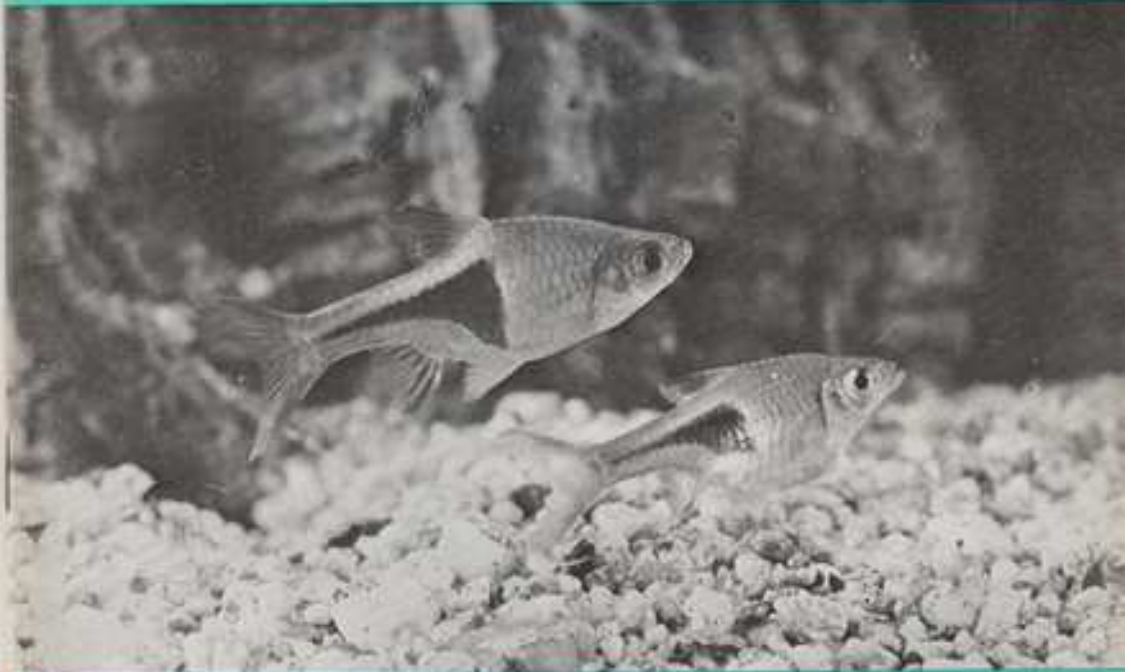


JULY 1974

20p

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In This Issue

	Page
Comments and Quotes	105
Letters	106
The Aquarium Show '74	113
Caesar the Champ	114
Naturalist's Guide to the Livebearing Fishes	115
Book Review	118
How Often to Change Seawater	119
Sex Factors in Guppy Inheritance	120
Octopus in the Sea and Tank	121
Coldwater Scene	125
Custom-Built Worm Mini-Factory	127
Harlequin No Longer a Problem Fish	128
Observations on a Spawning of Keyhole Cich- lids	132
Noteworthy Newcomer to the Dwarf Cichlids	134
Familiar Apogonetus with a New Name	136
Meetings and Changes of Officers	137
Personal Comment	138
Readers' Queries	
Answered	139
Club News	141
In Brief	144
Dates for Your Diary	146

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Comments and Quotes

Imported Fishes

AFTER reading our Comments on the future of fish importations a leading fish importer, who also perhaps has the longest experience of the trade of anyone in this country, telephoned PFM's office to give his concurrence with our appraisal of the likely future of imports. Our Comments had dealt with the aspects of conservation (our importer agreed that control of importations must come and said that after a possible initial period of some disruption he foresaw a healthier trade as a result) and the spread of disease by imported stock (our importer agreed that present imports are showing more diseases that are 'new' and incurable, which is leading to wastage of specimens, wastage of importers' time and facilities and adding to costs). Our importer stressed also that the likelihood of greatly increased costs of importations in the future is another factor that is going to make the home-produced aquarium fish an increasingly attractive proposition. Costs are rising not only through rises in freightage charges but because of unfavourable and unstable currency exchange rates (imports are invoiced in dollars). In fact, the situation is rapidly approaching where, given properly operating hatcheries in this country, for a good number of aquarium specimens it will no longer be economically worthwhile trying to import. Home-produced specimens free from serious disease will undoubtedly be a much better proposition for dealer and customer alike, and although it is possible that fish importers will have to turn to fish production to stay in business there is going to be—as we've said before and are going to say again and again until we are sure

that the message is getting across and the hobby is fully prepared for when the crunch comes—a very useful place for the enthusiast who can breed one, two or three species in regular quantities for disposal through the trade. It may not have been economically worth it for the amateur to involve himself in this way in the past: in the future it will be both financially rewarding and a valuable contribution to the furtherance of the hobby.

Sun Heat is Free

NOT altogether dissociated from the thoughts of the above Comment, we like the idea of saving on fuel costs for fish houses through the use of solar energy. Not workable in our cold climate? Don't believe it. Experts say that fuel costs for house heating in this country can be cut by up to two-thirds by installation of heat absorbers to utilise the annual 1200 - 1600 hours of sun's energy. These units are going to be available much more cheaply in the near future too, and, to quote from THE SUNRAY TIMES: 'we predict they'll be as common as TV serials before too long'.

Marines and Cyanide

THE appearance of 'A Review of Evidence Relating to the Use and Effects of Sodium Cyanide and other Methods Commercially Employed in Coralfish Collecting' is a matter for congratulation of the British Marine Aquarist Association and in particular its officers Mr P. J. Ireland and Mr G. C. Robertson. The review marshals facts and opinions in a competently impartial fashion and

although (in the 'cyanide controversy', at least) it can be regretted that there are too many opinions and anecdotes and not enough assessable facts for a conclusive appraisal the investigators can hardly be criticised for shortage of 'evidence'. Biologists with the laboratory facilities to test the question of whether short-acting toxic action of cyanide can leave permanent damage appear to differ in their findings, although here the two U.K. sources quoted do not mention having done experimental tests whereas a U.S.A. report ('perhaps the only definite research so far carried out') was concerned with experimental findings and found it 'proved beyond a doubt that sodium cyanide used in sufficient quantities to tranquilise fish is very detrimental to them'. It is also unfortunate that in various comments made on the known mechanism of action of cyanide the fact appears to be missed that recovery of overall respiratory activity in an animal after cyanide

poisoning does not mean that all cell populations of the animal's body will be left intact and functioning, since the respiratory mechanisms that can be affected occur throughout the tissues and not merely in blood and gills. To talk of the action of cyanide as anaesthesia or tranquillisation is very misleading: call the state it produces anoxia (deprivation of oxygen) or suffocation, and the implications, we submit, are much more obvious.

The Aquarium Show '74

THE Federation of British Aquatic Societies, who are presenting The Aquarium Show '74, with the sponsorship of this magazine, are making every effort this year to involve as many of their affiliated societies as possible in this, the seventh annual London Show, to be held on 25th - 27th October at the

Royal Horticultural Society's Old Hall, Vincent Square, S.W.1. The always popular tableaux competition will be held again, with certain changes in the rules (given elsewhere in this issue of PFM), a furnished aquarium and aquascape competition is also being staged with sections open to individuals and to clubs and, for the first time at The Aquarium Show, as well as coldwater and tropical fishes, water plants can be entered for judging on the competitive benches. Specialist society displays are being included and it is hoped that as well as manufacturer's exhibits there will be trade stands with fishes for sale. There are three main ways in which societies are being encouraged to help and further the Federation's Show: by participating as exhibitors (this is perhaps the way a society can itself gain most from the Show), by attending the Show (party tickets are cheaper) and by helping to publicise the Show in their own areas.



Your comments and views on all topics of interest to aquarists are welcomed. Address letters to PFM Letters, 554 Garratt Lane, London SW17 0NY

Spread of Disease

I WAS very interested to read your editorial Comment in this month's issue of PFM 'Look to the Future'. In April of this year I made a strong protest to the publishers of *ANGLING TIMES*, which they were good enough to print (an issue had contained an article, with pictures, of Midland anglers baiting for pike with dead koi obtained cheaply at local aquarists' suppliers). It was pointed out that this practice was highly irresponsible. For the dealers to sell their dead koi to anglers for use in local waters was deplorable and to me the quickest way of making any imported diseases endemic. Both aquarists and anglers should be more thoughtful of the end results of careless actions.

MRS H. ALLEN

*General secretary,
The British Koi-Keepers' Society*

Future Fish Stocks

THERE has, over the past few months, been a great deal of talk concerning the probability of tropical fish becoming more expensive and less readily available due to difficulties in their importa-

tion. It has also been suggested that this will be of obvious benefit by providing ready outlets to individual breeders in this country and that these breeders should sell only to recognised retailers and not direct to private aquarists.

It seems that the shops can't lose. For many years now there has been a steady increase in demand for tropical fish and importation has been relatively easy. This has meant that, in this area at least, aquatic dealers have not been interested in buying stock from individual breeders with the result that he has to sell to the public direct, usually through aquarist societies, or else use his hard-won offspring for food for his other fish. Now that importation is going to become less viable it seems that the dealers may shortly wish to change their policy.

Whilst everybody recognises that shops play a major role in the hobby, breeders could be excused for thinking that they should continue to sell direct

Continued on page 113

Make the diet balanced and varied.

Fish are quite human in one respect. They do like a varied diet. But it must be a balanced one.

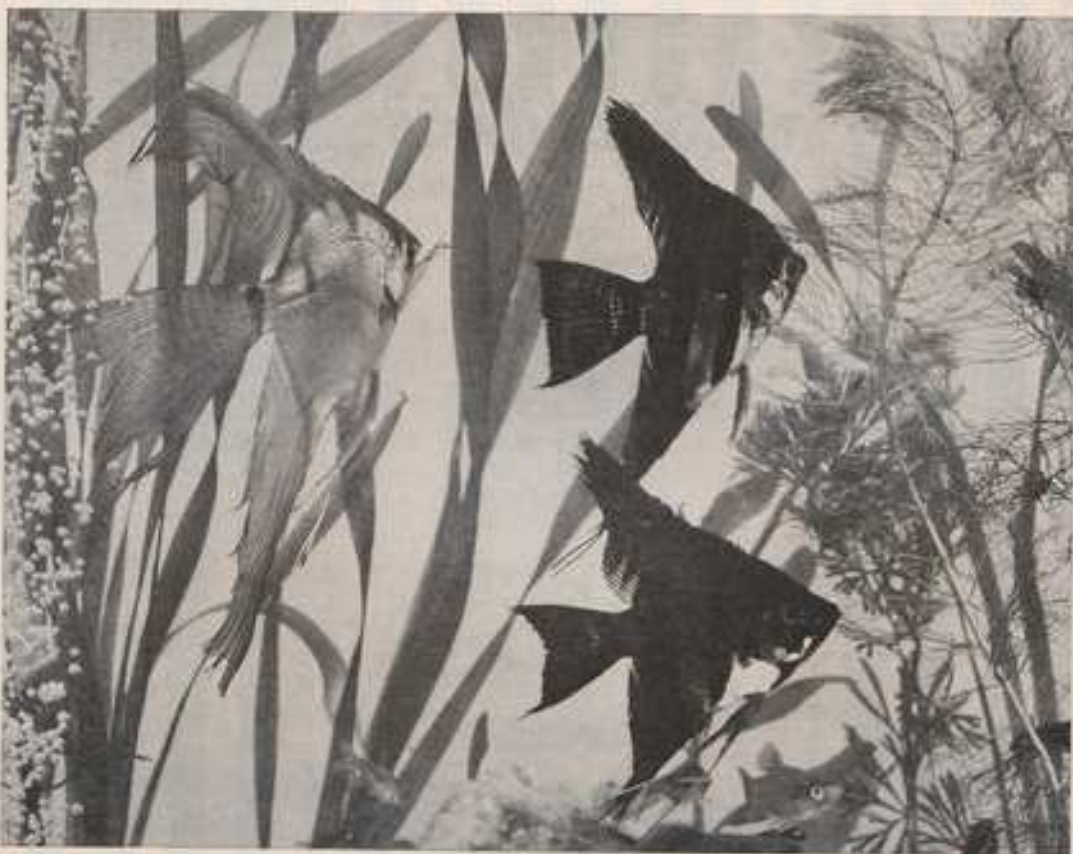
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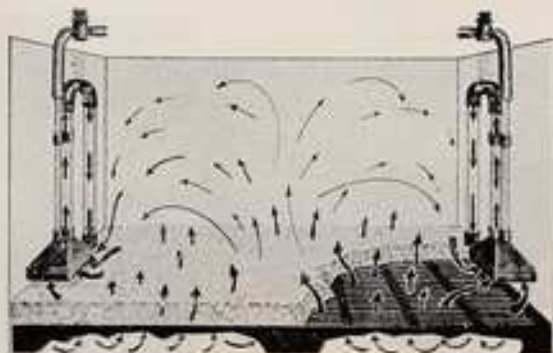
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LETTERS

continued from page 106

and let the dealers look after themselves; their problems will have been self-inflicted. It is also probable that breeders are getting better prices for their fish by selling privately. Unfortunately, whilst this situation would benefit clubs and club members in the short term (they would know best who was selling what) the long-term effect on the hobby as a whole would be devastating.

It is to be hoped that this is only a local problem, but if it is a widespread problem then I think the

time has come for retailers to take a look at themselves and think to the future. If they refuse to buy the young now they must not be surprised if the opportunity is with-held later.

GRAHAM R. HALL
Secretary, Abingdon Aquarist Society

Barry AS Trophies

FOR the past few years Barry Aquarist Society has not held an Open Show. We are now under new management with a forward-thinking viewpoint and with the help of your column we would like to appeal to anybody holding any of the Society's trophies to return them, or to anyone with knowledge of them to let us know (postage will be refunded).

M. C. GUTHRIE
*Secretary, Barry AS,
4 Nurston Close,
Rhoose, Glamorgan*

AKVARIET'S Oscar Award

to Dr J. J. Scheel



TIDSKRIFTEN AKVARIET, the eldest aquarium magazine in the world still being published without interruption, has once again celebrated 'AKVARIET'S Day'. The celebration took place in Gothenburg on 27th - 28th April, and this year Mr Edvin Brorsson of Malmö, who started the magazine 47 years ago, handed the Oscar trophy to a famous Danish aquarist. In the photograph, he is on the left just receiving the 'Oscar' from the hands of Mr Brorsson. Killifish enthusiasts especially will recognise the celebrated Colonel Doctor Jørgen J. Scheel, of Virum, Denmark, among other distinctions the author of the book RIVULINS OF THE OLD WORLD, and now a truly worthy member of the distinguished band of holders of AKVARIET'S Oscar.



The AQUARIUM SHOW '74

Friday 25th to Sunday, 27th October

at the Royal Horticultural Society's Old Hall
Vincent Square, London S.W.1

INDIVIDUAL aquarists, whether society members or not, who fancy their skill at furnishing aquaria or aquascaping can put it to the test at this year's Aquarium Show. The full list of classes available for furnished aquaria and aquascapes is:

Aa. Club furnished aquaria, tropical, 24 x 15 x 12;

Ab. Club furnished aquaria, cold-water, 24 x 15 x 12;

Ad. Individual furnished, tropical, 18 x 10 x 10;

Ae. Individual furnished, cold-water, 18 x 10 x 10;

Ag. Miniature furnished, 10 x 8 x 6;

Ah. Club Aquascape, 24 x 15 x 15;

Ak. Individual Aquascape, 24 x 15 x 15.

(Tanks in these classes are to be supplied by the exhibitors and may be partly set up before arrival.)



CLASSES for tropical fishes at this year's Show are for pairs: NB, pairs Barbs; NC, pairs Characins; NDM, pairs Cichlids and 400 Egg-layers; NEF, pairs Labyrinths and Tooth-carp; NGHL, pairs 400 Catfish, Corydoras and Loaches; NJK, pairs Rasboras, Danios, WCMM; NOP, pairs Guppies; NQRS, pairs Sword-

tails, Platys and Mollies; NT, pairs aos livebearers. Breeders are entered for in the following classes: X B-M, breeders Egglayers; X O-P, breeders Guppies; X Q-S, breeders Sword-tails, Platys and Mollies; XT, breeders aos Livebearers; X U-W, breeders Coldwater.

The coldwater aquarist, as well as having the above breeders class, can enter individual fish in Classes U, single tailed goldfish; V, twintailed goldfish; W, aos Coldwater.

Tropical marine fish (Class Ya) and coldwater marine fish (Class Yb) can also be entered.

For the first time at The Aquarium Show, classes for water plants are being staged. These should be plants grown under water: Za, rooted plants; Zb, cuttings. Floating plants can be entered in Class Zc.

BIG fishes really come into their own at The Aquarium Show this year since a special class is being provided for them. Any fish 12 inches or more in length from Classes B-M can be entered in this 'Special Class'.

ENTRY forms for The Aquarium Show '74 Tableaux Competition are now available. Any Society that has not yet obtained a form can have one sent on application to PFM, 554 Garratt Lane, London, SW17 0NY. This year, the fact that separate furnished aquaria and aquascape classes for both individuals and clubs are being staged as part of the competitive classes has enabled the Show Committee to present rather more choice to tableaux designers. Each tableau must incorporate at least ONE furnished aquarium, aquascape or pond (minimum surface area of a pond shall be 2 square feet) and, if this furnished aquarium(s) or aquascape(s) conforms to normal FBAS entry requirements for one of the following classes, then it can be entered for judging, without fee, by FBAS Aquarium Show judges in one of those classes: Club Furnished Aquaria (two Classes), Aa and Ab, 24 x 15 x 12; Individual Furnished Aquaria (two Classes), Ad and Ae, 18 x 10 x 10; Miniature Aquarium, Class Ag, 10 x 8 x 6; Aquascape (two Classes), Ah and Ak, 24 x 15 x 15. However, this year, the furn-

ished aquarium or aquascape that must appear on the tableau need not conform to the FBAS entry rules for these classes; but if the Society thus chooses, they must then enter at least ONE furnished aquarium or aquascape, to be benched separately from the tableau with the other entries in the furnished aquaria and aquascape classes.

