Keith Barraclough	Great Britain, was voted Press Officer.

The meeting then moved on to deal with selection of motif/insignia, selection of exclusive O.F.I. transit label. Airlines have already been contacted and they have expressed sincere interest, in giving O.F.I. members selected treatment because of O.F.I. high standard and responsibilities accepted by members. The label will include the official O.F.I. mark clearly recognisable to everyone involved in the transit of fish. All important airlines are to be circulated with samples of this label while I.A.T.A. approval and support is being sort.

It was reported by management council members, that a substantial number of people had indicated the wish to become members in all countries, including South America and the Far East. It is the declared intention of the O.F.I. management council, to make this group very strong and well respected throughout the world.

The sound foundations to create such an ideal have now been laid. Finally, plans were made for the next management council meeting, to be held in Amsterdam on 20/21st October. It was agreed that from Sunday lunchtime this would be an open meeting to welcome new members and bring together everyone involved, who can be present, details of the venue will be released soon.



# MARINE QUERIES

by Graham F. Cox

## READERS' SERVICE

All queries MUST be accompanied by a stamped addressed envelope.

Letters should be addressed to Readers' Service, The Aquarist & Pondkeeper, The Butts, Brentford, Middlesex, TW8 8BN.

I have a 39 in. x 12 in. x 14 in. tank, the only occupant of which is a small *Percula Clownfish*. The tank is filtered with air-lift operated U/G filtration (Algarde). I have one Sicce F100 power filter. I would like to convert this tank (with the addition of another power filter, as the tank has two outlets) to reverse-flow undergravel filtration, but have several questions about it.

Is my power filter sufficient for the job it will have to do, or will I have to buy two more filters of a higher turnover (my present one has a turnover of about 50 gallons an hour, but I imagine this will be reduced if it has to push water through my 4-5 inches of coralsand).

It is almost impossible, and out of the question, to remove the filter plates, without completely emptying the tank, which I am not prepared to do, but the air-lift pipes can be moved, though even this is a fairly major operation because of the depth of my coralsand.

At the moment, the outlet to the power filter is much too small to fit into the air-lift pipe. Can I buy an adaptor for this, or will I have to buy a new "telescopic" pipe. I remember reading somewhere that a telescopic pipe was necessary to allow for the water depth, is this really so? If not, could I just buy two more normal pipes, and fill in the gap made between the outlet pipe and the U/G filter pipe with silicon sealer, and then change the pipes when it is dry.

If this is not satisfactory, where can I get hold of the pipe or the adaptor?

Will the sudden filling of the tank with all the collected mulm significantly stress the fish during the first few days with the new type of filtration? I have a spare bare 2 ft. tank. Are my filter plates suitable for reverse-flow U/G

filtration? If there is any risk of them working up through the coral sand, I would rather not bother with the reverse-flow system.

Lastly, how often will I have to change the filter media, if it is: one "polyfilter" cut and shared between the two power filters, one bag of activated charcoal per power filter, and the rest filter wool?

Reverse-flow undergravel filtration powered by a power-filter(s) is in my opinion presently the most efficient form of aquarium filtration. Despite the fact that I have been advocating it since 1968 it is only just beginning to catch on amongst aquarists. This is probably due to the increasing level of popular affluence.

I maintain that it is the most efficient form of filtration for the following reasons:

- (1) Reverse-flow U/G filtration prevents a build-up of sea-humus in the coral-sand filter-bed atop the U/G filter. This is important since most of the *highly parasitic flukes* (i.e. trematodes, nematodes, cestodes, etc.) all thrive and breed in sea-humus. The usage of reverse-flow U/G filtration safely removes the sea-humus into the body of the power-filter from where it can easily be removed every 2-3 weeks depending on stocking/feeding regimes.
- (2) The only known weakness of the otherwise excellent air-lift-operated U/G filter is that you can't use charcoal with them. Inability to use ultra-high-activity charcoal (e.g. "Sea-Coal") means that you have no means of keeping the highly-toxic, yellow phenols, etc., within acceptably low levels of concentration.

The only known deficiency of the reverse-flow U/G system is the high capital/maintenance/running cost of power-filters when compared with the low capital/

*Continued on page 58*  
THE AQUARIST

# Commentary

by Roy Pinks

I RECENTLY received a letter from F. Hugh Dawson, Director of the Freshwater Biological Association which outlined his company's interest in the biological control of aquatic plants, and which stated that they generally avoid the use of chemicals because they get the results they seek by other means. Many readers will be unaware of the problems confronting those whose job it is to keep in check some of the more rampant plants which live in our rivers, ponds and streams, and I found the literature which Mr. Dawson also kindly sent me quite fascinating. It describes some of the problems encountered in managing the waters of streams in the best interests of the overall economy of different areas, taking into account such considerations as the avoidance of flooding and the support of fisheries. Studies were made of the optimum time for the removal of the plant in question (Water Crowfoot), and it was found that "pruning" at the wrong time could lead to further overcrowding due to regrowth, rather than the limitation aimed at. The papers also discussed the way in which this invasive plant had been controlled by the planting of trees on the river bank, in such a way that the shade generated by them reduced the Crowfoot's spreading power. All who are interested in maintaining both the usefulness and the beauty of our wonderful countryside will welcome the highly responsible approach of this Association. Supported in part of its work by the Ministry of Agriculture, Fisheries and Food, one can obtain satisfaction that at least some taxpayers' money is being put to good account.

## Floating Shaders

Although the principles of control mentioned in these papers were most relevant to streams and large masses of moving water, both the aquarist and pond-keeper will recognize the value of the floating plant as provider of shade in the control of underwater algae, though not all are adequately aware of the manipulation of these agents to get the right effect. In an aquarium, dense masses of *Riccia* can be moved

around on the water surface to limit or concentrate the quantity of overhead light, which itself can be varied by means of differently rated and differently constituted light sources (fluorescent, in its several forms, or tungsten). In the pond, the lily pad and the rapid spread of Duckweed or *Azolla* have a marked effect on the clarity of the water. These are fairly familiar aids, but are less easy to manipulate to advantage, both because of their mass and because of the dramatic surge of growth in the pond in late spring, which tends in most cases to solve its own algae problems. Nevertheless, the notion of tree planting to provide shade is something which will appeal to many pondkeepers, not just because it is such a safe method, but because it can be very attractive, too. The use of conifers is a good proposition where it is desired to avoid the nuisance of the annual leaf fall, but since most of us will have some worries in this respect and net our ponds in the autumn, suitable deciduous trees are by no means out of the question as shade providers; there are some wonderfully decorative varieties listed in nursery catalogues which are perfectly suited to the smallest gardens. The planting positions for selected trees must be carefully predetermined in relation to the compass and the overall symmetry of the pool.

## Polystyrene Algae control

A somewhat curious algae control was mentioned to me by the management of the Mythe Nurseries at Tewkesbury recently. Their fish are contained in the usual outdoor "sinks" covered by fine plastic mesh, but during fine weather the water, being unfiltered and uncirculated, turns pea green. This is very good for the fish in general terms, but it leaves the customer in two minds, so they adopted the practice of floating in each sink a fragment of polystyrene (a few inches in total area, and about an inch thick). This, in their experience, made a lot of difference. We certainly could not fathom the

rationale of this because polystyrene is inert and has no obvious properties to suggest its value in this odd role. I was certainly sceptical. However, I have recently had to do with a pool which resolutely refused to clear despite the usual biological controls, including copious additions of *Daphnia*, and I finally floated on its surface the lids of two polystyrene fish transit boxes. Within two days there was a marked improvement, and within a week I could see to the bottom of the pool. When the lids were removed there was a gradual deterioration once again. In this latter case I have no doubt that the lids simply acted as giant lily pads, and their surface area was enough to reduce the available light to levels where

the free swimming algae began to fail. Possibly, sheets of plywood or other buoyant material would have done just as well, but the notion of controlling algae with removable rafts is new to me, and it might be worth experiment in circumstances where the natural resources of the pool have not reached the point at which the algae begin to lose their grip. Late spring and brilliant sunlight could bring about this state of affairs, and likewise the establishment of a new pond during the summer months: in the latter case the complicated cycle of water maturation takes place rapidly, and even though many of the plants are at their peak, so are the algae, and it is not always safe to bet on which will prove to be the winner.

## MARINE QUERIES continued from page 56

maintenance/running cost of the air-lift operated U/G filter.

"Sicce" filters etc. I would suggest that two "Sicce's" (i.e. one per air-lift) is adequate. You will have to check-out the cost of adaptors with "ALGARDE" and "SICCE." However, even if these are not commercially available, they would be very easily fabricated from polystyrene, PVC or ABS plastics. Telescopic pipes are not necessary in your case.

Sudden sea-humus release from the filter-bed will not be enough to upset your fishes. Any turbidity you are capable of creating is nothing compared to the turbidity produced in reef water when a typhoon blows through the islands.

"Algarde" filters will not work up through the coral-sand and are suitable for your purpose as also are the "INTERPET" U/G filters.

Duration between filtrant-media changes will be dependent entirely on the excellence (or otherwise!) of your stocking/feeding regime. A definitive answer to this question is impossible. You must determine the answer yourself on a "suck-it-and-see" basis.

I have read in various books about the use of ultraviolet light i.e. "Blacklight" in the use of controlling some diseases, in one book the author mentions that there were some experiments being carried out at SeAquariums in America and I would like to know if you have heard anything about any results, also if you personally have any views on this light.

My set up is a 48 in. x 15 in. x 12 in. tank with 2 under-gravel filters with 4 uplifts, covered with a 3 in. rising to 4 in. at the back layer of crushed shell and a 1/2 in. layer of coral sand, the tank is lit with one 4 ft. GroLux and one 2 ft. GroLux. Could you please advise me if

**this is sufficient to keep Anemones. The uplifts are run with one Schwarzer Precision pump and one Orion Day and Night pump.**

(a) *Ultra-Violet Light*

It is a fact that light at U/V frequencies is lethal to bacteria at two levels as follows:

(i) These very short wave-length, non-visible, light frequencies are bactericidal in their own right and

(ii) Radiations at these frequencies tend to convert oxygen into ozone. Ozone (= O<sub>3</sub> = the triatomic form of oxygen) is in itself strongly bactericidal and carcinogenic. I have used ultra-violet light in prophylactic attempts many times but have never been able to justify its usage either technically or commercially. *There is no easy, "Magic" substitute for good water management, tank hygiene and care (i.e. miserly) feeding.* If you studiously avoid overstocking and always observe the "golden rule" of feeding, i.e. **never even one uneaten morsel of food shall be allowed to reach the bottom of the tank**, and always use each partial water-change as an opportunity to wash the sea-humus from the coral-sand, your fishes will never suffer from disease anyway.

(b) *Lighting*

A 15 in. high tank needs 2.5 feet of fluorescent light to each square foot of surface area if you are ever to be successful with invertebrates and the higher algae. The S.A. of your tank is 4 sq. ft. and so you need 10 feet of lighting tubes on for 12 hours each day. You might try the following:

2 x 36 in. "Northlight," plus

1 x 36 in. "Gro-Lux"

If, on the other hand, you only wish to keep fishes, your present lighting (which, incidentally, already produces a substantial amount of U/V radiation) is adequate.

# WHAT IS YOUR OPINION ?

by B. Whiteside, B.A., A.C.P.

PLEASE ACCEPT my best wishes for a Christmas that will bring happiness and peace to you and yours. For me, 1979 will be best remembered for a very severe winter that caused the death of many garden and greenhouse plants, followed by a summer when there were about two days that were sunny and warm enough to encourage one to consider lying in the sun.

No doubt other aquarists were as intrigued as I was by this morning's news, on BBC Radio 4 UK, that Russian scientists have just discovered a species of fish that can live in water at  $-2^{\circ}\text{C}$ . This saltwater specimen (fresh water would have turned to ice at  $-2^{\circ}\text{C}$ ) has, apparently, been given the name silver scales. It's encouraging to know that even in 1979 new species of fish are being discovered. No doubt the silver scales has gone through many aeons of evolution to enable it to live in such cold water.

The first letter to appear in this Christmas column was written by Mr. Barry W. Landers, of Sägstovagen 48, 14149 Huddinge, Sweden. At the moment I cannot recall whether or not I have previously received any letters from Swedish readers for inclusion in this feature. Anyway, Mr. Landers, in perfect English, says: "A friend loaned me a copy of your magazine, in which I saw your own advertisement for booklets. I would like to order *Angel Fish*. If you have a list of booklets on other fish, I would appreciate it if you could send me such a list.

"I also saw a mention of Java moss. As this is, as far as I know, unobtainable in Sweden, could you tell me how much a sample costs? Thank you in advance." (I had a glance through the August *Aquarist* and could not find a single advertiser offering Java moss for sale. No doubt some have plants for sale but are not advertising them. B.W.)

Miss Debra Watts, of 119 Cortis Road, Putney, London S.W.15, transports us to the other side of the world in her letter. She writes: "On the subject of public aquariums, I thought that readers might be interested in hearing a little about one that my boyfriend and I visited whilst on holiday in Chicago in June this year.

"The John G. Shedd aquarium on the shore of lake Michigan was built in 1929; it houses 4,500 fishes representing over 500 species from all over the world. There are 210 exhibition tanks and 175 reserve tanks, the total capacity of which is 450,000 U.S. gallons; and four reservoirs containing 2,000,000 gallons,

divided equally into fresh and salt water. The salt water is produced chemically in the aquarium. There is also a room given over to small tropical fishes, that we all keep, displayed in a Chinese setting because of the place where the art originated.

"But what was of most interest to us was the coral reef exhibit; this was completed in 1971 and is a tank measuring 40 ft. across holding 90,000 gallons of sea water. Constructed of artificial corals, it held over 500 Caribbean fishes including nurse sharks, rays and moray eels. Twice daily—we stayed for both feedings—divers would enter the tank to feed the fishes by hand, all the time talking to visitors through a built-in microphone in the mask. They claimed that the water in the tank circulated every hour and was the most modern and sophisticated life-support system yet designed. In addition to this, mammals, reptiles and invertebrates are also included in the collection."

No. 287 South Side, Duirinish (?) by Kyle, Ross-shire (?), Scotland, heads the letter I received from a young reader who signs himself "Your loyal supporter". He is Master Simon Richards, who says: "I am writing to tell of my experience with gouramies. I bought a very nice male and female three-spot gourami. I settled the pair into my 36 in.  $\times$  12 in.  $\times$  12 in. community aquarium. Within two days the male had wrecked most of the female's fins and one of her long feelers. Another day went past and the female was found to be dead. I was very disappointed with this result of my attempt to breed gouramies. Within two more days the male gourami had killed two resident swordtails. He went straight back to the shop. I have heard, from my friends, of the same sort of thing with gouramies."

