

JANUARY 1980 50p

# AQUARIST

AND PONDKEEPER

*The Magazine for Fishkeepers*





# THE AQUARIST

AND PONDKEEPER

Britain's Leading Magazine for Fishkeeping

Published Monthly 50p

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The Editors accepts no responsibility for views expressed by contributors.	

Printed by Buckley Press,  
The Butts, Half Acre,  
Brentford, Middlesex.  
Telephone: 01-568 8441

Subscriptions: Rate  
The Aquarist will be sent by  
post for one year to any address  
in U.K. for £8-00. Foreign  
Surface Mail £9-00. Airmail  
quoted on request.

MSS, or prints unaccompanied  
by a stamped addressed  
envelope cannot be returned  
and no responsibility is accepted  
for contributions submitted.

Founded 1924  
as "The Amateur Aquarist"  
Vol. XLIV No. 10, 1980

Editor: Laurence E. Perkins  
Advertisement Manager:  
J. E. Young

Our Cover:  
Yellow-faced Angelfish  
(*Euxiphops xanthometopon*)

January, 1980

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# THE POND SAGA (I)

## OR THE ATTACK ON AN OVERGROWN POOL

by Roy Pinks

THE ATTACK on my overgrown pool—now christened Despond, was preceded by a reconnaissance to determine just how many tools would be needed to begin the process of separating the water from the plants. Of the former there was, on first glance, no more than an inch or two in the shallows, but the surface was so cluttered that hardly more than a square foot or so of open water remained. What looked like a deep layer of evil smelling mud made footwork a tricky business, as I had no desire to descend precipitately into the 2 ft. deep basin, wherein I feared, the excesses of decay would be more fearsome than ever. The more I looked at this disreputable object, the more I doubted my ability to do much more within the season, than get things shipshape for 1980 when rebuilding of the shattered stonework could get underway. A very obvious need was to remove deep seated roots of rushes and grasses from the walling surround, and in several places it looked as though the wall would need to be demolished to ground level.

To get started, however, I decided to remove, as units, the various thickets of rushes, reeds and irises

which had at least individual identity as well as mere substance. My first rude shock was the sheer impossibility of even removing small segments as, seemingly, a mat of rootage had formed right across the pool, and this was up to 6 inches deep in places. The edging iron used for the lawn looked a likely tool for cutting this into manageable units but it simply bounced off. Incidentally, I was fairly rough when trying it out, for at this early stage I was indifferent to the fate of the Flexilene type lining which I calculated had done its job reasonably well after 17-odd years. So I had to look around for an alternative, and the long handled garden shears suggested themselves but again the roots proved to be too tough and wiry and the mat far too deep so these, too, were laid aside. In some desperation I therefore approached the pool with a variety of knives, saws and similar cutting implements, together with hooked tools with which to drag out the bits which would yield to this treatment. The bulrushes which I had unwisely introduced from the wild some years ago, and which had run riot, came away surprisingly easily after an assault with the

"To get started I decided to remove the various thickets of rushes, reeds and irises."



hooks, but this was small consolation as they were in a far and deep corner which could not be tackled until a late stage of the clean-up.

Rather dolefully I worked through the saws until I came to an 18 in. garden pruning saw with normal teeth on one edge and wide ones on the other. Gentle but determined use of this instrument eventually isolated one thicket of iris and out it came like the plug from the bath. The vacant hole indicated just how the rest of the pond would have to be treated—painfully and gradually, about a square foot at a time. Bearing in mind the amount of top growth surmounting each lump of matting, this would be an unfair challenge for the compost heap and it looked as though all the surplus would have to be burnt.

Turning aside to the species of plants involved in these initial stages, it was a moot point whether, in view of their invasiveness, any should be retained for replanting, but I decided to retain *Bowles Golden Carex*, *Typha angustifolia*, *Iris pseudacorus* and *Iris pseudacorus variegata*, and *Acorus calamus*, all of which had individual qualities worth preserving and which can be kept within bounds by the exercise of reasonable discipline. Selected clumps of these were sawn away from the basic mass, the fibrous underlay removed as far as possible, and the retained specimens arranged in convenient groups in the Nursery pond, currently occupied by my colleague's goldfish and shubunkins. Little did they know just how little room they would have left to them for swimming during the coming few weeks, as more and more plants took up temporary residence with them. It took about ten days to remove all this material (evenings only—after work!), and it was astonishing how high the pile of rejected material was rising, and it at one time almost equalled the bulk of my always considerable compost heap. It gradually dried out in the sun, but several attempts to burn it on quite respectable bonfires failed completely, so the lumps were stacked, somewhat like peat, and we shall see whether we can put them to good use as winter fuel indoors.

This does rather illustrate the way in which the larger marginals will take over even the larger pools, and why the beginner with the average garden pond should go for the dwarf or select varieties, ignoring almost completely the eulogies repeated by most of the catalogues in respect of some of the worst rogue plants in the whole business. When the bigger clumps had been dealt with I spent an evening or two collecting together the few remaining groups of the better-behaved species and these included *Pontederia cordata*, *Iris laevigata variegata*, *Menyanthes trifoliata*, *Scirpus zebra*, *Scirpus albescens* and a solo *Sagittaria japonica*. These had withstood the competition from the more thrusting types and remained neat, manageable entities with enough attractiveness to justify their inclusion anywhere. In the course of discarding individual species, I was determined that not a single piece of *Mentha*



"Selected clumps of irises were sawn away from the basic mass."

*aquatica* or *Ranunculus lingua grandiflora*—the Water Mint and the Giant Spearwort, would remain behind, so full of menace had they become.

The oxygenators were easy to deal with—I simply pulled them out in handfuls and consigned them to some water-filled plastic dustbins which I had commandeered for the duration of the exercise. The majority of this was *Ceratophyllum demersum* (Hornwort), together with a few strands of *Lagarosiphon* and *Potamogeton crispus*. The remarkable die-back of the latter two normally rampageous oxygenators was probably due to the severe winter, against which Hornwort had clearly made better provision in its winter form.

The very extensive water lilies were the next group to tackle, and they presented a pretty challenge because they were severely overgrown as well as being outside paddling distance, and I had to think out a way of getting at them without wallowing in the knee-deep morass which formed the deeper part of the pond. This was clearly the time at which a bridge would have been useful: but for this job it would have needed to be mobile, too.

# WHAT IS YOUR OPINION ?

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

I WISH YOU a Happy New Year and hope that it will bring you health and prosperity and a peaceful environment in which to enjoy life and the keeping of fish and plants in aquaria and ponds.

Recently I had a spending spree in an aquarium shop and bought myself some young, attractive fish and a few plants. The fish were: six small cardinals at 50p each; six small neons at 20p each (neons and new season's cardinals were the same size); four *Otoclinus* at 50p each; four, ordinary angels at 35p each; two *Epiplatys chaperi* at 50p each; two *Nannostomus anomalus* pencils at 60p each; and one *N. marginatus* pencil at 60p. Two wistaria plants cost 15p each; two *Ludwigia* 5p each; and two attractive pennywort 17p each. I also purchased a packet of algae-killing tablets because the liquid preparation I tried recently did nothing other than suggest that one of the main constituents was potassium permanganate because it dyed the water slightly purple for a short time. The liquid was British in origin; the tablets American. The latter cost 65p for six tablets, each of which is for the treatment of five gallons of aquarium water; hence treatment of a large tank is costly. I will buy two more packets to treat the tanks infected by a foul-smelling, green-blue algae.

I have no reservations about using a chemical form of control when all else has failed. The fact that the first brand of algae killer—or should I use the word control, whatever that means?—did not kill the algae suggests that the treatment did little harm or good. I have tried all the usual forms of controlling algae without resorting to chemical methods.

In one shop, where I unsuccessfully attempted to buy algae-killing tablets, the proprietor strongly suggested that my tank was either situated opposite a sunny window, or opposite a mirror or picture that reflected the sun's light into the tank and caused the algae to grow. The algae are in two separate tanks, situated in different rooms; several tanks share both sites and neither site is opposite a window or a mirror or picture. None of the other tanks is infected.

I shall quickly change subjects and deal with something that slightly annoyed me last month. Normally I bulk buy my fish food—8 oz. at a time, in a polythene bag, from one of the classified advertisers in *The Aquarist*. Bulk buy is probably exaggerated flattery

when applied to my infrequent purchase of  $\frac{1}{2}$  lb. of British-made fish food; however, recently when I sent for some more food I was informed that the manufacturer no longer supplied the food in bulk. I was offered a slightly smaller quantity of a German food and did not hesitate to accept the offer because I know my fish are as fond of one type of food as another. I assume that a fish food manufacturer would prefer his food to be sold in air-tight containers; no doubt there may be some deterioration if large containers of food are opened and the food stored in and sold in, say, polythene bags containing 8 oz.; I'd prefer to buy my food in a sealed container—but sealed containers are more expensive than loose food bought in a polythene bag; and the cost increases considerably when one buys a number of small containers instead of 8 oz. No doubt one could buy an 8 oz. drum of food—which one would immediately open. When I buy my food in a bag I immediately discard the bag and store the food in empty fish-food containers. No doubt my purchase is possibly a false economy, especially if there has been some slight deterioration in the fish food; however, I do not notice the deterioration and my fish do not know about it either. One could accuse me of being mean because it costs little to feed one's fish; however, the current economic climate for most of us is such that small savings on a variety of items soon mount up; indeed, such savings are essential to many of us to keep going. I can appreciate the manufacturer's wanting to have his food sold in peak condition; but if he refuses to sell in bulk (possibly only to those who wish to break down the bulk and sell it in smaller quantities in polythene bags) and users become former customers who, instead, purchase a competitive foreign brand, the British manufacturer would appear to be the loser while the foreigner would appear to be the winner. No doubt I am not completely correct in my conjecture; and no doubt someone who knows will explain the situation to me in a letter for publication at a future date.

An article in the Business Section of *The Observer* dated Sunday, 11th November, 1979, caught my eye. It was called 'Return of the swordtail and anglefish' and was written by Jonathan Hunt whose sub-heading read "... a bid to revive the living-room aquarium." I trust no one will mind my quoting the

opening sentence: "Since the 1950s, fish tanks have declined rapidly in popularity, other than as short-term depositories for fair-ground prizes or expensive and sophisticated equipment for dedicated pisciculturists." I am not at all sure about the meaning of the latter part of the sentence. I certainly did not know that since the 1950s fish tanks have declined rapidly in popularity. Have they really? I thought there had been a positive boom. Their popularity has certainly not waned in my home! The article goes on to describe how a Mr. Michael James has produced an innovation in aquaria which he considers will "... bring tropical fish back into the home. ..." Apparently the tanks are 4 in.  $\times$  4 in. and can be bought in any length from 1½ ft. to 6 ft. The article states that Mr. James has been approached by Aquarian, a division of Pedigree Petfoods (Mars), and that he is close to concluding a deal with Pedigree "to supply an initial 5,000 units." I should imagine that the units are supplied fitted with equipment as the suggested cost is "£50 and upwards."

The fish that appeal to me most in the selection I bought are the young angels. I should not wish to keep them in 4 in. of water if they were adults.

#### Fairground goldfish

Towards the end of the summer I was angered to see that one fair-ground stall was still offering goldfish as prizes to those who could throw a pingpong ball into one of a number of very small goldfish bowls. The poor fish, crowded in a tank, did not look too healthy. The chances of getting a ball into a bowl seemed very slight; no one managed it during the short time that I loitered as my anger rose. I was tempted to say something nasty, or smoke a cigarette. I resisted both temptations. The latter I have resisted for eight months so far; I am frequently rude; the situations are not unconnected! If you smoke, attempt to give up the habit and send some of the money you save to some of the world's very many starving children. By so doing you might save a number of lives—possibly including your own. . . .

#### Soft water

Dr. Christopher Andrews works for TetraMin (U.K.) Ltd., at the Tetra Information Centre, 15 Newlay Lane Place, Leeds, Yorkshire, and he has written to my feature before. We'll forgive him if he mentions his firm once or twice in his letter because the column is open both to those who manufacture and sell aquarium products and fish and those of us who buy them. Dr. Andrews says: "I would like to make some comments on a couple of the points raised at the end of the November, 1979, W.Y.O. feature in *The Aquarist*."

"To begin with softening water for use in the aquarium, there are obviously several methods available to aquarists. Of these, dilution of hard water

with clean rain or distilled water is probably the easiest. Care must be exercised in the collection and use of rain water in the aquarium, especially in industrialised areas where atmospheric pollution may be a real problem. This problem may be offset by the collection of rain water in a continuously-overflowing water butt—to dilute any potentially-dangerous pollutants—or the collection of only the second half—and, hence, the cleaner part—of any rain storm. If in doubt about the suitability of the rain water in their area, aquarists can check with other local fishkeepers, or keep a few relatively-inexpensive fish in a tank of the 'suspect' water as a preliminary test.

"To calculate how much tap water and how much rain/distilled water must be used, a simple calculation is necessary. For demonstration purposes let us designate the hardness of the tap water as A, the hardness of the rain/distilled water as B, and the required hardness of the mixture as C. Subtraction of C from A will indicate the proportion of tap water that is required, and subtraction of B from C will indicate the proportion of rain/distilled water that is required to achieve a hardness of value C. It is not as difficult as it sounds, and details of this calculation can be found in *Aquarium Water Chemistry* (T.F.H. Publications) by R. Geisler and in *Home Aquarium* (Ward Lock Ltd.) by G. Vevers.

"Moving on to the usefulness and effectiveness of brand remedies in the aquarium, Tetra quite naturally feel very strongly. When purchasing a reliable remedy, an aquarist is, in fact, buying the result of much research and development, all backed by the experience gained by its use for many years under aquarium conditions. I am personally a little suspicious of manufacturers who do not indicate at least the basic constituents of their remedies on their product, or give some idea of this data when questioned. Competitors could, if they so wished, obtain this type of information quite easily—so why all the secrecy?"

"When using brand remedies in the aquarium, the instructions for use must be followed. Delicate or heavily infected fish should be treated in a separate isolation tank, where their reaction to the remedy and their recovery may be monitored more closely. Filtration over activated charcoal should be suspended during a course of treatment, as this will decrease the effectiveness of most remedies. Different remedies should never be mixed without consulting the manufacturers. Effective control depends, of course, on prompt diagnosis as well as reliable remedies. Safe, broad spectrum remedies are a help to aquarists, although interested readers should consult *Textbook of Fish Diseases* by E. Amlacher or *Diseases of Tropical Fishes* by H. R. Axelrod (both T.F.H. Publications). A free leaflet on the diagnosis and control of fish diseases is available from the Tetra Information Centre, 15 Newlay Lane Place, Leeds LS13 2BB.

"In closing I would like to thank Mr. Daniel

Bennet of Old Glossop, Derbyshire, for drawing my attention, in the November 1979 *W.Y.O.*, to the F.N.A.S. article on decapsulation of *Artemia*. This technique was described at length by Sorgeloos *et al.* (1977) in a paper in *Aquaculture* (Vol. 12, pp. 311-315)."

Dr. Andrews has made some interesting comments about remedies (my dictionary defines a remedy as something that cures a disease); and obviously leading experts such as Doctors Neville Carrington, David Ford and Christopher Andrews are amongst the top men in the field; and they do not disguise the fact that their aims include the production and/or sale of aquarium products, remedies and foods. I mentioned that earlier in the year I had an interesting conversation with a leading aquarist—he is neither a doctor of science nor a doctor of philosophy—who shared my

Mrs. Patricia Bannister, of 15 Park Road, Timperley, Cheshire, who says: "I wondered if you would be interested to know that my aunt, who lives in Chorley, Lancs., discovered last week that her *Plecostomus* had hatched six young ones. There may be more which have not yet been seen. Unfortunately, for some unknown reason, the parent died within days of this event. This occurred in a 36 in. community tank with platies, mollies, loaches and catfish. My aunt has also been successful with the breeding of loaches; not intentionally, I must add."

From No. 16 Lonsdale House, Portobello Court, Portobello Road, London W11 2DG, comes another interesting letter from regular contributor to *W.Y.O.* Miss Margaret Cairns—or, I should write, Miss Margaret Cairns, B.A., because she graduated last year and this is the first letter that I've received passing



view that the cost of a bottle of cure to treat a diseased fish is often higher or much higher than the cost of a healthy, replacement fish would be. The morality of killing the diseased fish—or just letting it die—and spending one's money on a new fish must be left to the conscience of the individual, even allowing for the fact that bottles of cures often contain sufficient chemicals to treat numbers of ailing fish and not just one. I am still very much in favour of having a cure's contents printed on the container. It can't be other than useful to the aquarist; and I doubt if many manufacturers would go broke as a result.

#### **Plecostomus spawning**

I have a very large bale of letters beside me so I'll delve quickly in and pull one out. It was written by

on the information. Welcome to the ranks of the graduates, Miss Cairns, and congratulations on your success. Miss Cairns, whose subject is angelfish, writes: "Having kept angels for some years I find they rarely care for eggs or fry; and I should be pleased to hear from readers who have hatched the eggs artificially. However, much seems to depend upon whether or not angel parents look after their first spawning successfully; if they do they usually become reliable parents."

"An experienced fish is invaluable. I once bought an adult pair of golds and put them in a 24 in. deep tank which had held young angels and kribensis. These species inhabit different water levels and don't normally bother each other. The kribis were moved—or so I thought—and the young angels were lent to a

friend who had a 48 in. tank full of guppies which were reverting to the wild type; he wanted carnivorous fish to clear the tank. The golds spawned and tended their eggs; but next day I was astonished to find that they had been driven off by an over-looked female *kribensis* that had apparently laid unfertilized eggs on the angel eggs before adopting the whole batch. The batch fungused. I later found that this *kribensis* would not spawn under cover and adopted eggs laid in the open when in condition. I've bred this line of kribis for nine years but no others showed this abnormality.

"The golden female died three months later but on collecting my (superbly-conditioned) fish from the ex-guppy fancier I found I had four females and two males. The spawning between the best female and Sovereign, the old, gold male, was so successful that I paired him to each female in turn. The inexperienced

All went well for some days but the fry then vanished. The next day the box filter was blocked; the fish gasped at the surface; I cleaned the tank and was horrified to find that the fry had been on the glass, hidden by the frame, until I had siphoned them out. The pair became paranoid: the second spawning was guarded so frantically that they had no time to tend it; the third and fourth were eaten when strangers entered the room.

"I then cleaned the 24 in. x 15 in. x 15 in. tank, bought suitable plants, put in the fish and covered the tank. The next three spawnings went well until the fry began to leave the leaf; they then vanished overnight. On the eighth spawning I removed the male after fertilization; on the ninth I took out the female; in each case the remaining fish reared the fry until they began to leave the leaf—and disappeared. I had failed to hatch the eggs of the gold and blushing pairs



males were then paired with experienced females—who weren't too pleased about it but eventually spawned and apparently taught the males 'child care.' The fish were then kept together and Sovereign obligingly took two mates. I was wondering where to sell all the fry when I returned from work to find that a jammed thermostat had heated the tank to a lethal level. . . .

"The tank was later stocked with 5p-sized angels: two gold, two striped and two blushing. These all came into condition at once and obligingly chose the right mates—just as I left for a fortnight at summer school! The 'fancies' looked hungover when I returned, the tank was rather polluted (over-feeding) and algal growths made observation rather difficult; but the striped pair were devotedly caring for fry.

artificially and so, on the tenth spawning, I removed the striped pair after hatching and used a glass pipette to transfer the fry in the correct, parental way. My foster fry thrived; they ceased to resemble seething tapioca, became small, white tadpoles, made their first trips from the leaf—and were gone in the morning! I knew I hadn't eaten them. . . . The tank was dark; the parents ate their eggs in panic under artificial light; I got a strong flashlight and searched for the fry. Instead I found the planaria which had killed them.