THIS year's Aquarium Show secretary is Mr Derek Lambourne (7 Wheeler Court, Plough Road, London, SW11 2AX; phone 01-223 2630). Mr C. A. T. Brown is chairman of the Show Committee and

Mrs P. Lambourne the Committee's secretary. Also on the Committee are Mr F. Tomkins, chairman of the FBAS, and Mr P. Cottle. Mr T. Glass (10 Adelaide House, Portobello Court, London W.11) is dealing with all information and queries concerning the Supreme Championship.

JUDGING at this year's Show will be by FBAS judges Mr B. Baker, Mr A. Blake, Mr C. A. T. Brown, Mr R. Fowler, Mr E. R. Nisoll, Mr D. Renton, Mr J. Stillwell, Mr J. Sutcliffe, Mr F. Tomkins and Mr J. Wheeler.

Caesar the Champion



AS announced briefly in last month's issue, Caesar the snakehead (*Ophiocephalus micropolites*), well known to visitors to The Aquarium Show in London and to TV viewers, recently died. He is seen above with his owner, Mrs Sybil Hedges, at the moment of his triumph as winner of the first Supreme Championship Competition at The Aquarium Show 1971 and his first appearance on TV, after his most successful season of showing at numerous venues.

He was purchased as a fish a mere 3 inches in length and at the time of his death (5 years later) his overall length was 37 inches (33 inches to the caudal peduncle) and his weight was 18 lb 12 oz. Few people realised how much effort was needed to stage a fish of this size and strength at a show, in transfer from home tank to bench and back again, but those who saw the great care with which Caesar was treated on these occasions know that the viewing public had special reason to be grateful to Mrs Sybil Hedges for the chance to see this magnificent aquarium specimen. Caesar has the reputation of possessing a show personality and he certainly always seemed to be interested in what was going on beyond his tank.

It would have been possible for Caesar to have been preserved for posterity at the British Museum (Natural History) but Mrs Hedges thought that Caesar should remain at 'home' where a soft, koi pond will now commemorate this splendid pet.

Naturalist's Guide to the Livebearing Fishes

By J. J. HOEDEMAN

THE ovoviviparous (literally egg-live-bearing) toothcarps are native to the warm regions of North, Central and South America. Like oviparous (egg-laying) toothcarps, they are found in rivers, lakes, marshes, pools and paddles, even in the smallest pondlets left behind by floods, which dry up in the dry season. In this way, the dry season causes the death of millions of lovely fish each year.

The body of these toothcarps is elongated, more or less thick-set, and laterally compressed. The entire body, sometimes even including part of the fin bases, is covered with scales. Sexual dimorphism is particularly conspicuous in these fishes, not only because mature males are much more vivid than the females, but also because of the so-called 'gonopodium', the male copulatory organ which directs sperm capsules towards the female genital opening. (More about the gonopodium later.)

In addition to a number of external differences which distinguish the males from the females, there are also a few internal ones. For instance, a number of vertebrae in front of the tail section in the males, underneath the dorsal fin, have a kind of elongated bony ray. To these are attached the vigorous muscles that operate the gonopodium. It is in this connection with the growth of this organ that a sexless fish becomes male—the so-called change of sex, or reversal, frequently observed in



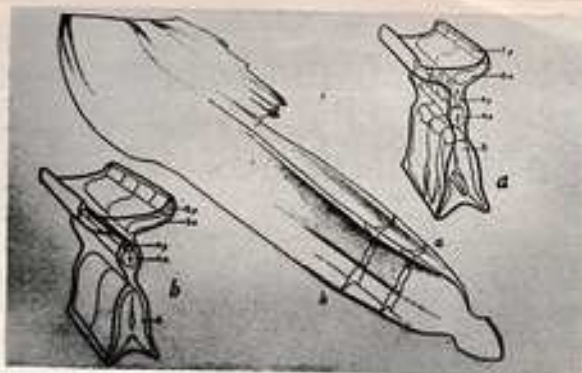
World map showing the area of distribution (shown stippled) of the livebearing toothcarps (family Poecilioides)

ovoviviparous fish. The elongated vertebrae divide the swim bladder of these fishes into two parts.

By now we are used to the idea of young fishes being born alive in the aquarium, and give the miracle no further thought. It is still something to marvel at, yet there is little cause for wonder, after all. This is a natural occurrence, even though it used to be considered a privilege of mammals alone. Although the organisation of viviparous creatures—those that bring forth their young alive into the world—and the manner in which the young are born alive are not the same in every instance, live birth occurs in almost all groups of the animal kingdom. Some unicellular organisms at the lowest level of development have a similar way of reproducing, as do some kinds of snails, sharks and other animals. Among fish, Poeciliodea are by no means the only oviparous ones, for the half-beak genera, *Dermogobius* and *Hemiramphus*, are also live-bearers.

Poeciliodea are ovoviviparous and viviparous. The difference is considerable, but can be clarified in a few words. Higher mammals are purely viviparous—that is, the fertilised eggs remain stored in the mother's body and are fed directly from the blood stream of the maternal organism, incorporated into the mother's circulatory system, thus implying a vital connection between mother

J. J. HOEDEMAN'S account of the live-bearing toothcarp family Poeciliodea is an excerpt from his newly published book **NATURALIST'S GUIDE TO FRESH-WATER AQUARIUM FISH** (printed by arrangement with the publishers, Sterling Publishing Co. Inc., New York and Oak Tree Press Co. Ltd., London).



Stereogram drawing of the gonopodium of *Xiphophorus* species (centre) with cross-sectional views of slices of the structure (a and b) taken through the lines a and b

and baby. There is no egg-shell at the time of birth, so the babies are literally brought forth alive. In the case of most ovoviviparous toothcarps, reproduction takes place much as it does with egg-laying fishes (the babies also come into the world alive and fully developed), the difference being that the male sperm is brought into the body of the female, and thus internal fertilisation of the eggs takes place before they are laid. The egg, which has a well developed shell, develops within the body of the mother but *without* feeding on her vital fluids, and is not incorporated into her circulatory system. At the moment of birth, the shell bursts at the slightest pressure, either inside or just outside the mother's body; thus, the baby is born alive, but from an egg. For nourishment, the developing embryo consumes the contents of the yolk sac, in exactly the same way as the larvae of egg-laying fishes do. The great difference is that egg-layers do so outside the maternal body, where they are exposed to all the risks of a hostile environment.

As soon as the young leave the mother's body, they swim away. At that moment, they are comparable to the larvae of egg-layers when they set out to hunt food on their own. There seems to be no inkling of relationship between the fry and their mother, such as is so obvious in mammals. An exception are the Goodeidae, a truly viviparous family.

Obviously, fertilisation is different in these ovoviviparous fish than in egg-layers. In order to perform internal fertilisation, the males are provided with a copulatory organ, called the gonopodium, which is one of the distinguishing sexual characteristics. The gonopodium in these fishes develops from the first few rays of the anal fin. The manner of growth is characteristic for different families.

The sperm is conveyed to the female in small capsules of spermatozoa alongside of or through

the gonopodium (depending on its structure). The female can store the spermatozoa for a very long time; in fact, some species continue to produce young over a long period after a single fertilisation.

Nature provided these fishes with a reproductive system that would amply compensate for the countless danger to which the small fish are exposed. Live-bearers, native to still or moderately flowing waters in tropical or sub-tropical climates, which, in the dry season, are deprived of fresh water from rivers or rain water, accommodate themselves to a considerable periodic drying of their natural environment. As the females can, after a single mating, continue to give birth throughout the whole season, the survival of the species is, to a certain extent, assured.

What actually goes on in the various habitats of these fishes? The females stay, for the most part, in shallow pools, while the males prefer deeper water with a faster current. The fry are most often born in pools and puddles isolated from the main stream during the dry season. Such seclusion provides them with a measure of comparative safety from their natural enemies. By the time the rains arrive, just about all the fry have reached sexual maturity, at which time they mate. Thereafter, the males migrate to the deeper, free-flowing waters through channels opened up by the rains. The fertilised females stay in the quiet, safer waters. Thus, nature provides a two-fold precaution for the preservation of the species: fertilisation inside the maternal body and the instinct to seek safe, sheltered water for the bringing forth of the young.

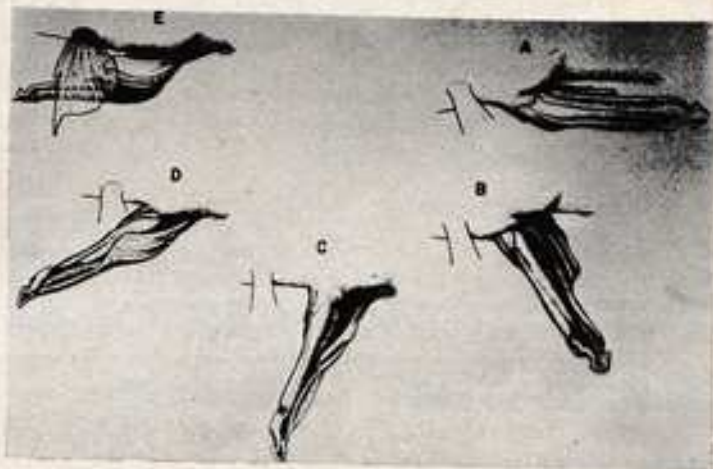
As a rule, the process of fertilisation takes place as follows. During the mating season—which in the freedom of nature is shorter than in the aquarium—the male releases a hormone called 'copuline' into the water. Copuline has a curious effect on the females—at least, on those females that have not been fertilised before. It causes them

to take on an elevated position in the water, heads up at about a 20° angle. They either stand still or swim about. In this position, it is much easier for the males to approach them for the purpose of fertilisation. Investigation (Jaski, 1939) showed this to be true for the guppy (*Poecilia reticulata*) and later it was found that most of these live-bearers behave in the same way.

For fertilisation, the gonopodium of the male is swung sideways, or sometimes in front, and the sperm is deposited on the body of the female. No proper kind of copulation takes place, as has been assumed. In other words, the male organ does not introduce the sperm into the body of the female, but the sperm capsules are expelled from the gonopodium towards the female genital opening.

works—certainly not as a copulative organ but, instead, more like the barrel of a gun. The barrel is formed from outgrown rays of the anal fin and is cocked and ready to fire when it is turned forwards, together with the pelvic fins. The genital exit lies between the bases of the pelvic fins and the gonopodium (the anal fin), and from it emerges one or more seed balls to be pushed to the top of the gonopodium. This takes place with lightning speed, so that it is not possible to see whether the discharged seed ball actually strikes the target.

What goes on in 'virgin' females that have not previously been fertilised? Mature virgin females, when exposed to the effect of the hormone copuline become, as it were, high—that is, they undergo a reaction of extreme excitation. The



Five phases (A to E) are depicted in the swing of the gonopodium of a swordtail (*Xiphophorus*) to the forward-directed position in the instant before the sperm capsules are discharged in the direction of the female.

This has also been observed (Breder & Coates, 1935) in the guppy. The spermatozoa (the motile gametes in the sperm) clump together to form clusters called spermatophores in the seed duct. Thousands of seed cells are contained in these spermatophores, cohered by means of a proteinaceous substance which is later dissolved in the female oviduct to release part of the seed cells. These then fertilise the eggs. Thus, the males have no active part in the actual fertilisation; the female takes care of the entire process.

When breeding ovoviviparous fish, it is desirable to keep the sexes apart as much as possible (which is what happens in the wild as well), and then to bring together several females with only a single male. This also seems to be the normal thing in nature, for relatively more females than males are found there. Curiously enough, in the aquarium, sometimes there is an entire brood of males only, without so much as a single female. It is not known how this occurs, nor whether it also happens in the wild.

Now for a close look at how the gonopodium

reaction lasts for a period of four days to a week, depending on the water's temperature and on the age of the female. At about the middle of the period, when the females swim in the most elevated position, chances for a successful target-shoot with the spermatophores are best. This is a condition worth being remembered by breeders.

When the spermatophore has penetrated into the oviduct, gradually and according to the demand, a part of the enveloping substance is dissolved by a fluid separated from the wall of the oviduct. In this manner, a number of spermatozoa are freed of the spermatophore to fertilise a number of eggs. These remain in the wall of the ovary sac until they are ripe. When about to hatch, they descend into the oviduct, from which the young emerge. Parturition usually takes a few hours, but, under certain circumstances, it can go on for several days. The number of young at a birth differs from species to species and may be anywhere from 4 to 100. The number, of course, may be influenced by the mother's age, the tank's temperature and the quality and quantity of food

in the period preceding mating, as well as other factors.

Inspection of the map showing the distribution of Poeciliidae and comparison with that of their egg-laying cousins shows that they are restricted to a relatively small area, the Americas only. It seems correct to conclude, therefore, that this is a fairly recent group that never was more widely distributed.

Like the egg-laying species, or even more so, these toothcarps are eminently suited to the aquarium. Because of their often lively coloration, their briskness, and their peaceful nature, they can be kept along with most other species. For the beginning aquarist, they are an easy group to start with, for they require only simple care. Even breeding is easy and often surprisingly successful. Still, Poeciliidae are not directly qualified as 'guinea pigs' for the beginner, for breeding them requires at least as much insight as it does for other fishes. Breeding in a hit-or-miss manner can cause loss and destruction of many lovely fishes.

CLASSIFICATION OF THE FAMILIES

Live-bearing toothcarps are classified according to their structure and organisation. The difference in the structure of the gonopodium is actually the only clearly visible characteristic. Hence, in the

table below, the form of the gonopodium was adopted as a criterion.

The four families have been familiar to aquarists for a long time, and the Poeciliidae in particular have contributed a veritable treasure chest of pretty specimens.

1. The gonopodium is formed by part of the anal fin only
 - A. The gonopodium has an extremely simple structure. It consists of the six foremost anal fin rays, shortened and hardened, separated from the remaining rays . . . family Goodeidae
 - B. The gonopodium is built up of the third, fourth, and fifth anal fin rays. During growth, the anal fin shifts towards the head . . . family Poeciliidae
2. The whole anal fin is grown out to form a tubular, copulatory organ, not shifted towards the head
 - A. The gonopodium is not scaly, eyes normal . . . family Jenynsiidae
 - B. Gonopodium scaly, eyes horizontally divided into two parts . . . family Anableptidae

Recent research shows that the families can be classified according to more natural criteria, considering differences in the gonopodium of minor significance. For the time being, the more familiar classification will be adhered to.

Book REVIEW

MARINE AQUARIUMS IN THE RESEARCH LABORATORY
by John M. King & Stephen Spotte. 40 pages,
9 line drawings in text. Aquarium Systems Inc.,
Ohio, 1974. \$2.00.

THIS short guide is written by two senior executives of Aquarium Systems Inc., Ohio, and although to some extent it may be regarded as publicity material in support of that institution, it is largely a faithful technical document in its own right. In the U.S.A. the possibilities of closed-system marine units as money-spinners have long been recognised, and they extend far beyond the mere hobby potential in which many readers of this magazine would normally be interested. However, in the case of marine fishkeeping there can never be too many books like this, which is an amalgam of much scientific activity coupled with a great deal of practical common sense.

This particular volume is directed primarily at the laboratory student, and half of it comprises information on laboratory tests, a bibliography, glossary of terms and a detailed list of references. The first half of the text deals most economically

with all the essentials for setting up and maintaining a saltwater tank, and has a brief section about disease prevention.

Those who have read Spotte's two books on marine aquarium fishkeeping will not find anything new here, but as their very essence has been distilled into this short work, many will welcome the opportunity of obtaining such useful technical information for a minimal outlay. The other books were rather highly priced for the tastes of many, and by comparison the book under review must be considered to be of high value.

There are many roads which lead the aquarist to marine fishkeeping, and in recent years it has developed into quite a thing. Most unfortunately a number of factors, not least the reluctance of the would-be mariner to take the trouble to read up his subject before he takes the plunge, has resulted in the growth of doubt and disillusion in many quarters, and books like this do two things at the very least. They will help the impatient starter to get going with the essentials in his head. More importantly they are encouragement to the students of the subject gradually emerging in this country, whose future peerings into what is still a large unknown may some day enable us to keep coral butterflies as simply as goldfish.

R. PINKS

MARINIST'S NOTEBOOK



Photo: D. Phillimore

How Often to Change Seawater

By ROY PINKS

ALTHOUGH I have briefly touched upon the subject of the necessity or otherwise to change the water in a marine aquarium, this may be a good opportunity to develop the theme somewhat. When I first decided to try my hand at marines I read up on the subject to the extent of every book I could lay hands on. Admittedly, the available bibliography was abysmal (and is little better even now), but so far as I can recall water changing was very seldom mentioned and was never one of the big things. In fact, such were the terrors and likely mishaps surrounding the luckless marine fish between its plastic bag and the lethal waters of our tanks, that it was a wonder that it ever survived the temperature and salinity equalisation routines we applied!

The fanaticism about all this was equalled only by the advice offered on the subject of how to transfer anemones and other invertebrates from their native water to ours. Sudden changes in salinity or temperature would be fatal, and it was therefore not the done thing to meddle with either. It is not surprising that, believing this, we assumed that if the transfer of living creatures to our tanks was achieved without instant death, their survival for a week or so virtually made us experts in their culture. Nothing was ever said about the inbuilt reserves of almost every living thing which enable it to survive adverse conditions for far longer than is commonly imagined, and what many observers

took for success was in reality little more than living death on the part of their charges.