In August I took a trip to Belfast to visit Ireland's biggest aquarium show. The show, AQUA '79, was arranged by the Irish Federation of Aquarists Societies and was held in the Y.M.C.A. hall in Wellington Place, Belfast. It reminded me of AQUA '69 except that tableaux seem to have gone out of fashion. Photograph 1 shows North Belfast's display, in the form of a large rosette. Photograph 2 shows one of the several trade stands. Ulster Aquatics has been in the business now for 31 years and I can clearly recall visiting the firm, over the years, at its several addresses around Belfast. My fondest memories are my earliest ones because my first fishes and tank



were purchased for me, by my father, from Ulster Aquatics.

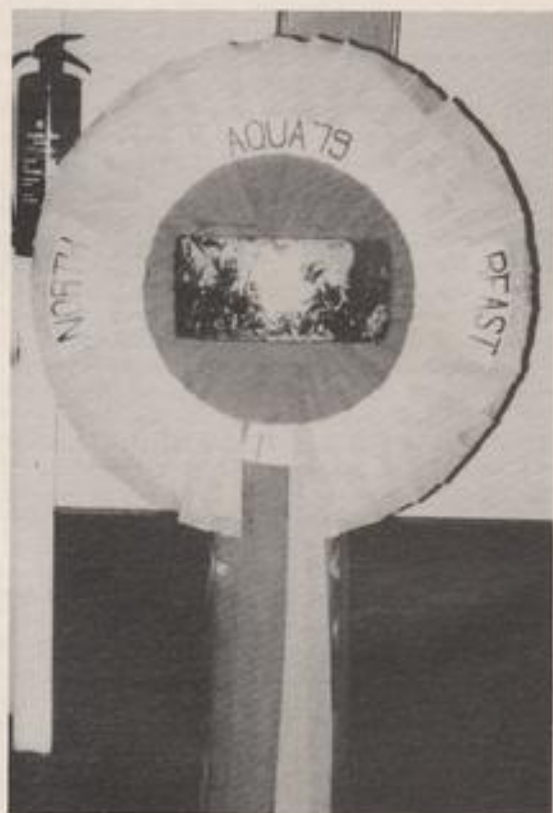
Recently I had a chat with the wife of the owner and learned that my early, vivid memories were quite accurate. Mr. Laurie Morris began Ulster Aquatics in a small shop in Beersbridge Road, Belfast. I can still recall my excitement, as a youngster at primary school, when my father lifted me up so that I could see into some of the higher-level tanks in the shop. I clearly remember thinking that Mr. Morris was a magician when he took a length of rubber tubing and caused water to flow from one of his tank into my sweet bottle fish transporter. At that early stage of my development I did not know about siphons; but I learned that day. I recall also Mr. Morris's business when he conducted it from the wine cellars at Orangefield House. Aluminium-framed tanks were a speciality; and indeed I still have two of them in daily use—as they have been since I bought them so many years ago.

Subsequently Ulster Aquatics moved to Montgomery Street in the centre of Belfast where it thrived for a considerable time until terrorist activity in the vicinity caused the removal of the business to its present home in Hope Street. Mr. Laurie Morris and his son Philip still run their successful business in the centre of Belfast, and other members of the family assist when the need arises. Messrs. Morris, junior and senior, were out collecting a consignment of fish when I telephoned; hence Mrs. Morris kindly supplied the information I requested. Perhaps, at some later date, I'll manage a personal interview with Mr. Laurie Morris. His having been for so long in the trade must put him in a unique position, in Northern Ireland, to monitor the progress of the hobby—and no doubt he has some interesting tales to tell.

There were many attractive fishes on display at AQUA '79; and a small number of plants. I found the decorative aquaria section most interesting and thought several of the tanks on display were very appealing. Many of the single fish and pairs of fish on display in bare show tanks would have benefited from an increase in the level of ambient light in the hall: they were somewhat difficult to see on the night when I attended. The most disappointing aspect of the show was the show programme. As a non-aquarist friend whom I took along said: "The English is appalling in some of those show programme notes." I had to agree. It's a pity the errors could not have been corrected by someone before the programmes were printed. However, all in all it was a popular show. I wonder if figures are available so that AQUA '69 could be compared with AQUA '79 to note if any changes in trends are noticeable.

Photograph 3 shows a pair of black widows. Please send me details of conditions etc. under which you have bred this species of tetra.

My thanks to the many kind readers who sent me letters for publication in 1979. The writing in the letters ranged from the beautiful to the almost-illegible. One of the neatest writers who contributed is 18 years old Mr. Derek Weaver, who resides at 13 Melbourne Avenue, Chodderton, Oldham. Derek says: "I am writing to your column about the problem of leeches in the aquarium. I am surely not alone in my consternation at the impossibility of eradicating these little squatters. The first time I noticed them I informed the proprietor of my local, excellent, aquarist shop and he informed me that they were introduced by accident in live *Tubifex* worms (their



staple diet) and they are impossible to eradicate except by draining the whole tank and boiling the gravel. I find that the only saving grace these creatures have is that they are rarely seen, being nocturnal in habit.

"If any readers believe they are free from this pest and wish to remain so then I advise them to clean and search *Tubifex* well; or maybe even refrain from using *Tubifex* altogether. Also, check any new plants. Recently I purchased some *Sagittaria natans* and they also had leeches on them. Those poor unfortunates who have them should either (a) stop

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feeding *Tubifex* and starve out the leeches; (b) clean out the tank completely; (c) include clown loaches, which eat them; or (d) stir up the gravel with a planting stick and suck up as many as possible with the siphon tube; or maybe try all four!

"I should like to conclude my letter by quoting some prices from the afore-mentioned shop: zebra danio 32p; guppies 55p; rams £1.50; marbled headstanders £3.25; *Cryptocoryne* (various) 15p-30p; and *Cabomba*—42p for six. I hope you and your readers have a merry Christmas and a happy new year." (Thank you for your kind wishes, Derek. B.W.)

I should also like to thank the many secretaries who send me club and society magazines. Unfortunately I do not have space to mention many

mysterious deaths, with apparently-healthy fish literally dying before my eyes. Tank management seemed correct—U/G filter and fairly frequent, partial water changes etc. The penny dropped when, after two months' wait after the latest deaths, I introduced some barbs—only to have the whole batch die within a few hours. The only sign was that the skin became slimy—almost as if they had been dipped in acid.

"I took out some of the gravel, washed it, left it in water for a day and tested the water—to find it strongly acid; which thus gave me the cause of death. The gravel was white aquarium gravel purchased from the largest aquarists' shop in the area. If anyone else has these mysterious deaths, then test the gravel!" (I usually warn aquarists about buying gravel contain-



of them very often. Two small-format magazines that I have to hand are the latest editions of the Coventry Pool and Aquarium Society Newsletter and the Midland Koi Association Newsletter. I was disturbed to read the following paragraph in a report of the minutes of the M.K.A. meeting held on 1st September, 1979. "... The secretary then read an anonymous letter that he had received. The letter warned us that M.K.A. members would not be welcomed at the B.K.K.S. Open Show at Tatton Park. The matter was briefly discussed and the general feeling was that it should be treated with contempt and ignored. ..." It's sad to think that someone could be so narrow-minded.

Mr. S. Ballen, of 7 Toes Road, Okehampton (?), Devon, writes: "The following cautionary tale might be of interest to your readers and might save the lives of a lot of fish. I've kept fish for very many years but for the past two years I have been plagued by

ing white particles because some of them can be calcium carbonate which, under certain conditions, can dissolve and render water hard and alkaline to a certain degree. This is, I think, the first time I have heard of white gravel containing acid-releasing particles. I wonder if it was a natural or a synthetic gravel. I hope the dealer was told. B.W.)

It's time I gave the ladies a turn—and I'll begin with the following comments received from Mrs. B. Mason, 68 Cavendish Road, Kersal, Salford 7, Lancs. "Ref. your subjects in the September issue: I strip a tank down only when the balance has been upset and the water becomes foul. Luckily this has not happened to me for some months; but when it does happen there never seems to be any reason for it. I use a corner filter and lots of plants and have learned the hard way not to over-feed. I used to be appalled at the thought of not giving fish some live *Daphnia* now and again, and/or some *Tubifex*. After

losing fish once from tainted *Daphnia* I have never ever given live food again, but feed wholly upon flake, freeze-dried *Tubifex*, FD *Daphnia* and the odd sprinkle of the food that looks like crushed Spillers Shapes, which the fish adore (?). Occasionally I stick an Aquatab on the glass and this is loved too.

"My fish are very greedy with Java moss and it does not last very long. (I keep my tank) in a corner of the living-room on a metal stand. It only catches the sun in high summer so Gro-lite (Gro-lux or True-lite?) is on most of the day. An electrician told me not so long ago that it wasn't worth switching off the light, it costs so little to run." (Recently, on a radio programme, I heard an expert reply to this comment by saying that it was cheaper to leave a

would not be inappropriate for the service provided on some occasions. B.W.)

Mrs. Mason concludes her letter by saying: "I get most of my plants from the local stretch of river; and before anyone throws up his hands in horror let me say that I leave them over-night in a bucket of clean water to which I have added a little Discasolve. I have never brought in any undesirables this way. I find bought plants are usually poor specimens and very expensive."

Mrs. L. Glanfield lives at 44A Queen's Road, Buckland, Portsmouth, Hants., and she writes: "I hope I have addressed this letter correctly, but I have not noticed in any editions an address to which to write to you, so I take it that the one on the contents'



fluorescent light lit if one were going out of a room for, say, only ten minutes; in all other cases one would save money by switching off lights—whether fluorescent or tungsten bulb. My tanks have been receiving much less light and aeration/filtration this year because of the high costs of electricity—and all other fuels—in Northern Ireland. Neither fishes nor plants seem to have suffered, although I am now tending to concentrate on plants that require less light than most. Java fern, Java moss and *Cryptocoryne affinis* seem to grow quite well without too much artificial light. With minimum plant orders at around £1.40 and postage at around 40p one now thinks twice about ordering plants by post. Speaking personally, I would award few prizes for speedy delivery of mail posted in Britain for delivery in the part of Northern Ireland in which I live. Frequently it is difficult to distinguish between first and second class mail delivery times; indeed the label third class

page covers all letters, queries, etc." (You are correct, Mrs. Glanfield. All letters should be addressed to the appropriate person or feature, using the name and address of the magazine—which is *The Aquarist & Pondkeeper*, The Butts, Half Acre, Brentford, Middlesex TW8 8BN. Don't forget to enclose a s.a.e. if you require a reply from Messrs. Boarder or Hems. B.W.)

Mrs. Glanfield continues, in her neat writing: "I am prompted to write to you after reading September's issue of *The Aquarist*. I noted a letter from an unknown gentleman who blames cigarette smoking for the loss of his seahorses. I would put it down to carelessness and recommend that he give up fish-keeping if he cannot see that to feed fish with a cigarette hanging from his mouth probably poisoned his tank with ash. I keep tropical and coldwater fish; I smoke, as does my husband, and I can say that we would not dream of opening a tank whilst even holding

a cigarette.

"We have visited a pub in Portsmouth that keeps marine tanks on show and the land-lord and his wife both smoke, and their seahorse thrives well with his shrimp friends. It is not the fumes but the ash that kills so quickly (doubtless the fumes will if allowed to form a fog)." (I have managed to refrain from smoking for more than seven months but must admit that I still have a strong desire to smoke. I must confess that my sense of smell has improved a lot and I now realise just how smelly smokers are. It amazes my pupils and me that I can now walk past a row of desks in school and tell which pupils, if any, are smokers. It is frightening to discover that if one stops at a pupil's desk to mark a book one can usually tell if the pupil's parents or siblings smoke. A friend who gave up smoking a year ago informs me that she can tell, when marking pupils' books at home, which young children have parents who smoke. Several days ago I lent my car to a couple of friends for a few hours. It came back smelling like a mobile ashtray despite their having carefully removed all visible signs of their combined smoking activities. I can appreciate fish not being too keen on any aspect of smoking; and as a reformed smoker at present—can one ever claim to have given up the habit for good?—I can verify that my temper is a little shorter some of the time, that my health seems to have improved, that my sense of smell is better, that I have more money to waste on other things such as fish, and that I am a living example of the psychological term 'projection' in that I strongly criticise those who smoke, just because I, too, would like to smoke. I may well have got my psychological terms muddled in the above. What I mean is that I currently criticise those who smoke because I have a strong desire to smoke but do not allow myself to do so; nor does my doctor. Readers may be sure that if I do slip back into the old habit I shall be the last person to tell them! B.W.)

Mrs. Glanfield has the following to say about black widows: "I keep four in a 36 in. tank with 40 or more other fish including scissortails, neons, cherry barbs, golden barbs, angels and gouramies, to mention but a few. I have heard that these fish can become vicious but I have had them for two years and have had no bad results. They chase each other and generally keep themselves to themselves. The only nasty fish I quickly disposed of were swordtails. I do not claim a great knowledge of fish and it took six months for my tank to become trouble-free; and I am happy with the result. Visitors admire our tanks—the second contains four fancy goldfish—and they are a pleasure to watch when we tire of television." (No doubt many readers spent much more time looking at their fishes during the past couple of months while ITV has been off our screens. Its return tonight, 24th October, will, no doubt, make

many readers happier people. Fortunately my addiction is radio so the presence or absence of Coronation Street or Crossroads will affect me no more than the last episode of T.T.S.S. B.W.)

Concluding her letter, Mrs. Glanfield writes: "As we live in a small flat we are restricted in our hobby, although we do keep a pair of albino gerbils and a completely mad cockatiel that drinks our coffee when he thinks we are not looking and has fallen in love with the Jack of hearts playing card; but that's another story. When we are able to move to larger accommodation we hope to try our hands at breeding some kinds of fish—possibly kribensis and angels; then we will find our time cut out trying to become temporary midwives, I suppose. I should be pleased to hear from anyone who wishes to exchange 'tank news'."

Miss Helen Adams sent me her letter from 50 Ordhard Way, Barnham, Bognor Regis, Sussex. Miss Adams, who is 19 years of age, states: "I should like to tell you of my experiences with bronze catfish. I bought a pair of them from my favourite pet shop in Littlehampton. They seemed to settle down quite well; but a week after their introduction to my community tank one of them died. I noticed that on the underneath of the fish there were red marks as if tiny blood vessels had burst. The solitary fish seemed all right so I left him to get on with it.