"Finally I set up a small, new, plastic tank with sterilized, plastic plants and put in the pair—only to find that, after at least ten unsuccessful spawnings, they were then dedicated egg eaters. I lent them to a friend—since there seemed a good chance that they would do better without my help—but they did not



attempt to rear fry again. Does anyone know how to ensure that new plants are free from planaria?"

Mr. T. Flood writes from his home at 18 Booth Close, Thamesmead, London SE28. "I was amazed recently at the climbing ability of my land crab, which I bought as a result of reading an advertisement in your magazine about a year ago. One morning I awoke to the sound of a tapping noise which I thought must be coming from the next room. When I got up I saw my 1 in. long crab crawling around on my chest of drawers, which is next to its tank. I don't keep my tank covered; but the highest stick in the tank is about 8 in. from the top of the tank, so either (a) the crab jumped, (b) flew or (c) simply defied gravity and floated out.

"Now, being the brainy, intelligent, logical-thinking, modest person I am I was unprepared to accept any of these explanations; however, no other explanation was forthcoming so the crab was placed back in its tank and the incident forgotten—until last night. I went to bed—my crab shares my bedroom—to find my crab hanging on by one claw to an inside corner, about 3 in. from the sand. I then realised how it had escaped previously. The tank is the old angle iron type which, two months previously, I had reglazed, using putty; however, I removed all the excess putty from the corners. What the crab was doing was poking its claw very slightly between the gap between the two panes of glass joining the corner and hanging onto the putty in the crack itself.

"This crack is only about  $\frac{1}{2}$  mm. wide so it's no mean feat on the crab's part to scale it when you consider that the climb is absolutely vertical. As of today my tank will be covered as I don't really fancy the idea of treading on my little crab; after all, it would probably hurt me more than it. Another thing I found out about land crabs is that the information I read somewhere, that a nip from one would not hurt, is untrue. My little darling did a trapeeze act from my thumb; one that Billy Smart would have loved to see. Now, I've never been mauled by a mad dog but given the choice between that and my land crab I'd pick the mad dog anytime. I had two little black marks for about four days afterwards. I must say, in my crab's favour, that he/she/it hasn't nipped me since, mainly because it doesn't get the chance. If I do hold him, however, I make sure he is not unsteady otherwise I might end up naming him Nipper. . . ."

Photograph 1 shows a beautiful thick-lipped gourami. Have you bred this interesting fish, with its subtle colours?

Master D. Procter is 16 years old and he resides at 90 Clarkes Avenue, Worcester Park, Surrey. He says: "I am writing to you about the cultivation of *Cryptocoryne* species, the use of peat in aquariums and mail order plants. I have never been particularly successful with aquarium plants so about four months ago I decided to set up a 24 in.  $\times$  10 in.  $\times$  10 in. tank with

a U/G filter,  $\frac{1}{2}$ -1 in. of soaked peat towards the rear of the tank and a covering of gravel—mixed small and large grades—3-1 in. deep. I planted *Vallisneria*, *Cabomba* and various other plants and after a week the *Vallisneria* became well-rooted and the *Cabomba* began sending down roots from their stems. I then introduced four 1 in. beacons, three 1 in. neons and a  $1\frac{1}{2}$  in. *C. julii* (leopard) catfish.

"After about a month every *Vallisneria* plant had sent out a runner and the *Cabomba* had rooted firmly. However, a few months later the plants began to die leaving the tank in a mess. I pulled up all the plants and decided to send for some plants, by mail order, from a firm advertising in your magazine. About a week later I received three *Cryptocoryne nevillei*, two *C. willisii*, three pygmy chain swords, two portions of hairgrass, six *Cabomba*, six *Elodea densa*, eight *Ludwigia* and three *C. wendtii*.

"A few weeks later the *Cabomba* was flourishing and the hairgrass settled. The other plants had all died back, apart from the three *Cryptocoryne* species. The water temperature ranged from 76-80°F. The *C. nevillei* had grown by about 1 in.; all the *C. wendtii* had sent out a new leaf and grown; and the *C. willisii* had rooted firmly. I then purchased two pairs of  $1\frac{1}{2}$  in. tiger barbs and while transferring them to the tank the smaller of the two males jumped onto the carpet—from a mere 3 in. of water. He flapped furiously as I tried to catch him but I finally manoeuvred him into a net and placed him into the water from which he had jumped.

"White spot has appeared on a few of my fish, perhaps introduced with the plants—although more probably with the tiger barbs as the plants are most likely to have been cultivated separately."

You may recall my telling you some months ago of planting a tank with *C. affinis*. The plants are growing slowly but strongly, their leaves now being much longer than the 12 in. depth of the aquarium and, hence, the leaves stretch across the water surface in places. To date I have seen no sign of the most annoying condition (or disease?) that occasionally affects *Cryptocoryne* species. I have postulated my opinions, in articles in this magazine in previous years, about the possible causes of degeneration of the leaves of *Cryptocoryne* species.

#### Angel fishes

No. 76 Rydal Road, Kendal, Cumbria, heads the following letter, written by Mrs. M. B. Lishman. "We enjoy your pages very much. My husband and I are members of the Kendal Aquarist Club. We have reared angel fish; we have two pairs of adults. One female, black lace and a yellow male spawned and ate their eggs a few times before we decided to rear them artificially. We obtained a test-tube 8 in.  $\times$  1 in.; we painted the inside green, put in a lead weight and

corked it up, after which we stood it in the tank, anchored to a stone. My husband took them (the eggs) out on the test-tube and placed them in a small tank of methylene blue and boiled water, at an angle of 45°, with an air stone under the tube. We reared about 100 baby angels—black, yellow and white. We gave quite a lot to our friends and I took about 80 to our local pet shop. I received food for our other fish in exchange for them.

"We were pleased to see a notice in the pet shop window later: 'Angels for Sale: Bred Locally.' We have the two pairs spawning now about once a month, but we haven't kept any more eggs. We are waiting patiently now for neon tetras to breed."

Mr. F. D. J. Hockey lives at 15 Ainsdale Avenue, Bispham, Blackpool, Lancs., and because his letter has no date on it I do not know when he wrote it;

"All of my tanks are facing east and have top and rear day-light; and the result is plants that have to be thinned out, with thicker and longer growth. I only siphon off when you can see algae taking over. I never strip them. The season of spawning in the outdoor pools has been late this year, but a really good one for shus. and fantails, and I hope to rear around 300 this year. I buy no special, baby fish foods; I used old pond water, micro-worms and *Daphnia*. I have orfe and golden tench ready to spawn.

"I read an article about perch not being suitable for keeping in garden pools. As usual I took up the challenge and have 6 in. long perch with 6 in. long American sunfish. They are beautiful and agree well together. I have over 60 sticklebacks with them. The latter are the bosses of the pool, but cause no damage to the other fish. Sticklebacks are also a good



however, Mr. Hockey has some interesting things to tell us. "When I first started tropical fish keeping at the age of 16—and I am 69 now—we could never afford the (?) that went with it, e.g. aerators, posh filters, or sometimes heaters and thermostats. We built our own tanks from anything. A favourite in those days was a large, square, biscuit tin with panels cut out and the bottom left in. We glazed the panels and made a box for it, to stand on a depth of 6 in., with a small opening door in the front and ventilation holes at the top rear. We heated it with a very small Woolworth's oil lamp kept as low as possible. It was easy to control temperatures and so ideal for breeding any of the smaller fishes.

"I am still running on the old-fashioned method of no aeration or filtration. Oh yes, I have tried the new methods; but now I even have no lighting over any of them.

fish to stimulate the (interest of) the new hobbyist. I give a pair to anyone who asks for them. Are there any 9-spined sticklebacks around? Also, what about the peacock-eyed bass? Could we please hear of other unusual methods of heating either tanks or fish houses?

"I read about the fungus cure and it took me back many years. When my father had massive goldfish with fungus on them he caught them up and threw them on the garden. Hours later I threw them back in the pool and they recovered after a while and lost all signs of fungus. I would not bother today."

I shouldn't like to try Mr. Hockey's fungus cure. Fortunately fungus can be cured without resorting to the use of the garden. . . .

The following letter came from Mr. Richard Townsend, of 59 Ironwood Drive, Vernon, Connecticut, U.S.A. "I received my latest issue of the *Aquarist*

and *Pondkeeper* today and after reading your article thought I'd let you know what I plan to do with the Java moss that you sent me (some time ago). My plans are to make several cuttings, bag them and give them to the fish society that I belong to: the Exotic Fish Society of Hartford, Inc., for the auction to be held at our annual show. The proceeds shall be turned over to the society to help to pay for the show tanks that our society has purchased. Many people here have never seen Java moss before and I am sure that they—as with me—will be quite pleased with this wonderful plant in their tank. I shall be sure to include a small note with each bag to inform the purchaser that the Java moss he has just purchased was sent to me from Northern Ireland by Mr. B. Whiteside. I shall also include the name and address of *The Aquarist and Pondkeeper* in case they would like to subscribe to your excellent magazine. Hopefully, others here will soon be waiting patiently for the mail man to deliver their latest issue. . . ."

Photograph 2 shows a lace plant. Under what conditions have you managed to get this plant to thrive for a long period? The third photograph is of a pair of glowlights. If you have successfully bred

this attractive, little species please send me details of the conditions that you have found to suit them best.

My thanks to my friend Dick Mills, man of so many parts that I do not have enough space left to list them, for sending me the two most recent copies of the F.B.A.S. Bulletin—which he edits. I am pleased to see a selection of interesting photographs reproduced in both Bulletins. Naturally the Autumn 1979 magazine contains a lot of photographs of *The Aquarist* Fishkeeping Exhibition at Alexandra Palace. The Bulletin contains the usual wealth of news that its readers have come to expect. Dick also sent me a copy of his latest book, *How About Keeping Fish*, by Val Singleton and Dick Mills. Fans of 'Blue Peter' and the late, lamented 'Tonight' will recall Ms Singleton's connections with these programmes. I hope to review the book in a future feature.

Please send me your opinions on the following: (a) breeding good quality guppies; (b) plants purchased by post; (c) external filters versus internal filters; (d) the reliability of power filters; (e) breeding acaras; and (f) cultivating pennywort. Please PRINT your name and address and write the date on your letter. Once again, Happy New Year.

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## FIRST IN THE FIELD

A NATIONWIDE advisory service for tropical fish enthusiasts has been set up—by a 12-year old boy.

Believed to be the first of its kind in Britain, advising on everything from setting up tanks to keeping unusual species of fish, it will offer water-testing facilities—something difficult to obtain at the moment.

Until now, only one shop in the Midlands has provided help with water chemistry—an invaluable aid to successful fish-keeping—according to schoolboy aquarist Peter Bird.

So the ambitious youngster decided to redress the balance and this month sent out the first advertisements of the new service, to be run from his home at 5, Rossall Grange Lane, Fleetwood, Lancashire.

Peter, a second form pupil at the town's Cardinal Allen RC High School, has already baffled fellow members of the Fleetwood and District Aquarist Society with his knowledge of the deep and, having amassed a reference library of books and cuttings on his hobby, has no qualms about the responsibilities he could be taking on.

"I want to help people who are not members of a society solve the problems they have with fish-keeping," said Peter. "When I first set up a tank 12 months ago, there was no-one to help me with the elementary points—and much of the information in books is

totally incomprehensible."

In the short time he has been involved with tropical fish, Peter has written to top research scientists and subscribes to several specialist magazines.

"I have kept many of the rarer types of fish and can advise people on conditions, diet and so forth, from first-hand experience," said Peter.

Although advice will be given free of charge, Peter's fee for water-testing will be 5 pence—to cover the cost of chemicals.

From just a small water sample and details of fish kept in the tank, not only will he be able to tell you whether the water is too acidic or too alkaline—and how to correct it—he believes he will be able to prevent fish becoming ill or dying.

"Different types of fish need different types of water and the chemical balance can easily become disturbed, by plants or snails, for example," Peter explained. "Most amateur aquarists will not know what to do when their fish start to die for no apparent reason. I am hoping that I will be able to help."

Once the advisory service has become established, Peter hopes to begin skin sampling, to discover which micro-organisms cause disease and how best they can be kept at bay.

*Chronicle News Service*

THE AQUARIST

# From a Naturalist's Notebook

by Eric Hardy

ONE OF THE chief differences between coarse-fish angling and game-fishing is that the former anglers usually return their captures alive for conservation, making them increasingly hook-shy and more difficult to catch. Trout-anglers usually retain their captures the bigger the record the better, and so unscientifically, depress the age-ratio and size. This is borne out by the biggest trout caught in British waters since 1894, weighing 25 lb., being held in deep freeze at the Lakeland Hotel, Inniskillen in Northern Ireland in 1979.

It is over a century since the biggest trout in British waters, 39½ lb. foul-hooked at Loch Awe, was caught in 1866. The last fish to be caught above the recent Irish specimen—the sixth to exceed it—was 26 lb. and taken in 1894. Since then specimen trout have been consistently smaller. I cannot trace another over 20 lb. since 1946 in the River Dungloe, though one of 19 lb. 4½ oz. from Lower Lough Erne in 1974 came close. Rainbow trout, which mature quicker and don't live so long as brown trout, don't grow so big, and the monster 102 Canadian "trout" the other year was an American "lake trout," a species of char. The exceptions are sea-trout, a migratory form of brown trout, and therefore not affected in the same way, with a few modern records above 20 lb. including 22 lb. from the Frome in 1946.

## Marine Nature Reserves

The Nature Conservancy Council informed me in October of their request to the Government to make provision for marine nature-reserves in its forthcoming Wildlife and Countryside Bill. This is a subject I have raised here before, mentioning the

provisionary marine reserves at Lundy and Skomer Islands, and on the Purbeck (Dorset) coast, with the desire for others at the Walney Island Channel and the Channel Islands. They are concerned with the reclamation of mud and sand flats as a threat to coastal marine life as well as wading birds and wildfowl, nurseries of young fish and the routes of migratory salmon and eels, also the catching of fish by Scuba divers, and bait-diggers killing other species by exposure; oil and gas-terminals, effluent-disposal and increased recreational use. Our position at the end of the Gulf Stream enriches our inshore fauna and flora, and in this respect the recently published 288-page book *Marine Life*, by Dr. David and Jennifer George (Harrap £16), is specially opportune. Although this is an encyclopaedia for recognising the invertebrates both underwater and on the shore anywhere in the world, it is particularly applicable to our own shores. It is, in effect, a systematic list of all the groups of backboneless marine animals down to families, with typical species. Obviously there isn't space for every species as invertebrates comprise 97% of over 1,000,000 world animals. It does not for instance include among barnacles *Elminius modestus*, the post-war conqueror of Britain's shores, among the selected few from over 900 world barnacles. Its 128 colour-plates are rather packed, with 1,300 photographs; but it is the most comprehensive worldwide coverage of the subject in one volume, an outstanding work of reference for amateur and professional, aimed also to Scuba divers who wish to learn more about life in their underseas visits. The authors, from the British Museum and Central London Polytechnic, have a close experience of the subject. They include a

comprehensive bibliography of countries as well as zoological groups, mostly modern, for it omits all the famous monographs of species by the old Liverpool (University) Marine Biological Committee, classics of their kind still referred to and some still not superceded, also Geise and Pearse's modern multivolume *Reproduction of Marine Invertebrates*. In effect, its text is a highly-condensed cradle for the illustrations.

#### Giant Kelp

The Nature Conservancy Council followed up its plea for marine nature reserves with a 65-page illustrated publication: *Nature Conservation in the Marine Environment*, NCC, Shrewsbury, SY4 4TW, £2.50, a report of its working party of biologists which provides the detailed background for its case. They draw attention to prospective invasions by introducing giant kelp, *Macrocystis pyrifera*, also by Japanese *Sargassum muticum* now established on both sides of the English Channel, and the use of seawater ballast which introduced the Indo-Pacific diatom *Biddulphia sinensis* to the Atlantic. The souvenir trade's collection of the pink gorgonian coral *Eunicella verrucosa*, skin-divers taking edible sea-urchins, and the attractive south coast fan-shaped, green and brown seaweed *Padina pavonia* collected for teaching purposes endanger species. The rarer seaweed *Fucus distichus* is safer because it is less attractive and confined to relatively inaccessible shores of north and west Scotland (e.g. its variety *anceps* at the Butt of Lewis and west Islay) and west Ireland.

Readers will be astonished that while they may take shellfish found on the shore to eat, there is legal doubt on collecting empty shells washed up, which belong to the owners of foreshores. The public have no legal right to go on the shore and collect seaweed deposited above high water without permission, but they can take floating seaweed. The public has the right to fish between tidemarks and in tidal waters unless there is a several right of fishery. The law's inadequate protection of fish-farming from the rights of public access, or theft, hinders investment.

Now let's turn to freshwater. Water-mites in fact, Florida University zoologists find these live on so many mosquitoes (gnats) as to reduce reproduction and survival. Their parasitic larvae feed on the insects' blood. They attach to the thorax behind the head. Some 250 British species also attach by suckers to water-beetles, water-scorpions, etc. in slow-flowing waters, canals and ponds. Some lose their legs and become permanently attached, while some are eaten by fish like trout.

#### Freshwater Ecosystems

An interesting publication from the Natural Environment Research Council at Cambridge, *Distribution of Freshwaters in Great Britain*, by Ian Smith and Alex Lyle (44-pages, £2) tabulates but not by

names, the number of lakes, reservoirs and rivers, many not on the maps, as an aid to students of freshwater ecosystems. Most natural lakes are in Lakeland, but only 26 waters in England and Wales are over 2 km. surface. Loch Lomond is the largest lake outside Ireland. Over a fifth of British lakes are in the Outer Hebrides. Most reservoirs are in England and Wales. But when waters marked only on the larger 1 inch maps are taken into consideration, England and Wales have 49,632 standing freshwaters compared with Scotland's 31,460, yet their total volume is less than Loch Ness. However, Scales Tarn, near Keswick, is not on the 1 inch map.

#### Evolution of Freshwater Fishes

Yet another book on *British Freshwater Fishes*, the Story of their Evolution, by Len Cacutt (Croom Helm £6.95), provides a most interesting history of the denizens of our waters. The story of the bitterling is incomplete, for it originated from anglers' releasing specimens used as livebait over 50 years' ago. The first account of it as a wild British fish was published by me in the *Salmon & Trout Association's* magazine, No. 142 (1954), as well as my newspaper and *Water Life* notes. There is no proof that the famous land-locked colony of smelt or spurling in Cheshire's deep Rostherne Mere is extinct, merely because none has been taken lately. They have been notorious for the long periods between occasional, accidental, specimens. There are post-war specimens of the rare burbot from the Little Ouse (Suffolk), and the Old West River (Yorks.) and earlier documented west coast river fish. Some of record weights given, even rod-caught, are well out, with no mention of the specimen grayling "over 16 lb." hooked by a workman on the Itchen (*Angler's News*, 19 December 1908, page 122). There's some confusion in quoting Travis Jenkin's grayling of: "5 lb. found dead in a trap in the Camlet, Wilts." as the latter's *Fishes of the British Isles* quotes it from "the Camlet near Shrewsbury," an obvious mistake for the Camlad; and the weight was 5½ lb. (*Shropshire Magazine*, June 1973, page 16, and *Where to Fish*, 1950). No mention is made of early Mesolithic pike teeth discovered by my friend Dr. Don Bramwell in Derbyshire's Dove Valley; or Child, Burnell and Wilkins' discovery of north and south blood-races of British salmon caused by the Ice Ages.