In fairness, at one time the animals died even more quickly, so that it could perhaps be claimed that some progress had subsequently been made by means of less-superficial understandings of water chemistry and animal tolerances. Nonetheless, I can recall no recommendations that water changes should be applied, and I think this was because it was assumed that if everything looked right and there were no deaths, everything probably was right. I must admit that if I had been told at that stage that I had to change a third of my tank water every 3 months I would have finished with a far smaller effort than I have in fact entered into. The cost of marine salt mix is hardly cheap, nor likely to become so.

In the course of the next 2 years there were more and more rumblings that the reason so many marine fishes died was the omission on the part of their owners to carry out regular water changes. To many fishkeepers this came as something of a rude shock because they had believed that this was just the very sort of thing to cause comparable reaction on the part of their fish, which would immediately cause them to display distress symp-

Continued on page 124

BREEDING FANCY GUPPYS

Sex Factors in Guppy Inheritance

By F. CAMPBELL

A QUESTION which often arises when guppy breeders gather is whether a knowledge of genetics is necessary to obtain the best results. It is doubtful if there is anybody qualified to give a really categorical answer. Genetics is a comparatively new branch of biological science and those who study it seriously are still a long way from knowing all the answers, particularly those who use guppies as their subject. The guppies in the tanks of the hobbyist are, of course, aware of this and whether we know anything about genetics or not they will continue to perplex us. The degree of perplexity, however, may be lessened if we know something of the basic principles of heredity. What then are the basic principles and how much do we need to know?

Adopting a logical and simple approach we might say that genetics is all about genes; these are the units of inheritance and in transmittance from the parents determine the characteristics of the offspring. The genes occupy fixed locations on the 23 pairs of chromosomes in the life centre of every cell that goes to make up a guppy. One of each pair of chromosomes is received from the male parent and one from the female. One pair of chromosomes are known as sex chromosomes because they determine whether the individual will be male or female; the other 22 pairs have no bearing on sex and are known as autosomes.

The genes on the autosomes, having nothing to do with sex, transmit their characteristics to both male and female offspring but often with different effect. For instance, we might get possession of a gold female and think it would be a good idea to mate it with one of our grey males; we would be disappointed to find that all the first-generation offspring were grey. Not to worry—although they are grey they are all carrying genes for gold, which has been suppressed. In this sort of situation the traits which have been suppressed are called 'recessive' and the others 'dominant'. In the second generation gold will re-appear in about 25% of the offspring and if these are bred 'gold' to 'gold' the third generation should be pure gold.

We can now appreciate that a knowledge of 'dominants' and 'recessives' can make the breeder's lot a little less puzzling. It is, alas, only half the battle for we are faced with many more complica-

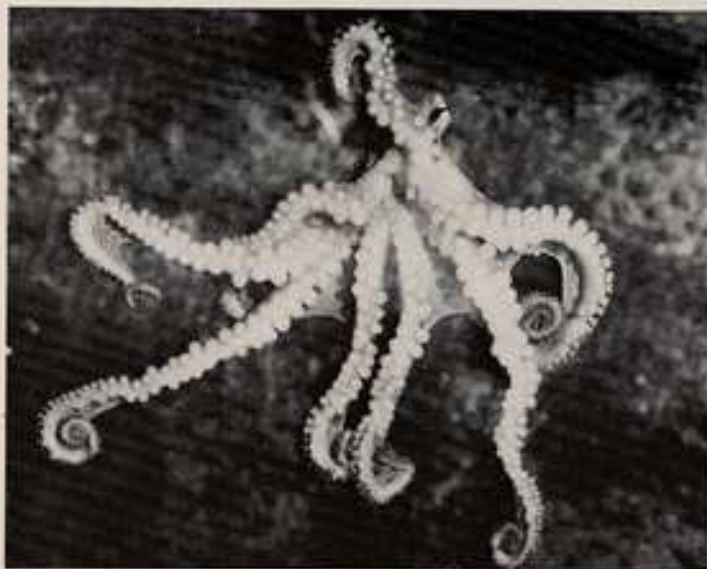
tions when we consider the traits which are carried on the sex chromosomes of the male. The sex chromosomes are always symbolised by X for female and Y for male, the females having two X and the males one X and one Y. Whether an ovum with its X chromosome is fertilised by a spermatozoon carrying X or by one carrying the Y chromosome determines the sex of the offspring. The caudal shape of the males will also be determined by genes which are carried on the sex chromosomes and which are said to be 'sex-linked'.

It is baffling to discover that when we breed from a male having a certain shaped caudal which we admire, none of the offspring shows this desirable trait. The reason for this is that the gene which determines it is situated on the X chromosome of the male and can therefore be transmitted only to his daughters, who, although they are carrying it, do not show it. When they reach maturity, however, they are capable of transferring it to both sons and daughters, so if we select a few likely ones and put them back to their father we should get the beginnings of a pure strain. I say the beginnings because there are other factors involved such as what the original female was carrying and whether she was a virgin or not. Then the male that was carrying the caudal shape we want on the X chromosome may have been carrying a caudal shape we don't want on the Y chromosome and this would manifest in the male offspring and would have to be 'bred out'. A prolonged business, particularly if the original male dies before his daughters are old enough to be put back to him.

So, even with an elementary knowledge of genetics, we are still committed to long but fascinating periods of experiment and the keeping of accurate records if we want to learn all the secrets of the guppy. The frustrating creature continues to present us with an endless succession of problems and the more involved we become the more absorbing do we find the business of guppy breeding.

Incidentally, there are no hard and fast rules governing sex-linkage; what we discover by our own experiments may not be accepted as fact by other breeders, as I will endeavour to explain in a future article.

Octopus in the Sea and Tank



IN 1973 I made a trip to the Mediterranean to get in some diving and photography—in the South of France, with its sun, sun-tanned crowds—and the mistral! It's a sunny, hot day; in and around the harbour are the French fishermen who catch even the smallest fishes like gobies and blennies and use them in fish soup or the famous bouillabaisse. At the water's edge a skin diver in his black diving suit, with the yellow high-pressure air-bottles on his back and armed with an underwater gun and harpoon, disappears beneath the surface of the water. It is so clear that I can follow his shadowy shape for a long time. Later the air-bubbles tell me where he is.

After about 20 minutes he surfaces and, tired, climbs ashore between the rocks and stones triumphantly holding his harpoon aloft. At the end is a rather strange animal in its death throes—the diver beams at me: 'An octopus, Monsieur'. I cannot share his joy and ask him: 'Are you going to eat it?'. He replies: 'No sir. It's too big—it's a monster'. He goes back to the sea to look for new prey and I have the opportunity to take a better look at the animal that has been dashed on the

By W. A. TOMEY

Photographs by the author

rocks, just like in Cousteau's movie. Big strange eyes, eight tentacles connected by a thin, flexible skin; many suckers and the strange sack-shaped body with its breathing hole and mouth centred between the tentacles.

The octopus lives in a cave under stones and rocks and shuns the daylight. It's a real night hunter that becomes active towards twilight. If you want to watch it in its natural habitat it is necessary to dive during the evening or at night armed with an underwater lantern. If an octopus is out in front of its cave or hunting and is caught in the light from the lantern it will immediately try to get back into its cave; so one can locate its lair like this. Even the endlessly shifting small stones can make a cave for an octopus. The 'cave' is made of little stones piled up in such a way that the creature can

get into the centre. The whole thing is usually covered by bigger stones. As the animal grows it must enlarge its cave or move on. Bigger animals keep to the deeper water but the smaller ones can be found near the coast. Often the entrance to the cave can be blocked off by a suitable stone and once the octopus is inside it will pull the stone across the entrance with a tentacle.

When a large or small octopus is surprised by a human being its first reaction is flight. Even fully grown animals retire to their rocks. When no shelter is available it will pull itself to the floor with its eight tentacles nestled around it. If you are very quiet, its curiosity will win over fear and the octopus will start to move again. Carefully reach out a hand and the octopus will stretch out his tentacle and examine your hand all over. Once an octopus came and sat on my hand to examine it. That was how I was able to lift it up in front of my diving glasses.

Only rough treatment or a sudden movement makes the octopus shoot away leaving in its wake a big brown cloud of ink that spreads out in the water. It's not quite clear whether this cloud of 'ink' contains poisons but such a cloud in the vast capacity of the ocean has no toxic effects. If an octopus ejects his ink in a container, say a bucket, in which there are other animals, these immediately come up to the surface as the cloud of ink spreads and they give the impression of being numbed, though it is not known whether or not they die from it.

Even apart from its secretive way of living on the bottom of the sea and under the rocks, it is not easy to find an octopus; unless it is betrayed by a movement one can swim right past it; even right under your nose you can't see it. Its adaptation to its surroundings and the sea bed is so perfect that the chameleon's proverbial skill is nothing compared with it. The octopus is capable of changing colour so fast that one sees the colours it has at its disposal running up and down its skin. That's why it has two kinds of pigment cells (chromatophores) in its skin giving different colours; they can be concentrated or diffused to change the animal's colour according to need, from black to red-brown and from red to pale yellow-orange. In fact, the octopus is capable even of changing the pattern of its skin. Underneath the chromatophores there is a group of little dots (iridocytes) that reflect the white light, making the skin blue or green. An octopus can melt into its surroundings by changing both its colour and pattern.

We've seen that the octopus lives in the ocean amidst rocks and stones and for this reason it is necessary to have a sufficient number of rocks and stones in the octopus aquarium. Not only will it hide behind them but will often move them from place to place. It's a fantastic sight to see an

octopus pick up the stones with the central parts of its tentacles, then walk on the end of its tentacles with the stone hanging from the suckers. It's very interesting, too, to see how these animals react to failure to find a real cave or enough stones to build a 'castle': the stones that are available are taken up and gathered together; then the octopus takes on the colours and patterns of the stones and when it rests it takes up the stones in its suckers, turns the suckers and stones outwards and covers itself with its own tentacles holding the stones. In this way it becomes very nearly invisible.

Like all crepuscular animals, the octopus has rather large eyes, soft green-pink with a very strange oval aperture. If you watch this carefully you can see that it dilates or narrows as required, dependent on the light available. The eyes are placed in short, tubular structures that can be moved sideways and can be closed or opened over the eye. In this way an octopus can look over stones when it's sitting behind them without itself being seen. The placing of the eyes and the eye structure give the octopus a field of vision of 180°, so that it can easily find its prey—and also guarantee its own safety. I was able to observe that a frightened octopus could swim backwards very fast and even find its cave like that. Thanks to the development of their eyes and brains and to their excellent swimming technique the octopus can compete with vertebrate animals in taking cover from danger.

There is quite a difference between a gentle crawl and jet propulsion but the octopus can do both. At the bottom of the sea it leans on its tentacles, using its suckers to catch hold of stones etc. Though it usually swims backwards it can also move forwards and sideways. This is effected by spurring out water through a 'siphon' opening to a chamber in which the gills are situated. The reproductive organs, kidneys, end intestine and inkbag all empty out into this. This 'mantle' is quite flexible and can be moved to the left or to the right and also it is the position of the 'mantle' that enables the octopus to swim up, down, forward or backward. Through the mantle siphon tube the ink cloud can be spurted out as a means of defence. The tentacles are connected by strong, flexible skin, and it resembles nothing so much as a swimming umbrella.

Octopus take in proportionately more water than, for instance, do fishes. You can see this clearly when an octopus is clinging to the aquarium glass; when it spurts water out of its mantle the jet can turn your aquarium hood into a water ballet. It's necessary to use cover glasses that fit exceedingly well. This powerful jet of water can be used for defensive purposes, but it can also be used as an indication of the animal's frame of mind. In an aquarium an octopus will get accustomed to a

certain rhythm of feeding times and you neglect these at your peril! The octopus can see exactly where its food provider is standing and if you're late you will finish up with a jet of water in the middle of your face.

The octopus's tentacles with their double row of suckers makes it possible for the creature to remain in its chosen position. The currents along the rocky coastlines are sometimes very strong—even experienced divers prefer to stay home. But the strength of the tentacle can combat the pull of the current. You can feel this strength when an octopus is embracing you with its tentacles. The message is: don't panic! Let the creature nose you—its organs of taste and smell are in its tentacles. They always let you go and return to their hiding places. If you panic and struggle the octopus will grip you more firmly and if it feels threatened you can get a bite—usually only a small and not dangerous wound, but it can be very painful. One octopus, about 4ft. (120 cm.) long was very curious and clung to my hand to see what happened above the water surface, but then it released me and disappeared back into the sea.

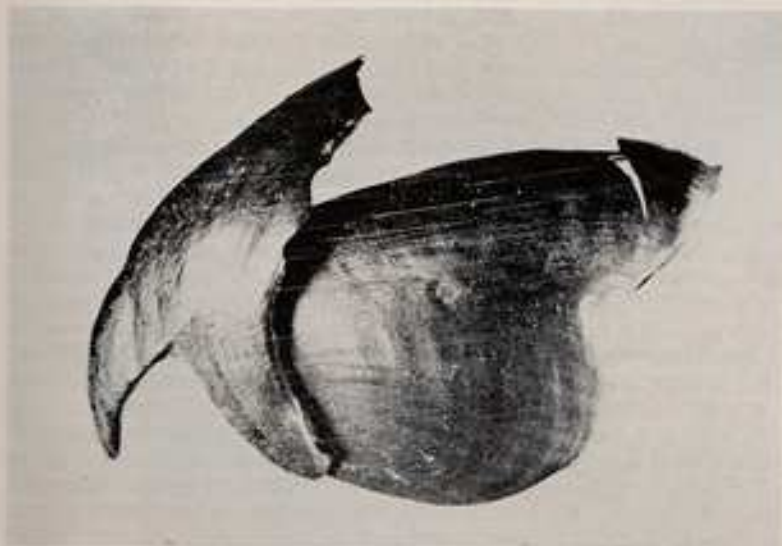
In the aquarium one can watch an octopus cleaning itself. It clings to the side or to a stone and rubs over its skin with one or more tentacles. When it finds something stuck to it, it pulls it off. Then it takes a shower by spurting a jet of water out of its siphon.

Either swimming or on the sea bed the umbrella of suckers gives the octopus good service. It can spread this umbrella very fast and jump forward by spurting out a jet of water backwards. The prey comes under the umbrella, is gripped with the tentacles and brought up to the mouth that is

situated in the centre of the tentacles. Around the mouth we find the jaws, that look just like the bill of a parrot. These can be used with such power that shellfish and the skulls of captured fish can be



Above: The eye of the octopus is not without beauty and is certainly interesting. Each eye is raised slightly on a small protuberance and is capable of being moved



Left: The internal mouth structure or 'beak' of an octopus, resembling a parrot's bill, gives it the strength to crack the shell of a crab or the bones of a fish



As well as the projecting eye of the octopus this picture shows the 'siphon' tube of the animal, which can be used to eject water forcibly.

cracked. Octopus eat practically anything but vegetable food and anemones. Crabs especially are favoured, along with other shellfish, snails, shrimps etc.

Octopus adapt excellently to aquarium life and get used to their owner, though its not known if they actually recognise him. I can say, however, that when I arrive in front of the aquarium the octopus comes to the front glass to beg and even puts its tentacles over the edge of the tank. If anybody else should approach it will stay hidden between the rocks. Feeding is no problem—small crabs, pieces of raw meat, seafish, mussel flesh etc. are gladly accepted. To every other animal in the tank, apart from anemones and starfish, the octopus is a deadly danger so care must be exercised.

As far as one can tell octopus do not react to noises. Its way of life requires only a small 'territory' for its maintenance so it is a suitable aquarium subject. But keep only one octopus per tank! With two octopuses in one tank bitter fights usually occur that end in the death of at least one and sometimes with the death of both. They can also crawl out of the tank, so a close-fitting cover is no luxury! Like all sea animals, it requires clean sea water, well filtered and aerated with plenty of oxygen. It is worth noting that filters and filter pipes often receive the octopus's special attention. Sometimes they pull on these so hard that, for instance, the return pipe is made to point upward or they can pull it to bits. They are most active in the darkness, as we said, and if the filter is interfered with in this way while you are sleeping, with a pump and filter having a 1000 litres per hour capacity . . . imagine! So secure those pipes so that the octopus can't shift them.

Marinist's Notebook

continued from page 119

toms or contract latent disease or both. In the same time-frame we witnessed the marvel of anemones being shipped 'dry' and doing rather well after being dropped straight into receiving tanks without any of the traditional careful preliminaries.

More and more we now hear that regular water changes are not only desirable but essential if our tropical marines are to live for more than a year or so. The Americans do regular servicing each month and report excellent results, though I note that *EXOTIC MARINE FISHES*, published by TFH Publications, urges that we leave well alone. The most convincing arguments in favour of water

changes come in the *MARINE AQUARIUM GUIDE*, by F. de Graaf (Pet Library Ltd.), though even here the practice is only one of nine named routine countermeasures to pollution.

It is right to highlight this matter. The practice will not be a popular one because it will prove expensive and some beginners will be put off by the recurring expense, which many will claim to be unnecessary. Come to that, many still think it unnecessary and feel that this is just the counsel of the perfectionist chemists who are playing safe because the subject is a tricky and delicate one. It certainly puts one in mind of the dismal willies of the 'thirties who made similar predictions about freshwater aquaria. I very much hope that they will either be proved to be similarly as wrong, or that somehow the technique may be modified in such a way as to cheapen and simplify the vital process of keeping our tanks decent places for our fishes to live in.