"On several different occasions I have tried to keep a second bronze, but without success. However when my bronze started to blush and fill with roe (I had just started to feed some food tablets that sank to the bottom) I felt I had to buy her a mate. I introduced a slightly smaller male.

"They seemed to get on well together; then I happened to notice my opaline gourami attacking the poor little fellow—mainly his dorsal fin. I could not see him a few days later and discovered him dead, although looking apparently-normal. Do you think my gourami was responsible for the other deaths? I still have my original bronze and the gourami seems to have left her in peace.

"My next topic is water. When I first set up the tank I used water straight from the taps—both hot and cold—mixing to obtain water of approximately the correct temperature. A short time later my uncle—once an avid tropical fish-keeper—gave me a lot of his 'fishy stuff' including some old 1953-55 editions of *The Aquarist*, and some pH test papers. Using these papers I found my water to have a pH of about 7.1-7.3. I should like to know if this is too high. I wonder what your readers think of box-type filters. I do not find them very easy to use, mainly because they seem to float up all the time—except when weighted down with a lot of gravel or stones; and then there is not much space for the wool, charcoal, etc. Thus I was very pleased when I discovered a new capsule-type of box filter which

can be used either in conjunction with a U/G filter, which I have, or separately, using suckers provided. As I don't have much success with T-clamps, air tubes etc. I thought I would use it separately, perhaps twice per week."

The writer of the following letter, Mrs. A. Powell, of 2 Elm Cottages, Laleston, Nr. Bridgend, Glam., virtually guaranteed its publication by neatly printing the whole letter—and by introducing a touch of humour. She said: "It seems that winter is on its way today because it is very cold and, as usual, I have a late spawning of goldfish fry. That means yet another winter of fry indoors; still, that's fish-keeping. With the TV strike on I find I have read all this year's *Aquarists* over and over and I wonder if next year the magazine could include a good write-up about and photographs of the spawning of goldfish and the rearing of their fry. I have had fish for many years now but I raised fry knowing nothing.

"I can smile now but I nearly went grey at the time. I did not know what a fish egg looked like, or a baby fish; and when I did find out, I knew I would never have thought that that is what they would have looked like. So, if a coloured picture of fish eggs on a plant were shown, plus one of the fry after they hatch, I am sure learners would learn a lot. And the feeding: so little is needed. A note on that, as well, would be useful. I once raised a whole bunch of pondskaters in my tank, thinking they were fry. I treated them with such care—only to find they flew away. Oh, the shame, after I had shouted with joy to everybody that my first babies were here! People came to see them; I had to give a daily report at our local shop. Oh, the shame! Thank goodness Mr. Boarder wrote his book. Everything he says about fry is so right. I hope you will consider the learner next year. The coloured pictures would be a grand start.

"I have had an early Christmas present: a garden shed; all of my own! My husband has given me my marching orders to leave his shed. Mind, I did take over. I must admit it was like a power station out there last winter. So, with my new shed up I moved out with buckets, nets, baskets, gravel etc., while my husband jumped up and down shouting, 'You're leaving at last!'. Nice to feel wanted, is it not! Men! He said it was worth the expense to get rid of me. He has, however, let our tortoise hibernate in his shed. So, each to his own shed, I say.

"I hope this winter will be kinder to the pond fish!"

Mr. Richard Handel's writing suggests to me that he is in the teenage age bracket (correct me if I am wrong). He lives at 3 Deacons Close, Elstree, Herts., and has the following to tell us: "Many fish experts while quoting the stocking capacity of a tank say that we must allow a certain number of inches of fish per gallon of water. This means that if a tank

can hold, say, 20 one-inch fish it can hold ten two-inch fish, and five four-inch fish. In my opinion this is not necessarily so. A two-inch fish, in theory, should use up eight times as much oxygen and have eight times the biological loading on a tank as a one-inch fish since it is not only twice as long but twice as wide and twice as deep. Thus, in theory: if a tank can safely support one four-inch fish, it can safely support 64 one-inch fish. In practice this may not be so as the fish may not have enough space; but the tank can certainly hold many more than the four one-inch fish one would expect. Books on marine fish in particular may say, 'Never exceed one inch of fish per two gallons of water.' If I were stocking my tank with small fish I would feel perfectly safe exceeding this limit; but not if I were stocking my tank with large fish (*sic*).

"In the December 1978 issue there was an article called 'Fish Tank to Furniture' that described how to prevent the ugliness of the stand and wires etc. from spoiling the look of the tank. However, for those who have not got the inclination or the money to build a wooden box around their tank, I have a cheaper method which I have used with great success on both of my tanks. It is simply to hang a curtain, or some such material, cut to size, on a wire stretcher, from the top of the stand down nearly to the floor. Then boards of the right size can be placed behind the curtain on the lower level of the stand, and food, filters, nets, starter units etc. can be stored on this, out of sight." (Beware of back-siphoning if the pump is placed at a level lower than the water level in the lowest item it operates, e.g. filter. B.W.)

Richard continues: "For added effect, strips of wood-grained Fablon, rounded off on the inside corners, can be placed around the outside of the front glass. As I already had some bits of curtain material, all I had to pay for was the Fablon—and it has considerably improved the look of my tanks."

Although I have a great bale of unused letters, all the space has been filled so I must conclude by hoping that you will have an enjoyable Christmas and a Happy New Year. May the peace that comes from gazing at a beautiful aquarium or a calm pond spread in ripples across a world that has of late been a sea of troubles.

For 1980 please send me your opinions on any of the following: (a) methods to improve the external look of your tank(s) and stand; (b) breeding tetras; (c) cultivating spatterdocks; (d) aquarium gravel and sources from which suitable kinds can be obtained; (e) pond care in winter; (f) type and duration of lighting that you supply to your tank during the winter months; and (g) producing plants and fishes for sale to supplement one's main income. I look forward to receiving a letter from you when the new decade begins.



## from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists societies for inclusion on this page should reach the Editor by 3rd of the month preceding the month of publication.

AT the 30th open show of the **Bethnal Green A.S.**, the best fish was a *Poecilia Vericolour* entered by Mr. J. Edwards, of Thanet A.S. Best exhibit entered by a lady, the *Panque Nigro* entered by Mrs. M. Netherell, of Riverside A.S. The highest pointed exhibitor, Mr. B. Hastings, of S.E.L.A.S., and the society gaining the most points, Thanet A.S.

Other results: Class AG: S. Fursedown (Walthamstow); 2, B. Myers (Walthamstow); 3, P. Mills (Walthamstow); 4, Mrs. G. Netherell (Riverside). AK: 1, Mrs. G. Netherell; 2, T. Butler (Runcyngede). B: 1, B. Myers; 2, Mr. Part (Romford & Becontree); 3, A. Akhurst (Thanet); 4, Mrs. M. Waller (East London). C: 1, J. Edwards (Thanet); 2, B. Hastings (S.E.L.A.S.); 3, Mr. Henman (Harlow); 4, P. B. Riley (Bethnal Green). CA: 1, P. B. Riley; 2, Mrs. J. Farrell (Bethnal Green); 3, Mrs. P. Edwards (Thanet); 4, I. and R. Taylor (Sudbury). G.B.: 1, Mrs. D. Winder (East Dulwich); 2, G. Owen (Orpington); 3, Miss S. Edwards (Thanet). D: 1, Mrs. M. Netherell (Riverside); 2, B. Hastings; 3, J. Part; 4, T. Woolley (S.L.A.G.). Db: 1, J. Owen (Orpington); 2, Mrs. W. Winder; 3, D. Winder (East Dulwich); 4, B. Hastings. Dc: 1, R. Thoday (East London); 2, Henman (Harlow); 3, J. Part; 4, T. Butler (Runcyngede). E: 1, Mrs. J. Farrell; 2, A. P. Taylor (Sudbury). Ea: 1, A. P. Taylor; 2, Mrs. D. Winder; 3 and 4, L. and R. Taylor (Sudbury). Eb: Mrs. J. Owen; 2, I. R. Walker (Thanet); 3, A. P. Taylor; 4, L. and R. Taylor. F: 1, R. Thoday (East London); 2 and 4, R. C. Smith (Romford); 3, C. Cheswright (Southend). G: 1, Mrs. M. Netherell; 2 and 4, Mrs. J. Farrell; 3, T. Woolley (S.L.A.G.). H: 1 and 3, B. Hastings; 2 and 4, I. Walker (Thanet). J: 1, Mrs. D. Winder; 2, Mrs. J. Owen; 3, D. Winder; 4, B. Hastings. K: 1, A. Akhurst; 2, S. Fursedown (Walthamstow); 3, I. and R. Taylor (Sudbury); 4, A. P. Taylor. L: 1 and 2, R. Thoday; 3 and 4, D. Winder. M: 1, Mrs. M. Netherell; 2, I. R. Walker (Thanet); 3, P. B. Riley (Bethnal Green); 4, T. Butler (Sudbury). N: 1, R. Thoday; 2, C. Cheswright; 3 and 4, Mrs. J. Farrell. No: 1 and 2, D. Cheswright; 3, A. Akhurst; 4, J. Edwards. O: 1, 2, 3 and 4, D. and J. Wood (East London). P: 1, J. Part; 2, B. Hastings; 3, I. and R. Taylor. Q: 1, A. Akhurst; 2, B. Meach (East London). R: 1, T. Woolley; 2, I. and R. Taylor; 3, B. Hastings; 4, S. Buck (Romford). S: 1, 3 and 4, D. and J. Wood; 2, B. Hastings. T: 1, J. Edwards; 2, D. Swale (H. Dulwich); 3 and 4, D. Cheswright. U: 1 and 2, P. Mills (Walthamstow); 3, Miss J. Dale (Bethnal Green); 4, Mrs. S. Brown (East London). V: 1, T. Woolley; 2, D. Cross (Romford and Becontree). W: 1 and 3, G. Owen (Orpington); 2, D. Winder; 4, J. Brown (Bethnal Green). XB-M: 1, Mrs. P. Edwards (Thanet); 2 and 4, G. Owen; 3, C. Cheswright. XO-Y: 1 and 2, J. Edwards; 3, D. Cheswright; 4, J. Part. Xu-W: 1, Mrs. S. Brown (East London); 2, J. C. Cheswright; 2 and 4, P. Mills (Walthamstow); 3, D. Cheswright. Bt-Y: Junior: 1, Louise and Elizabeth Riley (Bethnal Green). Tropical: 2, Tracy Waller (East London); 3, Louise and Elizabeth Riley; 4, Jackie Waller (East London).

**Goldfish Society of Great Britain** open show results: Bristol type Shubunkin:

1 and 2, J. Amos; 3 and 4, T. Ball. Veiltail: 1 and 4, B. Cook; 2 and 3, P. Kadwell. Bramblehead: 1 and 3, M. Johnson; 2, B. Lumley; 4, R. Pincock. Pearlscale: 1, 2 and 3, A. Lesurf; 4, J. Pollard. Celestial: 1, H. Berger; 2 and 3, P. Kadwell. Pom-Pon: 1, P. Whittington; 2, 3 and 4, J. Parker. Bubble-Eye: 1 and 2, J. Pollard; 3, D. Morris. Common Goldfish: 1, A. Barnes; 2, J. Ross; 3, D. Mackay; 4, P. Whittington. London Shubunkin: 1 and 3, P. Whittington; 2, W. Leach; 4, J. Pollard. Comet: 1 and 2, D. Mackay; 3, H. Berger; 4, J. Pollard. Fantail: 1, 2 and 3, W. G. Cook. Oranda: 1 and 4, A. Lawman; 2, G. Lewis; 3, J. Parker. Broad-tail Moor: 1, B. Cook; 2, J. Kingsland; 3, V. Cole. Bristol type Shubunkin (Matched Pairs): 1, T. Ball; 2 and 3, V. Cole. Bristol type Shubunkin (Breeder): 1, 2, 3 and 4, V. Cole. Veiltail (Breeder): 1 and 3, D. Mills; 2, B. Cook; 4, J. Kingsland. Bramblehead (Breeder): 1, A. Tagg; 2, G. Lewis; 3, M. Johnson; 4, J. Parker. Pearlscale (Breeder): 1, A. Lesurf; 2 and 3, D. Mills. Celestial (Breeder): 1, E. Metcalf. Pom-Pon (Breeder): 1, J. Parker. Bubble-Eye (Breeder): 1, E. Metcalf. Fantail (Breeder): 1, A. Barnes; 2, J. Amos. Oranda (Breeder): 1 and 4, A. Lawman; 2, G. Lewis; 3, J. Day. Broad-tail Moor (Breeder): 1, B. Cook; 2, 3 and 4, V. Cole. Novice Class: 1 and 2, B. McHugh. Best Owner Bred Fish in Show: J. Amos. Best Fish in Show: M. Johnson. Highest Pointed Basic Breeder's Team: D. Mills. Highest Pointed Basic Variety: J. Amos. Highest Pointed Metallic Veil: P. Kadwell. Highest Pointed Popular Variety: A. Barnes. Highest Pointed Single-tailed Popular Variety: A. Barnes. Highest Pointed Best Popular Twintailed Variety: W. G. Cook. Highest Pointed Owner Bred Dorsaleless Variety: P. Whittington. Highest Pointed Intermediate Breeder: J. Day. Highest Pointed Entry by a Junior Member: A. Barnes.

Mr. Michael Spicer, M.P., presented the trophies at **Evesham Fishkeepers' Society's** second open show in September. Entries totalled 280 in 30 classes.