On quite a different subject, a friend, a retired Nature Conservancy warden, tells me 1979 gave him no sightings of adders in his area of Gower, South Wales, where a colony of black adders exist on Cwm Ivy Tor "just like minicycle inner tubes" he added. Entirely black specimens occur also in Northwest Spain. But intense black markings are common on males and entirely black specimens are not considered rare, even in Britain. They are among the few snakes one can sex by different colours, the females usually the redder.



## 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

I have been told that an under-gravel filter can be a great source of trouble in an aquarium because it clogs up with mud and then pumps out smelly and poisonous water. Is this true?

It would take a very long time and a lot of mismanagement for a filter such as you have described in your letter to clog up and 'pump out' poisonous water. What a u.g. filter does is to render the waste products of fish and vegetation into harmless aerobic bacteria purified silt. Moreover, if plants are prospering in the regulation depth of washed grit (about 3 in.) spread over the filter plates, the aquarium should remain wholesome for an indefinite number of years. All the same, there will come a time in any well-stocked aquarium's life when an excess of mud will collect on the bottom. It does no harm to siphon the surface of the grit quite clean. Bear in mind though that no u.g. filter can cope with overfeeding and sheer neglect such as leaving dead livestock to decay on the bottom.



*Serrasalmus hollandi*

My dealer sold me four small piranha, leaden silver on the sides and adorned with black spots, black in the lobes of the caudal fin and red in the anal. He did not know the scientific name of the fish, so I wonder whether you could

by Jack Hems

make an educated guess at their identity?

I think the species you have is *Serrasalmus hollandi* which, in the natural state, can attain a length of about 6 in. It is more elongated in the body than the better known red-bellied piranha or *Serrasalmus nattereri*.

How many submerged plants do you recommend for a well-lighted 36 in. x 15 in. x 12 in. aquarium waiting to be stocked with small tetras and barbs?

Not less than about 70 plants of *Vallisneria spiralis* rooted along the rear half of the tank, with two or three groupings of plants such as *Cryptocoryne affinis* or *C. beckettii* near the front.



White Cloud Mountain minnow

Is it true that the White Cloud Mountain minnow is as easy to breed as the guppy?

The White Cloud Mountain minnow is not so regular in producing a brood of young as a livebearing female guppy, but for an egg-layer the species can be very prolific if conditions are right. Give a mature pair or trio of 'minnows' a 18 in. x 12 in. x 12 in. tank to themselves and almost fill it with lace-leaved or feathery foliated plants. Every so often the tiny cyprinids will spawn in the dense-packed vegetation, and if they are kept well supplied with such things as whiteworms, gnat larvae, and the like, will seldom trouble to do much, if any, egg-robbing or fry chasing. Almost certainly baby White Cloud Mountain minnows will be seen (in

Continued on page 68

THE AQUARIST

## COLDWATER QUERIES

by Arthur Boarder

**I have recently had a new copper pipe fitted in my coldwater supply system. How long will it be before I can safely use water for my coldwater tank with fancy goldfish?**

This is a tricky question as so much depends on the water supply. If the water is soft then it will take a long time before the water is safe. If it is hard, a coating of lime deposit can be formed on the inside of the copper pipe which will reduce the danger to fishes. Meanwhile, do not use any more water for the tank than is absolutely necessary. Then when you do take some, make sure that plenty of water has been run through the pipe first. Do not use any water in the mornings but wait until later in the day when plenty may have run through the pipes and always let some run to waste before using any for the tank. If you have some water snails or *Daphnia*, try a few in the tap water and if they survive all should be well.

**I have found thousands of tiny creatures in my pond which I use for breeding Shubunkins. They are very tiny and I have never seen one much larger than the sample I have sent you. They look like recently hatched water snails but I have no Adult snails in the pond. What are they and will they eat fish eggs?**

The creatures you sent are Nerites, a very tiny Mollusc. Those sent are probably *Neritina fluviatilis*. They do not grow more than a quarter of an inch high, and so you are not likely to find any larger than that. They are usually found in running water attached to stones. They lay their eggs, enclosed in a gelatinous blob, on stones, etc. I do not think that they could eat fish eggs as they may not be able to pierce the skin. I cannot see any easy way to get rid of them but small fishes like Bitterling or Minnows could eat them. Those sent were certainly no larger than a goldfish egg.

**I am a schoolboy and wish to start an aquarium for coldwater fish. What size tank should I get and which fishes will be the best for me?**

If you can afford a tank, 24 in. x 12 in. x 12 in. this will be fine. Do not get one less than about 20 in. x 10 in. x 10 in. as the smaller the tank the more difficult will it be to keep in good condition. Do not have more than an inch of length of fish excluding the tail, for each 24 square inches of surface area of water. Get some washed river grit for the

base and get some water plants, which should be allowed to become established before you add any fish. Common goldfish will be the best type for a start and if you are very successful with these you can try fancy goldfish, but remember the fewer fishes in the tank the easier will it be to keep in good order. Get a book on the subject and read up all about the hobby as it may save disappointment later.

**I am considering the construction of a Koi pond, 40 ft. x 25 ft. and am concerned about the possible seepage from the cement construction. I shall appreciate your advice on this?**

If you use a good liner such as Butyl, there will be no danger of seepage. Neither will there be any need to make the concrete safe from free lime as would be necessary without a liner. Also, as no concrete need be used the work is lessened considerably. Just dig the hole as necessary, line it and anchor the sides. The pond can then be filled with water and plants, etc., added right away. It is better to let the water plants become established before adding any fishes. I am enclosing an address of the British Koi Keepers Society, as they may be able to put you in touch with one of the 800 plus members in your district who could advise you on fishy matters.

**How can I get rid of blanket weed in my coldwater tank?**

It is not easy to clear a tank of this weed once it gets a strong hold. It has been introduced on water plants and should have been seen when added. You can pull off much of the weed but if it is very thick, you may have to scrap all the plants, sterilise the tank and compost and make a fresh start. There may be too much light getting to the tank, and although your top light may not be very strong, there may be too much daylight reaching the tank. When setting up again, use plenty of water plants and go easy with the feeding, as uneaten food appears to encourage the growth of Algae.

**I am proposing to convert a swimming pool 30 ft. x 15 ft. x 4½ ft. into a lily/fish pond. What are the correct things to do and is there a publication describing the construction of such a layout?**

You should be able to convert the pool into a very good fish and lily pond. Your trouble may be with the depth as there are no shallows on which to set water plants which do not need much depth of water. My book, *Coldwater Fishkeeping*, will give you all the advice you need for the task. You may have to construct a type of shelf along the side so that plants can be set thereon. Some types of water lily will grow in deep water but when they are planted in their containers, they must be raised from the bottom on bricks, etc., so that the growing crown is not too deep in the water. Then as the leaves grow, the container can be gradually lowered in the water. I am enclosing an address from where you can obtain all the plants and fishes you require.

**I am thinking of turning a garden shed into a fish house. Can you give me any advice on this please? It should hold about twelve tanks.**

It will be a good idea to have a concrete base to the shed and if not all over then down the centre if tanks are to be placed each side. I suspect that the shed is a timber constructed one and so it may be necessary to line it with hard-board or something similar to keep out much of the cold in winter. With coldwater tanks it will be necessary to have some form of heating in winter to prevent tanks from freezing. According to the size of any window you may need to make a light in the roof. If you have the tanks in rows see that you allow plenty of space between the top of one tank to the one above. This will make it easier for servicing them. If possible run a stout electric cable to the shed for necessary lighting at night and perhaps for warmth during the winter. A small table or shelf at the end of the shed will be useful to store accessories.

**I have a pond constructed with concrete blocks and intend to make another pond along one side of similar length. I want to have a small part of the dividing wall between the two ponds about a foot or so lower so that fishes can swim from one pond to the other. I am wondering if the dividing wall will be strong enough?**

As there will be approximately the same pressure of water on each side of the dividing wall I see no danger of anything going wrong. Make sure that the new concrete is well cleaned of any free lime before adding any fishes to the new part.

**During the past two months eight of my original goldfish in the pond have died. They have had fungus on them. The water was very green for some time but has now cleared. What has caused the death from fungus?**

The size of the pond was not stated, nor that of the fishes. Crowded conditions in the pond and over-feeding are likely to cause the disease to take a hold on the fishes. The fish have a mucus protective covering which enables them to resist the attacks of the disease. When any fish becomes out of condition, perhaps from over-crowding, it is liable to become attacked by the fungus disease. There should not be more than an inch of length of fish, excluding the tail, for each square foot of surface area of water. Then the fishes should not be given more food than can be cleared up in a few minutes. A feeding ring anchored at the side should be used so that it can be seen if the food given is cleared up quickly. Foul water soon causes the water to adversely affect the health of the fish and then their protective coating becomes disturbed and they become prey to the disease. Make sure that the pond is not over-stocked and do not over-feed. Many pondkeepers fail to realise that there is usually plenty of food in an established pond and so the fish may not need very much in the form of artificial feeding.

**Owing to the increasing cost of electricity I have decided to give up breeding tropical fishes and turn to coldwater ones. I have six tanks ranging from 48 in. x 20 in. x 15 in. down to 30 in. x 18 in. x 12 in. I thought of using the largest tanks as a display one and the others for breeding fancy goldfish. Which types do you suggest I should breed. I have electricity available in the fish-house?**

You have a good set-up for breeding fancy goldfish and I suggest that you try veiltails or/and orandas. If you keep to one variety you will find it easier to keep up a good strain and the possibility of cross-bred fishes will be avoided. Good veiltails will always command a good price and so if you are thinking of recovering some of your outlay, these will suit you well. Keep your breeding fish in the large tank and then you can keep one or two of the other tanks for breeding purposes. You can then take a good pair from the large tank and transfer them to a spawning tank. When sufficient eggs have been laid the parent fish can be returned to the main tank. As the fry grow they can be sorted and the best placed in other tanks, always making sure that the youngsters have plenty of swimming space. This is most important as few fishes thrive well unless they have enough space. As you have electricity available you will be able to use a little for hatching and rearing. There will be no need to use heat for the large tank and as the fry progress the use of electricity may be discontinued. In fact the fish house may get enough warmth from the sun to be able to dispense with the use of much electricity.





## THE AFRICAN KNIFE FISH

*by Peter J. Graham (aged 14 yrs)*

THIS INTERESTING and unusual fish is native to Africa and the Nile, hence its common name. It is a member of the family Notopteridae, not to be confused with the other families of knife-fishes which come from South America and include the notorious Electric Eel, *Electrophorus electricus*. It is similar to this and other South American families in that it does not possess a dorsal fin (unlike most of the African and Asiatic knife-fishes) but that the caudal fin

is merely a tiny bunch of rays that look like an extension of the anal fin, which extends from just behind the gills backwards. The anal fin itself is the centre of attraction on this fish. It is the main method of propulsion, and looks most impressive as it ripples in undulating waves.

In colour, the African Knife Fish is rather uninteresting, though in some lights, against a favourable background, it looks decidedly attractive. In the

main part, it is pinkish-brown, sometimes mottled with a slightly darker colour. Usually, half a dozen bars of brown are just visible on the body. Most specimens show an iridescent pinkish-purple around the gills. The eye is silvery-white with a large black circle, and is quite conspicuous.

The stomach is just below the gills and the vent is at the throat. When the fish has had a good meal, the stomach swells up until it is a large bulge behind the head.

The mouth is deceptively small looking as though it is used for gently pecking at live food or tiny worms. In reality, a half-grown specimen of about 6 in. (15 cm.) can easily dispose of a fully-grown male guppy. This necessitates either a species tank, specially "done out" with tall plants, the odd cave of bogwood or rocks and places of subdued light. It is also important that there is a large area of open space for them to swim about in, as they are almost continually on the move, especially when kept in a group of four or more. Alternatively, a single specimen or a pair can be kept in a community tank with fishes of a size large enough to escape being eaten.

One problem with many unusual fish such as these is that they are all too often nocturnal, rarely venturing out of a cave or clump of plant in daylight. Fortunately, the African Knife will venture forth at any time of the day, though it will occasionally

rest behind a convenient plant or rock. It is not by nature a shy fish, and, when peckish, it will peck any unusual object a pen, for example, which is dangled in its aquarium.

The fish is quite easy to please in the way of food. While very few specimens will accept dried food, all are eager for earthworms, snails, meat, insects and any aquatic live food such as *daphnia*, *tubifex* or bloodworm. They are especially fond of small morsels of cheese. The best way to feed the meat to the fish is by spearing it on a stick and enticing the fish to eat it. After one or two feedings in this manner, the meat, etc. can be dropped straight into the tank where the fish will dart after it.

Other things to note about the African knife are that it breathes air, coming to the surface every 3 minutes or so to take a gulp through its mouth. It does not like too much the company by boisterous fish which are continually on the move. These it often nips in passing, though no real harm comes to either party. It also has tubular appendages coming from the nostrils, and ventral fins 3 mm. long that are almost invisible. It can swim backwards just as easily as it can forwards, and often does. The usual price is £1.00 to £2.00.

The African Knife fish is an ideal fish to keep in a community of larger species as it is diurnal, active, unusual, peaceful and amusing. It also does well in a species tank.

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## *Pimelodella pictus*

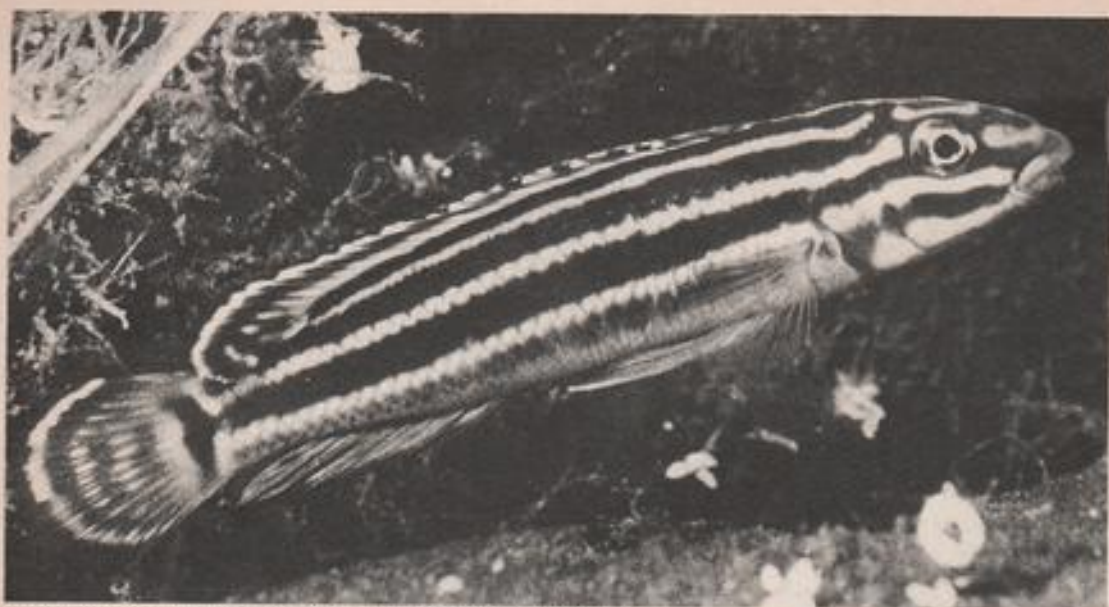
by A. Yates (aged 14 years)

*Pimelodella pictus* is a lively catfish and is always on the lookout for more food, searching the bottom of the aquarium like a metal detector. Its three pairs of whiskers help in its never ending search for food, because they can detect food nearly two inches away from each side of the mouth.

The colour is silver-white with spots covering the sides and top of the body. I have found that the spots vary from very dark grey to very black, so this makes it easy to identify individual fish. In the dorsal fin there is a very sharp spine and there is also a spine in both the pectoral fins. When caught in a net the spines are raised and made stiff and may get caught in the net if you are not careful. When brought out

out of the water in a net and angered this fish is able to make a loud croaking type of sound, which is very loud for its size. It is from 3-4 inches in length.

I myself have six *Pimelodella pictus* in a 36 in. x 15 in. x 12 in. aquarium with a pink-tailed Chalceus and a small sucking loach. The price of this catfish is quite expensive and I find varies from £2 to £2.60. This may be expensive but for a catfish which is beautiful, easy to feed (flake foods, blood-worms, meat, etc.) undemanding in water requirements and has many other advantages for the aquarist, I think it is well worth it. These catfish are a lively addition to any aquarist's aquarium containing small to medium-sized fishes.



*Julidochromis regani*. Distance 20 cm at F16 with one extension ring.

## AQUARIUM PHOTOGRAPHY

by Jørgen Hansen

WHEN WISHING to photograph one's fish or water plants, it is first necessary to ensure that one has the correct photographic equipment. The camera itself should be of a single-lens-reflex type, where what appears on the film is what is seen in the viewfinder; with other types of camera where the viewfinder is not coupled to the lens system, one can miss the subject completely, if one happens to look through the finder a bit askew.

Unless really big enlargements are wanted, it is immaterial if the camera takes 24 mm.  $\times$  36 mm. or 6 cm.  $\times$  6 cm. films. One should however be aware of the fact that a picture from a 6 cm.  $\times$  6 cm. film requires almost four times less enlargement than a corresponding picture taken on a 24 mm.  $\times$  36 mm. film, which will thus give the former a greater sharpness. However as the purchase of a 6 cm.  $\times$  6 cm. camera is an expensive matter, it is perhaps wise to begin with a 24 mm.  $\times$  36 mm. one. These are by no means the only possibilities, but the most commonly encountered.

When the decision as to film size has been made, it is necessary to consider which lenses and extra equipment should be acquired. The lens should either be a wide angle lens or a standard lens, which can focus at a distance of 30 cm. With the use of extension tubes the camera can come even closer and it is possible to achieve an enlargement of the subject of up to twice natural size. Further useful equipment for close-up photography includes a bellows unit and a tele-lens, of which the latter can be combined with extension tubes and bellows unit to enable one to sit metres away from the subject and bring it nearer. This equipment is of great help when photographing living creatures, which have a tendency to flee when exposed to the attentions of avid photographers at too close quarters. The acquisition of these extra aids is an expensive affair however and by no means obligatory.

An essential part of the photographic equipment is the flash. It is inadvisable to use quartz lamps, as these give off an excessive heat which not only

THE AQUARIST

warms the tank water to an undesirable extent but can also cause tensions in the glass with resultant breakages.

One should choose a type of flash which has a duration of at the most 1/1,000 second. Although the shutter speed of most camera types, when combined with a flash is not faster than 1/60th of a second, this will not influence the result, as it is the flash which captures the picture. An additional refinement is an electronic flash which when combined with a motor-driven film-winder enables one to take as many pictures per second as it is physically possible.

Normally the sharpness of the picture depends upon a combination of the following factors:

- (1) the rapidity of the film
- (2) the prevailing light intensity
- (3) the setting of the diaphragm
- (4) the shutter setting.

But matters are otherwise in the case of aquarium photography, where a flash is used, as the flash determines the time used for taking the picture, and this time is therefore constant. On the other hand there is nothing to prevent the simultaneous use of several flashes e.g. one placed at the left, one at the right, and one above the subject, but this has the

drawback that the area of photography is severely limited. An increased light intensity is however attained which in turn enables setting at a higher diaphragm number (smaller aperture) giving an increased depth of sharpness, which can well be expedient when using light-demanding extra equipment in combination with the lens.

The loss of light which occurs with the use of the aforementioned equipment can easily be calculated in ordinary photography, but in the case of aquarium photography there are many confusing factors, some of which steal light and some of which yield light. The proximity of the flash will for example influence

This Furnished Tropical Aquarium won first prize for Runnymede A.S. at *The Aquarist* Fishkeeping Exhibition at Alexandra Palace last July. It illustrates the need for colour film without which the plant species would be indistinguishable from one another in similar tones of grey with monochrome film. Top lighting as well as front lighting is advantageous with such a subject but is often impractical at exhibitions.