COLDWATER SCENE



By FRANK W. ORME

Holiday Time and Your Coldwater Fish • Judging and Improving the Strain

HOW many fishkeepers, now that the summer holiday period has arrived, when asked where they intend spending their annual break will reply that they are staying at home because they 'cannot leave their fish'? To allow your hobby to deprive you of that much-needed rest in fresh surroundings is absolutely unnecessary. The fish will come to no harm—indeed they may even benefit from a respite from over-zealous ministrations, and you will be surprised how fit the fish look and how clear the tank water appears upon your return. Each year I leave my fish to fend for themselves whilst my wife and I spend a fortnight in pastures new. It is always a pleasure, upon returning, to visit the fish house and note how much growth the young have made whilst we have been away, a fact which is not so noticeable when they are attended to two or three times a day!

Provided that a few simple precautions are taken a week or so before leaving for your holiday all will be well and it will not be necessary to rely upon the help of another person. Very often the friendly help of a second person can lead to tragedy—the death of fish and gross pollution of the tank, due to overfeeding. It just isn't worth putting friendship in jeopardy and risking disaster.

The first essential is to feed the fish just a little more than usual, but not too much more, so that a reserve of body fat is built up. Keep the front glass of the tank clean, but leave the back and side to build up a growth of green algae; the fish will 'peck' at this growth and find a small amount of sustenance to keep them going during your vacation. Finally, the night before you are due to leave, lightly siphon over the base material to remove any muck or sediment. Lower the water level by approximately half and then gently refill with fresh water. The tank and fish are now ready to survive your absence for 2 weeks, but, if it would make you feel happier, a final feed of live daphnia can be given just before you close the door to start your journey.

If you have a pool then there is even less to worry about, unless it is a very small pool as are some glass-fibre types. With these very small pools it would be advisable to give similar treatment to that recommended for the fish tank and then cover

the pool with a sheet of clear polythene, to prevent the plants drying out should hot weather cause excessive evaporation. Preferably, fish in these tiny pools should be housed in more suitable quarters, for safety, whilst you are away.

The larger pool can be given a partial water change and then covered with a $\frac{1}{2}$ inch mesh net. (A wise precaution is to keep your pool covered all through the year with a net: this will prevent the fish-catching cat exercising its skills and also foil the attempts of various birds etc. making a meal of your prized pet goldfish or young koi. A net also serves a useful purpose by preventing all but the smallest leaves falling into the pool and adding to any possible pollution.)

Attend to these minor tasks and you can spend an enjoyable holiday, knowing that your fish will be safe and are not being killed by good old 'what's his name's' lavish hand of bountiful food and deadly kindness! Do as I do—feed 'em, clean 'em, lock 'em up and go away and forget 'em! It pays, and allowing for the unforeseen, all will be well and your homecoming will be a happy one!

In the April issue of PFM Mr M. Clarke of Stoke-on-Trent wrote in the 'Letters' columns of his disgust for the standard of judging in some coldwater classes, and appeared to blame the judges. This problem is not confined to the Midlands; I have heard similar complaints from coldwater exhibitors in other areas. My own feeling is that this tends to be a vicious circle brought about by a number of causes. Most open shows are staged by societies that have memberships predominantly interested in tropical fish with very little interest in catering for the coldwater section of the hobby.

Too many standards could be another contributory factor; this problem does not arise with tropical fish. Classes for just 'Singletail' and 'Twintail' varieties of goldfish with, possibly, a class for 'A.O.V. coldwater fish' does not encourage coldwater hobbyists to show their fish. Coldwater judges are just not interested in judging only two, or maybe three, classes of mixed coldwater fish, therefore the task falls to the tropical fish judge,

who, quite rightly, states he has no judging knowledge of these fish. Finally, the coldwater fishkeeper is also to blame.

This section of the hobby is conspicuous by its silent acceptance of conditions. Not so long ago I wrote a plea for a single standard for fancy goldfish and suggested that goldfish keepers made their views known. The result?—nothing; not a single word appeared in the 'Letters' columns either for or against my plea. Oh yes, a number of people told me privately that they supported my view, but no one was prepared to say so publicly.

So what can be done to improve the classes, and judging, in one-day open shows? The 'silent majority' must find their voice and press for a sensible solution to producing a single National Standard for Fancy Goldfish. Secondly, they should press societies to stage more comprehensive coldwater classes, in keeping with those put on for the tropical fish exhibitor. Finally, having persuaded clubs to cater for the coldwater fish, the hobbyist must show his appreciation by supporting the classes fully. With sufficient classes and a larger number of fish being exhibited in those classes, the societies will be in a better position to obtain the services of qualified judges of coldwater fish.

I would suggest that the remedy to this situation lies in the hands of the fishkeepers, who, if they are prepared to remain silent and passive, can blame no one but themselves if things do not improve, or indeed get worse.

The tricks Nature plays upon the breeder of the fancy varieties of goldfish are many. A spawning will produce a great many fry that are worthless and a waste of time to rear, which, of course, is why the sorting and culling process must be rigorous and continued until only the best are kept to become the future breeding stock. This year I was exceedingly pleased to find in one of the spawnings a much higher percentage (around 60%) of young lionheads with smooth clean dorsal contours. Alas, Nature had not relented in her trickery! Excellent though the backs were this was counter-balanced by the number of caudal fins that were joined along the upper margin, the number of web tails being much greater than I have come to expect from my strain of lionheads; nevertheless there are some very nice little fish that help to compensate. Such are the disappointments and pleasures of the breeder of fancy goldfish!

Undaunted, I will give the best of these promising fish preferential treatment and, when they have become adult, the best male will be crossed back to the mother, who was the better fish of the

two parents and is known, usually, to throw quite good young.

It is by in-breeding and line-breeding that a strain is created, over a period of time, by selecting as parents only those which have a desirable future. With patience the stock can be, and will be, improved as these selected features become more evident in the young. Of course apparent setbacks do occur, but there are usually a few fish that show the desired improvement and it is these that are used to consolidate and set the desired pattern.

In a future article the subject of goldfish line-breeding will be covered in greater detail, but remember that it takes a long time and a great deal of perseverance before any real results become evident in quantity. The fancier who is prepared to concentrate his efforts will do far more good for the hobby than those who indiscriminately cross-breed the different varieties of fancy goldfish. Eventually the stage will be reached where experienced fellow breeders are able to recognise fish of his strain and this, in itself, is a compliment to the skill he has shown in improving his chosen variety of fish. There are a number of breeders who, though no longer with us, are remembered for the work they did, and whose names are linked with certain varieties of fancy goldfish the quality of which are still remembered and admired.

Recently I received a booklet from Stapely Water Gardens, London Road, Stapely, Nantwich, Cheshire. The handbook is free to applicants and is well produced with many illustrations of the various pools, water pumps, ornaments and other items which they offer. Two pages are devoted to various questions and answers aimed at the novice, and details are also given of the different methods of pool construction together with comparative costs of the different materials used. The main body of the booklet is, of course, a descriptive price list of pools and liners, fish and plants, together with all the sundry items that the pool keeper may require from food to underwater lighting kits, and most goods are covered by their guarantee as stated on page 53, the last page of the handbook. This excellent handbook will be found quite interesting by all coldwater fishkeepers and I thoroughly enjoyed browsing through it.

With the high cost of so many things the Association of Goldfish Breeders has decided to avoid spending money unnecessarily by making good use of the talents that exist within the membership. The skills of the various craftsmen members have been enlisted to produce a neat gold-plated badge, trophies are being designed

and made for competition within the Association and a member with artistic skills has designed attractive award cards, all at no cost to the existing funds. This is an idea that could no doubt be emulated by other societies where the members have the required skills.

Incidentally, in answer to a question that has been put to me quite often recently, the A.G.B. and Association of Midland Goldfish Keepers are not connected in any way; both are totally independent organisations devoted to the fancy goldfish and the well-being of both the fancier and the hobby. They merely share a similar title.

* * *

These articles are written some time before they appear in print. I was therefore intrigued to read

the Editor's notes, under the heading of 'Look to the Future' in 'Comments and Quotes' for the May issue of PFM. By now you will have read my warning, over the sale of koi dead bait (June issue), which is now reinforced by the Editor's remarks concerning the newly recognised disease of S.V.C. (spring viraemia). Coupled with the concern of British trout farmers over other infectious disease (pancreatic necrosis), that strikes in particular at rainbow trout with disastrous results, the rumours regarding a ban on all imported fishes could, perhaps, be nearer to fact than we realise. Then, as the Editor rightly says, the only source of supply to either trade or individual would be the breeder. I wonder whether the British amateur would be able to meet the demand; in lots of cases his skills could well be put to the test!

PFM EQUIPMENT REPORT

Custom-Built Worm Mini-factory

IGM Grindal Worm Culture

A RECENT article in PFM extolled the virtues of Grindal worms as live foods for aquarium fishes, and on behalf of readers we have been taking a look at a complete ready-to-produce Grindal worm mini-factory offered for sale by the long-established IGM firm. This consists of a specially designed culture box, and the culture of Grindal worms it contains is a mature one—that is, you can begin to take worms from it almost as soon as you receive it and thenceforth it will keep yielding as long as you maintain it properly.

The box is neatly and sturdily made of wood, with overall dimensions about 14 inches long, 7½ inches wide and 3 inches deep (1 inch of which is base thickness and the thickness of two battens that raise the box from the surface it stands on). Recessed into the top of the box is a sheet of flexible clear plastic, which the culturist is advised to replace by a piece of glass, and this is covered by a plastic-surfaced board. A square-sectioned wooden rod that fits into a ventilation slot along the centre of the base is supplied and this can be moved to and fro in the slot occasionally to keep the drainage and ventilation hole free. The box is filled with IGM Grindal worm Compost, specially selected and finely ground peat plus leaf mould, charcoal and loam, containing the worms.

Grindal worm cultures should be kept at a temperature of not less than 70 F (21 C), and Mr E. L. Arnold of IGM recommends bottom-

heating. It is necessary to keep the culture medium moist to the point of maximum saturation without actual oozing of water (this state is rather wetter than the one usually maintained in white worm cultures, for example). Feeding the worms (IGM supply a Grindal worm cereal-based food mixture which tends to prevent growths of fungus) is done every other day, the quantity of food added to the culture being based on the rate of consumption by the worms. Control of moistness in the box is managed by making the food mix extra wet if the culture has become rather dry and by mixing in fresh, dry Grindal worm Compost if the culture is over-moist.

As with all live-food cultures, to get the best results regular maintenance is essential. However, to test the ability of this culture to withstand neglect we left the box un-fed and unwatered in its 70 F environment for 4 weeks. At the end of this time the medium had dried around the edges but in the centre was still full of living worms (although they had dispersed themselves beyond hope of collecting them until feeding was started again!). They could obviously survive 2 weeks' neglect at holiday times in this purpose-built worm farm.

Price of one of these established cultures is £2, Grindal Food is 50p a large bag and extra compost is also 50p, all from E. L. Arnold, 80 Monega Road, London E7 8EW.



Harlequin No Longer a Problem Fish

Rasbora heteromorpha

By RUDOLPH ZUKAL

EVERY fishkeeper knows these beautiful fish from Thailand, the Malay peninsula and eastern Sumatra—the 'wedge-fleck barb' as German aquarists prefer to call it (though this is not a particularly appropriate name to my mind), or the 'harlequin' in English. Imported into Europe as long ago as 1906, it was considered a problem fish for many years. It could not be bred and it was only after World War 2 that success was achieved, and then only in isolated cases. A profusion of authors wrote countless articles on the harlequin. A soft, acidified water was recommended, a temperature of 82° F (28° C) and cryptocorynes for spawning. Aquarists found it hard to believe that these rasboras and cryptocorynes went together rather like, say, ham and eggs. It is my opinion that, today, it is perfectly possible to use normal tap water for these fish, now that they have been in captivity and acclimatised over a period of so many years. But it is true that hard water must not be used. In my town the water varies between 8° and 14° DH (German degrees of hardness).

For breeding harlequins I use a medium-sized or even quite small tank and water at a temperature of 79° F (26° C) or even a little higher. The most important thing of all, if you wish to be successful in spawning them, is to separate the sexes for a while beforehand. I do this with many species of fishes and they will then spawn almost on command.

Photographs by the author

Translation by F. MARSH

On the opposite page a close-up view of the spawning pair of harlequins is given.



On this occasion, when I wanted to photograph the fish, everything went splendidly according to plan. The only untoward event was that during the spawning one of the females had to be changed as she was not sufficiently 'full' (of roe). The impatient, excited male did not lose interest and after 20 minutes the spawning continued.

It is good practice to keep a shoal of these fish and leave a pair to select themselves. When the male is thus already active you are halfway there. The female should always be a younger fish than the male. Willingness to spawn can be recognised

in the female when she lies on or under the cryptocoryne leaves.

Spawning of harlequins proceeds considerably more slowly than is usual with similar kinds of egglayers. After the display and courtship is completed the female looks for a suitable place, usually under a plant leaf, and presses close to it while the male swims up to her and throws his caudal fin over her body. The fish press close together and the eggs

are laid. The male then swims away and the female takes up her position on her side beneath the leaf to be used for spawning and the male ends a display manoeuvre alongside her.



The female takes up her position on her side beneath the leaf to be used for spawning and the male ends a display manoeuvre alongside her.



Two enlarged views of the spawning pair of harlequins are given on this page, the eggs already deposited on the leaf's under-surface being clearly visible. The male's caudal peduncle and fin encircle the female's body during spawning.

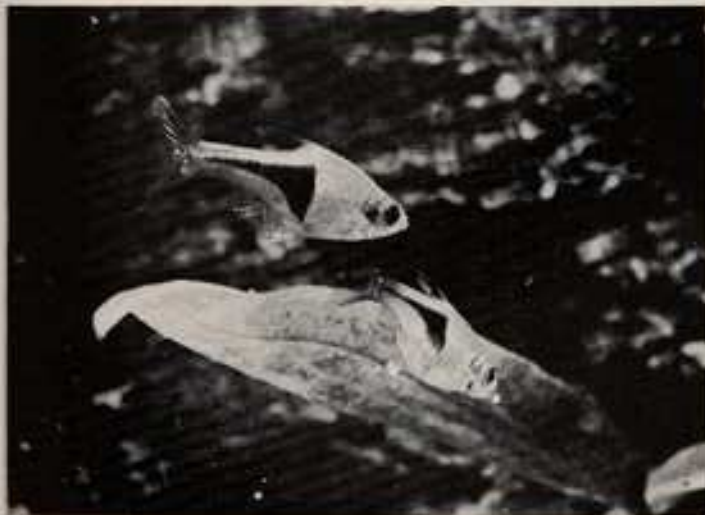
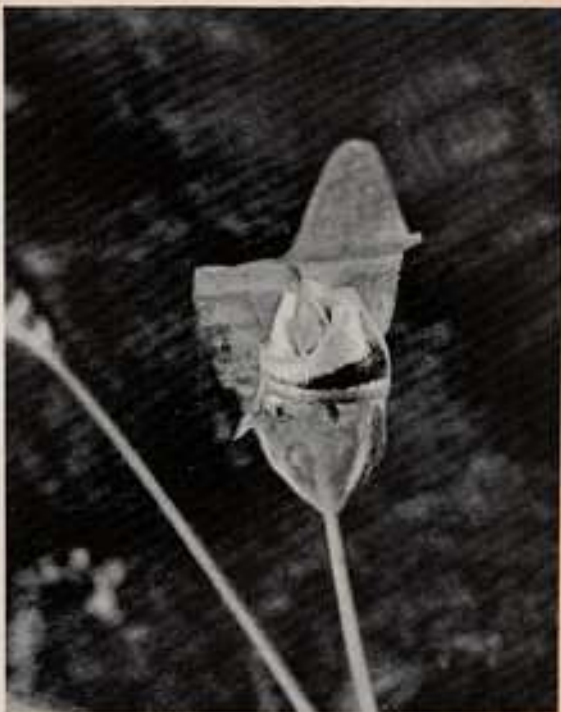


Spawning of the Harlequin (continued)

The tightness of the male's embrace is revealed in this view of the spawning harlequin.

are expelled and remain stuck to the leaf. Those eggs that do drop are usually eaten. This procedure is repeated many times over a period of 3 hours or so, and at the end there will be about 200 eggs sticking to the leaf.

Once the spawning is completed the parents should be removed from the tank. The eggs themselves must be protected from too much light entering the tank. After about 36 hours the young fish hatch; they are about 4 mm. in size and as soon as they are free-swimming they must be given plenty of the finest live food. Harlequins will spawn several times a year.



After spawning any unattached eggs are sought out and are usually eaten by the parents.

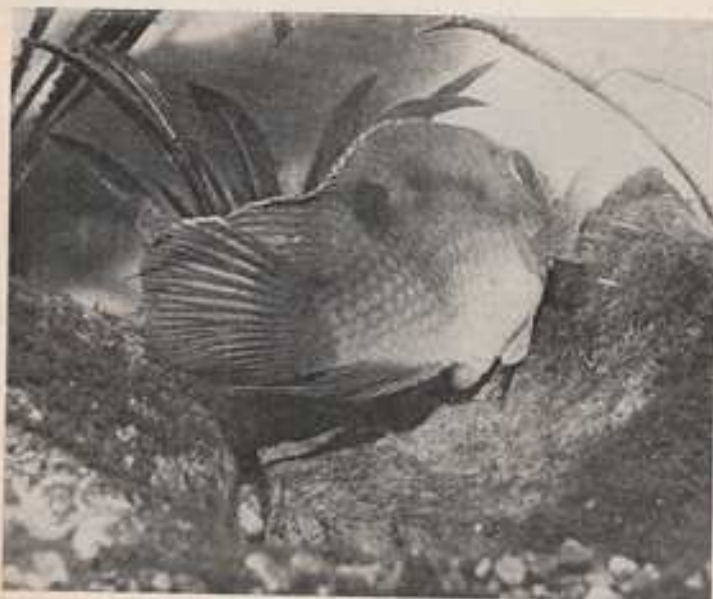
Observations on a Spawning



The male of the pair of keyhole cichlids whose breeding is described is here seen cleaning the chosen spawning stone. By swimming closely over the stone's surface and wriggling his body particles are brushed aside.