Results: Guppies (male): 1, R. Stallwood (Newbury); 2 and 3, C. Nightingale (Midland T.A.); 4, Miss G. Stallwood (Newbury). Guppies (female): 1, 2 and 4, Miss J. Thorpe (Dulson); 3, Mrs. J. Hessel (Evesham). Platies: 1, P. Taylor (North Wilts.); 2, D. Kenwood (Nailesa); 3, J. Mayle (S.L.A.G.); 4, C. Nightingale. Swordtails: 1, B. Goll (Evesham); 2, A. Parsons (Malvern); 3, Mrs. L. Wright (Evesham). Mollies: 1, D. Kenwood; 2 and 3, Mrs. J. Hessel; 4, Miss E. Wright (Evesham). A.O.V. Livebearers: 1 and 2, J. Mayle; 3, A. Parsons; 4, P. Parsons (Malvern). Barbs under 3 in.: 1 and 2, J. Mayle; 3, S. Biddle (Evesham); 4, F. May (Newbury). Barbs over 3 in.: 1, J. Mayle; 2, B. Goll; 3, C. Nightingale; 4, P. May. Characins (H. H. and C.): 1, R. Biddle (Evesham); 2, P. Parsons; 3, C. Nightingale; 4, Mrs. J. Hessel. A.O.V. Characins: 1, P. Parsons; 2, D. Kenwood; 3, D. McDermid (Kidderminster); 4, J. Mayle. Male Fighters: 1, A. Parsons; 2, R. Stallwood. A.O.V. Labyrinth: 1, C. Nightingale; 2, R. Stallwood; 3, M. Twinberrow (Malvern); 4, P. May. Corydoras and Brochis: 1, P. Taylor (North Wilts.); 2, J. Walton (Malvern); 3 and 4, C. Nightingale. A.O.V. Catfish:

1, J. Walton; 2, J. Thorpe (Dulson); 3, T. Perks (Malvern); 4, A. Parsons. Rasbora: 1 and 2, S. Biddle; 3, N. Wing (Evesham); 4, D. Lewis (Independent). Danios and White Cloud Mountain Minnows: 1, S. Biddle; 2 and 3, J. Mayle; 4, M. Twinberrow. Botias and True Loaches: 1 and 3, P. Parsons; 2, A. May (Newbury); 4, M. Twinberrow. Labors and Sharks: 1, S. Biddle; 2, J. Walton; 3, P. Parsons; 4, Mrs. J. Hessel. Apistogramma, Nannacara, Microgophagus: 1, D. McDermid. Angels and Discus: 1, A. Parsons; 2, T. Perks; 3, S. Biddle. A.O.V. Cichlids: 1, R. Underhill (Tamworth); 2, S. Sanders (Malvern); 3 and 4, P. Taylor. A.V. Sexed Pairs (Livebearer): 1 and 3, J. Mayle; 2, J. Thorpe; 4, C. Nightingale. A.V. Sexed Pairs (Egg-layers): 1, C. Nightingale; 2, D. McDermid; 3, R. Stallwood; 4, J. Mayle. Breeders (Livebearers) team of four: 1, 3 and 4, J. Mayle; 2, D. Kenwood. Breeders (Egg-layers) team of four: 1 and 2, J. Mayle; 3, M. Finney (Independent); 4, J. Walton. A.O.V. Fish: 1, J. Walton; 2, S. Biddle; 3, Miss G. Stallwood; 4, Mrs. L. Wright. Single Tail Goldfish: 1 and 2, G. Empage (Cheltenham); 3, P. Parsons; 4, A. May. Fancy Goldfish: 1 and 2, M. Biddle (Independent); 3, A. Weaver (Evesham); 4, M. Green (Evesham). Shubunkin: 1, P. Parsons; 2, A. May; 3, W. Twinberrow (Malvern); 4, S. Biddle. A.O.V. Pond or River Fish: 1, A. Weaver; 2, P. Parsons; 3, A. Parsons.

Trophy winners: Best in Show: *Aquarist & Pondkeeper* Gold Fin, J. Mayle. Best Tropical Fish: J. Mayle. Best Coldwater Fish: A. Weaver. Best Angelfish: A. Parsons. Best Shark: S. Biddle. Best A.O.V. Coldwater: A. Weaver. Best Barb under 3 in.: J. Mayle. Best Catfish: J. Walton. Best Characin: P. Parsons. Highest Pointed E.F.K.S. member: S. Biddle.

**Barnsley A.S.** 15th open show was a great success with 555 entries benched from 27 societies.

Results: Guppies: 1, A. Smith (Zenith); 2, B. Banks (Thorne); 3, Mr. and Mrs. Hill (Barnsley). Platies: 1, R. A. Johnson (Hyde); 2, W. Blundell (Doncaster); 3, G. Clarke (Thorne). Swords: 1, Mr. Hall (Swillington); 2, T. Tolhurst (Wyke); 3, R. Gee (Wyke). Mollies: 1, Mr. and Mrs. Hill; 2, M. and L. Price (Castleford); 3, Mr. Lambie (Louth). A.O.V. Livebearers: 1 and 2, T. and P. Busfield (Barnsley); 3, P. Fry (Caerulr). Small Characins: 1, Mr. and Mrs. Richardson (Scarboro); 2, W. Sowersby (Scarboro); 3, J. Britten (Moeley). Large Characins: 1, Mr. and Mrs. Hopkinson; 2, B. Slight (Mexboro); 3, N. Metcalf (Wyke). Dwarf Cichlids to 10cm: 1 and 3, M. and L. Price; 2, B. Banks. A.V. African Cichlids over 10cm: 1, D. Gregory (Scarboro); 2, Mr. and Mrs. Smith (Zenith); 3, M. A. Hollingworth (Shearwood). A.O.V. Cichlid over 10cm: 1, K. M. Fisher (Shearwood); 2, Mr. and Mrs. Barlow (Sheaf Valley); 3, T. Harrison (Swillington). Angels: 1, D. Harris (Mexboro); 2, Mr. and Mrs. Hovell (Shearwood); 3, Mr. and Mrs. Chadwick (Castleford). Small Barbs: 1, Mr. and Mrs. Daines (Doncaster); 2, Mr. and Mrs. Kemp (Sheaf Valley); 3, Mr. and Mrs. Hopkinson (Darfield). Large Barbs: 1 and 2, Mr. and Mrs. Kemp (Sheaf Valley); 3, B. Slight. Corydoras and Brochis: 1, Mr. and Mrs. Barlow; 2, Mr. and Mrs. Howell; 3, M. and L. Price. Loaches and Botias: 1, S. Sutton (Barnsley); 2, Mrs. Blades (Fish-keepers); 3, Mr. and Mrs. Barlow. A.O.V. Catfish: 1, K. M. Fisher; 2, Mr. and Mrs. Golland (Sheaf Valley); 3, H. Thorpe (Doncaster). Small Anabantids: 1, M. and L. Price; 2, Mrs. Gray (Hull); 3, M. Harrison (Swillington). Fighters: 1, Mrs. Blades; 2, Mrs. Gray; 3, Mr. and Mrs. Lee (Chesterfield). A.O.V. Anabantid: 1, K. Lancashire (Doncaster); 2, Mr. and Mrs. Copley (Doncaster); 3, M. Harrison. Toothcarps Aphyosemion: 1, P. Fry; 2, R. Brown (Ind.). A.O.V. Toothcarp: 1, R. Brown; 2, D. Harris (Mexboro); 3, Mrs. Blades. Rasboras: 1, A. Simpson (Barnsley); 2, S. Corbishley (Darfield); 3, A. Frisby (Wyke). Danios Minnows: 1, D. Barrett (Thorne); 2, Mr. and Mrs.

Hanger (Wyke); 3, B. Wigley (Mexboro). Sharks: 1, Mrs. Clifton (Wicksop); 2, A. Cooke (Hallcroft); 3, Mr. and Mrs. Shaw (Aireboro). Foxes: 1, R. Kendall (Barnsley); 2, S. Tabor (Zenith); 3, Mr. and Mrs. Hopkinson. Breeders (Live): A and B: 1, B. Banks; 2, A. Cooke; 3, D. Harris. Breeders (Live) C and D: 1 and 2, T. and P. Busfield; 3, B. Banks. Breeders (Egg) A and B: 1 and 2, Mr. and Mrs. Waller (Chesterfield); 3, A. Smart (Alfreton). Breeders (Egg) C and D: 1, G. Clarke; 2 and 3, B. Banks. Pairs (Live): 1 and 2, T. and P. Busfield; 3, Mrs. Blades. Pairs (Egg): 1, H. Thorpe; 2, Mr. and Mrs. Copley; 3, Mrs. Blades. A.V. Female (Livebearer): 1, A. Cooke; 2, T. and P. Busfield; 3, Miss Wilson (Chesterfield). A.V. Female (Egglayer): 1, Mr. and Mrs. Daines; 2, Mr. and Mrs. Copley; 3, Mrs. Blades. A.O.V. Tropical: 1, T. Tolhurst; 2, Mr. and Mrs. Snowdon (Wyke); 3, W. Blundell (Doncaster). Goldfish and Comets: 1, K. Chapman (Mexboro); 2, Mrs. Cooke (Hallcroft); 3, Mr. and Mrs. Ashton (Wyke). Shubunkins: 1, Mr. and Mrs. Waller; 2, Mr. and Mrs. Haigh (Huddersfield); 3, Mr. Keen (Barnsley). Fancy Goldfish: 1, B. Brook (Huddersfield); 2, Miss L. Wilson; 3, Mr. and Mrs. Haigh. A.O.V. Coldwater: 1, D. Harris; 2, Mr. and Mrs. Snowdon (York); 3, Mr. and Mrs. Riley (Leeds P.O.). A.V. Junior (Livebearer): 1, P. Busfield (Barnsley); 2, Miss T. Hopkinson (Dartfield); 3, Miss J. Lee (Chesterfield). A.V. Junior (Egglayer): 1, A. Dudding (Wyke); 2, Miss T. Hopkinson; 3, J. Chadwick (Castleford). Best in Show: R. Brown (Morley) A.O.V. Toothcarp. Best Exhibit other than Single Fish: T. and P. Busfield (Barnsley) Pairs (Livebearers).

AT a recent meeting of the **East Dulwich A.S.** a table show was held. Winners: Class Db: Doris Winder; D: Mick Powell; K: Dave Winder; Xb-m: Barry Light. Thanks to Terry Woodley for judging. The society meets every 2nd and 4th Monday of the month, starting at 8.30 p.m., at Dulwich Baths Reception Hall, Crystal Palace Road, London SE22. New members are always welcome.

**Evesham Fishkeepers' Society** devoted the September meeting to a general discussion on their forthcoming open show. Chas. Chamberlain and George Hayes judged the final showing of the Fish of the Year Contest. Results: 1, D. R. Goll (100 points); 2, B. R. Goll (99); 3, Miss C. Thornton (98); 4, Mrs. A. Biddle (97). The final results of the competition will be announced at the annual general meeting in October.

The Society meets on the first Wednesday of every month at 8.00 p.m. at the Hampton Scout Hut, Penhose Road, Evesham, Worcs. Visitors and new members welcomed. Secretary: Michael Barnett, 14 Meadow Road, South Littleton, Nr. Evesham. Telephone: Evesham 830034.

AT the October meeting of the **Mid-Sussex A.S.** the '50' club draw was won by Tom Tester, Jim Burtles and Brian Sayers. The talk for the evening was given by Jim Burtles on 'Structure and Design'. The monthly table show was judged by Mr. Tom Ramshaw of Brighton & Southern A.S., the cards being awarded as follows: Fish of the Year: 1, L. Pinney; 2, B. Perrin; 3 and 4, E. and T. Tester. Breeders (Egglayers): 1 and 2, L. Pinney; 3 and 4, B. Perrin. Novices: 1, 3 and 4, J. Fall; 2, I. Gillen. Breeders (Livebearers): 1 and 4, L. Pinney; 2, N. and S. Pellatt; 3, E. and T. Tester.

There will be a Fumble Sale on 17th November at the Ascension Hall, Vale Road, Haywards Heath, to raise money for club funds.

Meetings are held on the second Thursday of each month at Oakley Lodge, Oakley Lane, Keymer at 8 p.m. Anyone interested is welcome to attend. Further information from the Secretary, Mr. John Birch, 11a Sandrocks Way, Haywards Heath (telephone: H. Heath 50585).

AT the **Banff and District A.S.** annual general meeting the following committee was elected: Chairman/President, Mr. M.

Davidson (Banff); Vice-Chairman, Mr. J. Hardy (Turriff); Secretary, Mr. K. J. Davidson (Banff). "Innesville" Howe of Gellymill, Banff AB4 3QL; Treasurer, Mr. K. Galloway (Banff); Show Manager, Mr. K. Ravel (Mintlaw) and Mr. D. Duguid (Banff); Committee, A. White (Fraserburgh), Mr. Watt (Fraserburgh), M. Ritchie (Banff) and D. Reid (Macduff).

New members and visitors are welcome.

**Wellingborough A.D.A.S.** open show results: Class B: 1 and 3, A. and M. Crew; 2, J. Sykes; 4, L. Fuller. BA: 1 and 2, T. and P. Panther. C: 1, J. and P. Patching; 2, L. Fuller; 3, R. Wilson; 4, T. McPolin. CA: 1, L. Fuller; 2, T. and P. Panther; 3, P. Moye; 4, D. Beech. CB: 1 and 4, M. and B. Coe; 2, Mr. and Mrs. B. Ribridge; D: 1 and 4, N. F. Campbell; 2, M. Laws; 3, D. Beech. DB: A. Chapman; 2, M. and B. Coe; 3, F. Chapman; 4, T. Woolley. E: 1, P. Moye; 2, A. and M. Crew; 3, G. Stepstone; 4, M. Maber. FA: 1, M. Kirkham; 2, T. Woolley; 3, A. Chapman; 4, F. Chapman. F: 1, L. Fuller; 2 and 4, L. McCathie; 2, T. and P. Panther. G: 1 and 3, L. Woolley; 2, N. F. Campbell; 4, T. and P. Panther. H: 1, C. J. Sykes; 2 and 4, P. Moye; 3, L. Fuller; 1, J. E. Davies; 2, Mr. and Mrs. Ribridge; 3, P. O'Brien; 4, T. Woolley. K: 1, Mr. and Mrs. B. Ribridge; 2, R. J. Walden; 3, Tina Panther. L: 1 and 2, M. Rubenzer; 2, P. Moye; 3, C. Maber. M: 1 and 2, P. Moye; 3, R. Wilson; 4, E. Davies. NOT: 1, E. Davies; 2, L. Fuller; 3, S. Webb. NBM: P. Moye; 2, M. and B. Coe; 3, R. Wilson; 4, T. Woolley. O: 1 and 2, A. and M. Crew; 3, M. Stawforth; 4, P. Fry. P: 1, A. Chapman; 2, R. Bryan; 3 and 4, P. Fry. Q: 1, J. Fuller; 2, P. Fry; 3, M. Craddock; 4, R. Giles. R: 1, M. Craddock; 2 and 4, T. Woolley; 3, L. Fuller. S: 1, Mr. and Mrs. Ribridge; 2, P. O'Brien; 3 and 4, A. Chapman. T: 1, P. Moye; 2 and 3, L. Fuller; 4, S. Webb. U: 1, T. Buckseall; 2 and 3, J. R. Amos; 4, F. Askew. V: 1, 2 and 3, J. R. Amos; 4, Janet Amos. W: 1, A. and M. Crew; 2, A. Barton; 3, Mr. and Mrs. Ribridge; 4, M. Kirkham. XOT: 1, R. Wilson; 2, E. Davies; 3, L. Fuller; 4, T. Woolley. XBM: 1 and 3, S. Webb; 2, N. F. Campbell; 4, E. Davies. Best Fish in Show: P. Moye. Best Junior: M. Craddock. There were 271 fish entered.