For this photograph a 2½" square reflex camera was employed using a normal focus lens with a No. 1 supplementary lens, Agfa CT18 film, one electronic flash head at 45° with a stop of F22 to afford maximum depth of focus.





*Julidochromis marlieri* 20 cm  
with one extension ring  
at F16.

light intensity. A hint of water colouring will absorb some of the light, which should be compensated for by a lower diaphragm setting (larger aperture) than usual. Light is also absorbed by the aquarium glass, which can be of varying thickness.

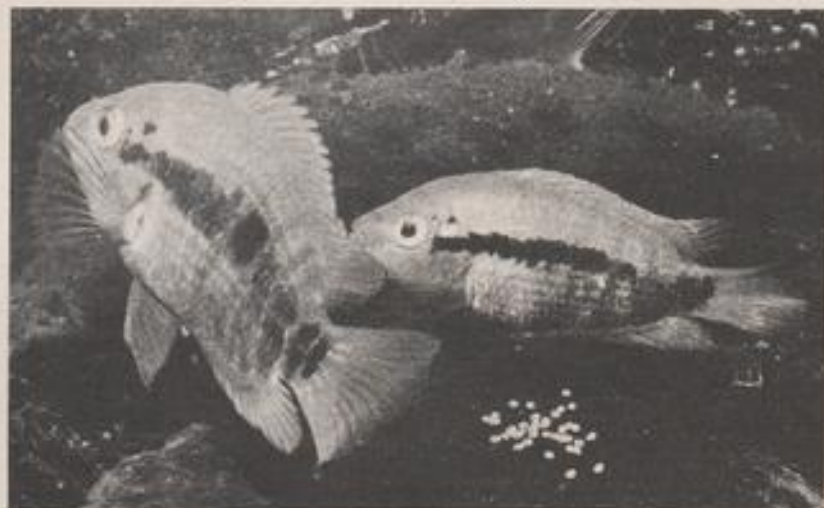
In order to deal with these problems, it is essential to take a test film of each type, black/white and colour. One records for each picture the distance, the diaphragm setting, and the position of the flash. Begin with the smallest possible distance and go through all the diaphragm settings, thereupon increase the distance by 10 cm. and go through the same procedure, etc. By comparing one's notes with the developed film, it is possible to determine the suitability of a given diaphragm setting for a given film and distance. Rather risk the cost of a few films in the beginning

than later ascertain that the photos one has taken of the first ever spawning of for instance mudskippers in captivity have been over-exposed.

There are three essential factors to consider when photographing through glass:

(1) The glass should be absolutely clean, both inside and outside. Nothing is more regrettable than to discover that an otherwise splendid picture has been completely ruined by white spots caused by drops of water on the outside of the glass, or streaks left by the cloth which has wiped the glass. An acceptable method of cleaning the glass is to wash with either clean or soapy water, which is then removed with a window-wiper of the type professional window-cleaners use. To ascertain if the cleaning has been effective, the glass should be examined from

Pair of *Heterotilapia*  
*multispinosa* spawning.  
One of a series. 30 cm  
at F16.



Clownfish and anemone.  
30 cm at F16.



the side, from which angle any dirty marks should be visible. The glass may be cleaned internally by means of a sharp razor-blade.

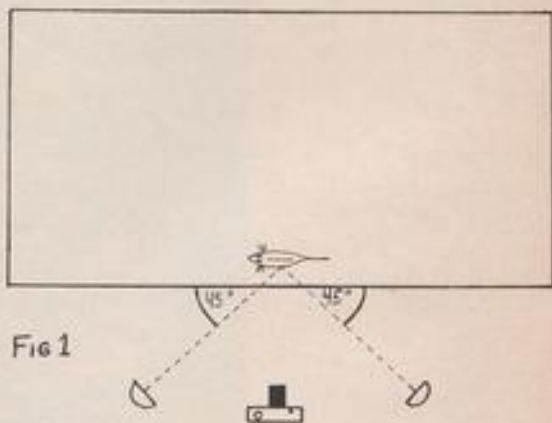
(2) The light from the flash should hit the glass at an angle of  $45^\circ$ , so that the reflection is thrown to the opposite side, as otherwise the reflection will show as a large white spot on the finished picture. One has to decide for oneself for each picture where the flash has to be, as a shadow will be formed which needs to be placed in some innocuous spot, preferably quite out of the picture, if this is possible.

(3) Shiny objects are very easily reflected in an aquarium glass, and as most cameras are chromium-plated or at least shiny in front, it often occurs that a splendid reflection of the camera is visible on top of the fish. This reflection can be avoided if one refrains from photographing at right angles to the tank, but from above and down or vice versa. The reflection will then occur in an area of the glass, which one does not photograph through, and the picture will furthermore be taken from a more exciting angle.

When all the aforementioned problems have been dealt with, then one can begin to think about sharpness. A good sharp result can be obtained at a distance of say 30 cm., with the diaphragm set according to the result of the test film, if one follows with the camera and flash, until the fish is in focus. As a rule it is best to focus on the eye of the fish, as it is mostly the eye which gives the fish life. It does not matter so much if the rear of the fish is unsharp, on the contrary this often gives the picture

an effect of depth and infinity. It should be borne in mind however, that the flash of light should hit the side of the fish seen through the finder.

The author is of the opinion that fish should be photographed swimming around displaying characteristic behaviour. Photo series displaying a sequence of events are especially exciting. One can well use a whole film of 35 pictures on one spawning. Sometimes great patience is entailed and it is necessary to wait weeks or more for the desired pictures. If the fish one wishes to photograph are very shy, they can often be accustomed to the camera by simply



Plan view of set-up. Flash heads placed at  $45^\circ$ . Three flash heads may be used, the third placed as in Fig. 2.

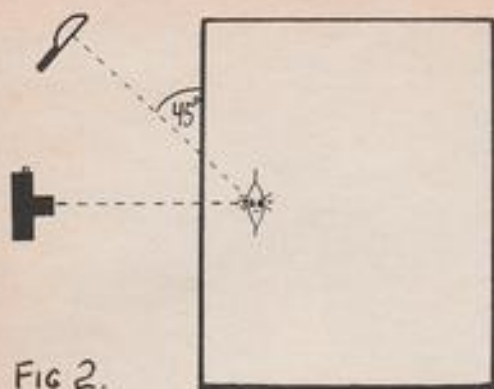


FIG 2.

Side elevation of set-up. Flash placed to direct the light at angle of 45°.

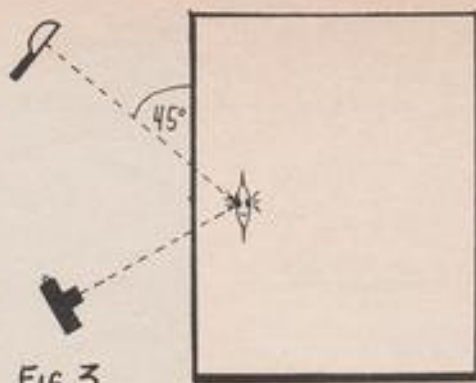


FIG 3

Side elevation. Camera directed upwards towards subject to avoid reflections.

setting it up on a stand in front of the tank for some days.

Black and white photography is somewhat more difficult than colour photography, because one has to imagine what one sees in colour as black and white and attempt to balance the background with the shade of grey which the fish will have in the finished picture. This needs some practice and one does not generally learn it until one has taken at least a couple of unsuccessful films. Black and white photography has, however, the exciting aspect that one can work with one's own pictures in the dark room, make one's own enlargements, and save otherwise unsuccessful pictures by cutting away mistakes from enlargements. This charm is missed when using a colour film, where one merely delivers the film to the local dealer and receives the developed slides a week later.

The photographer begins to take quality pictures

only when he has got to know his camera. It can well be said that one never stops improving one's pictures. It is possible to work with the same fish for years and still continue to find new and fascinating aspects of the fish which one wishes to capture with the camera.

Great depth of sharpness	large diaphragm number	much light (several flashes)
Slight depth of sharpness	small diaphragm number	little light (one flash)
Rapid film	little light	large diaphragm number
Slow film	much light	large diaphragm number
Slow film	little light	small diaphragm number

Jack Dempsey  
Distance 40 cm at F16.



## KOI QUERIES

by Hilda Allen

**I am considering bringing my Koi indoors for the winter but I would like to hear your views first. Do you consider this a good idea or not?**

If you had given me the numbers and sizes of your Koi it would have been helpful in formulating a reply. I believe that beginners to Koi-keeping may not be fully aware of all the problems associated with keeping Koi indoors for several months. Much will depend of course on the facilities and space that can be given.

Small Koi (below 8 inches in length) will probably benefit from an extended feeding period if not overstocked according to the space/water provided. Given good conditions they should grow and this could lead to problems of overcrowding before they can be safely transferred to outdoor ponds.

I am well aware of the fact that all our Koi would benefit from overall warmer conditions, but we must consider ALL the factors involved before being carried away with enthusiasm at the prospect of watching and feeding Koi indoors when it is freezing outdoors.

It is impossible to deny that many people do take Koi of all sizes under cover for the winter. Garages, greenhouses, conservatories, stables and even spare bedrooms are used to house temporary Koi ponds. A supportive wife can be a great asset!

Speaking personally, I can see no point whatsoever in bringing large, healthy Koi indoors for the winter. If they are well established in familiar ponds I believe they are best left alone, always providing that ponds are sufficiently deep for safety. It may be true that, through inexperience, some novice Koi-keepers will underestimate the problems associated with keeping Koi healthy in what may be a reduced volume of water compared to a pond. According to the number and size of fish involved, aeration, filtration and water-changing must be considered. Koi should not be overwintered at temperatures much above 50°F., higher temperatures will only increase the problems during winter and will delay their return to the great outdoors.

No one can foretell what the coming months may bring but we cannot ignore the possibility of power-cuts or their dire consequences. Koi kept in overcrowded conditions, or in smaller volumes of water and heavily reliant on oxygenation of water will be at greater risk if and when the pumps stop, than those in ponds.

We can protect our Koi to some extent by covering pools for the winter. Clear polythene sheeting or ridged "Perspex" sheets firmly attached to wooden battens make good covers. It is very important to make everything as strong and secure as possible to withstand the weight of snow or ice and the gale-force winds we have come to expect in February and March. As much light as possible must be admitted to the pond, snow should be swept clear and if a cover is slightly tilted rain will drain off, hopefully on to the garden rather than into the pond. Your query can only be answered by your consideration of the fish involved compared to the facilities you can provide, I wish you and your Koi well. We all make mistakes and trouble can rear its ugly head anywhere, any time. Come spring some people will be saying "I am glad I brought my Koi indoors" and others will be saying "I wish I hadn't brought my Koi indoors". Others, like me, will leave their Koi outside as usual.

When I first started with Koi in 1976 I soon found out for myself that established goldfish ponds and Koi are not compatible. Being unable to alter the pond I followed your suggestion and constructed an external filter where the water is sprayed over the gravel. This has operated quite successfully during the past two years and I intend to build a new pond especially for the Koi which have now grown as far as they are likely to in their present environment. I would appreciate your comments on the proposed plan.

I am sure your first hand experience and findings will prove of value to other readers and it helps me to avoid what I often feel is an endless repetition of basic facts.

The design of your new pond is generally good with a built-in gravel filter area of about one-third the total pond area and located at the shallow end.

I would suggest you need not arrange this with more than about a 12-inch depth of  $\frac{1}{2}$  screen and thoroughly washed gravel, thus allowing a minimum 18 inches cover of water in which the Koi can swim and as a safeguard against freezing over in a severe winter.

The deep end should be taken down to provide at least 4-4 $\frac{1}{2}$  feet depth of water but there is little purpose in exceeding 5 feet as the beneficial effect of sunlight will be minimal and an undesirable

*Continued on page 58*



# HARDY CARNIVOROUS PLANTS

by D. S. Bunn

IT MAY not be generally appreciated that several of the carnivorous plants can be cultivated successfully once their habitat requirements are recognised. Moreover they can be established in simulated bog surroundings which can look very effective, especially if a small pond is included for the bladderworts. Most species require an acid peat habitat which is not at all difficult to create. Sphagnum moss, sedges and heathers will usually appear spontaneously if some of the peat is collected from a local bog and will make the set-up all the more realistic. Alternatively, they can be grown in plant pots stood in a saucer of soft water. There are different opinions among the experts regarding the medium in which to grow them, some enthusiasts adding sand and/or perlite to the natural peat and sphagnum mixture while others prefer simply to follow nature.

## Sundews

Only one species, the Round-leaved Sundew *Drosera rotundifolia*, is really widely distributed throughout Britain and unfortunately, although it abounds in every reasonably large acid peat bog and in many a smaller acid habitat, it can usually boast no more than a 1½ in. diameter rosette of leaves, each only about ¼ in. across. The flower stem, which usually appears in June/July, may attain 4 in. in height, but its white flowers are insignificant. Another sundew, *Drosera intermedia*, is much less constant in its presence in wet places, but is nevertheless widely distributed in the west of the country and sometimes abundant in its preferred habitat. This is slightly different from that of the Round-leaved Sundew, a favourite habitat being bare damp peat rather than among *Sphagnum*. In Dorset I have seen particularly large specimens growing in quite extraordinary profusion in a swamp in which the substratum was actually covered with shallow water, a habitat which is usually associated with the next species.

To those who are accustomed to the insignificance of *D. rotundifolia* it comes as a pleasant surprise to find that *D. anglica*, the "Great" Sundew, is a good deal bigger and stronger-looking in all its parts—though still by no stretch of the imagination a large

plant. Its strap-shaped leaves stand stiffly erect and are usually around 3 in. tall, with the flower head well above them. Despite its scientific name it is very rare throughout most of England and, so far as I am aware, can only be seen in reasonable profusion in a few of the wet heath bogs in Hampshire and Dorset. It appears to be more exacting in its requirements than the foregoing species and is confined to the very wettest places. The north of Scotland, however, provides it with unlimited saturated moorland habitat and here it virtually replaces the Round-leaved Sundew and flourishes in great abundance.

*D. intermedia* is well named because it falls between the two, a little larger than *D. rotundifolia* and with leaves that, though not round, widen near the tips of their stalks instead of from much lower down. The clearest point of difference, however, is the flower stem which, instead of rising vertically from the centre of the rosette, emerges sideways and then curves upwards, ceasing growth when the flower head is level with the tips of the leaves.

## Hairy leaves

The leaves of sundews are covered on their upper surfaces with strong hairs, each topped with a conspicuous globule of glue (hence their name). These hairs are very efficient and sensitive, and commence to bend towards and converge upon any insect that gets itself into difficulties on the leaf. I have even seen such large prey as damsel-flies securely held.

All three sundews are quite easy to grow outdoors in wet peat and/or *Sphagnum*. Indoors, even in the cold greenhouse, they present problems—in summer they tend to be scorched by the sun whenever the weather is really hot and in winter the winter-buds are particularly susceptible to attacks of *Botrytis* mould. Unfortunately, outdoors one often finds that birds are attracted to the *Sphagnum*—either for nest-building or as a likely hiding place for insects, etc. The results are usually disastrous so the plants need to be netted over. Being acid bog plants, it is essential, of course, that these sundews are given only soft water containing no nutrients.

### Butterwort

Another reasonably common insect-eating plant likely to be encountered is the Common Butterwort *Pinguicula vulgaris*. This species, on the contrary, seems to like quite a rich habitat and is often to be found growing in almost soilless situations on wet limestone and other base-rich rocks. Consequently, it does not suffer from the use of tap-water, although I feel the safest way to deal with all carnivorous plants is to cultivate them in soil obtained from places where they naturally occur and water them with rain water. It is ecologically interesting to note how the two common insect-eating plants, *D. rotundifolia* and *P. vulgaris*, despite differing requirements, can be found growing virtually side by side, acid and calcareous conditions existing within a few inches of each other. *P. vulgaris* has star-shaped rosettes of yellow-green leaves covered with short glandular hairs. Its blue flowers, each on a separate stem, are quite attractive. It passes the winter in a tight "bud" which is resistant to disease, but which must be kept cool to keep it dormant.

There are other butterworts in this country. The smaller, rather insignificant Pale Butterwort *P. lusitanica* is very local. It does not form a winter bud, instead maintaining a small rosette of its grey-green leaves throughout the cold months. Its flowers, as its name implies, are whitish and are quite tiny.

The third member of the family, *P. grandiflora*, is really only native to Ireland, where it is quite common in some parts. In general appearance it is almost identical to *P. vulgaris*, but whilst the leaves are little, if any, larger than those of that species the flower is very much bigger and bluer, and for this reason, no doubt, it is stocked by a number of plant nurseries. Not surprisingly it has been successfully introduced into suitable habitats in a few places in England.

The butterworts are only capable of trapping very small insects, etc., and their movements are confined to a slight inrolling of the edge of the leaves as if to retain the prey.

### Bladderworts

The most ingenious of the native carnivorous plants are the bladderworts which can be kept, with varying success, in aquaria. These are distantly allied to the butterworts as may be gathered from the similarity of their flowers which, however, are somewhat sporadic in their appearance. There are four species and even the largest of them, once again, are disappointingly small, although their yellow flowers are quite showy. The species in question, *Utricularia vulgaris* and *U. neglecta*, are almost identical, but can be separated when in flower by the shape of the lip. The former would appear to be mainly eastern in Britain and the latter its western replacement. The bladders which

serve as traps, as well as to buoy the plant up in the water during the summer months, are no more than 1/8 in. across and this makes their mechanism difficult to observe. In fact, the plant absorbs the water from the bladders thereby creating a vacuum, more water being prevented from entering by a door. When tiny prey such as *Daphnia* brush against sensitive trigger hairs at the entrance to the bladder the door is released and they are sucked in with the rush of water.

The two remaining species, *U. intermedia* and *U. minor*, are even smaller, with the bladders 1/8 in. and 1/16 in. respectively. *U. intermedia* is particularly interesting because its bladders are confined to the lower part of the plant and are buried in the detritus at the bottom of the pond or ditch where, no doubt, they are ideally placed to catch their prey. *U. intermedia* is rather rare while *U. minor* is locally common, sometimes occurring in dense mats although individually the plants are very tiny. I once found a pond in the Lake District yellow with the flowers of *U. neglecta*, *U. intermedia* and *U. minor*. The bladderworts die back to winter buds, surviving the cold months at the bottom of the pond.

### Pitcher plant

This concludes the list of true British carnivorous plants, but there is another to add which, though not native, is well established, thoroughly hardy and this time big enough to really appreciate. This is the widely distributed North American pitcher plant, *Sarracenia purpurea*. Introduced into Central Ireland in 1906, it has flourished and is described as "abundantly naturalised" in some of the bogs. A friend in Ireland tells me that its range is continually extending, probably as amateur botanists introduce it elsewhere. These days ecologists are strongly opposed to such practices, but ethical or not it has now been introduced to certain bogs in England.

### Lure of nectar

It is a striking plant, its leaves forming a rosette of rain-filled pitchers which are handsomely veined with red markings to attract its insect prey; they are also lured by a copious exudate of nectar around the entrance to the pitcher. Downward pointing bristles in the hood encourage the fly or wasp to move towards the entrance; pre-occupied by the generous liquor they reach a point where the wall of the pitcher becomes too smooth even for their efficient little feet. Usually, they re-emerge hurriedly before it is too late, but every now and again an insect loses its grip and falls into the fluid, which not only contains digestive enzymes but has the property of water-logging the prey and causing it to sink and drown long before it would normally do if it fell into ordinary water.