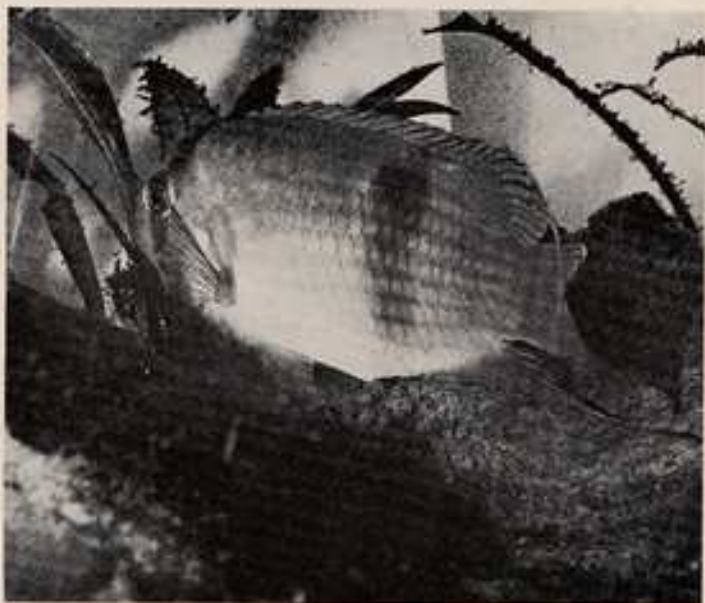
By JØRGEN HANSEN and PAMELA HANSEN

Photographs by the authors



A row of eggs has just been deposited by the female keyhole cichlid. Her large swollen rounded ovipositor is clearly visible and should be compared with the ovipositor of the male seen in the photograph on the facing page.

of KEYHOLE CICHLIDS



Fertilization of the eggs laid by the female is accomplished as the male swims over them. The small pointed ovipositor is noticeably different from the tube of the female.

WE had several times bred the keyhole cichlid (*Aequidens maromoni*) successfully, but had never been able to photograph the actual spawning; either we were not at home when spawning occurred, or spawning was fully under way before we discovered it and the front glass was filthy, making photography impossible; or else it occurred on a Sunday evening when we had run out of film and could not obtain more!

However, patience was eventually rewarded one Sunday afternoon, when we did have some film, and we noticed that both male and female showed protruding ovipositors: that of the male was small and pointed whereas the female's was large and swollen. The front glass was considerably overgrown with algae, but in order not to stir up too much dirt, we scraped clean only that area of the glass behind which lay the stone selected as the spawning site.

The stone in question had previously been thoroughly cleansed by the male. The female eventually began to spawn by gliding slowly over the stone with ovipositor close to it. The ovipositor is apparently very sensitive and the fish can feel

where there is room to lay each egg, and then pushes it carefully out. When the female had completed laying a row of eggs, it was the male's turn to glide over the eggs and fertilise them, whirling water behind him by a fanning movement of the pectoral fins, which spread sperm over the whole stone. The male and female changed position several times; often the one not occupied with the spawning swam threateningly forward to the front glass in an attempt to chase the photographer away.

In the course of an hour approximately 200 eggs were laid, but out of these 200 only 60 young survived. As only about 20 eggs developed fungus, while the remainder hatched out, and as the parents were seen to devour many of the young at the larval stage, it seems as if this is a deliberate or instinctive tactic on the part of the parents, triggered somehow by their awareness of the limited ecosystem they inhabit.

As long as the young are left with the parents, the latter will not attempt another spawning, as the fulfilment of the parental instincts inhibits the urge to spawn. When the young are removed, the urge to spawn will again predominate.

Noteworthy Newcomer to the Dwarf Cichlids

By JAMES BARRIE

IN Britain *Herotilapia multispinosa* has been on sale only in recent years. Initially it appeared in some areas as an unnamed dwarf cichlid and in others, more dubiously, as *Cichlasoma salvini*. Since Salvin's cichlid, as it is commonly called, has a well-established reputation for roguery, this particular case of mistaken identity probably did little to commend the newly introduced species to the cautious aquarist. Retailers were not responsible for the error; it was perpetrated in a wholesaler's price list.

Classification Problem

Those of us who chanced purchasing the fish were delighted to find that it failed to 'live down' to its attributed name. Instead it turned out to be an interesting acquisition that was relatively easy to keep. Not that *H. multispinosa* is incapable of exhibiting normal cichlid-like aggression traits when spawning, protecting its young, or merely expressing innate territorial drives. But attacks, if they can be so described, are more boisterous than vicious: they are mainly bluff, seldom with serious consequences, directed against others of its own kind. A group will circle one another for long spells displaying their repertoire of threat-postures without a blow being struck—which can be both entertaining and instructive to the observer as it permits close study of intricate behavioural patterns of colour-change, gesture and movement, typical of the cichlid family as a whole.

That this fish was accidentally slotted into the genus *Cichlasoma* by a section of the trade is understandable: in appearance and habits it has much in common with some species of that genus. Dr Robert J. Goldstein explains in the CICHLID HANDBOOK that it differs from *Cichlasoma* in having tricuspid (with three cusps or points) teeth; those of *Cichlasoma* are conical. Creation of the special genus *Herotilapia* (*multispinosa* is the only species) suggests classification problems.

H. multispinosa is an attractive, robust fish which matures at about 2in. and, if properly treated, grows to nearly 4in. From just behind the striking red eye a broken, darkly blotched line runs the length of its body terminating at the caudal peduncle; several transverse bands are also visible at times. Backward of the eye, above the upper-front edge of the gill-cover, a characteristic black spot is always present. Overall coloration is variable, depending on health, mood and conditions. Seen at its best, *H. multispinosa* is suffused in a golden glow, radiating vitality and well-being. When sickly, afraid or otherwise unhappy the colour fades to a mottled brown with brassy undertones. Aroused, or when guarding the young, its entire ventral surface, including the fins, takes on a jet hue which lightens to grey-black as it rises toward the lateral-line region. The dorsal and caudal fins are clay-yellow, the former having a pale grey-blue border, and the anal fin is edged in a deeper blue. The ventral fins are generally dark blue to black, but on some individuals only the fin-rays have this coloration. Sexing is difficult as the females are practically indistinguishable until they become ripe with ova.

Aquarium Habits

A Central American species—it is found in Costa Rica, Nicaragua and the south of Honduras—it requires only moderate temperatures; somewhere around 75°F (24°C) is adequate. Being neither finicky about food nor over-fussy where water quality is concerned, a varied diet (live, freeze-dried, flake) coupled with clean, roomy living quarters suffice to ensure its comfort. Experience shows that the minimum desirable tank size is 36in. by 12in. by 12in. Anything less tends to make the fish uneasy so that when they are not dashing about in panic at every footfall, they are huddled restively in corners.

Whether their aquarium should be planted is a matter of personal choice and judgment. But it is a fact that only the toughest plants are likely to survive the attentions of *H. multispinosa*, for while it does not uproot them with the verve and dedication of many cichlids, it nevertheless produces equally devastating results by tearing the foliage to pieces. A more suitable decorative outcome can be achieved with a selection of carefully treated and reasonably inert materials—for instance, washed gravel, lime-free rocks, slate, petrified wood, old plant pots etc. Floating plants may also be included to give shade. By judicious and imaginative arrangement of these a lively, aesthetically pleasing and functional natural biotope can be built up to provide hides, spawning grounds and territorial stations—three prerequisites for a successful cichlid set-up.

Unless breeding is intended, it is unnecessary to isolate these fish as they will live amicably with other compatible species. Compatible in this context means large enough to avoid being eaten, and sufficiently vigorous and resilient to withstand a certain amount of rough-and-tumble. The writer's original quartet (purchased mid-1971 and still surviving) co-existed happily for over a year with the following—one or two of them unlikely companions: *Acarichthys heckelii*, *Aequidens pulcher*, *Belontia signata*, *Hemichromis bimaculatus*, *Labeo bicolor*, *Peleichachromis pulcher* and *Synodontis nigricentris*. It is not claimed that this mixed bunch represents an ideal combination or one the inexperienced should attempt to emulate; on the contrary, it simply illustrates that *H. multispinosa* can hold its own in most company without causing disruption, even when put alongside fishes which are notoriously volatile and easily provoked. During the 'power crisis' an effort was made to reduce consumption of electricity and, on this occasion, they were forced to share accommodation with *Barbus amazona*, *Belontia signata*, *Labeo bicolor* and *Lacostoma senigerum*. Again they were no trouble—that is, if one ignores decimation (to be taken literally) of the vegetation; but this was not unexpected.

Breeding Procedure

No special skill is called for to induce spawning. However, if the object is to rear the maximum possible offspring, then a measure of forethought is advisable and the following method, or similar, should be considered.

(a) *Provision of the right environmental conditions.* There is no evidence that water quality (critical pH/DH requirement), other than temperature, has a direct influence, therefore preparations are rudimentary. A tank, preferably 36in. or larger,

is thoroughly disinfected and layered with a zin. substrate of well-washed gravel on which flat rocks or slates are placed; it is then filled with tap-water which is aerated for at least 24 hours. The temperature is raised to 78° F (26° C).

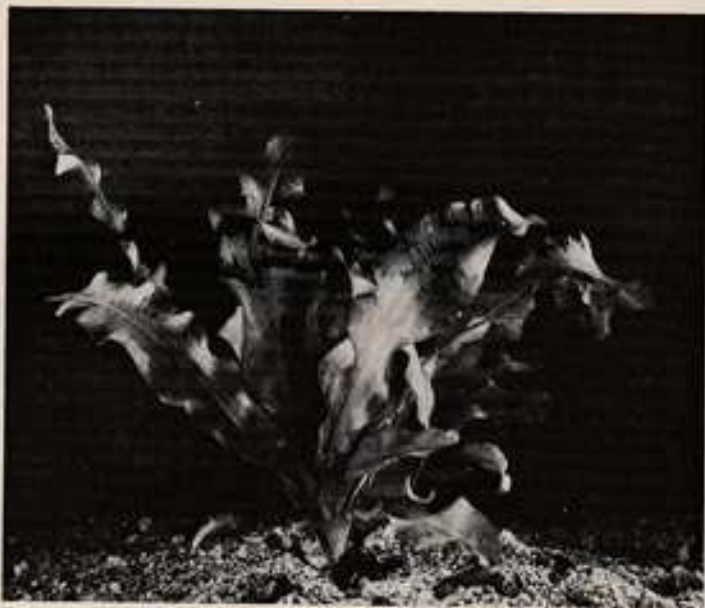
(b) *Isolation of the spawners.* Because of the difficulty in sexing this species, four or five fish are transferred to the breeding tank to encourage pairing-off. Once there, live foods are offered—for choice whiteworms and earthworms, but definitely nothing from an aquatic source which could bring in pathogens, parasites and larval forms potentially harmful to the eggs and fry. The first indication of bonding comes when a pair begin the search for a spawning site (the writer has observed no jaw-locking activity in this species). In typical cichlid fashion a particular rock is selected and vigorously scoured by repeated mouthing over many hours. At this stage the other fish are removed.

(c) *Prevention of egg and fry losses.* Early experiences with *H. multispinosa* demonstrated that both eggs and fry are very susceptible to fungus. Out of a spawning of several hundred only a few dozen were left after 2 weeks. The adhesive eggs are deposited on the surface which has been so diligently cleaned, and for the next 48 - 36 hours they are fanned continuously by the parents. Frequently the male takes over completely, driving off his spouse whenever she dares approach. When this happens it is as well to remove the female.

Meantime, the male has excavated one or more depressions in the gravel to which the minute fry are transferred when they hatch; here they are guarded and, from time to time, cleaned by being sucked into the parental mouth and chewed over before being spat back into the family pit. Care continues during the early part of the free-swimming phase. This is Nature's way, which is of tremendous value in the wild state; in the aquarium it appeared to result in the losses referred to above. By substituting a gentle air-flow over the eggs for the fanning of the parents and by adding methylene blue to the water, losses can be dramatically reduced. Furthermore, with this method no pit-digging is involved so gravel can be dispensed with in the breeding tank; some pieces of slate strategically placed to receive the eggs are all that is necessary. As a first food the young are given Liquifry and shortly they are able to take newly hatched brine shrimp and micro worms. From this point they grow on rapidly.

Not everyone will want to take this trouble, and many will prefer the enjoyment of witnessing the nuances of parental care. Having reached 2 - 2½ in. *H. multispinosa* will probably oblige on many occasions, even in a community set-up. It is this, amongst other things, that makes it an excellent choice for the beginner who wishes to gain experience in keeping cichlids.

Familiar Aponogeton With a New Name



Aponogeton echinatus

THIS species, of the family Aponogetonaceae, comes from southern and central India, where it grows profusely in lakes, ponds and open tanks in areas from sea-level to 1300 metres high. In these conditions it flowers throughout the year.

Although this plant under the designation *Aponogeton echinatus* may appear to be a new one to aquarists, it is in fact the very well-known *A. natans* or *A. undulatus* that has been cultivated for a very long time. The true *A. natans* (L.) Engler et Krause is not grown in our tanks; its submerged leaves are only 2 - 3 inches (5 - 7.5 cm.) long and $\frac{1}{4}$ inch (1.5 cm.) wide and it forms a great many floating leaves that are most undesirable in the aquarium. *A. undulatus* Roxb. is the widely distributed viviparous species, known in our tanks under the synonym *A. stachyosporus* De Wit.

The rhizome of *A. echinatus* is ovoid, 1 - 2 inches

(2.5 - 5 cm.) in diameter. Submerged leaves vary a great deal in size—they may have long or short stalks and blades that can be anything from 6 - 16 inches long (15 - 40 cm.) and 2 - 2½ inches (5 - 6.5 cm.) wide. These are moderately undulating at the edges. The top of the leaf is usually rounded, tapering to a wedge-shaped base. Floating leaves are oval, sometimes narrowed at the top and up to 8 inches (20 cm.) long and $\frac{1}{4}$ - 1½ inches wide. The inflorescence, in the form of one single spike, shows minute flowers, white, bluish or light purple. In good conditions a plant may develop up

By **KARL RATAJ**

Photographs by
RUDOLPH ZUKAL

to 20 floral stalks in a year. The fruits are $\frac{1}{2}$ - $\frac{3}{4}$ inch long and germinate instantly.

This is a species that shows considerable variations and imported plants may show a great many floating leaves with long stalks or be of the much more decorative variety with many submerged leaves on short stalks and without floating leaf blades. These are the ones that are really suitable for our indoor tanks.

A. echinatus does particularly well in aquaria that have been set up for a long time, where the



Both long-stalked and short-stalked varieties of *Aponogeton echinatus* are shown in the photographs with this article. Left, the single spike of flowers

bottom is enriched with plenty of detritus. It does not thrive if lime is present and the water must not be too hard. Because of its tendency to form floating leaves, it does not require a great deal of light—cutting down on surface light will help prevent floating leaves from forming.

Meetings and Changes of Officers

BRISTOL AN. Change of meeting time to alternate Thursdays, the Bedford Room, the Bailey, Mow, West Saint Helen's Street, Avonmouth. New members and visitors welcome. Secretary: Mr G. R. Hall (16 Marrell Close, Littlemore, Oxford).

BRISTOL TTC. Meetings: 3rd Thursday of month, Black Horse, Old Market, Bristol. Current and new members welcome.

CRUDDON AN. Chairman, Mr A. J. Smith; assistant chairman, Mr P. S. Bopen; show secretary, Mr D. R. Pope; assistant, Mr K. Dwyler; secretary, Mr L. S. Derrick (5 Glenworth Avenue, Shirley, Surrey); assistant, Mr A. S. Pevins (113 Beckford Road, Coppice, Surrey); treasurer, Mr H. R. Smith; meetings: every 2nd and 4th Tuesday, Woodside Social Club, Emms Road, South Norwood.

DARLINGTON & DAS. New Society. President, Dr P. Hartnett; vice-president,

Mr J. Fox; chairman, Mr T. Lowe; vice chairman, Mr D. Harton; secretary, Mr A. Barrie; show secretary, Mr D. Penwright; assistant, Mr K. Hall; P.R.O., Mr G. Coney (53 Cambridge Road, Wednesfield, Walsinghampton, Staffs.). Meetings: 4th Tuesday of month, Ex-Servicemen Club, Dorset Road, Darlington, Staffs.

HORSFORTH AN. Chairman, Mr J. Wood; vice-chairman, Mr J. Dunn; treasurer, Mr M. Barker; show secretary, Mr C. Coma; secretary, Mr P. J. Smith (10 Wylford Rise, Leeds 16); social secretary, Mrs J. Dickerson; watering, Miss D. Matgley; librarian, Mr R. Ramzies.

KEIGHLEY AN. New Secretary, Mrs B. Emson (Highfield, Lee Lane, Cottingham, Ringley, Yorkshire, BD24 1UT).

MID-SUSSEX AN. Secretary: Mr Bave (26 Riverside Lane, Haywards Heath; phone 2702 evenings). Meetings: 3rd Thurs-

day of month, 8.00 p.m., Oakley Lodge, Kevinge Road, Keymer, Sussex.

SITTINGBOURNE & DAS. Chairman, Mr T. McDonald; secretary, Mr J. Welby; treasurer, Mr A. Shoop; show secretary, Mr P. Flood; programme secretary, Mr N. Pearson; P.R.O., Mrs A. McDonald (16 Exiles Close, Sittingbourne, Kent).

SMETHWICK & DAS. President, Mr L. Stoker; chairman, Mr D. Johnson; secretary, Mr W. Layland (67 Cambridge Road, Smethwick, Warley, Wores B66 2HW; phone 921 358 1971).