**SECOND Louth and District A.S.** open show results:

Section 1—Guppies: 1, Mrs. I. Avis (Immingham); 2, Mr. and Mrs. Davis (S. Humberside); 3, D. Harris (Mexborough). Mollies: 1, Mr. and Mrs. Parish (Sherwood); 2, Mr. Aspinall (Boston); 3, Mr. and Mrs. Hancock (Hallcroft). Swordtails: 1, Mrs. J. Shaw (Boston); 2, R. Ranson (Gy. and Cle.); 3, Mr. and Mrs. Smith (Zenith). Platies: 1, W. Blundell (Doncaster); 2 and 3, Mr. and Mrs. Smith. A.O.V. Livebearer: 1, N. Walker (Gy. and Cle.); 2, A. Cook (Hallcroft); 3, Miss L. Wilson (Gy. and Cle.). Section winner: N. Walker.

Section 2—Small Barbs: 1, Mr. and Mrs. Kemp (Sheaf Valley); 2, Mr. and Mrs. Daines (Doncaster); 3, M. Ivarsson (Louth). Large Barbs: 1 and 2, Mr. and Mrs. Kemp (Sheaf Valley); 3, Mr. and Mrs. Smith. Section winner: Mr. and Mrs. Kemp.

Section 3—Small Characins: 1, Mrs. Fisher (Louth); 2, Mr. and Mrs. Chester (Retford); 3, Mr. and Mrs. Lake (S. Humberside). Large Characins: 1, B. Sleight (Mexborough); 2, Mr. and Mrs. Smith; 3, Quantock (Wyke). Best in Section: B. Sleight.

Section 4—Corydoras: 1, Mr. and Mrs. Barlow (Sheaf Valley); 2, Mr. and Mrs. Copley (Doncaster); 3, D. Harris (Mexborough). Small A.O.V. Cats: 1, Mr. and Mrs. Golland (Sheaf Valley); 2, Mr. and Mrs. Hancock; 3, Mr. Ryder (Louth). Large A.O.V. Cats: 1, T. Robinson (Zenith); 2, Mr. Vamplew (Louth); 3, D. Harris. Botas and Loaches: 1, F. Coxon (S. Humberside); 2, K. Prendergast (Boston); 3, Mr. and Mrs. Barlow (Sheaf Valley). Best in Section: Mr. and Mrs. Golland.

Section 5—Sharks: 1, A. Cook (Hallcroft); 2, Mrs. I. Avis (Immingham); 3, M. N. Hancock (Hallcroft). Foxes: 1, Mr. and Mrs. Pickford (Caistor); 2, T. Sands (Boston); 3, Mr. and Mrs. Parish (Sherwood). Best in Section: A. Cook.

Section 6—Dwarf Cichlids: 1, A. Johnson (Louth); 2, A. Frisby (Wyke); 3, T. Robinson (Zenith). Large Cichlids: 1, Mr. and Mrs. Barlow; 2, M. A. Hollingworth (Sherwood); 3, Mr. and Mrs. Lambie (Louth). Rift Valley Cichlids: 1, Mr. and Mrs. Smith; 2, M. A. Hollingworth; 3, Betts (Gy. and Cle.). Angels: 1, D. Harris; 2, Mr. and Mrs. Smith; 3, R. C. Laverick (Wyke). Best in Section: Mr. and Mrs. Barlow.

Section 7—Fighters: 1, Mr. and Mrs. Pickford (Caistor); 2, Mrs. G. Frisby (Wyke); 3, Mr. and Mrs. Chester. Small Anabantids: 1, T. Robinson; 2, Mr. and Mrs. Garton (Hallcroft); 3, Mr. Roper (Louth). Large Anabantids: 1, Mr. Plastow (Immingham); 2, Mr. and Mrs. Copley; 3, S. Mettan (Louth). Best in Section: T. Robinson.

Section 8—Rasbora: 1 and 3, Mr. and Mrs. Lake; 2, Mr. and Mrs. Daines. Minnows and Danios: 1, Mr. and Mrs. Lake; 2, R. Jackson (Sherwood); 3, A. Cook. Best in Section: Mr. and Mrs. Lake.

Section 9—Male Toothcarps: 1, 2 and 3, R. Ranson (Gy. and Cle.). Female Toothcarps: 1, Mr. and Mrs. Chester; 2, A. Frisby; 3, Mr. and Mrs. Holland (Retford). Best in Section: R. Ranson.

Section 10—A.O.V. Tropical (Small): 1 and 3, H. J. Plastow (Immingham); 2, H. Tolhurst (Wyke). A.O.V. Tropical (Large): 1 and 2, T. Tolhurst (Wyke); 3, R. Cooney (Louth). Best in Section: T. Tolhurst.

Section 11—Pairs (Egglayer): 1, Mr. and Mrs. Chester; 2, Mr. Roper; 3, A. Cook. Pairs (Livebearer): 1, Mr. and Mrs. Bradley (Hallcroft); 2, A. Cook; 3, W. Blundell (Doncaster). Best in Section: Mr. and Mrs. Chester.

Section 12—Breeders (Egglayer) A and B: 1, R. Ranson; 2, A. Dudding (Wyke); 3, Mr. and Mrs. Lambie (Louth). Breeders (Egglayer) C and D: 1, Mr. and Mrs. Chester; 2, Mr. and Mrs. Copley. Breeders (Livebearer) A and B: 1, Mr. and Mrs. Copley; 2, T. Sands (Boston). Best in Section: Mr. and Mrs. Chester.

Section 13—A.V.F. (Egglayer): 1, Mr. and Mrs. Daines; 2, Mr. and Mrs. Lake; 3, Mr. and Mrs. Copley. A.V.F. (Livebearer): 1, A. Cook; 2, N. Kershaw (S. Humberside); 3, S. Macalister (Louth). Best in Section: Mr. and Mrs. Daines.

Section 14—Junior (Egglayer): 1, Miss A. L. Hollingworth (Sherwood); 2, R. Jackson (Sherwood); 3, N. Metcalf (Wyke). Junior (Livebearer): 1 and 3, Marie Lambie (Louth); 2, Miss L. Wilson (Gy. and Cle.). Best in Section: Miss A. L. Hollingworth.

Section 15—Goldfish and Comets: 1, K. Chapman (Mexborough); 2 and 3, B. J. Mooton (Hull). Shubunkins and Fancy Goldfish: 1, E. and J. Morton; 2, K. Chapman; 3, Mr. and Mrs. Maddison (Louth). A.O.V. Coldwater: 1 and 2, D. Harris; 3, Hodson (Independent). Best in Section: K. Chapman.

Section 16—1, A. Cook; 2, Mr. and Mrs. Holland; 3, S. Hancock (Hallcroft). Trophy winners: Best in Show and Best Catfish: Mr. and Mrs. Golland. Best Coldwater: K. Chapman. Best Characin: B. Sleight. Best Anabantid: T. Robinson. Best Cichlid: Mr. and Mrs. Barlow. Best Angel: D. Harris. Best Livebearer: N. Walker. Best Toothcarp: R. Ranson.

AT **North Wilts A.S.** Open Show there were 286 entries. Best in Show was won by Mr. P. Gollup, of Catfish Ass., with A. Orinodoras Eigenmanni. The highest Pointed Team was Newbury. Results: Ag: 1, A. Parson; 2, E. Stallwood. B: 1, A. Chaplin; 2, D. Goss; 3, R. Cooke; 4, P. May. C: 1 and 2, P. Bridle; 3, P. Parson; 4, P. Lawrence. Cb: 1, J. Carpenter; 2, A. Chaplin; 3, F. and S. Whitehouse; 4, D. Goss. C: 1, F. S. Whitehouse; 2, L. Perk; 3, P. Lawrence; 4, M. Parson. Da: 1, A. Chaplin; 2, A. Parson; 3, J. Gale; 4, L. Perk. Db: 1, J. Carpenter; 2, P. and M. Fitchett; 3, J. Jackson; 4, P. and

M. Fitchett, Dc: 1 and 3, W. Knight; 2, P. S. Whitehouse; 4, R. Cooke. D: 1, F. May; 2, P. Lawrence; 3, T. Monk; 4, P. and M. Fitchett. Ea: 1, R. Prior; 2, M. Parson; 3, P. Cripps. E: 1, R. Adams; 2, P. Cripps; 3, P. Bridle; 4, R. Collier. F: 1 and 3, J. Jackson; 2, R. Prior; 4, G. Woolford. G: 1, P. Gallop; 2, P. Woolford; 3, R. Adams; 4, T. Monk. H: 1, F. May; 2, W. Knight; 3 and 4, J. Carpenter. J: 1 and 2, D. Goss; 3 and 4, Mrs. S. Saunders. K: 1, J. Jackson; 2, I. Slinn; 3, D. Goss; 4, P. S. Whitehouse. L: 1 and 4, N. Jackson; 2, A. Parson; 3, T. Chamberlin. Ma: 1, L. Gale; 2, P. Cripps; 3 and 4, A. Parson. M: 1, P. R. and M. D. Fitchett; 2, F. and S. Whitehouse; 3, T. Gardener; 4, L. Perks. N-BM: 1, P. Lawrence; 2, D. Goss; 3, P. Stallwood; 4, R. Townsend. N-OT: 1, C. Howe; 2, R. Townsend; 3, A. Parson; 4, A. Chaplin. O: 1, P. Stallwood; 2, Miss Stallwood; 3, P. Cripps. P: 1, R. Adams; 2 and 4, W. Holland; 3, P. Cripps. Q: 1, D. Goss; 2, A. Parson; 3, F. S. Whitehouse; 4, R. Knight; 5, F. S. Whitehouse; 6, I. Slinn; 4, Mr. and Mrs. Curtis. S: 1 and 2, B. Duffield; 3, L. Gale; 4, L. Gale. T: 1, C. Howe; 2, J. Carpenter; 3, F. S. Whitehouse; 4, A. Parson. X-BM: 1, P. R. and M. D. Fitchett; 2, T. Monk; 3, T. Chamberlin; 4, J. Jackson. X-OT: 1, C. Howe; 2, P. R. and M. D. Fitchett; 3, R. Adams; 4, R. Cook. U: 1 and 4, R. Adams; 2, F. May; 3, P. Taylor. Class U was F.B.A.S. Championship Class. V: 1, Mr. and Mrs. Curtis. W: 1, N. Jackson; 2, R. Adams; 3, P. S. Parson. Club meetings are held on every other Tuesday at Ridgeway School Youth wing. For more information, Mr. P. Taylor, 7 Ridgeway Rd, Stratton, Swindon, Wilts. (Tel. Swindon 824114).

**Darwen open show results:** Guppies: 1, B. Frost (Fleetwood); 2, Mr. and Mrs. Stevenson (Ossam); 3, Mr. and Mrs. Rimmer (Sandgrounders). Platies: 1, T. Hinsley (Bridgewater); 2, K. Corbett (Merseyside); 3, B. W. Carter (St. Helens). Swordtails: 1, B. and B. Durham (Longridge); 2, B. Frost; 3, Mr. and Mrs. Ashton (Darwen). Mollies: 1, M. Allison (Sandgrounders); 2, T. Hinsley; 3, T. Williams (Merseyside). A.O.V. Livebearers: 1, B. W. Carter (Section Winner); 2, J. Corbett (Merseyside); 3, B. W. Carter. Small Anabantids: 1, Mr. and Mrs. P. Yates (Darwen); 2, P. Harris (St. Helens); 3, Mr. and Mrs. Underwood (Sandgrounders). Large Anabantids: 1, Mrs. Underwood (Section Winner); 2, Mrs. P. Yates (Sandgrounders); 3, Mrs. Baldwin (Sandgrounders). Fighters: 1, K. Corbett (Section Winner); 2, J. Haley (Darwen); 3, D. Conway (Darwen). Dwarf Cichlids: 1 and 2, Mr. and Mrs. Underwood; 3, B. W. Kenyon (Blackpool). Large Cichlids: 1 and 2, Mr. and Mrs. Underwood; 3, S. Davies (Bridgewater). Angels: 1, K. Buckley (Bridgewater); 2, D. Garstang (Longridge); 3, L. Buckley (Bridgewater). Rift Valley Cichlids: 1 and 2, D. Moseley (Fleetwood) Section Winner; 3, Mr. and Mrs. Iddon (Sandgrounders). Small Barbs: 1, P. Kenyon (Sandgrounders); 2, P. J. Harwood (Darwen); 3, P. S. and A. Hopwood (Darwen). Large Barbs: 1, B. and B. Durham (Longridge) Section Winner; 2, T. and J. Selby (Wythenshawe); 3, A. Mellor (Blackpool). Small Characins: 1, Wallbank and North (Morecambe Bay) Section Winner; 2, J. Lynch (Merseyside); 3, Mr. and Mrs. Underwood. Large Characins: 1 and 3, Mr. and Mrs. J. Walsh (Darwen); 2, Mr. and Mrs. P. Yates (Darwen). Toothcarps: 1, K. Buckley, Section Winner and Best-in-Show; 2 and 3, S. Ainscough (Bridgewater). Danios: 1, C. Mason (Longridge); 2, Wallbank and North; 3, Mr. and Mrs. Baldwin. Minnows: 1, Mr. and Mrs. Underwood; 2, Mr. and Mrs. P. Yates; 3, Mr. and Mrs. Baldwin. Raboras: 1, Mr. and Mrs. Underwood, Section Winner; 2, J. Corbett; 3, B. W. Carter. Corydoras and Brochis: 1 and 2, B. W. Carter; 3, Mr. and Mrs. Underwood. A.O.V. Catfish: 1 and 3, Mr. and Mrs. Underwood, Section Winner; 2, P. Kenyon. Loaches: 1, Wallbank and North, Section Winner; 2, A. Hopwood (Darwen); 3, Mr. and Mrs. Underwood. Sharks: 1, Mr. and Mrs. Iddon, Section Winner; 2, D. Garstang (Longridge); 3, Mr. and Mrs. P. Yates. Foxes: 1, Mr. and Mrs.