The *Sarracenia* flower is no less spectacular than the leaves and lasts a long time. It is no wonder that at present there is an upsurge of interest in this group of plants. Rather more handsome than the typical form is the sub-species *venosa*, found naturally in some southern States of America. This is the type most commonly sold by nurseries and is characterised by a more "inflated" pitcher with an attractive frilly hood; its flower also appears much earlier—in spring with the new pitchers.

There are seven (or eight according to some authorities) species of *Sarracenia*, all North American, two of which have their leaves in horizontal rosettes, the remainder with vertical pitchers. One of the latter type is also able to survive the English climate, at least in the milder west, although it is not to my knowledge found in the wild. This is *S. flava*, noteworthy for its efficiency in catching prey—the pitchers usually fill to the brim with insects within a few days of opening—and its superb yellow flower which appears in spring. The remaining five species are only slightly less hardy (with one exception perhaps) and may be easily cultivated if the temperature is prevented from reaching freezing point. All the species continually produce side shoots which, if detached, establish themselves in a very short time; if left a large clump is formed. The only snag one

must watch for is *Botrytis*, particularly in winter. After much experimentation I have found the only really effective means of prevention in the damp north-west of England is to be vigilant in removing all dead parts. Growing *Sarracenias* from seed is a lengthy business, but as all species readily hybridize, with patience no end of permutations can be obtained. Apparently, whenever *S. purpurea* and *S. flava* occur together in the wild they freely hybridize, the hybrid being *S. x catesbaei* which has been found to be hardy out of doors in the south-west of England. I should add that the intensity of the red markings on the pitchers of some of the *Sarracenia* species is largely dependent on the degree of sunlight to which they are subjected: the better the light conditions the brighter and more extensive the markings become.

Should the reader feel interested enough to try keeping some of the carnivorous plants it is worth mentioning that a few half-hardy sundews, far more exciting than our native species, are obtainable from certain nurseries. Notable among these is the large and very vigorous *D. binata* with narrow forked leaves and  $\frac{1}{2}$  in. white flowers, the similar *D. dichotoma*, an even larger but slower growing plant with leaves forked twice, and the beautiful pink-flowered *D. capensis* with long mobile strap-shaped leaves capable of folding right over their prey.

## THE HOUTTUYNIAS

by Philip Swindells

HOUTTUYNIA is a monotypic genus, the only species being *Houttuynia cordata* (syn. *H. foetida*). This is an attractive scrambling perennial that is equally at home in moist soil or several inches of water. A native of China and Japan, it produces a carpet of handsome bluish-green heart-shaped foliage liberally sprinkled with striking white four-petalled flowers with conspicuous hard central cones. In the double form 'Plena' these are lost in a dense central ruff of petals. Both kinds are increased by division in the spring.

Formerly known as *H. californica*, but now more correctly as *Anemopsis californica*, the Californian apache bead is equally accommodating. Requiring similar conditions to its more popular cousins, but preferring soil of an alkaline persuasion, it forms robust hummocks of dull green foliage which support single white anemone-like blossoms. Some pool owners believe *anemopsis* to be tender but I have yet to hear of plants being lost during the winter. Nevertheless, it may be an idea to overwinter a few

pieces of rootstock in a frame as they are readily divisible. But beware, for the roots have a sickly overpowering fragrance.



THE AQUARIST



# 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.

Please can you advise me on the best way of filtering a marine tank. I have been having trouble with Sea Humus. I have a 48 in. x 18 in. x 18 in. tank with two undergravel filters, two uplifts and a bubble-up corner filter.

I am thinking of purchasing a Power Filter, what is the best type to purchase? Also how would you advise I use it and the best way to maintain it?

We have purchased several sea anemones and they all fall apart and die. Can you tell us where we are going wrong? We have 12 ft. of lighting, 2 pink and 2 white.

The fish we have at present are 1 Regal Tang, 1 Pinnatus Batfish, 1 Sebastes clown and 1 Anemone stichopus, purchased a few days ago.

I am enclosing a stamped, addressed envelope and look forward to hearing from you soon.

1. *Filtration.* The best type of filtration for a sea aquarium, housing as it ultimately will, some of the most expensive animals (i.e. fishes and invertebrates) in the aquatic world, is the reverse-flow undergravel system. In this method of semi-natural aquarium-keeping, the normal undergravel filter's motive force of an air/water mixture rising in accordance with the laws of Archimedes within an airlift and so sucking water down through a bacterially-active filter bed is reversed. Instead the seawater, mechanically pre-filtered by a true power filter such as one of the "Nuova" or "Sicce" range is passed *downward* through what used to be the undergravel filter's airlift pipe and after radiating out beneath the perforated plastic baseplate of the U/G filter, travels vertically upwards through the still bacterially-active nitrifying filter bed. In passing upwards through the cockle-shell/coral sand filter bed this stream of water carries with it all the non-biodegradable sea-humus and all parasites and their eggs to the power filter wherein they become entrapped in the filter "wool" and from where they can be easily washed out to waste from time to time.

The precise *ADVANTAGES* therefore of reverse-flow undergravel filtration (which I have been alone in recommending since 1968) are as follows:

- (1) it is almost totally silent in operation when compared to the airlift-operated U/G filter. The sound of constantly running water made by the latter can be offensive to some people.
- (2) it prevents the slow, frequently-unnoticed accumulation of fluke-breeding sea-humus\* in the coral sand layer of the biochemical filter-bed.

The *DISADVANTAGES* of the reverse-flow undergravel filtration when compared with the massively popular, "simple undergravel filter plus a 75 pence internal corner filter full of ultra-high activity charcoal" school of thought (which I also spawned in late 1966) are:

- (1) the high capital costs caused by the essential purchase of a foreign power filter. These tools can cost over £500 (1979) for the reverse-flow filtration of a larger aquarium, although a 20 gallon (100 litre) marine aquarium would be adequately powered by a £50-£60 power-filter.
- (2) that in my personal experience the manufacturers of powerfilters still have a long way to go to even approach the longevity and reliability of operation of a better-quality air pump such as one of the superb "WISA" range. These German machines are virtually inaudible, enormously powerful and in my personal experience are capable of continuous unattended service in excess of over three years before needing even half an hour's maintenance. *NB—The two powerfilters mentioned above are two of the most reliable makes which I have been able to obtain for testing purposes during the last decade or so. I am even tempted to go further and state that due to its considerably greater complexity of design, the*

power filter will NEVER be as cheap or reliable to buy or even run as a vibrator air pump is.

\* In fairness I must state that this argument is really one of convenience only, since the efficient marine aquarist will always use the periodic 25%—33% partial water change as an opportunity to flush the sea-hamster from his coral sand anyway.

- (3) that a large and awkwardly shaped powerfilter is even more difficult to hide than an airpump—and once one has hidden it with reasonable success we usually find that we cannot service it without resorting to extremely difficult acrobatics.

2. **DYING ANEMONES.** The surface area of your aquarium is six (6) square feet. Since the tank is 18 in. deep you need 2.5 feet of fluorescent tubing per each square foot of water surface area, (my own calculated rule which I have tested experimentally with great success), or in other words:  $6 \times 2.5 = 15$  feet of fluorescent tube.

Now, although you only have 12 feet of tube, and although a better colour distribution would be two (2) only 36 in. "Gro-Lux" and three (3) 36 in. "North-lights," I am certain that inefficient lighting isn't the cause of your problem. My reason for saying this is that a "light-starved" coelenterate (e.g. anemone) doesn't "fall apart and die." It simply slowly gets smaller and smaller until it eventually vanishes, having totally digested its own tissues. Anemones which "fall apart" have, in my experience suffered one or more of the following misfortunes:

- (1) been exposed to "heavy-metal" toxicity, i.e. lead, silver, tin, mercury, zinc, copper, brass, bronze, poor quality Japanese stainless steel etc., or
- (2) been predated upon by a fish or some other invertebrate, e.g. a mollusc, or
- (3) have been bacterially-infected, usually as a result of tissue damage stemming from (1) or (2) above or from rough handling by exporters or importers.

If your *Stoichactis* species anemone seemed perfectly healthy when bought, but gradually falls to bits in your tank, I suggest that you scrap your entire aquarium (and all materials used to put it together) and start again or, alternatively, stop buying anemones—and probably any other invertebrates as well.

I intend to establish a 4 ft.  $\times$  2 ft.  $\times$  2 ft. aquarium with a view to keeping an octopus.

My questions are:

1. Bearing in mind that the aquarium will contain a high turnover-rate reverse-flow under-gravel filter operated by a power-filter, do you consider the tank to be large enough?
2. Would an anemone, some sea-urchins and starfish be compatible with an octopus?
3. Are there any fishes which you would recommend as being compatible with invertebrates—not forgetting the octopus?

4. Are there any *Octopus* spp which keep to a moderate size?

5. Please could you recommend a source for purchasing *Octopus* spp? The shops in the Bradford area don't appear to want to stock them. Please could you give me a rough idea of the price I might pay for an octopus?

6. Could I feed well-quarantined shore-crabs to my octopus? It strikes me that this useful food might be what an octopus would eat in the wild state.

1. **Tank size.** Your tank has a gross capacity of 100 gallons. Allowing for water displaced by your cockle-shell/coral-sand filter-bed and rockwork (—octopi need a spatially-complex rock arrangement with lots of caves and tunnels if they are to feel "at home") this will probably result in a nett gallonage of 80-85 gallons. Such a tank is large enough to keep any known tropical *Octopus* species in fine health. **PLEASE NOTE:** because of the extremely low tolerance of nitrate ( $\text{NO}_3$ ) of the octopods, you will have to maintain a lower than 10 mgs/litre nitrate level at all times by either once-weekly 25% water changes OR mass cultivation and regular harvesting of one of the faster-growing *Caulerpa* spp of alga.

2. **Compatibility with other invertebrate species.** All invertebrates would be compatible with an octopus in a tank as large as yours, except for:

- (i) another octopus of any species.
- (ii) another cephalopod of any species (e.g. cuttlefish, squid etc.)
- (iii) any of the crustacean family, e.g. crabs, shrimps, prawns, lobsters etc.

However, do not forget that each and every invertebrate which you add to the system will have to be fed and therefore their excretory metabolites will ultimately add to your ever-present nitrate nightmares.

3. **Compatibility with fish species.** Frankly, no fish other than those possessing an extremely toxic mucous secretion would be safe with an octopus—no matter how large the fish nor how small the octopus might be.

This probably restricts you to a choice from the following:

- (a) Mandarin dragonets; (b) *Canthigaster* spp.; (c) *Ostracion* spp.; (d) and just possibly (though I have not personally confirmed this) a member of the *Diodon* (Porcupine Puffer) spp.

4. **Size of currently available *Octopus* spp.** Any octopus which you would be likely to obtain could be satisfactorily housed in a 100 gallon (450 litres) aquarium.

5. ***Octopus* availability.** The statement in your fifth question is, I feel, an unwarranted slight on the spirit of adventure (commercial and biological) so characteristic of Yorkshire aquatic dealers. I can

Continued on page 56

THE AQUARIST

waste (Urea) builds up in the water restricting growth and giving the water a yellowish colour. To keep my fishes in the best condition I like to change one third of the water at approximately fortnightly intervals, more often if possible. There is good reason for changing only one third of the water. This is that too great a change in acidity (pH) at one time is bad for the fishes. All water used in my tanks has stood in open vessels (pails) for two days or more. A point about siphoning water, often disregarded, is that the gravel should be raked about before siphoning the detritus in just the same way as gardeners aerate their soil. It may surprise you to see how much dirt can be removed from the gravel in this way. The end of the siphon tube or a planting stick can be used for this operation.

#### Feeding

When working away from home so the fishes could only be fed twice a day it became obvious that breeding stock could not be kept in peak condition and egg-layer fry died off between feeds. Working closer to home my fishes can get a minimum of three feeds a day, generally five, and they grow faster and fatter. Live foods are fed a minimum of twice a week. No feeding rings are used, dried foods are fed at both ends of the tank so that the less greedy fishes get a chance to eat in peace.

#### White spot (*Ichthyophthirius*)

This parasite is the bugbear of the beginning aquarist. It often used to show itself when I purchased new fishes. When I was financially embarrassed and unable to buy any new fishes I noticed there was

never any white spot in my tanks. Now I quarantine all new arrivals in a bare tank with two drops of five per cent methylene blue solution per gallon. For many years it has been impossible to cure white spot in a planted tank without risking damage to the plants but recently better cures have arrived from America which are colourless and do not affect plants (e.g. Maracide).

#### Filtration

The modern vogue seems to be to use under-gravel biological filtration. This seems to be ideal for tropical marine tanks and should theoretically be ideal for freshwater tanks. Unfortunately, it appears to restrict the growth of plants, possibly due to movement of water around the plant roots. Also, as the solid waste matter is broken down to soluble waste, the one third regular water change is essential.

#### Lighting

In these days of fuel economy it is surprising that we find tank hoods with tubes and bulbs six or more inches from the water surface. Light follows the square law principle and if this distance is halved there will be four times as much light at the water surface. Therefore for efficiency our lights should be as close to the water surface as is safe. In these days of all glass tanks a glass cover can rest directly on the tank and the lamps can be as little as 1 in. above the cover. This may be one of the reasons we are hearing so many complaints about poor plant growth lately.

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## MARINE QUERIES *continued from page 54*

think of at least half-a-dozen well-known (famous, even) aquatic dealers in your area who would, if approached in the right way, order an octopus for you.

However, the rub is in the seemingly innocent phrase "if approached in the right way." You see, octopi are such notoriously nervous travellers, that only one in three shipped from the Tropics reaches Heathrow alive. Now, let's imagine your local shipper ordered six octopi from Ceylon (Sri Lanka) at US \$15.00 each (total FOB price =  $6 \times \$15 = \$90 = £45.00$ ) to which cost must be added £15.00 per animal (airfreight, documentation, Customs, etc.) to give a total landed cost of approximately £135.00. Let us imagine it is mid-summer and the weather is warm and there are no aircraft delays due to strikes, technical trouble etc., so that of the original 6 animals shipped two arrive alive at London (Heathrow) Airport. Your local supplier now has to collect his shipment from Air Ceylon/BA and drive the 200

miles back to Bradford. The chances are that during this drive or whilst attempting to acclimate the octopus to his seawater aquarium, a further octopus will die. Thus, if he is very lucky, for an expenditure of £135.00, a 400 mile drive and a long day's labour he *might* have an octopus to offer you. Now, the crux of the matter is, are you prepared to pay him even £135.00 (= less than cost!) for one octopus—let alone give him some profit for his risks, capital expenditure and hard work? I frankly doubt it.

6. *Feeding an octopus in captivity.* In view of the trouble and expense to which a lot of people will have gone, (only *SOME* of which is detailed above) to get an octopus to you alive and healthy, I must say, even at the risk of offending you, that you would be clearly barmy to introduce any foodstuffs other than gamma-ray irradiated seafoods for the octopus/fishes and a liquid suspension food for the other invertebrates.

# Commentary

by Roy Pinks

THE NEW YEAR is attended by long winter evenings during which we may allow ourselves the luxury of pondering about the hobby in agreeably relaxed circumstances. The pressures of the season past have let up a little, we can take stock and prepare for another year. I am often asked which of the three main lines of the hobby I prefer above the others, and this is a recurring topic of discussion wherever and whenever fish are talked about—unfortunately many folk become over-emotive because of their loyalties or partisanship, and divisions appear where none need exist. For my part, the hobby is one great collection of a thousand and one activities, from keeping damselfish to peering through a microscope at the wing structure of a mayfly. There is a vast spectrum of interest for all with enquiring minds, and there is no room for admissions that boredom need ever exist.

## Fishkeeping

But people do get tired of what they call fish-keeping, and they take up other things because they have never really penetrated beyond the community tank or that awful first venture with marines. There are so many alternative opportunities for the exercise of one's interest and ingenuity that I often offer thanks that I have experienced so many failures during my fishkeeping career, as these in themselves have opened up fresh challenges and unexpected triumphs. I would therefore remain cautious of advising the beginner to start with, say, Coldwater, and then graduate to another branch because such an approach would imply that different interests are on varying levels, with promotion or demotion for good or bad behaviour!

I would admit, however, that I have a scale of preference beginning with Marine, followed by Tropical Freshwater and Coldwater. That is when

I am thinking in terms of overall spectacle. When I am thinking in terms of interest or value for money, these three branches take a different order each time, which can be justified for quite valid reasons. As a writer I am obliged to keep something of almost everything (but not all at once), and this certainly helps to prevent a single track approach and to justify the personal whims which come and go over the years.

## Frustrations

My biggest frustrations have certainly been in the tropical marine sector, and yet here, too, are some of the most fascinating of all fish and of all techniques for their management. It is a highly costly branch of the hobby, and it requires more time and dedication than almost any other. The rewards, as might be expected, are extremely high in terms of visual satisfaction. Regrettably there is overweening pride of possession of rare fish on the part of those whose depth of pocket matches a certain sense of snobbery; those with true craft and respect for threatened species exercise restraint and derive tremendous satisfaction from the hardier and commoner (and cheaper) members of the marine world. No part of the hobby is more challenging to attain perfection, and no aquarist's education is fully complete without an excursion into saltwater fish-keeping.

## Tropical Freshwater

The bread and butter of the hobby is undoubtedly Tropical Freshwater, with opportunities for breeding which the mariner will never enjoy. The choice of species is seemingly limitless, with newcomers appearing every year, and so many fish will live happily together that the habit we all possess of

impulse buying can be indulged in from one end of the season to the other. Variety of colour and form make it possible for collections to be assembled to match the mood or the furniture, and even now the prices of both equipment and stock are eminently reasonable. The availability of a host of fascinating plant species, denied to the mariculturist, tends to attract the gardeners to this area, and here is a wonderful opportunity for decorative instincts to come to the fore. Like saltwater, this part of the hobby can be carried out throughout the year, which is most appealing to those whose normal activities are curtailed by the winter months. Coldwater fishkeeping is properly centred on the garden pool, even though many derive great interest and sometimes profit from keeping coldwater fish in slightly warm conditions indoors all through the year.

I must confess to a great yen towards the pool and all that goes with it, and this, perhaps, I should miss most if I had to part with it. There are mysteries

and happenings in and around the pool which have me spellbound for all of the open season: not just those related to the fish, but to the whole complex of living things which, themselves, are attracted to water. Apart from the exotic fancy fish which commonly inhabit garden ponds, we have opportunities of keeping some of our native fish, of which the minnow can offer greater challenges in the way of successful culture than marine angelfish, and at a fraction of the cost. The waft of the Water Hawthorn and the extravagant glow of the *Lobelia cardinalis* can be experienced in recollection in the depths of winter, when the annual resting and cleansing is taking place. And those who live closely with nature find that their own metabolism goes much in hand with it, so the pool will invisibly start those early stirrings in its manager which will bring him forth on lengthening days to inspect it and to detect the first signs that the wonderful cycle will once more unfold.

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## KOI QUERIES *continued from page 49*

stratification in temperature may occur. I note that you have made provision for a bottom drain at the deep end which is excellent for the periodic removal of soiled and mildly polluted water from this area.

The filter pipe network under the gravel should be 1½ inches diameter and drilled through with 1 inch holes spaced from 4 inches apart near the suction connection at the centre of the grid to 2 inches apart at the remote parts for an even pull-through. There is every advantage in retaining your outside filter particularly for use in summer and autumn when it would be impossible to have too much filtration. During the colder months, from November to March, the outside filter could be disconnected and drained for safety.

Your present submersible pump should prove adequate to operate the under-gravel filter with the water return at about water level to provide some aeration and to keep an area free of ice during frosts.

For general use you will have to invest in a larger capacity water pump. In order to achieve reliability this should be an external surface type driven by an induction motor and the pump rated at 600 to 700 gallons per hour. Allowing for friction losses in the pipes and head of water to your outside filter this should provide an output of about 450 gallons per hour. By taking your deep area down to about 4 feet you will increase the volume of water from less than 2,000 gallons to over 2,500 gallons and the suggested pump will turnover this volume not less than four times per day.