TONBRIDGE & DAS. New Secretary, Mr S. Fount (19 Eardley Road, Sevenoaks, Kent, TN11 1XX; phone 54994). Meetings: 2nd Wednesday of month, 8.00 p.m. New Venue: St Eusebius Church Hall, Priory Road, Tonbridge, Kent.

TOTTENHAM & DAS. New Venue. The Harringer Sports Centre, Territorial Drill Hall, 491 High Road, Tottenham, London N17. Meetings: 2nd and 4th Thursday of month, 8.00 p.m. New members and visitors welcome.



by
ARPEE

Personal COMMENT

I WAS very heartened by a letter received recently from Mr E. J. Small of Hillside Aquatics, who responded to my call for details of aquarium pumps rated at 110 volts, which, as earlier stated, are the sort of tools most likely to enable us to overcome future electricity power cuts. Mr Small states that any reputable manufacturer or importer of aquarium pumps should be able to obtain a model of any required voltage, given that due account is taken of the possible long delays in meeting precise specifications in these straitened times. He goes on to say that his particular firm often supplies pumps with coils wound for 10, 12, 50, 60 and 110 volts, and I have no doubt that the second of these will have immediate appeal to many readers in view of the general availability of the power unit for the average family car!

I have written to Mr Small asking for more information on this subject, because I feel it is greatly under-publicised. However, being well aware of the very high cost of 'one-off' equipments of any sort, I shall be surprised if anything emerges which will prove to be the answer to a maiden's dream. Whatever the outcome, though, the final decisions will doubtless be based on economic considerations. Those who have been successful in keeping expensive marines for a long period will pretty obviously pay a lot of money to enable themselves to continue their success. The average fishkeeper will probably be content with nothing significantly more expensive than the sort of pump he is using at present, for the simple reason that, on the whole, a pump is not vital to any installation (other than marine) that is not overstocked.

It will be another matter for the dealer or for the breeder, and if a particular strain is being developed it would be quite tragic if everything had to come to a halt because of another economic confrontation. (Perhaps I should modify this to the extent that the degree of tragedy would depend on what was being developed—I must admit that I wish the contortions wrought on the angel and the black widow had been nipped in the bud!)

Another aspect of all this is the performance of the pumps themselves, and I cannot say whether the range offered would compare acceptably with

those normally in use; theoretically, there should be no serious problems, and it should be remembered that we only visualise this equipment as performer in a standby role. Nonetheless, some would-be purchasers would accept nothing less than a duplicate of what they have. I will report again on this subject when further useful information becomes available.



Aquaria come and aquaria go, but ponds tend to go on for much, much longer. By 'pond' I do not mean those ghastly preformed things you buy from garden centres. Certainly, because these are basically inadequate for their task, they do tend to come and go rather quickly, but here I am referring mainly to the properly constructed concrete pool, or to the rather less-satisfactory substitutes made from plastic sheeting of one sort or another.

When one has come to a decision about whether or not to have a garden pool, the thing to do is to study the subject in considerable detail before actually undertaking the project. It is rather like buying a greenhouse. It is quite simple to have a pipe dream midway through the winter that a greenhouse would be a good thing, and in these affluent days it is not unduly difficult to achieve one. However, if you do decide to invest in one of these immensely pleasurable things, it is a thing you will always regret and hate if you site it just where it cuts off a particularly appealing view, or if it is only accessible after a sortie through your most prickly shrubs and the part of the garden which gets ankle-deep in mud after a summer shower. So with a pond. Its siting is of supreme importance, and you should create mock-ups made of garden canes placed in all the various possible positions before you finally decide upon the place where the first sod will be turned.

There are two books on ponds which should be read and digested by all newcomers to the subject. The first and best is the *BOOK OF THE GARDEN POND* by Hervey and Hems, and the other is *THE WATER GARDEN* by H. L. V. Fletcher. The first is as full of thorough technical competence as the second, but it has an ageless quality about it, as has the pond itself if it is treated as the product of a craft instead of a weekend shopping spree. If you consider for a moment what the pool is for, you may agree that its planning should be almost as much an event as the construction work. True, it is for fish to live in, and to contain plant life both below and above the surface. But in the long run it is most likely being built so that we may gaze into its depths and contemplate.

These ponderings may not be simple wastings

of time, but they may relate to personal defeats or family successes. They may be necessary to cushion the soul against the impending arrival of a dreaded relation, or they may coincide with the peace of mind and body after the annual Christmas dinner. Whatever the occasion, the pond must be companionable and an ever-agreeable part of one's garden existence. If it is not, it will grate upon one's awareness, consciously or otherwise, and we shall either fill it in or spend much of the rest of our time performing the surgery upon it which might have been rendered unnecessary by a more contemplative conception. Let not your pool, therefore, be the subject of commercial-inspired rage: the harder times we have immediately before us will make the days a little longer, and the labour of love may prove to be as satisfying as I would advocate.

The horrifying surroundings of many pools are a constant source of wonder to me, though they may please some. Although we have moved away from brightly coloured gnomes (but at least they were friendly!), we are now surrounded by grey and brown mouldings of animals and arty little people, all supposedly respectable because they are expensive and because they aren't gnomes. At the very most, the average sized pool can only sport one image or fountain or artificial decoration, and in most cases they are not even adequate for this. The formal pool alone can bear such titivation, and quite different treatment is necessary for the natural or informal setting. I will not attempt to suggest what selection of marginals is appropriate for any given situation, but I think it is always

worth considering, when embarking on water gardening, whether the obvious approach is in fact the best one. Try to consider whether two small pools will look better than one large one, for example. They needn't both contain fish—one could simply house plants and newts if it proved that the small size precluded it being made deep enough to accommodate fish all the year round.

If you are building an informal pool (remember that this may look ridiculous in a formal garden) it is well worth ignoring the catalogues of the water garden firms and turning instead to our native rushes and associated plants for poolside plantings. The OBSERVER'S BOOK OF GRASSES, SEDGES AND RUSHES will give details of the vast range of plants that might be obtainable locally. It should be remembered that if you do decide to use native plants you must respect the country code and not despoil local resources, but it is not too difficult to come to terms with all this if collecting is carried out with restraint and discrimination. Of course, some of the natural inhabitants of the marshlands can be terrible spreaders, and they can begin as dwarfs and finish as giants. In other words they have much the same qualities as those plants which grace the pages of catalogues, but whose vices are never mentioned.

A further possibility, for many intending pond-owners, are the collections of decorative grass seed at present very popular with flower arrangers. The contents are certainly worth experimentation, and for a small outlay one may produce some very attractive results in a way which even the most hardened conservationist would roundly approve.

Readers' Queries Answered



Flag Cichlids

*Would it be safe to keep some small flag cichlids in my aft. community tank? I have no very small fishes there now, the smallest probably is a *Corydoras melanistius*.*

It is quite possible to keep *Aequidens curviceps* in a community tank since, apart from spawning time, they are peaceful—even a little timid. They are not going to become very large (2½ - 3 in.) and they will not harm companions of medium

size (even adult swords and mollies, for instance). Nor will they damage the plant life in the tank. If they should breed, however (and since you have 'some small flag cichlids' it is very likely that you will have a pair), their behaviour will become more aggressive. These fish mature quite quickly (particularly if fed well with live foods) and can be fully developed and ready for breeding at about 9 months. If any pair should have sorted themselves out in a few

months' time (the male fish is distinguishable by its long pointed dorsal and the female is the smaller and rounder fish when full of roe) then it would be a good idea to transfer the pair to their own tank for breeding.

Spiny-Rayed Fishes

What does 'acanthopterygian' mean? I have recently seen angel fish referred to as this but cannot find out what it is.

This is an ichthyological term used to describe one of the groupings into which fish can be divided on anatomical grounds. It means 'spiny-rayed' (*acantho*, Greek, spiny; *pterygo*, Greek, fins) and their counterparts are the Malacopterygii or soft-rayed fishes.



For the second consecutive year Mr and Mrs D. Phillimore have won the FGA World Guppy Championship, judged at the recent FGA International Open Show at Birmingham. Mr Phillimore is photographed with some of the trophies the family partnership achieved at this Show; these include Best in Show and Best Male, Best Female, Best Breeders and the Master Breeders trophy. Son Lloyd Phillimore won the award for the Junior Classes



Photo: East Kent Gazette
Members of Sittingbourne & DAS with the annual trophies presented to them at the Society's AGM: Mr J. Bean, Fighter Cup & Swordtail Cup; Mr P. Floyd, Barb trophy & Characin trophy; Mr B. Newman, Anabantid trophy, Fish of the Year & Points trophy; Mr J. Wellby, Home Aquaria trophy; Master A. McDonald won the Guppy Cup, Challenge Cup & Junior Challenge trophy

It is proposed to form a CHARACIN STUDY SOCIETY. An inaugural meeting will be arranged at which officers and a committee will be elected. Will all interested aquarists please contact the acting secretary, Mr M. West, 76 Lingfield Avenue, Kingston-upon-Thames, Surrey; phone 01-546 3381.

Club

News

FBAS Basic Show Class Letters:
A, furnished aquaria and aquascapes; B, Barb; C, characin; D, cichlid; E, labyrinth; F, egg-laying tooth-carp; G, tropical catfish; H, Corydoras and Brochis; J, rasbora; K, danio and W.C.M.M.; L, loach; M, a.o.s. tropical egg-layers; N, pairs of fish; O, guppy male; P, guppy female; Q, swordtail; R, platy; S, mollie; T, a.o.s. livebearer; U, singletailed goldfish; V, twintailed goldfish; W, a.o.s. coldwater; X, breeders' classes; Y, marine fish; Z, plants.

AT the COVENTRY POOL & AS open show, best fish in the show was a catfish, *Glyptothorax ornatus*, owned by Mr D. Lamboume (Rochampton). Other special awards were: Betty Easingwood trophy (best coldwater) and Spencer Memorial trophy (best fighter), Mr C. Pratt (Bedworth); Rosedale Shield (egg-layer broods), Mr F. Hirst (Coventry); K. B. trophy (best angel), Mr T. Salisbury (Bedworth); E. Hirst trophy (best tropical entry), Mr D. Lamboume. Mr D. White (Bedworth) gained most individual points and Bedworth AS the most society points. Mr S. Walker (Coventry) submitted most individual entries and Midland TA most society entries. 630 entries were benched, and after a hard weekend setting up the show the committee thank the three aquarists from London who, after the show, came and said how much they had enjoyed it. Few people know how much hard work goes into arranging and setting up a show and to receive special thanks seems to make all the hard work worthwhile. One of the highlights of the show was a display of fancy goldfish staged by the newly formed Association of Midland Goldfish Keepers. Excellent examples of lionheads, veiltails, moons and orandas were among the exhibits. Full details as follows:

Decorative aquaria: 1, Mr J. Butler (Coventry, 74); 2, Mr P. Hinde (Coventry, 56); 3, Mr A. Simmons and Mr J. McIntyre (Coventry, 50). Miniature aquaria: 1 & 2, Mr R. Harlow (Derby); 3, Mr Brainsbridge (Gosport & Shipman). Male guppy: 1, Mr D. White (Bedworth, 80); 2, Mr R. Harlow (Derby, 54); 3, Mr R. J. Farmer (Wednesbury, 68). Female guppy: 1, Mr E. Sanderson (Goosey's End, 112); 2, Mr C.

Cartwright (Leicester); 7/1; 3, Mr. A. Woodhead (Clifton); 7/1; 4, Mr. G. Roberts (Oxford); 7/1; 5, J. & F. Mace (7/1); 6, Mr. C. Pratt (Bathurst); 7/1; 7, Mrs. D. Cusackbank (Ealing); 7/1; 8, Mr. D. White (Bodsworth); 7/1; 9, Mr. A. Dinslow (Loughborough); 7/1.

Dwarf & minnow: 1, Mr. T. Crisickbank (4/1); 2, Mr. A. Kettle (Coventry); 7/1; 3, Mr. H. Wilson (Cooby); 7/1; Barbs: 1, Anson & Williams (Rushy); 7/1; 2, Mr. R. Clarke (Prest); 7/1; 3, Mr. W. H. Saville (Worcester); 7/1; 4, Mr. K. Dore (Prest); 7/1; 5, D. & H. Tamworth (Rife); 7/1; 6, A. & A. Smith (Loughbridge); 7/1; 7, Mr. B. J. & R. 9/1; 8, A. Nash (Coventry); 9/1; 9, Mr. D. Bristow; 1, Mr. G. Fyfe (Glasgow); 7/1; 2, Mr. & Mrs. G. Hayes (Dunstable); 7/1; 3, Mr. D. White (Bodsworth); 7/1; Cichlids: 1, Mr. R. Dore (7/1); 2, Mr. A. Dale (Prest); 7/1; 3, Mr. & Mrs. Wood (Bathurst); 7/1; Anguill: 1, & 3, Mr. T. Sibley (Bedford); 7/1; & 5/1; 2, Mr. D. Maloney (Squid); 6/1; Catfish: 1, G. V.S.R. (Chesham); 8/1; 2, Mr. J. Goodman (Worcester); 7/1; 3, Mr. B. Eason (Kidderminster); 7/1; Fishers: 1, Mr. C. Pratt (7/1); 2, J. & F. Mace (7/1); 3, B. & S. Stevens (Lester Gortall); 7/1; Anabantid: 1, & 3, Mr. C. R. Chamberlain (Leamington); 6/1 & 7/1; 2, Mr. C. Pratt (8/1); Characin: 1, Mr. G. Roberts (Coventry); 8/1; Characin: 1, Mr. G. Roberts (8/1); 2, Mr. C. Cartwright (Leamington); 7/1; 3, Mr. R. Clark (7/1); Clariid: 1, Mr. D. Wilson (M.E.A.); 8/1; 2, Mrs. L. Gould (M.E.A.); 8/1; 3, Mr. P. Allen (Kidderminster); 7/1; 4, Mr. C. Cartwright (Leamington); 7/1; 5, Mr. P. Barnes (8/1 & 8/1); 2, G.V.S.R. (Chesham); 8/1.

Goldfish: 1, B. & F. Hunt (Coventry); 8/1; 2, Mr. R. E. Farnor (Walsbury); 8/1; 3, Mr. C. Walker (Coventry); 8/1; Corydoras & Wrasche: 1, Mr. J. Goodman (Worcester); 7/1; 2, Mr. A. Dale (Prest); 8/1; 3, Mr. J. C. Sibley (Coventry); 7/1; 4, Mr. D. Bristow (8/1); 5, Mr. J. Goodall (BASS); 6/1; 6, Mr. W. H. Saville (Rushy); 7/1; 7, Mr. D. White (7/1); 8, Mr. C. Roberts (8/1); 9/1; 2, Mr. B. Eason (Kidderminster); 8/1; 3, Mr. D. White (Bodsworth); 8/1; Eelgrass: 1, Mr. P. Loughborough (Buckingham); 7/1; 2, & 3, Mr. D. White (Bodsworth); 7/1 & 7/1; Livebearer: 1, Mr. A. Dinslow (7/1); 2, Mr. D. White (7/1); 3, Mrs. Moss (Bodsworth); 7/1; Labyrinth: 1, & 2, B. & F. Hunt (7/1 & 7/1); 3, J. & F. Mace (7/1); 4, Mr. C. Suggan (7/1); 5, Mr. S. Walker (7/1); Starke: 1, Mr. S. 2/1; Payne (7/1); 2, Mr. K. Dore (7/1); 3, Mr. & Mrs. Watts (7/1); 4, D. & H. (7/1); 5, Mr. D. Loughborough (8/1).

Shoalwater goldfish: 1 & 2, Mr. J. Whitman (Coventry); 7/1 & 6/1; 3, Mr. D. Parnwright (7/1); Tropical goldfish: 1, Atwood & Williams (8/1); 2, Mr. C. Pratt (8/1); 3, Mr. & Mrs. Bennett (Henley); 5/1; Coldwater: 1, Mr. R. & F. Hunt (7/1); 2, Mr. J. C. Suggan (7/1); 3, Mr. S. Walker (7/1); Starke: 1, Mr. S. 2/1; Payne (7/1); 2, Mr. K. Dore (7/1); 3, Mr. & Mrs. Watts (7/1); 4, D. & H. (7/1); 5, Mr. D. Loughborough (8/1).

Mr. J. BURTLES of Mid-Sussex AS gave a talk on native marine to members of HASTINGS & ST. LEONARDS AS. He illustrated his lecture with drawings showing the colour, size and shapes of crustaceans and fishes found on our own beaches and demonstrated by drawings how to prepare a glass tank ready to house the blennies etc. by piling the rocks up out of the water (since the fish enjoy being out of the water part of the time). He stressed the importance of obtaining unpolluted water and that, if possible, it should be obtained from about 2-3 miles out at sea. Mrs. J. Pannell won the table show, for services only,

FEDERATION NEWS

Championship Classes Show Dates

Forthcoming Championship Class Shows*

6th July	Basingstoke AS	Db	Dwarf cichlids
4th August	Tenbridge & DAS	T	a.o.s. Livebearers
17th August	Anson AS	Cb	Characins
31st August	Plymouth AS	Ma	Labros
1st September	Newbury & DAS	R	Platy
1st September	Bethnal Green AS	W	a.o.s. Coldwater
1st September	Wellingborough AS	U	Singletailed goldfish
2nd September	Harlow AS	P	Guppy female
8th September	Bracknell AS	Ba	Barb
14th September	Hounslow & DAS	V	Twintail goldfish
22nd September	North Kent AS	F	Egglaying toothcarp
22nd September	Torbay AS	Ya	Tropical Marines
29th September	Northampton AS	W	Native & Foreign Plants
5th October	East London A & PA	Z	
5th or 6th October	Hampstead & DAS	S	Mollies
6th October	Ealing & DAS	Be	Barbs
10th November	Walthamstow & DAS	Xu-w	Breeders (coldwater)

Results

Southend, Leigh & DAS	Cz	Mr P. Coyle (Independent)
Riverside AS	Dc	Mrs M. Netherell (Riverside)
Catfish Association	H	Mr & Mrs J. Murphy (Ealing)
Thurrock AS	L	Mr T. A. King (N. Kent)
Mid-Kent AS	Xb-m	Mr T. B. Adams

*Winners of Federation Championship Trophies in classes for single fish automatically become eligible for the Supreme Championship Trophy Competition (to be staged at The AQUARIUM SHOW '74 at the Royal Horticultural Society's Old Hall, London, S.W.1, 25th-27th October). Six awards are made at this Competition, and each entrant will receive a Championship 'Certificate'.

judged by Mr & Mrs Grieg. The Society meets on the 2nd and last Friday in each month.