Stevenson (Ossam); 2, K. K. Tattersall (Darwen); 3, T. J. Selby (Wythenshawe). Breeders (Egg) A and B: 1, Mr. and Mrs. P. Yates; 2, K. Buckley; 3, B. W. Kenyon (Blackpool). Breeders (Egg) C and D: 1 and 2, D. and G. Moseley (Fleetwood), Section Winner; 3, D. Wright (Blackpool). Breeders (Livebearers): 1, Mr. and Mrs. Baldwin; 2, J. Lynch; 3, J. Corbett. Pairs (Egglayers): 1, K. Buckley, Section Winner; 2, P. Gregson (Darwen); 3, F. S. and A. Hopwood (Darwen). Pairs (Livebearers): 1, M. and N. Rimmer (Sandgrounders); 2, K. Corbett; 3, P. Kenyon. A.O.V.: 1, Mr. and Mrs. P. Yates, Section Winner; 2, D. and G. Moseley (Fleetwood); 3, C. and M. Wadman (Darwen). Junior (Livebearers): 1, S. Hinsley (Bridgewater); 2, K. Corbett; 3, P. and I. Iddon (Sandgrounders). Junior (Egglayers): 1, K. Corbett, Section Winner; 2, Miss J. Baldwin (Sandgrounders); 3, P. and I. Iddon. Single Tail Coldwater: 1, C. H. Whitely (Accrington), Section Winner; 2, L. Fountain (Runcorn); 3, B. Frost (Fleetwood). Twin-Tailed Coldwater: 1 and 3, C. Wallbank (Accrington), Section Winner; 2, T. Williams (Merseyside). A.O.V. Coldwater: 1, S. Walsh (Accrington); 2, B. Frost; 3, C. Wallbank. A.V. Marines: 1, B. Hill (Fleetwood); 2, D. and G. Moseley (Fleetwood).

TO overcome the effects of ice on ponds featured prominently in a discussion on the overwintering of fish at Bristol A.S. meeting. Among those mentioned were inflatable balls floating on top, aerators, heaters and all sorts of windcreens. To cut out feeding when the temperature fell below 45°F seemed to be general practice. Table-show Results—Bristol Shubunkins bred 1979: 1, 2 and 4, Victor Cole; 3, Dick Pinnock. Bluest Fish bred 1979; Victor Cole.

**Evesham Fish Keepers' Society** held their annual general meeting in October, and the following officers were elected: Chairman, B. R. Goll; vice-chairman, Mrs. E. M. Thornton; secretary, Mrs. E. M. Thornton; show secretary, F. G. Thornton; assistant show secretary, Miss J. R. Chester; treasurer, Mrs. J. E. Hessel; minutes secretary, Mrs. E. M. Thornton; public relations officer, Mrs. E. M. Thornton; lay members, Mrs. L. J. D. Wright, T. J. Rixon, D. R. Goll; secretary, Mrs. E. M. Thornton, 41 Crooks Lane, Studley, Warks. (Tel: Studley 7123).

The "Fish of the Year" award was presented jointly to Miss J. Chester and Miss C. Thornton (393 points). Third place to B. R. Goll (392). Joint fourth place to Miss M. Goll and D. R. Goll (386). The "Aquarist of the Year" award was presented to Mrs. E. Thornton (66 points); 2, S. Biddle (62); 3, D. R. Goll (51); 4, Mrs. J. Hessel (22).

**Wrexham Tropical Fish Society** at their recent A.G.M. elected the following officers: President, Ron Ellis; chairman, Ron Smith; vice chairman, Roy Mathers; secretary, Elwyn Jones (Gresford 2351); treasurer, Mrs. Kath Williams; show secretary, Cyril Pritchard; ass. show secretary, Peter Jones; committee members, Glyn Kent, Alan Orchard, Martyn Jones, Brian Williams. A vote of thanks was passed unanimously to Mrs. Vera Oliver and Mike Johnson who were not seeking re-election this year. Mrs. Oliver was the club treasurer for the past seven years.

In his annual report, the secretary mentioned that the high spot of the year was winning the Best Tableaux trophy at the B.A.F. at Belle Vue at the first attempt.

Recent winners of the society's competitions have been Wendy Mathers, who won the "Kryger Trophy" for novices, and Mr. Frank Oliver who won the "Cunliffe Trophy" in the Home Aquarium competition, with Mr. and Mrs. Alan Orchard runner up, and Mr. Elwyn Jones third.

**MEMBERS** of the Sandgrounders A.S. were treated to a rare experience at their recent meeting at the Mount Pleasant Hotel, Southampton. It is many an aquarist's dream to be able to visit the countries from where his tropical fish come from and to see each species in its native habitat. For many this almost became

a reality for the evening, thanks to the presence of Mr. David Sands, who was until recently the secretary of the Catfish Association of Great Britain.

His lecture to the Society was a complete account of his Brazilian trip, including the first public showing of the slides he and his companion, Steve Pritchard, had taken. They found many species which were unidentified as well as numerous other species which have rarely been seen outside of South America, and specimens were taken for the Universities of Sao Paulo, Amsterdam and the British Museum.

**THE** October meeting of the New Forest A.S. was well attended. Members covered several subjects, including local shops catering for the aquarist, a proposed quiz with Pisces A.S., Table show results: Characins: 1, T. Kirby. Comet Goldfish: 1 and 2, L. Menhennet.

New members are most welcome at meetings on the third Monday each month, at 8.00 p.m., at the Community Centre, Lymington, Hants.

**RESULTS** of the Chesterfield & D.A.S. open show. There were 460 entries, and the best fish in show was awarded to Mr. and Mrs. Golland, of Sheaf Valley A.S., with a catfish *Brachyramphus imitator*. Guppies: 1, D. Barrett (B.B.C. Thorne); 2, Mr. and Mrs. Smith (Zemith); 3, R. Banks (B.B.C. Thorne). Platies: 1, Mr. and Mrs. Howell (Sherwood); 2, Mr. and Mrs. Smith; 3, Mr. Day (Caistor). Swordtails: 1, S. Hall (Swillington); 2, Mr. and Mrs. Smith; 3, Miss T. Tolhurst (Wyke). Mollies: 1, T. Stansfield (Sherwood); 2, Mr. and Mrs. Hill (Barnsley); 3, R. A. Johnson (Hyde). A.O.V. Livebearers: 1, Mrs. D. Cruickshank (Kingston); 2, Mrs. D. Cruickshank (Kingston); 3, G. Gullier (M.A.S.G.). Sm. Characins: 1, Mr. Buckley (Fish Keepers); 2, C. Burton (M.A.S.G.); 3, Mr. and Mrs. Griffiths (Hallcroft). Large Characins: 1, R. A. Johnson; 2, Mr. and Mrs. Smith; 3, H. Thorpe (Doncaster). Small Barbs: 1, Mr. and Mrs. Kemp (Sheaf Valley); 2, Mr. and Mrs. Daines (Doncaster); 3, Mr. and Mrs. Hooley (Fish Keepers). Large Barbs: 1, Mr. and Mrs. Kemp; 2, A. Marples (Sherwood); 3, Mr. and Mrs. Smith. Dwarf Cichlids: 1 and 2, L. and N. Price (Castleford); 3, B. Banks. Endemic Rift Valley Cichlids: 1, L. and N. Price; 2, Mr. and Mrs. Smith; 3, A. Frisby (Wyke). Angels: 1, Mr. and Mrs. Chadwick (Castleford); 2, D. Harris (Mexborough); 3, Mr. and Mrs. Howell (Sherwood). A.O.V. Cichlids: 1, K. M. Fisher (Sherwood); 2, A. Bryan (Sherwood); 3, Mr. Morell (Independent). Small Anabantids: 1, Mr. and Mrs. Garton (Hallcroft); 2, Mr. Smart (Alfreton); 3, A. Dudding (Wyke). Large Anabantids: 1, R. and A. Johnson; 2, K. Lancaster (Doncaster); 3, Mr. and Mrs. Copley (Doncaster). Fighters: 1, G. Frisby; 2, Mrs. Pickford (Caistor); 3, Mr. and Mrs. Chester (Redford). Corydoras and Brochis: 1, T. Stansfield (Sherwood); 2, Mr. and Mrs. Golland (Sheaf Valley); 3, Mr. and Mrs. Barlow (Sheaf Valley). A.O.V. Catfish: 1, Mr. and Mrs. Golland; 2, Mr. and Mrs. Hancock (Hallcroft); 3, T. Stansfield (Sherwood). Loaches and Botias: 1, Mr. and Mrs. Barlow; 2, Mrs. Blades (Fishkeepers); 3, S. Sutton (Barnsley). Ras. Dan and Minnows: 1, Mr. and Mrs. Chester; 2, A. Cook (Hallcroft); 3, B. Wagle (Mexborough). Egg Laying Toothcarps: 1, Mrs. Blades; 2, T. A. Cruickshank (Kingston); 3, Mr. Buckley (Fishkeepers). Sharks and Foxes: 1, A. Cook; 2, Mrs. Clifton (Workop); 3, L. and N. Price. A.O.V. Tropical: 1, T. A. Tolhurst (Wyke); 2, Mr. and Mrs. Copley; 3, T. Harrison (Swillington). Pairs Livebearers: 1 and 2, Mrs. D. Cruickshank (Kingston); 3, T. and P. Butfield (Barnsley). Pairs Egglayers: 1, H. Thorpe (Doncaster); 2, Mr. and Mrs. Waller (Chesterfield); 3, D. Barrett (B.B.C. Thorne). Breeders Egglayers A and B: 1, Mr. and Mrs. Waller; 2, D. Barrett; 3, Mr. and Mrs. Waller. Breeders Egglayers C and D: 1, Mr. and Mrs. Copley; 2, B. Banks (B.B.C. Thorne); 3, Mr. and Mrs. Chester. Breeders Livebearers A and B: 1, Mr. and Mrs. Copley; 2, B. Banks; 3, Mr. and Mrs. Hill. Breeders Livebearers



C and D: 1, 2 and 3, T. and P. Busfield. Common Goldfish and Comets: 1, K. Chapman (Mexborough); 2, Mr. and Mrs. Chadwick (Castledon); 3, G. and R. Wall (Barnsley). Shubunkins and Fancy Goldfish: 1, Mr. and Mrs. Waller; 2 and 3, D. Jones (Dearn). A.O.V. Goldwater: 1, D. Harris (Mexborough); 2, D. Jones; 3, S. Simpkins (Sherwood). Juniors A.V. Fish: 1, Miss H. Johnson (Hyde); 2, Master S. Robinson (Independent); 3, Master J. Chadwick (Castledon). Ladies Class: 1, Mrs. G. Cook (Hallerod); 2, Mrs. Golland (Sheaf Valley); 3, Mrs. B. Fox (Sherwood). A.V. Female Egg-layer: 1, Mr. and Mrs. Daines; 2, Mr. and Mrs. Copley; 3, Mr. and Mrs. Waller. A.V. Female Live-bearer: 1, H. Thorpe; 2, A. Cook; 3, D. and T. Busfield.

**RESULTS from the Priory A.S. open show:** Class BA: 1, Mr. and Mrs. Embleton (Novos); B: 1 and 3, S. Smith (Hartlepool); 2, J. Middlemast (Stanley); 4, T. Sayers (Stanley). CA-B: 1, L. Blackburn (Throckley); 2, Mr. and Mrs. Embleton; 3, P. Wright (CAER URFA); 4, K. Ring (M.P.A.S.). C: 1, A. Duncanson (Priory); 2, T. Sayers; 3, J. Douthwaite (Throckley); 4, D. Smith (Ind.). DA: 1 and 3, P. Dawson (Stanley); 2, J. Carter (Amble); 4, I. Maxwell (York). DB: 1, A. E. King (CAER URFA); 2 and 3, T. Sayers; 4, P. Wright. DC: 1, Smith (Hartlepool); 2, J. Mills (Priory); 3, J. Orgill (Newbiggin); 4, J. Douthwaite. D: 1, G. Hunt (Novos); 2, J. Middlemast; 3, J. Cross (Novos); 4, R. James (Priory). EA: 1, Mr. and Mrs. Embleton; 2, J. Middlemast; 3, Taylor (CAER URFA); 4, R. Piper (Stanley). E: 1, P. Wright; 2, S. Smith; 3, M. and G. Parkin (Berwick); 4, J. Middlemast. F: 1 and 3, H. Hargreaves (Stanley); 2, P. Wright; 4, K. Drummond (CAER URFA). G: 1 and 2, P. Wright; 3, D. Horsfield (Killingworth); 4, K. Drummond. H: 1, J. Cross; 2 and 3, P. Fry (CAER URFA); 4, C. A. Hutton (Priory). J: 1, Mr. and Mrs. Embleton; 2, S. Smith; 3, D. Thackeray (Stockton); 4, L. Blackburn (Throckley). K: 1, Sinclair (CAER URFA); 2, C. Hutton (Priory); 3, G. Payne (Midd. Bro.); 4, D. Smith (CAER URFA). L: 1, K. Dobbie (Killingworth); 2, S. Todd (Priory); 3, L. L. Metcalfe (Killingworth); 4, C. Pringle (Amble). MA: 1, P. Dawson; 2, D. Smith; 3, J. Douthwaite; 4, L. Blackburn. M: 1, S. Smith; 2, J. E. Short (S.P.A. Scarborough); 3, A. Duncanson; 4, D. Dixon (Stanley). NBM: 1, L. Blackburn; 2, J. English (Throckley); 3, I. Elliot (CAER URFA); 4, S. Smith. N.O.T.: 1, L. Wilson (Midd-bro); 2, K. Armstrong (Amble); 3, J. D. Cutting (B.A.S.S.); 4, M. J. Sanderson (Killingworth). O: 1, J. E. Short; 2, Mr. and Mrs. Peel (Newbiggin); 3, I. Parvis (Berwick); 4, M. G. Short (Scarborough). P: 1 and 2, P. Fry; 3, J. E. Short; 4, F. Pattinson (Amble). Q: 1, M. and G. Parkin; 2, Mr. and Mrs. C. Pringle (Amble); 3, G. Hunt; 4, S. Smith. R: 1, P. Fry; 2, J. Cross; 3 and 4, D. Russell (Stanley). S: 1, K. Dodd (Bishop Auckland); 2 and 3, M. and G. Parkin (Berwick); 4, D. Smith. T: 1 and 4, J. English; 2 and 3, P. Wright. U: 1, K. Lowthian (Ind.); 2, D. Hume (M.P.A.S.); 3, B. Dailey (Ind.); 4, P. Arnett (Priory). V: 1 and 3, G. Lowthian (Ind.); 2, K. Lowthian; 4, K. Oxley (BASS). W: 1, A. Duncanson (Priory); 2, Mr. and Mrs. Embleton; 3, I. Affleck (CAER URFA). XB-M: 1, S. Smith; 2 and 3, I. Elliot (CAER URFA). XB-T: 1, Mr. and Mrs. Embleton; 2, M. Porter (Newbiggin). Z: 1, K. Armstrong (Amble). BC: 1, G. Lowthian. Best Fish-in-Show: J. Cross in Class H. 2nd Best Fish-in-Show: J. English in Class T. 3rd Best Fish-in-Show: Smith (Hartlepool) in Class DC.