It is not necessary to build a barrier to keep the

Koi off the gravel bed, they enjoy 'rooting' in that, but the gravel should be about 3 inches lower than a retaining wall to prevent the gravel spilling over into the pond or when large Koi decide to 'sort it out'. I note that your pond will be in-ground with the surface at ground level. A low wall would give some protection from cats, provide some form of safeguard when Koi jump and prevent soil and/or any fertilizers, weedkillers, etc. running in during wet weather.

**I have recently noticed that one of my Koi has a badly split pectoral fin. I cannot understand how this could have happened but do you think it will mend?**

If the Koi is in good condition the split should largely mend in time but I cannot promise you that it will mend completely. The larger the fish the longer the repair process is likely to take. I have a Koi that arrived in an appalling state with fins and tail torn and split, probably due to bad handling. Some of the splits mended quite rapidly but after six years I have accepted the fact that one pectoral fin will never fully mend although it has grown in relation to the Koi which is now 26 inches long.

Are you sure there is nothing sharp or rough in your pond? It is vital to ensure that no plant containers, overhanging rocks, stepping stones, ornaments, etc. can damage Koi. If alarmed by sudden movements they may panic and dash away and during the spawning season they are likely to harm themselves if any obstacles are in their way.



# Coldwater jottings

by Frank W. Orme

DURING EARLY November I awoke one morning to find a thin covering of ice over the water surface of the pond which made me realise that before very long the goldfish would be entering their state of semi-dormancy which lasts throughout the colder months of the year. At around that same time I received a telephone call from someone who wanted to know when they should cease to feed their fish. Of course, there is no specific time at which we can promptly withdraw from offering food—any more than there is a set time to recommence feeding cold-water fishes. Temperature has much to do with the feeding cycle; the lower the temperature the less will the fishes be inclined to accept food, whereas warmer conditions will encourage a greater appetite. Like all creatures, fishes are individuals, and as the temperatures fall it will be seen that some begin to eat less than others; this is the time to start reducing the amount of food—always making sure that no food is left uneaten—until the time arrives that none of the fishes are tempted to eat. When that stage is reached it is the signal to cease feeding because the uneaten food is not only wasted, it is also dangerous. If uneaten food is not removed it will become a source of water pollution and help to create conditions which can be toxic to the fishes. Very few fishes will die through being underfed, but a great many have done so due to the polluted conditions resulting from over-feeding. Observation of the fishes will provide the clues as to whether it is time to decrease, or increase, the rate of feeding. If the clues are noted and the aquarist acts accordingly there is little chance of anything going wrong.

## **The Fork-Tailed moor or Globe-eye**

Over the years various livestock spheres have seen the disappearance of different animals or varieties, because they have become unpopular or fallen out of favour. Often, when it is too late, their passing is greatly lamented and people wonder why nothing was done to prevent them dying out. In the poultry world many famous old breeds and varieties no longer exist, all that remains are their pictures—and the

same thing has happened in some other hobbies. The fork-tailed Moor, known as the Globe-eye to the Goldfish Society of Great Britain—and once kept by many of its members—is now passing into obscurity. Its popularity has waned in favour of the Broad-tailed Moor and, it seems, very few now bother to breed it.

Of course, these fashions tend to be created by being able to acquire varieties which are easier to come by, and by the preferences of show judges and/or the requirements of current show standards. In the dog world this has resulted in the scaling down of some breeds from their original size so that they have become undersized miniatures of their forebears.

It seems a great pity that popular opinion of the time may be the cause of many older varieties, breeds or strains to be lost forever. The only way to prevent this happening is to have enthusiasts sufficiently dedicated to continue breeding and raising these unpopular types—despite the dictates of fashion or any criticism that others may level at them. Equally, the reprehensible habit, which some have, of interbreeding the different varieties should be discouraged. Even this unthinking habit can, if enough people practise such a method of breeding for a sufficient length of time, radically alter the appearance from that of the original stock. In order to maintain our existing varieties of fish they must be line-bred, and continue to be bred even when they are no longer fashionable. Unless some aquarists are prepared to follow this reasoning not only is the Globe-eye likely to vanish but, at a future time, some other variety may also sink into oblivion.

## **Lionheads**

Not so very long ago a letter was received from overseas in which the writer enquired about the possibility of obtaining some of my Lionheads. He informed me that he had previously written to Japan and a number of other countries. However, he did not like the type of fish which they had offered. He described the fish which he had purchased as 'commercial types' and, he felt, of inferior quality. He then informed me that he would like to obtain

some of my stock 'but they had to be top quality show specimens' and he would prefer, if possible, a Lionhead with a 'silver body and red hood, tail and fins' to be included.

No doubt this gentleman knew what he wanted, but he failed to realise that very few fish reach the high standard which he specified—and I must admit I have never produced, or seen, the distinct colour pattern which he asked for. The very few really good specimens that may be reared are invariably kept for future exhibition and show purposes, and I doubt if any fish breeder would part with the best of the fishes. Having said that, an established fish breeder can normally supply some stock of reasonable show quality—especially from amongst the current season's young—and they will carry the potential to produce some young which may be of a quality superior to themselves. It is even possible to buy a young fish which, when it has matured, can turn out to be better than any which the breeder has retained. Some time ago I gave an undersized youngster to a friend from Bristol; this fish has now grown into an exceedingly nice specimen because it was given individual attention and care.

All too often breeders of fancy goldfish are asked to supply a perfect fish—unfortunately we have not yet produced one!

#### Winter purchases

Another thing which puzzles me is why those aquarists who should know better try to purchase fish during the winter. Whenever the cold weather sets in, at the end of the year, I start to receive enquiries—sometimes there are almost as many as during the breeding season. Often I am asked to send fish by train to the hopeful enquirer. Always, without exception, I refuse to part with stock. I explain that this is not the ideal time to think of buying coldwater fishes and, if I were to send the fish on a rail journey, it would be asking for trouble. Just suppose the temperature fell low enough to freeze the water, would the recipient be happy to find a block of ice awaiting collection, with the fish solidly frozen in?

As I have said on many occasions, I believe that winter should be a period of semi-dormancy for my fishes, a time during which they are allowed to remain undisturbed. In my opinion this winter rest period helps to prepare them for the coming breeding season. During this time their metabolism slows right down and they become very lethargic seldom, if at all, showing any signs of wanting to be active. Most certainly this is not the time to be interfering with them; nor is it the time to catch them up, place them in a container and then send them on a journey expecting them to then become acclimatised to their conditions in a new home.

It may well be that some people would be quite

capable of dealing with the fishes, and bringing them through the transition with safety—despite the many factors that would be operating against them—but the majority would not. When I part with any fish it is my hope that it will survive and give pleasure to its new owner for many years. If I thought otherwise I would not let the fish go and for this reason I will only let fish go during those times of the year when the transference from my hands to those of another is likely to be safely accomplished—and the winter is not one of those times.

No, if you must obtain new stock try to be both patient and sensible, wait until the warmer temperatures of spring, summer or autumn; the fish are less liable to cause problems and will stand a much better chance of survival—especially in the hands of the less experienced fishkeeper.

#### Said story

"News Views and Ideas" is the title of the quarterly journal published by the Northern Goldfish and Pondkeepers Society. This is an unpretentious little magazine, edited and, I suspect, compiled by Mrs. Pauline Hodgkinson. It always makes interesting reading and the summer issue was no exception, although I felt sorry for her when reading the editorial page. I hope she will not mind if I repeat the tale of her misfortune, she writes: "Way back in June, in my part of the world (Lancashire), we had such a cloud burst of the sort I have never experienced in my life. We had so much rain in such a short space of time that the drains could not take all the water. The manhole covers were literally shot into the air. As my house is on low ground, water from the neighbouring gardens rushed through the fences, and at one time was eighteen inches deep.

"My pond, which is built up to about ten inches above ground level, was completely covered. Only the previous week we had spent two to three hours cleaning out, and refilling the pond—which is quite a job as it is eighteen by five feet and a couple of feet deep. As you will imagine, without a pump, rather a lot of water to bail out. After the flood my pond looked a real mess, but the fish were my main concern. It was late and getting dark, so the only thing to do was to bail out half the water, which was thick and mucky, refill it and do a complete clean-out the next day. Luckily, I lost only two fish so my policy of not putting any really good fish in the outdoor pond paid-off."

There are times when Dame Fortune seems to delight in creating difficulties for us but, fortunately, not many of us have had to contend with that sort of problem—even when she has been at her most spiteful. Pauline was very lucky indeed; it would have been quite possible for the fishes to have been swept from the submerged pond and lost forever, or suffocated by the silty, muddy water.

## PLANT QUERIES

by Vivian De Thabrew

A month ago I decided to reset my 36 in. x 15 in. x 12 in. tank. I have never had too much success with tropical aquarium plants. I put an undergravel filter in, this was covered with two layers of gravel, with a layer of peat in between. The tank was left like this for a week before being planted. The lighting in my aquarium is by one Gro-lux tube. The plants I purchased were as follows:

Bacopa, Cabomba, Ambulia, Willow-leaf Hygrophila, Amazon Sword, Acorus rush, Hair grass, Pygmy chain Sword, Water Wistaria, Pennywort, several Crypts, Lizard Tail, *Hygrophila polysperma* and Elodea. All these plants are growing well. The Cabomba and Ambulia both have roots hanging from them, and have to be cut back already. The rest are growing fast, with new leaves, new shoots, and even new plants off my Pygmy chains. But my Elodea and *Hygrophila polysperma* have just rotted away. My plants are kept at a temperature of 76°F, the pH is 6.6 and the hardness is 8 DH. I have now had fish in my aquarium for a week and all is well so far. I still can't understand why Elodea and *Hygrophila* won't grow. Have you any suggestions?

It appears from your description that you have achieved a healthy tank for most aquatic plants, except for Elodea and *Hygrophila polysperma*. Your temperature of 76°F and pH of 6.6 are most favourable to all the plants you grow except Elodea. Elodea adapts well to most aquarium conditions, likes plenty of light of strong intensity and will tolerate a wide range of temperature, 60°-75°F. However, it does prefer alkaline water with a pH of 7.0-8.0 (yours is slightly acid at 6.6). The hardness required is around 20-25 DH (yours is only 8 DH). Therefore it seems that it is ecologically difficult for it to survive with the other plants in your tank.

*Hygrophila polysperma*, on the other hand, will adapt to general water and temperature conditions preferred by most aquatic plants, i.e. slightly acid water and a temperature of 65°-78°F, but it requires a considerable amount of light. It would appear therefore that you should concentrate on giving it plenty of light, certainly much more than the others are receiving. In order to achieve this, it is recommended that you

place it in a position where it will receive more natural light than the others, if possible. Lighting of up to 10 hours at 40 watts intensity is recommended.

I have purchased a 36 in. x 12 in. x 15 in. tank. My problem is that I want undergravel filtration and also reasonable plant growth. I believe using aquarium peat is a popular idea, but I am not sure how to go about this with an undergravel filter, because of the danger of clogging the base plate. Do you advise a stocking of some description to hold the peat still over the base plate and under the gravel?

Could you also tell me if one undergravel filter is sufficient covering half the bottom of my tank, or should two be used covering all of the base glass? My lighting is a Gro-lux system for use in a tropical community tank.

It is generally possible to have satisfactory plant growth using undergravel filtration. However, you should ensure that a reasonable depth of about 3 inches of planting medium (i.e. aquarium gravel) is present. As you have suggested, you can certainly place the aquarium peat in a casing of some description, the best available material being a nylon material with a very fine mesh. This is essential in order to encourage the fibrous roots to penetrate into the peat. The peat layer should be placed immediately above the undergravel filter and a 3 inch layer of gravel or gravel and sand should be placed above this.

It is best if you cover the entire tank bottom with undergravel filters, as this will ensure even filtration. Your Gro-lux system of lighting is quite adequate for plant growth provided you give a 30-40 watt light intensity over a period of 6 to 8 hours per day. Most tropical aquatic plants require slightly acid water conditions; please ensure that the pH of your water is around 6.5-7.0.

My tank is 24 in. x 12 in. x 12 in., with an undergravel filter and one 15 watt Gro-lux light. I would like plants that would stand plenty of light, in the region of 10 hours a day, big and small ones. Could you please supply me with details, height the plants grow etc.

Most plants do well with about 10 hours of lighting

a day. However, you must ensure that you have a suitable planting medium and the water condition is right for good plant growth. If you maintain a temperature of around 74°-78°F and a slightly acid water condition of pH 6.5-7.0 you should have success in growing most of the aquarium plants.

Here is a list of plants which can be grown with ease in your tank:

*Aponogeton crispus*, *A. undulatus* (up to 10 inches), *A. natans* (up to 9 inches), *Ambulia Linnophila sessiflora*, (up to 10 inches), *Bacopa monnieri* and *Cabomba aquatica*, both of which have long stems which should be pruned and re-planted as necessary, the same being the case with *Alternanthera sessiflora*, *Cryptocoryne affinis* (up to 4 inches), *C. beckettii* (up to 8 inches), *C. ciliata* (up to 6 inches), *C. lutea* (up to 6 inches), *C. nevillii* (up to 3 inches), *C. wendtii* (up to 6 inches), *C. willisii* (up to 6 inches), *Echinodorus tenellus* (Pygmy chain—up to 3 inches), *E. cordifolius* (up to 12 inches), *E. martii* (up to 12 inches), *Hydrilla verticillata* and *Hygrophilla polysperma*, which have long stems should be pruned and replanted, *Ludwigia natans* (up to 12 inches), *Microsorium pteropus* (Java Fern—up to 10 inches) and *Synnema triflorum* (Water Wisteria—up to 12 inches).

All the above grow well under the conditions described earlier. *Elodea densa*, however, a very popular plant whose long stems should be pruned, requires alkaline conditions; the water should have a pH of over 7.0.

An analysis of my local tap water supply obtained from the North West Water Authority discloses that the supply contains 91 p.p.m. of chloride (inter alia). Can you please advise me whether chloride is detrimental to plant growth, and, if so, is there any means of removing it?

Also, could you please advise me whether 'clear' type tungsten electric light bulbs have a more beneficial effect on plant growth than the usual 'pearl' type. (one opinion I have is that 'clear' bulbs always encourage the growth of a hard, crusty type of blue-green algae). I recently changed over to three 40 watt 'clear' type bulbs in my 36 in. x 15 in. x 12 in. tank and have a hard, crusty type of blue-green algae on the bottom gravel which seems to lend support to the opinion given to me (much to my annoyance).

My own experiments involving over sixty species of tropical aquatic plants grown in chlorinated water do not show marked growth retardation. The plants were grown in tap water and showed normal progress within the given parameters. The effect of chloride is more damaging to the fish than to the plants.

The slight disadvantage of using clear electric light bulbs is their unevenness of light diffusion. However, this disadvantage can be turned to an advantage by

planting those plants which require more light where the maximum intensity of the light of the bulb falls, and those requiring less light away from the main light rays. The general opinion of aquarists about the pearl type of bulbs is as you say, but with the present-day light bulbs, this type of bulb is as good as the pearl type.

Blue-green and green algae are caused by shallow-reaching red light rays of the spectrum. As these are virile under strong illumination, their development can be reduced by the reduction of the light intensity. Furthermore, these algae are encouraged by the alkalinity of the water. Chlorinated water with a high calcium content usually has a pH of above 7.0, favourable to the growth of blue-green algae. Therefore the answer to your problem seems to me to be (a) reduce the lighting by one 40 watt bulb; (b) maintain your water in an acid condition (below 7.0 pH) by using rainwater which has been collected and stored for a week or so. This water should be filtered before use, either through a diatom filter or fine muslin.

I have been an aquarist for about four years, but as yet, I have never had any luck with plants in my tank. No matter what plants I try they grow for a couple of weeks, then they go brown and die. My tank is 60 in. x 18 in. x 12 in. and is stocked with 3 Angles, 6 neons, 2 Black Widows, 4 Scissor Tails, 2 Glow-lights, 2 Mollies, 2 Kissing Gouramis, 1 Siamese Fighter. My tank receives approximately 10 hours of light a day from a 40 watt 4 ft. Gro-lux light which does not seem to help them. The plants I have tried are Vallisneria, Cabomba, Amazon Sword, none of which seem to grow readily. The filtration in my tank consists of two surge filters and pH is about 6.8-7.0. I do not use plant plugs or compost, but have about 3½ ins. of gravel in the tank.

From all accounts the filtration does not seem to cause any problems. Your pH range, too, is satisfactory for the plants you have tried to grow. Plant plugs and special composts are not essential, but of course all these are helpful aids to easy plant growing. If your 3½ ins. of gravel bottom were to be enriched a little with, say, aquarium peat, you need not introduce any further medium to establish your plants. You are certainly giving adequate light of the correct intensity.

Perhaps the very information which you omit, i.e. the temperature, may, I suspect, be at fault. A temperature range of 70°-75°F is ideally suitable for your combination of plants. Allowing some of the dead plant matter to remain in your tank will prove beneficial, as this provides invaluable detritus, which is much appreciated by the plants. However, large, unsightly pieces should be removed from the tank by siphoning. Amazon Swords are particularly partial to a muddy or nutritious tank bottom.

# PROPAGATING WATERLILIES FROM EXISTING ROOTSTOCKS

by Philip Swindells

WATERLILIES are expensive plants to buy because of the relatively long period of time it takes the nurseryman to bring them to maturity. However, the patient hobbyist wishing to increase his own stock or the economically minded one just starting a water garden and who has a friend with established clumps, can propagate these gorgeous subjects quite easily.

All hardy waterlilies, with the exception of the miniature varieties *Nymphaea pygmaea alba* and *N. tetragona*, can be readily propagated from 'eyes.' These are tiny growing points which occur with varying frequency along the rootstocks of mature plants. In most cases they appear as smaller versions of the main growing point, each with its juvenile foliage seeming ready to burst into active growth, although occasionally, as with *N. tuberosa* and its hybrids, they take the form of brittle rounded nodules which are easily detached.

Established plants are carefully lifted during early summer and the eyes removed with a sharp knife. The wounds of both eye and rootstock must then be dusted with powdered charcoal or sulphur in order to prevent infection and the latter returned to the pool. The severed eyes can then be potted into small pots in a good clean loam and stood in a shallow container of water with the growing points just submerged. If the eyes are very small it is advisable to give them the added protection of a cold frame or greenhouse during their early stages of growth.

As the leaf stalks of the young plants lengthen the water level can be raised. The plants then being transferred into progressively larger pots as they develop, until a four or five inch size is attained, when they can be moved into baskets and placed in the pool in their permanent positions.

As mentioned earlier, some of the pygmy waterlilies do not produce eyes and therefore have to be increased from seed. This must be freshly collected from

ripened seed pods and not have been allowed to dry out. If harvested in its correct state, the seed will be embodied in a gelatinous mass which should be sown with the seed. Attempts to separate the tiny individual seeds are futile.

A good loam soil is as good a sowing medium as any, providing it is well sieved to remove any large particles. Shallow pans can then be filled with this soil and the seed and jelly spread as evenly as possible over the surface. A light sprinkling of fine soil is necessary to cover the seeds and a gentle soaking from a watering can with a fine rose attachment will settle the compost nicely. The pans should then be stood in a bowl or aquarium with the water just above soil level.

After two or three weeks the first seedlings should appear. They have tiny translucent lanceolate leaves and look a bit like liverworts. From the time they germinate, and indeed for the first few months of their formative life, filamentous algae are likely to be a nuisance, becoming entangled with the fragile juvenile foliage of the seedlings. A good algicide correctly administered will alleviate this problem, but any dead algae that lingers should be removed before fermentation begins and causes rotting of the waterlily foliage.