THERE were 573 entries from a wide area at the STOCKTON-ON-TEES AS Open Show. 28 classes were contested and 500 spectators watched the display. The best fish in the show award was won by Mr J. Bellhouse (Zenith). Other results were:

Parrotfish aquaria: 1, Mr & Mrs Saunders (Stockton); 2, Mr. L. Osmar (Stockton); Parrotfish jars: 1 & 2, Mr & Mrs Saunders; 3, Mr J. Ryan (Billingham); Large barbs: 1 &

3, Mr Davison (Aldington); 2, Mr Hope & Son (Hartlepool); Small barbs: 1, Mr J. Nixon (Preston); 2, Mr R. Ashman (Hartlepool); 3, Mr & Mrs Daines (Doncaster); Large characins: 1, Mr R. Atherton; 2, Mr Hope & Son; 3, Mrs Wells (Doncaster); Small characins: 1 & 2, Mr & Mrs Richardson (Hartlepool); 3, Mr P. Cowie (Hall Green); Large cichlids: 1, Mr R. Atherton; 2, Mr F. Askew (S. Shields); 3, Mr & Mrs Lamb (Rochester); Small cichlids: 1, Mr R. Atherton; 2 & 3, Mr C. Ewart (S. Shields); 4, Mr Farnham; 1, Mr & Mrs Shaver (Rochester); 2, Mr J. Baxby (Hartlepool); 3, Mr Waggon (Billingham).

Egg-laying toothcarp: 1, Mr R. Walker; 2, Mr & Mrs Saunders; 3, Mr J. Middleton (Stockton); 4, Mr & Mrs Lamb; 2, Mr & Mrs Saunders; 3, Mr McDermott (Hartlepool); 4, Tropical catfish: 1, Mr L. Collins (Stockton); 2, Mr H. Gardner (Hartlepool); 3, Mr & Mrs Fletcher

Doncaster), *Corydoras & Borealis*: 1, Mr Blandell; 2, Mr Richardson; 3, Mr Sanddon & Son (Hartlepool); as *Rasbora & danio*: 1, Mr R. Albertson; 2, Mr & Mrs Risbridger (South Shields); 3, Mr W. Rowman (Stockton) (as Tropical egglayer); 1, Mr J. Bellhouse (Zenith); 2, Mr Dawson (Billingham); 3, Mr Binks (Billingham), *Sharks & lobos*: 1, Mr K. Greenley (Half Maun); 2, Mr Willford (Radcast); 3, Mr D. Dryden (Mount Pleasant), *Breeding pairs (egglayers)*: 1, Mr L. Collins; 2, Mr Hope & Son; 3, Mr Binks, *Breeding pairs (livebearers)*: 1, 2 & 3, Mr Brown.

as *Guppy*: 1, Mr & Mrs Lamb; 2 & 3, Mr J. Myers (Independent); as *Swordtail*: 1, Mr Adron (Doncaster); 2, Mr Coyne; 3, Mr Wrightson, as *Platy*: 1, Mr Wrightson; 2, Mr Binks; 3, Mr & Mrs Shearer, as *Livebearer*: 1, Mr & Mrs Fletcher; 2, Mr & Mrs Kington; 3, Mr Rodway (Peterlee), as *Mollie*: 1, Mr Binks; 2, Mr Brown; 3, Mr Mairhead (Ashington).

Coldwater: 1, 2 & 3, Mr R. E. Edwards, *Breeders, egglayers*: 1, Mr R. Walker; 2, Mr & Mrs Fincher; 3, Mr Wrightson (Billingham), *Breeders, livebearers*: 1, & 2, Mr Blandell; 3, Mr Rodway, as *Marine*: 1, Mr & Mrs Sanddon (Hartlepool); 2 & 3, Mr J. Ryan, *Janitor*: 1 & 3, Master Corbett (Billingham); 2, Master Cawd (Doncaster).

AT an inter-club show organised by the **NEWCASTLE GUPPY & LIVEBEARER SOCIETY**, 194 entries were benched by members of Ashington AS, Mount Pleasant AS, Priory AS, Tyneside AS, Newcastle TFS and Newcastle G & LS. The fish were judged by Mr A. Cutting (FBAS), Mr B. Risbridger (FBAS), Mr A. Bebbington (FNAS) and Mr J. Young. Best fish in the show was shown by Mr Robertson (MPAS). Total points gained by each society: Priory AS 48 points; Newcastle G & LS 31; Ashington AS 27; Tyneside AS 25; Newcastle TFS 25; Mount Pleasant AS 19. Remainder of results:

Main guppy: 1, Mr & Mrs McKenna (PAS); 2, Mr & Mrs Farnwick (NGLS); 3, Mr Paterson (PAS), *Female guppy*: 1, Mr Donaganon (PAS); 2, Mr Fellows (TAS); 3, Mr & Mrs Renton (NGLS), *Swordtail*: 1, Mr Poythick (AAS); 2, Mr Paterson (PAS); 3, Mr Lawson (NTFS), *Mollie*: 1, Mr Simpson (NTFS); 2, Mr Milton (PAS); 3, Mr Lawson (NTFS), *Platy*: 1, Mr & Mrs Liddle (AAS); 2, Mr Kerr (NGLS); 3, Mr Walton (PAS), as *Livebearer*: 1 & 3, Mr & Mrs Renton (NGLS); 2, Mr Donaganon (PAS), *Sharks, lobos & flying forms*: 1, Mr Kenney (NTFS); 2, Mr & Mrs Renton; 3, Mr & Mrs McKenna, *Large cichlids*: 1, Mr Graham (NTFS); 2, Mr & Mrs Hunt (AAS), *Small cichlids*: 1 & 3, Mr Manzanar (MPAS); 2, Mr Lawson, *Rift Valley cichlids*: 1, Mr Scammell (AAS); 2, Mr Dando (NTFS); 3, Mr Cotton (PAS), *Angels*: 1, Mr Lilley (TAS); 2, Mr & Mrs Hickman (TAA); 3, Mr & Mrs McKenna (PAS), *Rasbora & danio*: 1 & 2, Mr Lilley (TAS); 3, Mr Bavin (NTFS), *Egglayer, swordcarp*: 1, Mr Robertson (MPAS); 2, Mr Manzanar (MPAS); 3, Mr Poythick (AAS), *Large barb*: 1, Mr & Mrs Hunt (AAS); 2, Mr Dantle (NTFS); 3, Mr James (PAS), *Small barb*: 1, Mr Lilley; 2, Mr & Mrs Liddle; 3, Mr Kerr (NGLS), *Large danio*: 1, Mr Donaganon (PAS); 2, Mr Quinell (PAS); 3, Mr Graham (NTFS), *Small characin*: 1, Mr Walton (PAS); 2, Mr Robertson (MPAS); 3, P. & T. Robinson (MPAS), as *Coldwater*: 1, Mr & Mrs Bell (AAS), as *Labyrinth*: 1, Mr & Mrs Renton;

2, Mr Holman; 3, Mr & Mrs Farnwick, as *Fighter*: 1, Mr Brown (PAS); 2, Mr Marshall (NTFS); 3, Mr James, as *Loach*: 1, Mr & Mrs Fenton; 2, Mr Cummings; 3, Mr Kerr, *Corydoras & danio*: 1, 2 & 3, Mr & Mrs Liddle, as *Catfish*: 1 & 2, Mr Holman; 3, Mr Todd, as *Egglayer*: 1, Mr Paterson; 2, Mr Graham; 3, Mr Pomroy, *Platy*: 1, Mr & Mrs Renton; 2, Mr Walton, *Furnished jars*: 1, Mr Robertson; 2, Mr James; 3, Mr Robertson (Jury), *Breeder, livebearer*: 1, Mr & Mrs Renton; 2 & 3, Mr & Mrs Hickman, *Breeder, egglayer*: 1, Mr Hall, *Breeding pairs, livebearer*: 1 & 2, Mrs Renton; 3, Mr & Mrs Liddle, *Breeding pairs, egglayer*: 1, Mr Todd; 2, Mr Lilley; 3, Mr Fellows (TAS).

MRS F. ROGERS P.R.O. of **BETHNAL GREEN AS**, reports: Busy, busy, Bethnal Green AS started March successfully at the FBAS Assembly table show for Class W, as coldwater, the first six places being taken by Sybil and Trudy Hedges. At the Catfish Association (G.B.) first Open Show, Bethnal Green earned two firsts, one third, and Best Junior entry. The Points Cup and a knock-out competition table show held at the club were judged by Mr P. Tomkins, chairman of the FBAS and resident lecturer at Bethnal Green. Fish of the Month competition was judged by Mr W. Dale of Leytonstone & DAS. April started with a seven-club table show at which Bethnal Green was awarded the following: class D: 1 & 2, Mrs F. Rogers, class B: 1, Mr T. MacDonald, class H: 1, Miss T. Hedges; 2, Mrs S. Hedges, class J: 2, Mr S. Adams, class D: 3, Mr D. Bundy. At the club, members were entertained with a cine film recording of the breeding and rearing of *Herotilapia multispinosa*, made by Mr J. Coombs, a Bethnal Green member. Two work nights were spent making all-glass tanks and sealing existing angle-iron tanks. Mr T. Kudrovitch gave an interesting demonstration and talk on furnished aquaria. Fish of the Month club table show was judged by Mr B. Davies. Results: 1, Mrs S. Hedges; 2, Mrs F. Rogers; 3, Mr K. Waller. At an Area Group show held at Harlow,

results for Bethnal Green were: Class G: 1, Mrs S. Hedges; 3, Mr A. Haley, class M: 1, Mrs S. Hedges. Best Exhibit in Show was entered by Mrs S. Hedges.

AT THE inter-society show between hosts, **ALFRETON & DAS**, and **DERBY AS**, 10 classes split the 89 fishes that were benched; the best fish in the show was a small characin owned by Mr J. Wright (Alfreton). Results as follows:

Mollie & sword: 1 & 3, Mr A. Dean; 2, Mr M. Darrington, *Large barb*: 1, Mr & Mrs Bull; 2, Mr S. Hill, *Small characin*: 1, Mr J. Wright; 2, Mr M. Darrington; 3, Mr A. Lane, *Large cichlids*: 1, Mr A. Dean; 2, Mr D. Lee; 3, Mr S. Hill, *Small cichlids*: 1, 2 & 3, Mr S. Hill, *Sharks & loach*: 1 & 2, Mr R. Harlow; 3, Mr & Mrs Bull, as *Catfish*: 1, Mr T. Bullock; 2, Mr R. Harlow; 3, Mr A. Dean, *Anabantids*: 1, Mr S. Hill; 2, Mr P. Walker; 3, Mr & Mrs Bull, *Egglayer, pair*: 1, Mr R. Harlow; 2, Mr A. Lane; 3, Mr J. Wright, *Breeder, egglayer*: 1, Mr S. Hill; 2, Mr J. Wright; 3, Mr R. Harlow, *Points*: Alfreton AS, 31; Derby Regent, 26.

MR H. Chick of Llanrwit Major won the award for the Best Fish in the Show at the **PORT TALBOT AS** Open Show out of a total of 433 entries. The Best Fish award to a Port Talbot member went to Mr M. Fouracre and the highest member's points award to Mr C. Rupert. Mr C. Turner of Cardiff had the highest aggregate of points, 745 and received the FBAS class award. Details were:

Ad: 1, Mr K. Daniels (PT); 2, Mr W. Evans (Rhonda); R: 1, Mr M. N. Lovell (Penarth); 2, Mr C. Turner (Cardiff); 3, Mr J. Egan (PT), *B*: 1, Mr J. Edwards (L. Major); 2, Mr N. Bowles (Rhonda); C: 1, Mr C. Turner; 2, Mr C. Harding (Rooth); 3, Mr M. Williams (Rhonda), *C*: 1 & 2, Mr C. Turner; 3, Mr K. Usher (Amson), *C*: 1, Mr P. L. Payer (Cardiff); 2, Mr R. Newton (Cardiff); 3, Mr P. Thomas (Swansea), *D*: 1, Mr K. Usher (Cardiff); 2, Mr K. Usher; 3, Mr A. J. Callister (PT), *D*: 1, Mr C. Morrison (PT); 2, Mr A. S. Gibson; 3, Mr R. Lingard (Penarth), *E*: 1, Mr M. Williams; 2, Mr K. Usher; 3, Mr R. S. Wigg (L. Major), *G*: 1 & 2, Mr B. A. Jones (Brook); 3, Mr C. Phillips (Swansea), 1, Mr K. Usher; 2, Mr C. Turner; 3, Mr J. Edward (L. Major), *J*: 1, Mr D. Egan (PT); 2, Mr C. Harding; 3, Mr S. Hill (Rhonda), *K*: 1 & 2, Mr J. J. Edwards (L. Major); 3, Mr R. Newton (Cardiff), *F*: 1 & 2, Mr M. Addison (Newport); 3, Mr D. R. Warraman (Cardiff), *E*: 1, Mr C. Davies (PT); 2, Mr C. Dennis (PT); 3, Mr R. Perkins (PT), *O*: 1, Mr J. Morris (PT); 2, Mr P. A. Payer (Cardiff); 3, Mr P. Parry (L. Vale), *P*: 1, Mr P. Parry; 2, Mr M. Thomas (Rhonda); 3, Mr J. Egan (PT), *E*: 1, Mr R. Perkins (PT); 2, Mr D. R. Warraman; 3, Mr R. T. Davis (Cardiff), *Q*: 1 & 3, Mr R. Perkins (PT); 2, Mr K. Williams (Rhonda), *R*: 1, Mr P. A. Payer; 2, Mr R. Davis; 3, Mr T. Edwards (PT), *S*: 1, Mr G. Bur (Swansea); 2, Mr A. M. Smith (Rhonda); 3, Mr N. K. Guy (Cardiff), *M*: 1, Mr H. Chick (L. Major); 2, Mr M. K. Lovell (Penarth); 3, Mr B. A. Jones, *T*: 1, Mr B. A. Jones; 2, Mr K. Usher; 3, Mr C. Morrison, *X*: 1, Mr D. Warraman; 2, Mr C. Turner; 3, Mr R. Newton (Penarth), *X*: 1, Mr C. Turner; 2, Mr K. Usher; 3, Mr C. Morrison, *Y*: 1, Mrs L. Jones (Brook); 2,

THE GOLDFISH SOCIETY OF GREAT BRITAIN hope to welcome many exhibitors from outside the Society, as well as their own members, when they hold their Open Show (7th September, at Sutton Adult School, Benfield Road, Sutton, Surrey). Schedules are available from Mrs M. Dudley, 163 South Park Road, Wimbledon, London SW19 8RX.

Mr C. Harding; 3, Mr A. S. Gibson (Reading); 4, Mr M. Fournier (PT); 2 & 3, Mr C. Roper (PT); V: 1, 2 & 3, Mr C. Roper; W: 1 & 3, Mr C. Roper; 2, Mr A. M. Smith (Rhodes).

THE newly formed ASSOCIATION OF MIDLAND GOLD-FISH KEEPERS held its inaugural meeting on 24th March at the Foleshill Community Centre, Coventry. This meeting was attended by gold-fish enthusiasts of varying experience but all with the will to see the Association formed. A guiding committee was elected composed of Mr A. Roberts (chairman), Mr F. Orme (secretary), Mr R. Hancock (treasurer), and Mr D. Denny and Mr M. Mason, to hold office until the AGM in October. For the time being, the subscription is to be £1.00 per member. During April the Association staged a non-competitive display of members' fish as part of the Coventry P & AS Open Show, and this aroused a great deal of interest from the public. For further details please write to the Secretary, 94 Newman Way, Rubery, Birmingham.

The BOURNEMOUTH AS Open Show, held on the 5th May, was a great success this year. Entries were double those of last year; 440 entries were recorded from 21 clubs, some as far as Wales, London and Portsmouth. The members felt this was due to having the show a month earlier than last year and also to the weather which brought many more

members of the public to view. Manufacturers are thanked most sincerely for the samples and advertising material that were sent for prizes which were gratefully accepted. The Society's members arranged many of the prize cards. Mr B. Coombes had the highest number, for which he was awarded a trophy; 2, Mr Jeffery and Mr Middleton; 3, Mr Chaffield and Mr Turner; 4, Mr Gibbs; 5, Mrs Bebb; 6, Mr Travers and Mr Haskins.

R: 1, Mr H. Armitage (81); 2, Mr P. Brown (80); 3, Mr R. Lakin (76); C: 1, Mr T. Fraser (82); 2, Mr T. Hutton (81); 1, Mr K. Fournier (80); C: 1, Mr L. G. Little (75); 2, Mr J. Clarke (74); 3, Mr T. Fraser (72); D: 1, Mr R. F. Adams (83); 2, Mr B. Small (80); 3, Mr J. G. Dickinson (78); Dec: 1, Mr B. Watson (80); 2, Mr K. Fournier (75); 3, Mr M. J. Turner (73); E: 1, Mr E. H. Chaffield (72); 2, Mr G. G. Coadle (71); 3, Mr R. F. Adams (71); F: 1, Mr A. S.