**Port Talbot A.S.** held their annual mini-show at the British Steel Corporation's Sports Club, Port Talbot. While judging was in progress John Egan kept members occupied with a quiz, Men versus Ladies, and the Ladies won! The Judges were Colin Turner, Colin Harding, Clive Davies and Paul Willis, who commented on the good quality of many of the exhibits. The 10 classes were filled by 96 fish (limited entry, 2 fish per member in each class).

Results:—Class B: 1, J. Egan; 2, M. Egan; 3, A. Callister; 4, E. Perkins. C: 1 and 2,

T. Rees; 3, J. Egan; 4, R. Perkins. D: 1, J. Egan; 2 and 3, T. Rees; 4, B. Fouracre. E: 1, D. Williams; 2, E. Jones; 3, J. Davies; 4, T. Rees. J: 1 and 3, J. Egan; 2, J. Biston. O: 1, 2 and 3, J. Arnold (Jnr.); 4, J. Arnold. Q: 1, R. Perkins; 2, D. Williams. R: 1 and 2, J. Egan; 3, M. Egan; 4, J. Biston. W: 1, B. Fouracre; 2 and 3, J. Biston. A.O.V. Tropical: 1 and 4, T. Rees; 2, J. Arnold (Jnr.); 3, B. Fouracre. Special prizes awarded on points accumulated from cards won: 1, J. Egan (23 points); 2, T. Rees (18); 3, J. Biston (8 points).

**RESULTS of the open show staged by the Newcastle Guppy & Livebearer Society and the Tyne/Wear section of the Fancy Guppy Association:** Male Delta Tail Guppy: 1, K. Whetley; 2, R. Finkell; 3, P. Sarginson. Male Short Dorsal Veil Guppy: 1 and 3, A. Charlton; 2 and 4, P. Sarginson. Male Bottomword Guppy: 1, A. Charlton. Colour Male: 1, D. Sarginson; 2, A. Charlton. Male Cofer Tail Guppy: 1, 2 and 3, J. Hutchings; 4, J. Chisholm. Male Lyretail Guppy: 1, Mr. and Mrs. Embleton; 2, J. Hutchings; 3, G. Martin. Female Wedge Tail Guppy: 1, R. Wheatley. Female Cofer Tail Guppy: 1, Mr. and Mrs. Embleton; 2, W. Douthwaite. Male Long Dorsal Veil Guppy: 1, R. Whetley; 2, W. Douthwaite. Male Top Sword Guppy: 1 and 3, Mr. and Mrs. Embleton; 2, J. Peel; 4, S. A. Hutton. Male Doubleword Guppy: 1, L. Blackburn; 2, Mrs. Ribridge; 3, J. Hutchings. Male Original Veil Guppy: 1, J. W. Johnson. Male Spstartail Guppy: 1, J. Hutchings. Female Superba Tail Guppy: 1 and 4, P. Sarginson; 2, R. Finkell; 3, A. Charlton. Female Natural Tail Guppy: 1, P. Whetley; 2, Mr. Elliot. Colour Female: 1, P. Sarginson. Male Guppy Junior entry: 1, Miss L. Embleton. Breeders Class Female: 1, A. Charlton; 2, J. Chisholm. Breeders Class Male: 1, A. Charlton. Breeders Pairs: 1, A. Charlton; 2, B. Fleming; 3, J. Ardle. Best Male Guppy, J. Hutchings. Best Female Guppy, R. Wheatley. Best Breeders Team, A. Charlton. Best Guppy exhibit, A. Charlton. Three Matched Males—any species: Livebearer: 1 and 3, I. Dibble (S.L.A.G.); 2 and 4, R. Kerr (N.G.L.S.). Female Xiphophorus Helleri: 1, M. J. Sanderson (Keworth). Male Xiph. Maculatus and Variatus: 1, B. Fleming (Livingstone); 2, J. Cross (Novos); 3, Mr. and Mrs. Renton (N.G.L.S.); 4, Mr. Finkle (S.S.A.S.). Breeding Pairs Xiph. Maculatus and Variatus: 1, J. Smith and J. O'Sullivan (Dalkeith). Male Poecilia Mexicana, Latipinna and Velifera: 1, Mr. Dodd (B. Auckland); 2, Mrs. Ribridge (Novos); 3, J. King (Redcar); 4, J. Chisholm (F.G.A.). Breeding Pairs Poecilia Mexicana, Latipinna and Velifera: 1, C. A. Hutton (Priory); 2, J. Smith and J. O'Sullivan; 3, F. Barber (Ind.). Breeders Class Xiph. Helleri, Maculatus and Variatus, Poecilia Mexicana, Latipinna and Velifera: 1, Mr. Dodd; 2, D. Robertson (Livingstone). 1. Male Goodside Types: 1, 2 and 3, I. Dibble (S.L.A.G.); 4, R. Kerr (N.G.L.S.). Breeding Pairs Goodside Types: 1 and 2, I. Dibble. Male Xiphophorus and Poecilia Species: 1, M. Strange (B.Stoke); 2, J. Milligan (Edinburgh); 3 and 4, I. Dibble. Male Xiphophorus Helleri: 1, J. English (N.G.L.S.); 2, M. Strange; 3, M. J. Sanderson. Breeding Pairs Xiph. Helleri: 1, F. Barber. Female Xiph. Maculatus and Variatus: 1, D. Roberts (Livingstone); 2, C. A. Hutton; 3, M. J. Sanderson; 4, A. Robinson (Throckley). Female Poecilia Mexicana, Latipinna and Velifera: 1, A. Robinson; 2, J. Smith and J. O'Sullivan; 3, S. Cook (Lanthorpe); 4, C. A. Hutton. Female Goodside Types: 1, M. Jenkins (N.G.L.S.); 2, M. Strange; 3, I. Dibble; 4, S. Cook. Female Xiphophorus and Poecilia Species: 1, Mr. and Mrs. Renton (N.G.L.S.); 2, I. Dibble. Breeding Pairs Xiphophorus and Poecilia Species: 1 and 2, I. Smith and J. O'Sullivan (Dalkeith); 3, J. Douthwaite (Throckley). Male Gambusia and Phallichthys Species: 1, I. Dibble; 2, M. Jenkins; 3, Mr. and Mrs. Renton; 4, J. Smith and J. O'Sullivan. Breeding Pairs Gambusia and Phallichthys Species: 1 and 3, I. Dibble; 2, J. Hutchings (F.G.A.); 4, J.

Smith and J. O'Sullivan. Male—any other species: Livebearer: 1, M. Strange; 2, R. McInosh (Livingstone); 3, I. Dibble; 4, M. Jenkins. Breeding Pairs—any other species: Livebearer: 1, M. Jenkins; 2 and 4, Mr. and Mrs. Renton; 3, I. Dibble. Breeders Class—A.O.S.: 1 and 3, J. Smith and J. O'Sullivan; 2, I. Dibble; 4, J. Hutchings. Female Gambusia and Phallichthys species: 1, B. Fleming (Livingstone); 2, G. Learoyd (N.G.L.S.); 3, R. Gledhill (Redcar); 4, I. Dibble (S.L.A.G.). Female—any other species: Livebearer: 1, J. English (N.G.L.S.); 2, J. English (N.G.L.S.); 3, R. Gledhill (Redcar); 4, I. Dibble (S.L.A.G.). The Robinson Trophy (Male Melly): Mr. Dodd Bishop. The Renton Trophy (Male A.O.S.): M. Strange. The Bailey Trophy (Female A.O.S.): Mr. Fleming. The Alf Clegg Trophy (Best single Platy): Mr. Fleming. The Laidler Trophy (Best Guppy): J. Hutchings. The Wallend Aquatics Trophy (Guppy Pairs): A. Charlton. The Tyne Tees Area Assoc. Trophy: M. Strange. The 'Best Fish in Show' awards (Laidler Shield, Gold Pin and top tank) were won by a male Xiphophorus Montezumae Montezumae owned by Mr. Mervyn Strange. The Judges at the show were:—Mr. and Mrs. A. Charlton, R. Hill and J. Hutchings of the F.G.A., D. Keightley (F.B.A.S.); G. Liddle (F.B.A.S.); K. Low (F.B.A.S.); J. Sutcliffe (F.B.A.S.); D. Kenwood (Severnaide) and Herr Gunter Entlinger (D.G.L.Z. German Livebearer Assoc.). B. Auckland, Bishop Auckland A.S., F.G.A., Fancy Guppy Association; Ind., Independent; K.Worth, Killingworth A.A.; B.Stoke, Basinstoke A.S.; L.Stone, Livingstone A.S.; N.G.L.S., Newcastle Guppy and Livebearer Society; S.L.A.G., Southern Livebearer Area Group.

**Whitby and District A.S.** held their 4th open show at the Spa Pavilion. The total of 276 entries, an increase over last year, were from as far afield as Hull and Newcastle.

Results: Barbs (large): 1, Mr. and Mrs. Ribridge (Novos); 2, Mr. and Mrs. Snowden (York); 3, D. Romas (Whitby); 4, A. Shaw (Ind.). Barbs (small): 1, Mr. and Mrs. Hare (Ind.); 2 and 3, W. Smith (Redcar); 4, A. and J. Bowman (Whitby). Characin (small): 1, Mr. Leighton (Ind.); 2, D. Smith (CAER-URFA); 3, I. Elliot (CAER-URFA); 4, W. Sowersby (Scarboro). Characin (large): 1 and 3, Mr. and Mrs. Ralphs (Newton Ayedcliffe); 2, Mrs. J. Frame (Redcar); 4, W. Sowersby. Pencilfish: 1 and 3, W. Sowersby; 2, J. and P. Duffell (Redcar); 4, P. Fry (CAER-URFA). Dwarf Cichlids: 1, Mr. Frame; 2, A. E. King (CAER-URFA); 3, Mr. and Mrs. Frame; 4, J. W. Short (Scarboro). Angels: 1, J. King (Redcar); 2, Paula Canning (York); 3, Mr. and Mrs. Hare; 4, A. and J. Bowman (Whitby). Rift Valley Cichlids: 1, 2 and 4, J. King; 3, Mr. Rowley (Scarboro). Large Cichlids: 1 and 4, P. Metcalfe (Scarboro); 2, M. Readman (Redcar); 3, A. and J. Bowman. Siamese Fighters: 1, Mr. and Mrs. Embleton (Novos); 2, I. Lakey (Throckley); 3, A. Stevens (Middlesboro); 4, Mr. and Mrs. Welsh (York). A.O.V. Labyrinth: 1, P. Wright (CAER-URFA); 2, W. Smith; 3, J. King; 4, P. Metcalfe. Killifish: 1, Mr. and Mrs. Embleton; 2, Mr. Drummond (CAER-URFA); 3, P. Wright; 4, Mr. Elliot (CAER-URFA). Tropical Catfish: 1, Mr. and Mrs. Ribridge; 2, Mr. McQuade (Redcar); 3, Mr. Readman (Redcar); 4, J. and P. Duffell (Redcar). Corydoras and Brochis: 1, P. Fry; 2, Mr. Cross (Novos); 3, A. Brown (Whitby); 4, Mr. and Mrs. Furber (Whitby). Rasboras: 1, Mr. Frame; 2, Mr. and Mrs. Embleton; 3, Mr. and Mrs. Stone (Scarboro); 4, Mr. and Mrs. Welsh (York). Danio and W.C.M.M.: 1, P. Fry; 2, A. E. King; 3, D. Smith; 4, P. Didecot (Whitby). Loach and Botsia: 1, J. King; 2, Mr. Leather (Scarboro); 3, A. and J. Bowman; 4, Mrs. Frame. Labeo: 1, L. Gray (Billingham); 2, Mr. and Mrs. Hare (Ind.); 3, A. and J. Bowman; 4, J. King. Egg-layer: 1, Mr. and Mrs. Snowden; 2, A. Shaw (York); 3, Mr. and Mrs. Forbes; 4, J. and P. Duffell. Pairs (egg-layer): 1, W. Sowersby (Scarboro); 2, Mr. and Mrs. Embleton; 3, Miss Berry (Redcar); 4, A. E. King. Pairs (live-bearer): 1, L. Gray (Billingham); 2, Mr. Short (Scarboro); 3, S. Burgess (Whitby). Guppy (male): 1, Miss J. Short (Scarboro); 2, L. Short (Scarboro); 3, Mr. Shackcloth (Half Moon); 4, J.

Mr. and Mrs. Embleton. Guppy (female): 1, and 2, P. Fry; 3, Mr. and Mrs. Embleton; 4, Mr. and Mrs. Snowden. Swordtails: 1 and 3, A. Brown (Whitby); 2, P. Fry; 4, P. Berry (Redcar). Platy: 1, Mr. Cross (Novos); 2, Mr. and Mrs. Stone (Scarboro); 3, J. King; 4, A. E. King. Molly: 1, Mr. Rossall (Stockton); 2 and 3, Mr. McQuade (Redcar); 4, Mr. Shackcloth (Half Moon). A.O.V. (livebearer): 1 and 2, P. Wright; 3, S. Burgess; 4, J. and P. Duffin. Single-Tail Goldfish: 1, A. and J. Bowman; 2, 3 and 4, D. Horsley (Whitby). Twin-Tail Goldfish: 1 and 3, D. Horsley; 2, Mrs. McCarthy (Whitby); 4, Mr. Dodd (Bishop Auckland). A.V. Coldwater: 1, D. Horsley; 2, Mr. and Mrs. Snowden; 3, Mr. and Mrs. Embleton; 4, Mr. and Mrs. Phillips (Hall). Breeders (live): 1, S. Burgess; 2, Mr. and Mrs. Embleton. Best Exhibitor: J. King. Best Fish in Show: Mr. and Mrs. Ralphs (Newton Aycliffe). Aquarist Gold Pin: Mr. and Mrs. Ralphs.