When the first couple of true floating leaves have come to the surface of the water, the plants should be pricked out. Lift them in clumps and wash thoroughly to remove all the soil and then gently tease them apart. A plastic seed tray is the most useful container in which to prick out the seedlings, immersing it so that the compost is about an inch beneath the surface of the water. The water level is then raised as growths lengthen and become stronger. After six months or so the plants will become crowded and the compost exhausted, at which time they may be carefully lifted and transferred to their permanent quarters.

## BOOK REVIEW

**Mediterranean Fishes** by G. H. Jennings. Calypso Publications, London, £2.25.

This pocket-sized guide will come in useful for the information and means of identification it contains for the holidaymaker with an interest in sea fishes in general (including those served on a plate) and the rockpool investigator, enthusiastic skin diver and marine aquarist in particular.

The author states: 'Whilst all recorded Mediterranean species are listed, emphasis has been given to those fishes most likely to be seen. . . .' In the next paragraph readers are told: 'Information on all other species has been restricted to a minimum, but for those keenly interested in the subject a list of books for further reading is given later in the text.'

Attention is drawn to Mediterranean fishes ideally suited to the home marine aquarium as, for example, the easy to come by blennies, gobies—the latter species make up the largest family of fishes common to the inshore areas—the smaller wrasses, the ubiquitous mullets—beloved by the ancients—and others too numerous to mention here. The collector is warned about the difficulties which can arise about transportation. Indeed it is not to be wondered at that not a few species create transportation problems; whereas others demand nothing more than minimal requirements.

In earlier pages of his guide, the author reminds us that: 'The diversity of types in the area, caused by its geographical situation, is really amazing. They range from the Common Eel, a species well known in northern Europe, to the representatives of truly tropical, reef fish families, such as the Black Damsel (*Chromis chromis*), the Cardinal Fish (*Apogon imberbis*), Parrot Fish (*Euscaris*) and many more.' There is a section called *Edible Fishes*. Surprisingly though all the author thinks fit to give us is a list of eleven species, out of which number four are awarded such comments as 'Require expert preparation', 'Delicious when fried', 'Taste deteriorates with storage', 'Seasonal availability'. Yet the fishes on his list left free of comment include such species as saupe, dentex and moray eel which admit admirably

of treatment by the adventurous and proficient cook. (At this point, I should like to say that those who, like myself, have a fondness for fish, even the least known or outlandish, on the menu, should dip into Alan Davidson's scholarly and fascinating book called *Mediterranean Seafood*, a Penguin handbook. I think it is still available.)

Some consideration is given to *Hazardous Fishes*. And rightly too. For it is easy for venom-loaded spines to penetrate unprotected human flesh. More. It is not unknown for the careless or the foolhardy to show contempt for curious sharks or rays which may have poisonous stings in their tails or pack an electric charge powerful enough to knock the average man silly. 'Classical writers noted that a dangerous shock could pass along a spear to the hands of a fisherman'. So Alan Davidson in his book mentioned above.

There are two *Identification Guide Charts*. These give outline drawings of body shapes, fin shapes, mouth shapes, distinctive eye-markings, the presence of spines, distribution of spots and other external features such as barbels and fleshy appendages. *Species Coding* explains how to translate the recognisable features of a fish into something more positive than mere generic recognition. There are two indices. The first lists scientific names; the second popular or common names. No doubt the repeated use of 'colouration' instead of 'coloration' will cause the reader to wince as much as the reviewer.

*Mediterranean Fishes* is illustrated by nine colour photographs (the cover illustration would have been better left unretouched) and nine reproductions of black and white photographs. The basic drawings in pen and ink of fishes in the 12 plates are clear and good. Equally good are the many drawings sprinkled about the text. For all that, the book has the appearance of a hastily assembled brochure and the process by which the text (printed on different tinted papers) has been reproduced is not pleasing. The guide is, I think, an expensive 68 pages for the price asked.

JACK HEMS.

THE AQUARIST

# SALINE SOLUTIONS

by Graham F. Cox

Director of Waterlife Research Industries Ltd.

## QUESTION

As a Biology teacher, I have a good theoretical background in the subject. My special study during three years at college was the writing of a handbook for teachers wishing to set up and maintain a tropical seawater aquarium on a scientific basis. For this study I used a 60 in. × 15 in. × 15 in. aquarium set up with various species of fish and many invertebrates (and very successfully, I might add!).

Due to moving house I have been forced to completely dismantle my set up and sell off my animals, but have recently got it going again. However, I have run into a problem which I do not think will be easily solved.

The set up has been running now for twelve weeks, the U/G's being matured by means of a chemical maturing complex rather than Damsels. This took three weeks, after which I "tested" the U/G's with an electric blue and a very small filter feeding Hermit Crab. All seemed well. Over the remaining weeks I have gradually added:

- |                            |  |
|----------------------------|--|
| 1 <i>Gramma loreto</i>     | 1 <i>Elacatinus oceanops</i>                   |
| 1 <i>Centropyge argi</i>   | 1 <i>Lythripinus dalli</i>                     |
| 1 <i>Stenopus hispidus</i> | 1 <i>Radianthus malu</i><br>(5 in.-6 in. dia.) |

1 long tentacled sand anemone (10 in.)

Various "photosynthetic" anemones and soft coral polyps.

These are all doing extremely well, but: after being away for 5 days and entrusting feeding to a sensible relative, I returned to find the aquarium astonishingly clean of algae. Even a fair proportion of the super-fast growing *Caulerpa prolifera* had died and turned clear. I now have masses of copepods, and the water has a slight grey bloom which I feel is caused by copepod larvae. I have not yet had a chance to prove this microscopically.

To try to cure the problem biologically, I supplemented the U/G, charcoal and soft coral filtration with:-

- 1 *Lima scabra* (Flame scallop)

1 Bivalve with one or two barnacles on its encrusted shell

1 Tube worm

This, not surprisingly, has made no difference, and the scallop looks rather poorly after only 5 days.

My questions are as follows:-

1. What has caused the explosion of copepods?
2. Due to the small number of fish (and their small size), I have not yet done a water change, although I intend to tomorrow. Could this be the cause of the water bloom?
3. Will the copepod population reach a peak and then tail off?
4. If I use Sterazin (I have never as yet needed to use any chemicals in all these past years) how long will it take to biodegrade so that I can continue to keep crustacea, which are of especial interest to me?
5. How long have you managed to keep Flame scallops and clams ("photosynthetic" types)? Apart from the obvious what special conditions do they need? I never feed filter feeders at all, and never have done, and they generally seem to do fine. Flames and clams have, however, been a problem of mine in the past.

I do apologise for such a lengthy letter, as I realise how busy you must be. I would, however, find your comments invaluable.

General conditions: Light: 1-40 watt Gro-Lux, 1-40 watt Color-rite pH: 8.4 (adjusted regularly. Alkali reserve very good). Temperature: 78°F. Filter: Algarde U/G 4 airlifts on 2 × SP302's, full belt! Round bottom filter + charcoal. Vitamins added regularly, but trace elements only recently.

## ANSWERS

Q1. *Copepod/general plankton population explosion.* This is undoubtedly a manifestation of the twice annually population explosion of all plankters—i.e., both phytoplankton blooms and zooplankton blooms of both food organisms and pathogenic/parasitic organisms. I have for some months now been

researching a comprehensive article on these phenomena and their relevance to disease/parasitisation syndromes in aquaria/ponds. I hope to have this article published in "Aquarist & Pondkeeper" in the very near future.

At this stage I can inform you that scientific staff within my Company have accumulated impressive evidence over the last ten years to suggest:-

- (a) that phytoplankton blooms occur very quickly and persists for short times (i.e. of the order of 1-4 weeks) in all naturally occurring bodies of salt—and freshwater all over the planet;
- (b) that these phytoplankton blooms occur regularly at least twice every year at more or less predictable times of year.
- (c) that these phytoplankton blooms are almost invariably followed within 5-10 days by an equally explosive increase in zooplankters of both non-pathogenic/non-parasitic species and *pathogenic/parasitic species*,
- (d) that many species of fishes and invertebrates (both salt—and freshwater) "arrange" their annual reproductive cycle to coincide with one or both of these annual blooms,
- (e) that the causative mechanisms underlying these blooms are probably functions of the planet's varying photoperiodicity photophoresic movements and upwelling of inorganic nutrients and other physico-chemical factors which are as yet not fully understood,
- (f) that these cycles of planktonic densities are equally detectable in *aquaria/ponds*, i.e. relatively small bodies of fresh/salt water (i.e., small compared to rivers, lakes, seas and oceans), which are, relatively-speaking, cut-off from nature,
- (g) and that (a) to (f) above combine to produce at least two annual aquarium/pond disease syndromes which are usually exacerbated by:
  - (1) the aquarist's persistent overfeeding which causes a high solution/colloidal level of dissolved nutrients in his aquarium/pond;
  - (2) the aquarist's failure to *diagnose correctly* the disease/diseases present, leading him to use an *adequate medication* of the wrong type;
  - (3) the aquarist *correctly diagnoses* the disease(s) and uses a correctly-formulated, entirely-adequate medication *incorrectly*;
  - (4) the aquarist *correctly diagnoses* the disease(s) but uses an incorrectly-formulated, wholly-inadequate "medication";
  - (5) the aquarist is attempting to culture species of freshwater/saltwater fishes and/or plants and/or invertebrates in total ignorance of those species' correct water chemistry and territorial requirements. This inevitably leads to chemical stress

and psychological stress which even further disposes the fishes towards disease;

- (h) that the two periods each year when population explosions of all types of plankters are likely to occur are, in our northern latitudes, identifiable with the seasons loosely called spring and autumn. That is to say that the year's first population explosion always occurs sometime during the period March/April/May and the year's second explosion always occurs sometime during the period September/October/November. My Company's own records suggest that the most likely month for the year's first bloom is April and second bloom is most likely to occur in October. I must stress here however that the last ten year's records show a pronounced drift with regard to the exact timing of the blooms. For example in the year 1976, the excellent summer appeared both to delay the year's second bloom (at Longford these did not occur in aquaria/ponds until mid-November) and extend its period of duration.

On careful consideration of the lengthy data above, you may be able to decide that your letter dated 2/11/79 places you in the correct time period for the year's second bloom and that your sensible relative may be guilty of transgressions under at least (g) (1) above.

Q2. *Water changing.* If you were to use a correctly-formulated artificial seawater (e.g., "Natura") which contains all the correct trace elements *and in the correct proportions* to synthesise a replica of tropical oceanic seawater, doing a partial water change at this time would actually *prolong* the plankton bloom. You see, shortly the plankters of all species will run out of nutrients and *lebenraum* and their numbers will then steeply decline back to the more normal parameter of 1-3 organisms per millilitre. This will be the case *especially* if you do not effect a partial water change and thus do not renew the plankter's nutrient supply and also if you cut back all feeding of the tank's macro-organisms to the bare minimum necessary to support life.

Additionally, I suggest that as a matter of some urgency you obtain either a Mandarin Dragonet or a Scooter Blenny to eat all the copepods.

**NB: At a solution strength of "Sterazin" in seawater which would destroy harpacticid copepods, the product would also destroy your fishes/invertebrates.**

Thus "Sterazin" is incapable of killing the *non-parasitic, easily-visible, harpacticid copepods* which are currently infesting your aquarium and we have never made that claim for the product. What we do claim for the water treatment "Sterazin" however, is that, used correctly according to *General Note (E)* on the wall-chart "Treatment and diagnosis of fish



diseases." "Sterazin" and the closely chemically-related "Sterazin 'P'" will totally destroy all generations of both monogenetic and digenetic trematodes (i.e., "flukes"), cestodes and nematodes which, in our experience, always bloom at the same time as these and other copepods.

Q3. *Copepod population tailoff*—Yes. However, you should remember that by this time, owing to the equally large explosion in the numbers of microscopic (and, in any case, largely *internal*), flukes, cestodes and nematodes, your fish population by that time may be non-existent if you don't use "Sterazin."

Q4. *Biodegradation of "Sterazin"* This is a function of several parameters, principal amongst which are filtration efficiency, pH, oxygen tension and alkaline reserve. However, in most sea aquaria we have tested, the periods of 72 hours—150 hours are common.

Q5. *Flame scallops, clams and other filter-feeders* are without exception very difficult to keep for extended periods. If the level of lighting in the aquarium is inadequate! Given lighting of adequate intensity, colour temperature and photoperiod, (all of which I have dealt with extensively in previous editions of this and other publications) together with regular additions of a high quality particulate food suspension (e.g. "Invertfood"), and good water management, we have successfully kept organisms of these types on public display for periods in excess of 5 years.

With regard to your comments about the disappearance of most of your algae, I would inform you that this almost invariably occurs when copepods occur in an aquarium as the "tip" of the planktonic food triangle. I have known beautiful, verdant green marine aquaria be transformed into white marine deserts literally overnight. This is caused by the copepods which, having exhausted all the sea-humus, uneaten fish-foods and other food sources within the system, then turning their unwelcome attentions onto the tank's algal populations.

Finally, I would yet again warn you and all other readers, that the only method I know of preventing such an occurrence in a sea aquarium and of preventing the vastly more dangerous simultaneous explosion in the numbers of *parasitic* organisms such as flukes, cestodes and nematodes, is to maintain at all times the *sea-humus* content of the filter-bed at the lowest possible level. This is achieved (expensively but conveniently) by reverse-flow undergravel filtration through a reliable power-filter (e.g., "Nuova" range), or inexpensively by always taking the periodic partial water-changes in any aquarium (salt—or freshwater) as an opportunity to rinse as much of the sea-humus as possible from the filter-bed.

After 2-3 minutes to allow the sea-humus to settle at the front of the re-sloped filter-bed, siphon as much of this sea-humus as possible to waste with the 25-33% old seawater.

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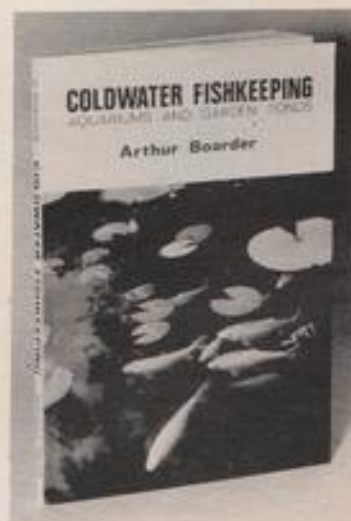
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continued from page 36

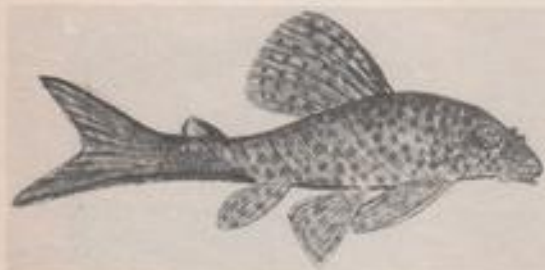
all sizes) moving in the upper levels of the water. Tiny fry have all the brilliance of young neon tetras. The White Cloud Mountain minnow does not require a strictly tropical temperature. It will spawn at a temperature in the middle to upper sixties (°F.) and for normal care is quite comfortable at a temperature in the upper fifties (°F.).



*Poecilia mexicana*

I recently acquired some young so-called black sailfin mollies. The dealer assured me they would turn completely black within the space of a few weeks. My question is: one or two have turned black on their backs and sides but three others have remained a sort of grey well-marked with black specks. Are these fish 'throw outs' or are they stricken with some disease?

A great deal of cross-breeding has been done among the mollies. Your speckled fish may be a reversion to the old *Mollienisia sphenops*, now known as *Poecilia mexicana* (all-black *mexicana* are not unknown) usually seen as off-white or ivory-white fish with black spots or they may be late developers. They are certainly not diseased.



*Plecostomus catfish*

Can you tell me whether the plecostomus catfish requires any food besides algae to keep it in good condition?

It most certainly does. Last thing at night, just before all the lights in the room go out, drop tangled balls of whiteworms, well-washed *tubifex*, compressed fragments of raw red meat or raw white fish where the catfish is lurking or where it is likely to find them when it starts its nocturnal searching around. An insufficiently fed *plecostomus (hypostomus)* does not live longer than a few months—if that.

Would the common spatterdock or brandy bottle grow in a tropical aquarium?

It most certainly will if you obtain a seedling plant on its own roots and set it in a perforated pot layered with pebbles or small crocks (broken clay flower pot) and then three-quarters fill with a mixture of well-soaked peat and sharp sand enriched with a few pellets of stiff clay. Keep the water level just above the leaves until the plant has made some growth and then see that it is given deeper water. I have never kept this most attractive water plant at a temperature above 75°F (24°C), but at comfortable room temperature it flourishes exceedingly well.

Please give me the names of the best foods and range of temperature to suit the green rivulus.

Well-balanced flake foods, whiteworms, tiny pieces of raw lean meat and surplus livebearer fry are well-suited to the green rivulus. A range of temperature from the middle sixties to the middle seventies (°F.) is recommended.

I am considering making a 6 ft. x 2 ft. x 2 ft. all-glass aquarium. Will 1/2 in. glass prove strong enough to take the outward and downward pressure of the water?

It would be advisable to use 1/2 in. toughened plate for your tank. For all that, I feel certain that you could get away with 1/2 in. glass if you provided strengthening tie-bars of 1/2 in. glass across the top near the centre.

I have six young tinfoil barbs in a four-foot tank. Do you think my fish will attain full size in the space allowed?

If the six fish live to attain full size in your tank then it will look, and be, overcrowded. The tinfoil barb (*Barbus schwanefeldi*) grows to about the length of a fresh herring and is taller than a herring, that is between dorsal fin and belly. However, it does take quite a few years for *B. schwanefeldi* to reach full size. Your tank would turn out all right for four tinfoil barbs and leave some room for growth.

Please give me some information about *Amblydoras bancoki*?

This is a 6 in. catfish from the north-east corner of South America and thence down to the Peruvian Amazon and thereabouts. It is all right with other fishes of about its own size or not too small to be looked upon as livefood. *A. bancoki* is a nocturnal prowler and likes to come across a feed of whiteworms, chopped or tiny earthworms, fragments of raw, red meat, or small slivers of raw wet fish such as cod, fresh haddock or whiting.



## 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.

**RESULTS of the Newbury & D.A.S. open show:** Best Fish-in-Show, M. Bourne (South East London); Class Db; Best All Rounder, B. Hastings (South East London); Highest Pointed Junior, M. Bourne (South East London); Highest Pointed Newbury Member, S. Dyer; Highest Pointed Newbury Junior, A. Hart; F.B.A.S. Championship Class, Mrs. S. Canning (Newbury); Class X B-M; Highest Pointed Visiting Society, South East London.