**Doncaster and District A.S.** open show results held 21st October, 1979. Guppies: 1, D. Barrett (B.B.C.); 2, B. and I. Jackson (Doncaster); 3, Mr. and Mrs. Smith (Zemith). Platies: 1, Mrs. Anderson (Ind.); 2, G. Clark (B.B.C.); 3, Mrs. V. Lee (Chesterfield). Molies: 1, Mrs. N. Hollingsworth (Sherwood); 2, Mr. and Mrs. Hill (Barnsley); 3, B. Wigley (Mexboro). Swords: 1, S. Hall (Swillington); 2, P. Atkinson (Dearn); 3, Mr. and Mrs. Lake (Sth. Humberside). A.O.V. (Live): 1, Mrs. D. Cruickshank (London); 2, T. and P. Bushfield (Barnsley); 3, T. and P. Bushfield (Barnsley). Breeders (Live) A and B: 1, Mr. and Mrs. Copley (Doncaster); 2, Mr. and Mrs. Hill (Barnsley); 3, Mr. and Mrs. Hill (Barnsley). Breeders (Live) C and D: 1, T. and P. Bushfield (Barnsley); 2, Mrs. Anderson (Ind.); 3, B. Banks (B.B.C.). Breeders (Egg) A and B: 1, D. Barrett (B.B.C.); 2, Mr. and Mrs. Waller (Chesterfield); 3, Mrs. Anderson (Ind.). Breeders (Egg) C and D: 1, Mr. and Mrs. Copley (Doncaster); 2, B. Banks (B.B.C.); 3, J. Simmonite (Doncaster). Dwarf Cichlids: 1 and 2, M. and L. Price (Rothwell); 3, B. Banks (B.B.C.). Angels: 1, D. Harris (Mexboro); 2, Mr. and Mrs. Jarman (Darfield); 3, G. Wall (Barnsley). A.O.V. Cichlids: 1, K. M. Fisher (Sherwood); 2, Mr. and Mrs. Barlow (Sheaf Valley); 3, M. Stroud (Skegness). Endemic Rift Valley: 1 and 2, M. and L. Price (Rothwell); 3, Mr. and Mrs. Smith (Zemith). Small Barbs: 1, Mr. and Mrs. Kemp (Sheaf Valley); 2, M. Adams (Ind.); 3, J. Simmonite (Doncaster). Large Barbs: 1 and 3, Mr. and Mrs. Kemp (Sheaf Valley). Goldfish and Comets: 1 and 2, R. Chapman (Mexboro); 3, Mr. and Mrs. Waller (Chesterfield). A.O.V. (Coldwater): 1, Mr. and Mrs. Riley (Leeds G.P.O.); 2, Sutton and Harris (Barnsley); 3, Mr. and Mrs. Snowden (York). Shubs and Fancy Goldfish: 1, Mr. Brook (Huddersfield); 2, T. Simpson (Dearn); 3, Mr. and Mrs. Tolhurst (Wyke). Novice (Live): 1, Mr. Freebury (Doncaster); 2, G. Hull (Doncaster); 3, N. Cooney (Zemith). Novice (Egg): 1, Mrs. S. Dawn (Sherwood); 2, G. Hull (Doncaster); 3, R. Gee (Wyke). Junior (Live): 1, Master P. Bushfield (Barnsley); 2, Master A. Stansfield (Sherwood); 3, Neil Hassall (Doncaster). Juniors Egg: 1, S. Price (Rothwell); 2, S. Osborn (Sth. Humberside); 3, T. Hopkinson (Darfield). A.O.V. Tropical (Small): 1, Mr. and Mrs. Lake (Sth. Humberside); 2, B. and I. Jackson (Doncaster); 3, Mr. and Mrs. Riley (Leeds G.P.O.). A.O.V. Tropical (Large): 1, T. Harrison (Swillington); 2, F. Griffiths (Mexboro); 3, Mr. and Mrs. Snowden (York). Corydoras: 1, Mr. T. Cruickshank (London); 2, Mr. and Mrs. Riley (Leeds G.P.O.); 3, Mr. and Mrs. Barlow (Sheaf Valley). A.O.V. (Cat): 1, T. Stansfield (Sherwood); 2, B. Sleight (Mexboro); 3, Mr. and Mrs. Golland (Sheaf Valley). Loaches: 1, E. Rice (Barnsley); 2, F. Coxon (Sth. Humberside); 3, Mr. and Mrs. Riley (Leeds G.P.O.). Apheisium: 1 and 2, R. Ramson (Grim and Cleethorpes); 3, Mr. and Mrs. Hill (Barnsley). A.O.V. Toothcarps: 1, D. Harris (Mexboro); 2, R. Ramson (Grim and Cle); 3, B. Sleight (Mexboro). Ladies

(Live) 1, Mrs. Anderson (Ind.); 2, R. Johnson (Hyde); 3, Mrs. Hopkinson (Darfield). Ladies (Egg): 1, Mrs. Price (Rothwell); 2, Mrs. Tolhurst (Wyke); 3, Mrs. Hopkinson (Darfield). Fighters (True): 1, Mr. and Mrs. R. Hey (Leeds G.P.O.); 2 and 3, Mrs. Gray (Hall). Fighters (Multi): 1, Mrs. and Mrs. Lough (Wyke); 2, Mr. and Mrs. R. Shaw (Aiboco); 3, B. and I. Jackson (Doncaster). Small Anabantids: 1, P. Griffiths (Mexboro); 2, Mr. Brook (Hudds); 3, M. and L. Price (Rothwell). Large Anabantids: 1, K. Lancashire (Doncaster); 2, Mr. and Mrs. Copley (Doncaster); 3, Mr. and Mrs. Richardson (Scarboro). Pairs (Live): 1 and 2, T. and P. Bushfield (Barnsley); 3, D. Barrett (B.B.C.). Pairs (Egg): 1, T. Cruickshank (London); 2, Mr. and Mrs. Lake (Sth. Humberside); 3, Mr. and Mrs. Copley (Doncaster). Platies: 1, Mr. and Mrs. Silk (Sheaf Valley). Furnished jars: 1 and 2, Mrs. Lee (Chesterfield); 3, D. Harris (Mexboro). Small Characins: 1, Mr. and Mrs. Lake (Sth. Humberside); 2, M. and L. Price (Rothwell); 3, Mr. and Mrs. Riley (Leeds G.P.O.). Large Characins: 1, B. Sleight (Mexboro); 2, Mr. and Mrs. Smith (Zemith); 3, Mr. Quinlock (Wyke). Sharks and Foxes: 1, M. and L. Price (Rothwell); 2, Mr. and Mrs. Clifton (Workop); 3, Mr. and Mrs. Hopkinson (Darfield). Rasboras: 1, Mr. Simpson (Barnsley); 2, Mr. Simpson (Barnsley); 3, Mr. and Mrs. Lake (Sth. Humberside). Molluscs: 1, Mr. and Mrs. Lake (Sth. Humberside); 2, R. Jackson (Sherwood); 3, Mr. and Mrs. Dearing (York). Danios: 1, Mr. and Mrs. Lake (Sth. Humberside); 2, Mr. A. Frisby (Wyke); 3, Mr. and Mrs. Smith (Zemith).

Best in show: P. Griffiths (Small Anabantids). Best exhibitor: Mr. and Mrs. Copley; Best Society: Barnsley. There were 618 entries.

The October meeting of the **Newbury & District A.S.** was the clubs' annual general meeting at which the following Officers and Committee Members were elected: Officers: chairman, Mr. B. A. Barrett; vice-chairman, Mrs. G. Barrett; treasurer, Mr. F. Cripps; secretary, Mr. R. Puttock, 23 Fairfield, Compton, Nr. Newbury, RG16 0JF; joint show managers, R. Prior and L. Gale; committee members, Mrs. I. Gale, Mrs. P. Cripps, M. Myers, D. Allen, L. Hart, I. Dibby.

Meetings are held on the Third Tuesday at Pletis Canteen, Hambridge Road, Newbury, Berks. at 7.30 p.m. New members always welcome.

Results: Best Fish in Show: M. Bourne (S.E. London). Class Db. Best All-Rounder: E. Hastings (S.E. London). Highest Pointed Junior: M. Bourne (S.E. London). Highest Pointed Newbury Member: S. Dyer. Highest Pointed Newbury Junior: A. Hart. F.B.A.S. Championship Class: Mrs. S. Canning (Newbury). Class XE-M. Highest Pointed Visiting Society: (S.E. London).

Class AG: 1, M. Bird (Tongham); 2, Mrs. Rushbrooke (R'dg); 3, Mrs. Stallwood (N'by); 4, T. Trussler (Tongham). B: 1 and 2, M. Bourne (S.E. London); 3, A. Chaplin (B'atoke); 4, D. Goss (N'by). BA: 1, B. Hastings (S.E. London); 2, E. and T. Tester (Mid-Sussex); 3, P. Lawrence (R'dg); 4, R. Canning (N'by). C: 1, M. Paxton (B'atoke); 2, C. Richards (Sudbury); 3, T. Fraser (B'atoke); 4, P. Rushbrooke (R'dg). CA: 1, T. Fraser; 2, C. Richards; 3, Mrs. V. Feast (Tonbridge); 4, B. Hastings (SILAS). CB: 1, M. Fox (Wickham Marsh); 2 and 3, I. Pinney (Mid-Sussex); 4, M. Bourne. D: 1, B. Hastings; 2, F. May (N'by); 3, J. Partt (Romford); 4, W. Knight (Gosport). Da: 1, A. Chaplin; 2, D. Elliott (N'by); 3, Mrs. Larkin (R'dg); 4, R. Canning. Db: 1, M. Bourne; 2, J. Carpenter (Hounslow); 3 and 4, M. Chapman (B'atoke). Dc: 1, W. Knight (Gosport); 2, I. Sellwood (N'by); 3, S. Swann (Tongham); 4, M. Bird (Tongham). E: 1, P. Moye (Sudbury); 2, M. Bourne; 3 and 4, C. Richards (Sudbury). EA: 1, B. Hastings; 2, A. Hart (N'by); 3, J. Partt; 4, R. Prior (N'by). F: 1, A. Aitken (GDAS); 2, R. Prior; 3, J. Jackson (B'atoke); 4, C. Woodford (Bracknell). G: 1, P. and M. Lambert (Romford); 2, J. Partt (Romford); 3 and 4, C. Richards. H: 1, P. Rushbrooke (R'dg); 2, W. Knight (Gosport); 3, J. Carpenter; 4, R. Canning. J: 1, D. Goss;

2, Mrs. Bebb (B'mouth); 3, T. Frazer; 4, T. and T. Rushbrooke (R'dg). K: 1, M. Bourne; 2, D. Goss; 3, C. Richards; 4, Mrs. Bebb. L: 1, N. Jackson (R'dg); 2, 3 and 4, C. Richards. M: 1, P. Moye (Sudbury); 2, T. Gardiner (NWAS BRSA); 3, Mrs. Bebb; 4, L. Hart (N'by). Ma: 1, P. Moye; 2, C. Osbourne (S.E. London); 3, A. Feast (Tonbridge); 4, P. Cripps (N'by). NB-M: 1, P. Lawrence (R'dg); 2, J. Humphries (Abingdon); 3, B. Hastings; 4, D. Goss. NO-T: 1, Mrs. Bebb; 2, P. Martin (B'atoke); 3, C. Richards; 4, B. Hastings. O: 1, Mr. Garner (Saxons); 2, Mrs. Bebb; 3, C. Richards; 4, Mr. Stallwood (N'by). P: 1, B. Hastings; 2, B. Wittenidge (Sudbury); 3, Mrs. Bebb; 4, R. Adams. Q: 1, Mrs. Bebb; 2, B. Hastings; 3, C. and V. Howe (S.L.A.G.); 4, R. Prior. R: 1, Mrs. Bebb; 2, W. Holland (Nailsea); 3, B. Hastings; 4, M. Bourne. S: 1 and 3, B. Hastings; 2, Mrs. Bebb; 4, Mrs. P. Cooke (Tongham). T: 1, P. Moye; 2 and 4, C. and V. Howe; 3, T. Fraser. Ua-d: 1, W. Knight; 2, M. Fox (Tonbridge); 3, R. Adams (Salisbury); 4, J. Jupp (Gosport). Ubc: 1, Miss L. Feast (Tonbridge); 2, E. Binstead (Porsmouth); 3, A. May (N'by); 4, G. Stallwood (N'by). V: 1 and 2, E. Binstead; 3 and 4, M. Tydeman (Kunynmede). W: 1, 2 and 3, S. Dyer (N'by); 4, K. Lambert (Romford). XE-M: 1, S. Canning (N'by); 2, C. and V. Howe; 3, P. Fitzharr (Nailsea); 4, D. Blundell (Abingdon). XO-T: 1, T. Fraser; 2, C. and V. Howe; 3, P. Adams (Salisbury). XUW: 1 and 2, A. Feast (Tonbridge); 3, R. Adams. Y: 1 and 3, A. Esser (Abingdon); 2, Mrs. G. Barrett (N'by). Z: 1, P. Rushbrooke (R'dg); 2, J. Jackson (B'atoke); 3, M. Goss (Hendon).

The following officers were recently elected at **Stockton A.S.** meeting: Chairman, Mr. D. Keighly; vice-chairman, Mr. L. Collins; treasurer, Mr. J. Farrington; secretary, Mr. W. Mooney; 3 Dawson Close, Stockton-on-Tees, Cleveland TS19 8ND.

AT the annual general meeting at **Romford and Beacontree A.S.** the following officers were elected: Chairman, Mr. J. Partt; secretary, Mr. J. Rink; treasurer, Mr. B. Ward; show secretary, Mr. G. Steptoe; asst. show secretary, Mr. P. Lambert; programme officer, Mrs. M. Lambert; social secretary, Mr. P. Hines; junior member, Mr. S. Court; lay members, Mr. T. Allen, Mr. R. Court, Mr. J. Adams.

The officers elected at the **Swillington A.S.** annual general meeting were: Chairman, Mr. M. Walker; vice-chairman, Mr. J. Freer; secretary, Dr. D. Curtis, 158, Sandgate Drive, Kippax, Leeds LS25 7QR, Tel. (0532) 864114; treasurer, Mrs. A. Farr; show secretary, Mr. T. Harrison; entertainment secretary, Mrs. J. Harrison; publicity officer, Mr. S. Hall; and junior representative, Mr. A. Siberry.

Meetings are held on the second and fourth Tuesdays of each month at the Gascoigne Arms, Garforth, further details from the Secretary. Any prospective member attending a meeting can be sure of a warm welcome.

#### SECRETARY CHANGES

**Evesham Fish Keepers Society:** Mrs. E. M. Thornton, 41 Crooks Lane, Studley, Warks. (Tel. Studley 7125).

Mr. Eric K. Holmes, 42 Elsenham Road, Grimsby, South Humberside DN31 2QR, is now the secretary of the Yorkshire Association Aquarist Societies.

#### CALENDAR

1980

**9th March:** Brighton and Southern A.S. open show at Portside Town Hall. Further details from Tel. Ramshaw, 26 Wilmet Road, Shoreham (Tel. Shoreham 62630).

**June 29:** Sherwood A.S. open show at the Lady Margaret's Hall, Workop.

**21st September:** Tonbridge and District A.S. open show at Hadlow Community Centre, Hadlow, Kent. Scheduler from Mrs. D. Feast, Show Secretary, c/o 6 Albert Road, Tonbridge, Kent.