Class AG: 1, M. Bird (Tonham); 2, Mrs. Rushbrooke (Reading); 3, Mrs. Stallwood (Newbury); 4, T. Truaser (Tonham). B: 1 and 2, M. Bourne (S.E. London); 3, A. Chaplin (Basingstoke); 4, D. Goss (Newbury). BA: 1, B. Hastings (S.E. London); 2, E. and T. Tester (Mid-Sussex); 3, P. Lawrence (Reading); 4, R. Canning (Newbury). C: 1, M. Paxton (Basingstoke); 2, C. Richards (Sudbury); 3, T. Frazer (Basingstoke); 4, P. Rushbrooke (Reading). CA: 1, T. Frazer; 2, C. Richards; 3, Mrs. V. Feat (Tonbridge); 4, B. Hastings. CB: 1, M. Fox (Wickham Marsh); 2 and 3, L. Pinney (Mid-Sussex); 4, M. Bourne. D: 1, B. Hastings; 2, F. May (Newbury); 3, J. Partt (Romford); 4, W. Knight (Gosport). Da: 1, A. Chaplin; 2, D. Elliott (Newbury); 3, Mrs. Larkin (Reading); 4, R. Canning. Db: 1, M. Bourne; 2, J. Carpenter (Hounslow); 3 and 4, M. Chapman (Basingstoke). Dc: 1, W. Knight; 2, I. Sellwood (Newbury); 3, S. Swann (Tonham); 4, M. Bird. E: 1, P. Moye (Sudbury); 2, M. Bourne; 3 and 4, C. Richards. EA: 1, B. Hastings; 2, A. Hart (Newbury); 3, J. Partt; 4, R. Prior (Newbury). F: 1, A. Aiken (GDAS); 2, R. Prior; 3, J. Jackson (Basingstoke); 4, C. Woodford (Bracknell). G: 1, P. and M. Lambert (Romford); 2, J. Partt; 3 and 4, C. Richards. H: 1, P. Rushbrooke; 2, W. Knight; 3, J. Carpenter; 4, R. Canning. J: 1, D. Goss; 2, Mrs. Bebb (Bournemouth); 3, T. Frazer (Basingstoke); 4, T. and T. Rushbrooke (Reading). K: 1, M. Bourne; 2, D. Goss; 3, C. Richards; 4, Mrs. Bebb. L: 1, N. Jackson (Reading); 2, 3 and 4, C. Richards. M: 1, P. Moye (Sudbury); 2, T. Gardiner (NWAS, BRSA); 3, Mrs. Bebb; 4, L. Hart (Newbury). Ma: 1, P. Moye; 2, C. Osbourne (S.E. London); 3, A. Feat (Tonbridge); 4, F. Cripps (Newbury). NB-M: 1, P. Lawrence (Reading); 2, J. Humphries (Abingdon); 3, B. Hastings; 4, D. Goss. NO-T: 1, Mrs. Bebb; 2, P. Martin (Basingstoke); 3, C. Richards; 4, B. Hastings. O: 1, Mr. Gainer (Saracens); 2, Mrs. Bebb; 3, C. Richards; 4, Mr. Stallwood (Newbury). P: 1, B. Hastings; 2, B. Wateridge (Sudbury); 3, Mrs. Bebb; 4, R. Adams (Salisbury). Q: 1, Mrs. Bebb; 2, B. Hastings; 3, C. and V. Howe (SLAG); 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 (Tonham). T: 1, P. Moye; 2 and 4, C. and V. Howe; 3, T. Frazer. Ua-d: 1, W. Knight; 2, M. Fox (Tonbridge); 3, R. Adams; 4, J. Jupp (Gosport). Ubc: 1, Miss L. Feat (Tonbridge); 2, E. Binnsend (Portsmouth); 3, A. May (Newbury); 4, G. Stallwood (Newbury). V: 1 and 2, E. Binnsend; 3 and 4, M. Tydesman (Runnymede). W: 1, 2 and 3, S. Dyer (Newbury); 4, K. Lambert (Romford). XH-M: 1, S. Canning (Newbury); 2, C. and V. Howe; 3, P. Fitzhen (Nailsea); 4, D. Blandell (Abingdon). XO-T: 1, T. Frazer; 2, C. and V. Howe; 3, R. Adams; 4, C. and V. Howe. XUW: 1 and 2, A. Feat (Tonbridge); 3, R. Adams. Y: 1 and 3, A. Enser (Abingdon); 2, Mrs. G. Barrett (New-

bury). Z: 1, P. Rushbrooke; 2, J. Jackson; 3, M. Goss (Hendon).

**AWARD Winners, at the annual open show of the Walthamstow and District A.S.** Best fish in show and best coldwater—B. Cook (WDAS). FBAS Trophy NBM—P. Lawrence (Reading). Highest pointed individual—B. Hastings (SELAS). Highest pointed society—SELAS. AA-B: D. Goodbody (WDAS). AG: S. Pursedon (WDAS). AK: D. Wans (WDAS). B: D. Goss (Reading). CA: P. Chandler (WDAS). C: P. Moye (Houghton Regis). D: B. Hastings (SELAS). DB: A. Waller (ELAPA). EA: Mrs. D. Winder (B. Dulwich). E: D. and J. Wood (ELAPA). F: H. Johnson (Bexley). G: C. Osbourne (SELAS). H: G. Lester (Houghton Regis). J: D. Goss (Reading). K: J. Payne (SELAS). L: C. Osbourne (SELAS). M: A. I. Feat (Tonbridge). NOT: B. Hastings (SELAS). O: D. and J. Wood (ELAPA). P: B. Hastings (SELAS). Q: D. Goss (Reading). R: S. Beck (Romford). S: D. and J. Wood (ELAPA). T: J. Edwards (Thanet). U: D. Chewright (Southend). V: B. Cook (WDAS). W: C. Jackson (Reading). XBM: G. Lester (Houghton Regis). XOT: B. Myers (WDAS). XUW: B. Cook (WDAS). Z: B. Moore (WDAS).

**AT the annual general meeting of Malvern & D.A.S.** the following officers were elected: chairman, D. Kaufman; vice-chairman, R. Higgott; treasurer, A. Jones; secretary, J. V. Walton; 1 Beaver Close, Lower Wick, Worcester. (Tel. 422002). During the proceedings D. Hutchinson kindly travelled once again to judge the club champion of champions table show, results of which were: Junior champion, P. Parsons; Senior and overall champion, B. Stoker.

**THE November meeting of the Mid-Sussex A.S.** was the annual interclub night. Six clubs were represented: Brighton, Littlehampton, Hastings, Tonbridge, Horsham and Mid-Sussex. Entertainment was by way of an auction, and two films—"Caech Carp" and "Beneath the Sea." The main event, the table show, was judged by Mr. Jack Sellwood, who commented on the high standard of fish being shown.

Cards awarded: Barbs: 1, E. and T. Tester (Mid-Sussex); 2, B. Savers (Brighton); 3 and 4, A. Feat (Tonbridge). Cichlids: 1, Mr. and Mrs. M. Smith (Brighton); 2, Mr. and Mrs. C. Raggio (Brighton); 3, E. and T. Tester (Mid-Sussex); 4, A. Feat (Tonbridge). Pairs—Egglayers: 1, B. Savers (Brighton); 2, J. Birch (Mid-Sussex); 3, T. Ramshaw (Brighton); 4, L. Pinney (Mid-Sussex). Coldwater: 1, L. Feat (Tonbridge); 2, T. Deeprose (Hastings); 3, S. Smith (Brighton); 4, A. Grice (Brighton). Characins: 1 and 2, B. Savers (Brighton); 3, A. Feat (Tonbridge); 4, T. Deeprose (Hastings). Rasboras: 1 and 2, B. Savers (Brighton); 3 and 4, P. Levine (Mid-Sussex). Livebearers: 1, T. Ramshaw (Brighton); 2, E. and T. Tester (Mid-Sussex); 3, B. Savers (Brighton); 4, A. Feat (Tonbridge). Brighton won the Interclub, with Mid-Sussex second and Tonbridge third. The overspill class for excess fish brought along was judged by Tom Ramshaw. Cards

as follows: 1, B. Savers; 2, L. Pinney; 3, A. Feat; 4, B. Price.

The monthly '50' club draw was won by—1 and 2, N. Short; 3, A. Levine.

Further information from the Secretary, Mr. John Birch, 11a Sandrocks Way, Haywards Heath (Phone H. Heath 50585). Meetings are held on the second Thursday of each month at Oakley Lodge, Keymer, from 8 p.m.

**AT the annual general meeting of Darwen A.S.** the following Committee was chosen: president, B. Farran; vice-president, J. Doodly; secretary, D. Gow, 95 Greenway Street, Darwen (Tel. 76435); treasurer, J. Farnhill; show secretary, P. Yates, 21 Rosegate, Darwen; committee members, J. Halsey and R. Conway.

**THE November meeting of the New Forest A.S.** was held at the Community Centre, Lymington. The main item was a friendly quiz organised by the New Forest A.S. treasurer, Mr. J. Jefferies, with Pisces Aquarist Society from Christchurch. Pisces A.S. won the competition by six rounds to three and a table show. Results: 1, 2 and 3, C. Phipps (Pisces); 4, P. Willis (Pisces). A return round with Pisces as hosts was planned, at which, hopefully, New Forest will have a little more luck. Prospective new members are always welcome at the meetings, which are held on the third Monday of each month at 7.45 p.m.

**THE Wycombe Marsh A.S. meet** at the Social Club, Radko Limited, Loudwater, High Wycombe at 8.30 p.m. on alternate Mondays. Visitors, other Clubs' members and juniors are welcome. The Club's agenda has covered various subjects (e.g. Killies, Fish Photography, A.O.S. Livebearers), excluding showing which does not interest the majority of the members. Recently they have had Mike Fox (their secretary) on making all-glass tanks, Mr. Johnston (club member) on Tropical Cichlid, an evening coach trip to an aquarium shop, Mr. Trigg on Marine Fish and a F.B.A.S. Tapeslide programme on goldfish. Future meetings include: 7th January, annual general meeting; 21st January, Dick Mills on Filters; 4th February, F.B.A.S. tapeslide programme on Native Freshwater Fish; 18th February, Mr. Hickman on Cichlids; 31st March, F.B.A.S. tapeslide programme on Fish Farming; 14th April, Trevor Butler on Cichlids. Further details can be obtained from the Secretary, Mike Fox, 24 Kelvin Close, High Wycombe, Bucks. (Tel. HW 38823).

**CHANGES on the committee of the Northampton & District A.S.:** chairman, Mr. H. Riley, 54 Lumberbush Lane, Northampton (Northampton 38658); vice-chairman, Miss A. Papworth, 30 Fallowfield, Amphil, Beds. (Amphil 405427); treasurer, Mr. M. Walden, 45 Lower Halesstone, Northampton (Northampton 843737); secretary, Mrs. M. T. Readbury, 30 Langford Drive, Wootton, Northampton (Northampton 51079).

**LESLIE DODGE** showed some excellent slides of ponds, water-lilies and fish when he spoke to Bristol A.S. A raffle and sale of high quality fish rounded off the evening.

**THE Goldfish Society of Great Britain** held a general meeting at the Conway Hall, Red Lion Square, Holborn, London, when a follow-up to a talk given at their previous meeting by the chairman, Ron Dodkins, on equipment needed to photograph fishes, was given by another distinguished member, Pamela Whittington, demonstrating with colour photographs and slides, the results of different techniques used. The number of questions that followed each talk, were an indication of the interest shown. Results of the table show for Current Year Breed Fishes, in pairs, were: Veiltails: 1, D. Mills; 2, J. Kingsland; 3, and 4, D. Mills. Brambleheads: 1, A. Tagg; 2, J. Parker; 3, D. Mills; 4, J. Parker. Bristol Type Shubunkin: 1, A. Barnes; 2, G. King; 3, W. Cook; 4, G. King. Pearlscales: 1 and 2, D. Mills.

Their next general meeting will be at the above address, 2 p.m. on the 19th January. Inquiries re membership to: Hon. Sec. Mr. A.

C. Law, 'Bracken' 4, Elgin Crescent, Caterham, Surrey CR3 6ND.

**MEMBERS of the Evesham Fishkeepers Society** met in November for a debate on future club activities. The table show was unsupported, but members were able to purchase saffron molly fry—for the Fish of the Year Competition, the first round to be judged at the December meeting. The Society meets on the first Wednesday of every month at The Hampton Scout Hut, Hampton, Pershore Road, Evesham, Worcs. at 8.00 p.m. Visitors and new members welcomed. Secretary: E. M. Thomson, 41 Crooks Lane, Studley, Worcs. (Phone Studley 7125).

The Northern Section of The Catfish Association of Great Britain at a recent meeting appointed the following officers to inaugurate this new section: Chairman, Mr. David Sands (Hesketh 2707); hon. gen. secretary, Mr. Steve Hooton (Southport 24743); hon. min. secretary, Mrs. Martha Sands; hon. treasurer, Mr. Alan Waterhouse (Wigan 853738); joint show secretaries, Mr. Bernie Baldwin, Mr. George Robinson (Southport 43384); P.R.O.; Mr. George Waterhouse (Southport 213904); committee members, Mr. Keith Thompson and Mr. Barry Black.

Monthly meetings were agreed, the first to be a Table Show for Callichthyidae and Pimelodontidae to be held at Quarry Bank Community Centre, Skelmersdale on Friday, 25th January, at 7.30 p.m. All fish will be judged and discussions will be held on all specimens benched. Family membership fee: £2-00. Single membership: £1-50. Everyone welcome.

The open show of the Ichiban Ranchu Society was held at Woodford Bridge, Essex. There was a total of 130 lionheads on show with the general quality being very high. This was the largest show of lionheads ever presented in this country and there was a great deal of enthusiasm voiced by the many visitors. Class awards: A (metallic current year fish): 1, 2 and 3, G. Lewis. B (metallic second year fish): 1, F. Hilton; 2 and 3, G. Lewis. C (metallic adults): 1 and 2, M. Johnson; 3, G. Lewis. B (macreous second year fish): 1 and 3, A. Lawton; 2, F. Hilton. F (macreous adults): 1, F. Hilton; 2 and 3, Mr. and Mrs. J. Davidson.

Members trophies awarded: Tonis Challenge Shield, G. Lewis; Ladies Rose Bowl, Mrs. P. Tagg; best fish in show cup, G. Lewis; Joe Porter cup, G. Lewis; Stanley Gover cup, G. Lewis; Junior Tonis Shield, David Gay.

**S.A.F. SECRETARY**—All enquiries relating to the Scottish Aquarist Festival should be addressed to Mr. W. Bennett, 15 Coulter Avenue, Coltness, Wishaw, Lanarkshire ML2 8SZ.

The Nottingham Home A. S. meets every alternate Thursday at the "Queen's Hotel" (near Midland Station). New members welcome. For further details: Mr. Ian Hardwick, chairman, phone: Nottingham 873073.

**OFFICERS** elected at the AGM of the Yeovil and District A.S. were: president, D. S. Langdon; chairman, T. Perry; secretary, P. Johnson; treasurer, J. Axe; vice-chairman, P. New; show manager, R. Bond; show secretary, A. Holt; Committee, A. Midlen, R. Muryn, T. Sparks. Meetings are held at the Hillside Hotel, Yeovil, on the first Wednesday of each month at 8.00 p.m. Newcomers always welcome.

The new committee for Redcar A.S. 1979-1980: chairman, J. Duffell; secretary, D. Readman; treasurer, Mrs. P. Duffell; committee, R. Gledhill, J. King, D. Lawrence, L. Grant, Mrs. K. Grant, B. Smith, Mrs. V. Smith. All enquiries to the secretary, D. Readman, 1 Lovat Ave., Redcar, Cleveland TS10 5BS. (Tel. Redcar 0642 474854).

**OFFICERS** elected at the recent A.G.M. of Ashford and District A.S. were: chairman, L. Green; secretary, Mrs. J. Traynor, 244, Station Road, Lymington, Folkestone; treasurer, J. Gibson; show secretary, I. Hooper, 262 Dover Road, Folkestone; committee, Messrs. T. Cutler, K. Graves, A. Pilbeam and M. Traynor. Meetings are held at the "Albion" public house, Willborough, Ashford on the second and last Thursdays of the month; new Members welcome.

**SHOW TROPHIES MISSING**  
SEVERAL of the Accrington & District A.S. open show trophies are missing. These were won at their open show in June, 1978, at Antley Methodist Church, despite numerous attempts to recover the trophies no replies to letters have been received. Would anybody still holding a trophy won in 1978 please send it to the secretary, D. Hargreaves, 11 First Avenue, Church, Accrington, Lancs. BB5 5EH.

**NEW SOCIETY IN NEWARK**  
AT an initial meeting of 21 interested people desirous of forming an Aquatic Society it was decided to hold further meetings every 1st and 3rd Tuesday of each month and to be known as the Newark & District A.S. The meetings will take place at The Rutland Hotel, Barnby Gate, Newark, Notts. at 8 p.m. New members will be gladly welcomed. There is a reduced fee for the under 16s and O.A.P. The aim of the society is to make the meetings interesting to fellow members in any way possible. A Committee of seven members was formed and anyone wishing further details can obtain them from Chairman Mr. R. Worth 21 Russell Avenue, Newark N75 4J9, or Secretary, Mrs. M. Griffin 3 Welbeck Avenue, Newark. (Tel: 71462).

**SECRETARY CHANGES**  
Miss Sandra Brooks, 17 Angel Close, Dunkinfield, Cheshire (Tel: 061-330 9965) has been appointed secretary of the Osram A.S. in place of Mr. P. Lawton, and future correspondence should be forwarded to her. Mr. Graham Horrocks, 30 Kenyon Lane, Middleton (Tel: 061-653 7285) has been appointed Show Secretary in place of Mr. K. Aldred.

Mr. John Arthur, 24 Stanhope Close, Dairy Lane Estate, Houghton-le-Spring, Tynes and Wear, has been appointed secretary of the South Shields A.S.

**CLUB APPOINTMENTS**  
Following his recent trip to Brazil details of which will shortly appear in this magazine, Mr. DAVID SANDS of *Aquarium World Ltd.* was pleased to accept an invitation from Fleetwood A.S. to become their president. A similar request from Sandgrounders A.S. to become their vice-president was also accepted. Mr. Sands is pleased and honoured to be associated with both of these well-known and highly successful Clubs.

**OBITUARY**  
North Avon A.S. has been saddened by the death of one of its most enthusiastic and popular members, Mr. W. Gadd. Bill, as he was called by all his friends, will be sadly missed. He was always grateful for the hours of advice he gave them on the keeping of their particular fish. The chairman, Mr. L. R. Lerway, on behalf of all aquarists, offers deepest sympathy to his wife and family.

**CALENDAR**  
28th January: Holset A.S. auction of fish and equipment to be held in Works Canteen, Parkinson Lane, Halifax. Details from S. Shedden, Show Secretary (Tel: Hx 248173).  
10th February: Sheaf Valley A.S. 7th annual open show at the premises of Dormer Tools Ltd., Summerfield Street, Sheffield 11.  
9th March: Brighton and Southern A.S. open show at Portside Town Hall. Further details from T. Ramshaw, 26 Wilmot Road, Shoreham (Tel: Shoreham 62630).  
31st March: Nelson A.S. annual open show at the Civic Theatre, Stanley Street, Nelson. Details from show secretary R. McKenna, 52 Bath Street, Nelson, Lancs BB9 6NP.  
11th May: Bournemouth A.S. open show at Kinson Community Centre, Kinson, Bournemouth. Show secretary, Jack Jeffery, 30 Besemar Avenue, Bournemouth Dorset BH6 4JF.  
17th May: Port Talbot A.S. open show at the Talbach County Youth Centre, Margam Road, Port Talbot, West Glamorgan. Trophies, cards and plaques for all classes. Schedules from early March from Show Secretary, A. E. B. Fouracre, 3 Cross Street, Velindre, Port Talbot, West Glamorgan SA13 1AZ.  
18th May: Scarborough Fishkeeping Society first annual show. Schedules and details available later.  
25th May: Portsmouth A.S. inter-club show at the Portsmouth Community Centre.  
June 29: Sherwood A.S. open show at the Lady Margaret Hall, Weobey.  
8th July: South East London A.S. open show at 141 Greenwich High Road, SE10. Information from secretary, W. Hastings (Tel: 8586344 or 6920283).  
21st September: Tonbridge and District A.S. open show at Hadlow Community Centre, Hadlow, Kent. Schedules from Mrs. D. Feast, Show Secretary, c/o 6 Albert Road, Tonbridge, Kent.

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