Watts (76); 2, Mr L. G. Little (73); 3, Mr E. Rossard (73); G: 1, Mr M. Medway (80); 2, Mr J. G. Dickinson (79); 3, Mr B. Watson (75); H: 1, Mr K. Howell (80); 2, Mr B. Watson (75); 3, Mr T. Hutton (74); I: 1 & 2, Mr E. Latham (74, 75); 3, Mr R. A. Potts (74); K: 1, Mr C. N. Middleton (76); 2 & 3, Mr J. J. Edwards (69, 68); L: 1, Mr T. Hutton (75); 2, Mr J. Edwards (74); 3, Mr R. Little (73); M: 1, Mr T. Taylor (79); 2, Mr F. Willis (78); 3, Mr J. Clarke (74); N: 1, Mr J. Clarke (73); 2, (joint), Mr W. A. Cowburn (74); Mr M. Medway (74); 3, Mr W. A. Cowburn.

O: 1, Mr W. West (84); 2, Mr K. S. Gibbs (77); 3, Mr R. J. Adams (84); Q: 1, Mr B. Watson (74); 2, Mr R. A. Potts (71); 3, Mr G. Peering (70); R: 1, Mr B. Watson (78); 2, Mr G. M. Fox (73); 3, Mr K. P. Christoforou (72); S: 1, Mrs M. H. Seymour (71); 2, Mr J. G. Little (72); 3, Mr & Mrs Bebb (71); T: 1, Mr R. Giddens (74); 2, Mr T. Fraser (73); 3, Mr B. Watson (72).

U: 1 & 2, Mr D. S. Langdon (79, 78); 3, Mr B. Coombes (75); V: 1, Mr R. P. Christopher (76); 2, Mr J. V. Jeffery (75); 3, Mr B. Coombes (74); W: 1 & 2, Mr B. Coombes (72, 69); 3, Miss D. & S. Jackson (68); W: 1, Mr E. Rossard (82); 2, Mr M. G. Stude (81); 3, Mr J. V. Jeffery (74); X: 1, Mr F. Willis (76); 2, Mr M. J. Turner (75); 3, Mr G. D. Coadle (74); Y: 1, Mr R. Giddens (76); 2, Mr L. G. Little (77); 3, Mr B. Watson (76).

Large Assembly at OSRAM Show

A LARGE assembly of exhibitors and visitors showed a keen interest at the OSRAM AS Open Show in the work of the judges (JNAS), Mr B. Pergilly, Mr G. Holmes, Mr L. Baxter and Mr I. Wood. B-class judges, Mr B. Ward, Mr J. Martin and Mr J. S. Hall, were also in attendance. The Best Fish in the Show award was made to the moor entered by Mr C. H. Whitsey of Accrington. The best tropical fish award went to Mr & Mrs H. Marshallba (Blackburn). 25 societies competed and Accrington won the award for receiving most points (42); Merseyside, 33; Oram, 27; Aireborough, 22. Details were:

Aquarists: 1 (and Special), Miss J. Gullane (Barnes, 78); 2, Mr & Mrs Muckle (Alders, 75); 3, Miss E. Gregory (Nelson, 72); Fishery: 1, Mr G. Kerthaw (Heywood, 72); 2, Mr D. Buckley (Heywood, 74); 3, Mr A. Buckley (Bury, 71); Small fishes: 1 & 2, Mr F. E. Gregory (Giffers, 77, 76); 3, Mr D. Buckley (74); Large fishes: 1, Mrs S. Seymour (Merseyside, 72); 2, Mr F. Mulla (Merseyside, 69); 3, Mr R. Mellison (Oram, 68); Tubing, shades, signs: 1 (and Special), Miss J. Gullane (78); 2, Mr G. Horrocks (Oram, 77); 3, Miss S. Clarke (Aireborough, 75); Small characins: 1, Mr F. E. Gregory (73); 2, Mr F. Mulla (76); 3, Mr K. Smith (Middleton, 69); Medium characins: 1, Mr K. Smith (73); 2, Mr R. Jenkinson (Merseyside, 71); 3, Miss S. Clarke (75); Large characins: 1 (and Special), Mr & Mrs Gragan (Accrington, 76); 2, Mr R. Mellison (73); 3, Mr F. Alderlade (Oram, 73).

Dwarf cichlids: 1 (and Special), Mr T. Horrocks (Oram, 76); 2, Mr & Mrs Marshallba (Blackburn, 74); 3, Miss J. Gullane (69); Angels: 1, Mr L. Taylor (Hyde, 75); 2, Mr A. Ason (Ashton, 74); 3, Mr P. Rhodes (Village, 70); 400 Cichlids: 1, Mr & Mrs Rigby (Worsley, 74); 2, Mr F. Mulla (73); 3, Mr J. Miffin (N. Staffs, 72); Toothpaste: 1 & 2, Mr R. J. Payne (Merseyside, 75, 74); 3, Mr & Mrs H. Marshallba (72); Rainbow: 1 (and Special), Mr R. W. Strand (W. Cumberland, 74); 2, Mr R. Mellison (76); 3, Mr &

Mrs Gragan (73); Denton: 1, Mr R. Atherton (Grimwood, 77); 2, Mr R. W. Strand (73); 3, Mrs E. Dawson (Oram, 73); Minnows: 1, 2 & 3, Mr R. W. Strand (76, 75, 70).

Guppies: 1, Mr & Mrs Marshallba (76); 2, Mr E. J. Brown (Bradford, 69); 3, Mr J. R. Syddall (Worsley, 68); Swordtails: 1, Mr G. Harvey (Merseyside, 72); 2, Miss S. Clarke (71); 3, Mr & Mrs H. Marshallba (70); Mollies: 1 (and Special), Mr D. Buckley (Heywood, 77); 2, Mr E. Seymour (Merseyside, 75); 3, Mr A. Atherton (Grimwood, 74); Platys: 1, 2 & 3, Mr T. Hindley (Worsley, 75, 74, 72); 400 Livebearers: 1, Mr A. Jenkinson (70); 2, Mr R. J. Payne (Merseyside, 69); 3, Mr & Mrs H. Marshallba (67); 4000 Livebearers: 1 (and Special), Mr & Mrs Marshallba (76); 2, Mr J. Prichard (Grimwood, 76); 3, Mr H. Penhall (75); Corydoras: 1, Mr & Mrs Muckle (77); 2, Miss J. Gullane (74); 3, Mr & Mrs Cobb (Belle Vue, 72); 400 Catfish: 1, Mr P. S. Ludgans (Hyde, 70); 2, Mr G. Horrocks (Oram, 69); 3, Miss S. Clarke (64).

Goldfish: 1, Miss S. Clarke (76); 2, Mr S. Faine (72); 3, Mr H. Penhall (63); Shubunkins: 1, Mr H. Penhall (76); 2 & 3, Mr S. Faine (75, 72); Veltails: 1, Miss S. Clarke (68); Draculas: 1, Mr C. H. Whitsey (Accrington, 66); 2, Mr H. Penhall (68); Livebearers: 1, Mr S. Walsh (66); Fantails: 1, Miss S. Clarke (76); 2, Mr C. H. Whitsey (64); 3, Mr S. Walsh (64); Minors: 1 (and Special), Mr C. H. Whitsey (62); 2, Mr C. H. Whitsey (70); 3, Mr M. Wild (62); 400 Asian or USA: 1 & 2, Mr S. Walsh (63, 62); 3, Mr C. H. Whitsey (60); 400 European: 1 & 2, Mr S. Walsh (75, 69); 3, Mr C. H. Whitsey (62); Coldwater breeders: 1, Mr H. Penhall (62).

Breeders, egg-layers: 1, Mr F. E. Gregory (75); 2, Mr F. Chaburn (Heywood, 74); 3, Mr R. W. Strand (73); Breeders, egg-layers: 1 (and Special), Mr R. Mellison (79); 2, Mr S. Wootenholme (Heywood, 74); Breeders, spawners: 1 (and Special), Miss S. Clarke (74); 2, Miss S. Clarke (58); 400 not listed: 1 (and Special), Mr F. Thorne (Village, 75); 2, Mr R. J. Payne (70); 3, Mr G. Howarth (69); Pairs, egg-layers: 1 (and Special), Mr F. E. Gregory (78); 2, Mr & Mrs Marshallba (77); 3, Mr R. W. Strand (76); Pairs, livebearers: 1 (and Special), Mr P. Armstrong (Heywood, 77); 2, Mr R. J. Payne (75); 3, Mr A. Jenkinson (Merseyside, 75); Minors, nature: 1 (and Special), Mr & Mrs Cobb (Belle Vue, 70); 2, Mr M. Wild (68); 3, Miss S. Clarke (66); Minors, novelty: 1, Mr M. Wild (69); 2, Mr E. Seymour (Merseyside, 65); 3, Miss S. Clarke (66); Marines 400: 1, Mr P. Armstrong (Heywood, 70); 2, Mr J. R. Syddall (Worsley, 65); Juniors, livebearers: 1 (and

CHAIRMAN of ELY & DAS Mr S. Porter writes: 'Following my letter in the April issue of 1974 I am now glad to let you have full details as promised. Our Exhibition is on Sunday 26th July at Bedford House, St Marys Street, Ely, open 10.00 a.m. to 6.00 p.m. There are lots of tropical fish, plants, home aquariums (all set up) different displays, river fish, traders' stalls with fish food and free samples, working filters and accessories with lots of other attractions and good refreshments. After you have been to the exhibition you can visit places of interest like Ely Cathedral, the old Canon and buildings, not forgetting the river with its lovely boats and swimming pool. So do come and enjoy a good day out. Maps and posters can be had from: Mr S. Porter, 54 Cambridge Road, Stratham, Ely, Cambs. CBB 3LB; phone Stratham 304'.

Special, D. Dawson; 2 & 3, A. Hough (70, 68); Egglayers: 1 and 2 Special S. Lord (78); 2, D. Dawson (69); 3, A. Hough (66).

BEST fish in the show at the sixth Open Show held by WARRINGTON AS was a ticto barb entered by R. and C. White of Leigh. Other results were:

Guppies: 1, Mr W. Bamber (Sandgrounders); Mullies: 1, Mr M. Baker (Warrington); 2, Mr C. Norton (Sandgrounders); 3, Mr R. L. Payne (Merseyside); Platys: 1, Mr C. Norton (Sandgrounders); 2, Mr T. Hildry (Worsley); 3, Mr R. Butterworth (Merseyside); Swordtails: 1, Mr G. Harvey (Merseyside); 2, Miss S. Goddard (Mauchfield); 3, Mrs R. Harvey (Merseyside); and Livebearers: 1, Mr B. H. H. Smith (N. Staffs); 2, Mr D. Johnston (Merseyside); 3, Mr R. L. Payne.

Small characins: 1, Mr G. Wainhouse (Sandgrounders); 2, Mr A. Cobell (Warrington); 3, R. & C. Wilson (Leigh); Small barbs: 1, R. & C. Wilson (Leigh); 2, Mr C. Norton; 3, Mr R. Wilson (Merseyside); Small cichlids: 1, Mr J. Hopkin (Warrington); 2, Miss J. Gillian (Barnes); 3, Miss A. Gregory (Nelson); Large characins: 1, Mr D. & B. Booker (Manchester); 2, Mrs B. Booker; 3, Mr R. May (Leiston E. Lancs); Large barbs: 1, Mr A. Vassier (Merseyside); 2, P. & H. Batchelor (Leyce); 3, Mr K. Wright (Sandgrounders); Large cichlids: 1, Mr S. Hinton (Sandgrounders); 2, D. & B. Booker; 3, Mr F. Hampton (Dunlop).

Angels: 1, Mr A. Axon (Aldershot); 2, Mr H. R. Nephthys (Greenwood); 3, Mr S. Harvey (Merseyside); Fishers: 1, Mr A. Cobell (Warrington); 2 & 3, Mr D. Potts (Warrington) and Anabainids: 1 & 3, Miss J. Gillian; 2, Mr S. Hinton (Leiston); 1, P. & H. Batchelor; 2, B. & C. White (Leigh); 3, Mr & Mrs Muckle (Independent); Catfish: 1, Mr & Mrs Graham (E. Lancs); 2, Mr R. W. Carter (Merseyside); 3, Mr G. Wainhouse (Sandgrounders); Loaches: 1, D. & B. Booker; 2, R. & C. White; 3, Mr J. Hall (Runcorn); Labros etc.: 1, Miss J. Gillian; 2, Mr M. Baker (Warrington); 3, Mr T. Hinton; Toothcarps: 1, Mr R. L. Payne; 2 & 3, Mr & Mrs Skilton (Yorkshire); Mollies: 1, R. & C. White; 2, Mr G. Hildry; 3, K. & J. Hinchey (Leyce); Rainbow: 1, Mr A. Goddard (Mauchfield); 2, Mr W. Bamber; 3, Mr Thomas (Northwich); and Tropical: 1 & 2, P. & H. Batchelor; 3, Mr G. Bilsman (Warrington).

Brooders, egglayers: 1, Mr A. Vassier; 2, Mr S. Hinton; 3, Mr K. Wright; Breeders: 1, Master T. Brown (Warrington); 2, Mr B. Knowles (Northwich); 3, Mr L. Watkins (Greenwood); Pairs, egglayers: 1, Mr R. Knowles; 2, Mr A. Vassier; 3, R. & C. White; Pairs, livebearers: 1, Master A. Cook (Warrington); 2, K. & J. Hinchey; 3, Mr R. Knowles.

Common goldfish: 1, Mr C. H. Whitby (Accrington); 2, Master G. Millman (Warrington); 3, Master A. Cook (Warrington); Fancy goldfish: 1, Mr C. H. Whitby; 2 & 3, Mr S. Walsh; and Colibrats: 1, 2 & 3, Mr S. Walsh; Junior egglayer: 1 & 2, Master A. Hinchey (Leyce); 3, Miss J. Gillian; Junior livebearer: 1, Master A. Hinchey (Greenwood); 2, Miss S. Goddard (Mauchfield); 3, Miss K. M. Perkins (Mauchfield).

BEDWORTH AQUARIST and POOL SOCIETY celebrated their 100th meeting recently with a buffet dance to which were invited friends and helpers of the Society, judges and speakers, representatives of MAAS and of MAL. Altogether 174 people were present to enjoy the evening. The eliminator for the MAAS inter-society show was also held and results were:

Danos: 1 & 2, Mr M. Lee, Cheshire; 3, Mr R. Mackintosh; 2, Mr D. White, Bath; 1 & 2, Mr M. Lee, Cheshire; 3 and best in show, Mr R. Shakespear; 2, Mr M. J. Salisbury; Guppies: 1, Mr R. Shakespear; 2, Mr D. White; and Tropical: 1 & 2, Mr J. Salisbury; and Livebearers: 1, Mr D. White; 2, Mr J. Salisbury; Rainbow: 1 & 2, Mr D. White; Catfish: 1, Mr D. White; 2, Mr C. Pratt; Anabainids: 1, Mr J. Salisbury; 2, Mr C. Pratt; Loaches: 1, Mr J. Salisbury; 2, Mr T. Combs; Singtail goldfish: 1, Mr C. Pratt; 2, Mr R. Shakespear; Twinstail goldfish: 1, Mr R. Shakespear; 2, Mr J. Salisbury; Pond & river fish: 1, Mr C. Pratt; 2, Mr R. Shakespear.

These fish were then taken to the MAAS inter-society show at Drayton Manor Park, at which Bedworth were the winning Society with a total of 82 points. Owing to unforeseen circumstances it has been necessary to change the date of the Society's Open Show. This will now be held on the 24th August and not on the 18th as previously published.

BRISTOL TFC received 412 entries at their 14th Open Show and these were judged by members of the Severnside Aquarist Association's panel of judges. Mr C. Russell (Bath) received the award for the best exhibit in show and Mr R. Lawrence (Bristol TFC) was the competitor receiving the highest number of points. Bristol TFC received 98 points and were the Society with most points. Class results were:

Fishers: 1, Mr A. Gilbert; 2, Mrs K. Price; 3, Mr D. Perry; Livebearers: 1, Mr J. Ferguson; 2, Mr B. Steel; 3, Mr R. Lawrence; Barbs: 1, Mr R. Lawrence; 2, Mr D. Phippen; 3, Mr S. Lacey; Hemirhamphus & Rhamphocentrus: 1, Mr R. Tonne; 2, Mrs B. Pedersen; 3, Mr K. Dunsford; and Characins: 1, Mr D. Phippen; 2, Mr G. Farber; 3, Mrs R. Pedersen; Angels: 1, Mr P. Greenwood; 2, Mr B. Pugh; 3, Mr C. Searcy.

Dwarf cichlids: 1, Mrs B. Pedersen; 2, Mr W. Gibson; 3, Mr M. Tynes; and Cichlids: 1, Mrs B. Pedersen; 2, Mr B. Steel; 3, Mr T. Coggins; Corydoras & Rivulids: 1, Mr A. Gilbert; 2, Mr D. Phippen; 3, Mr R. Lawrence; and Catfish: 1, Mr C. Tonne; 2, Mr B. Kilmister; 3, Mr D. Phippen; Danos, etc.: 1, Mr R. Potts; 2, Mr R. Osdon; 3, Mr R. Lawrence; Bettas, sharks, loaches, etc.: 1, Mr C. Russell; 2, Master K. Williams; 3, Master J. Edwards.

Mollies: 1, Mr B. Pugh; 2, Mr & Mrs R. Dutton; 3, Mr D. Gray; Swordtails: 1, Master K. Williams; 2 & 3, Mr J. Ferguson; Pairs: 1, 2 & 3, Mr K. Martin; Guppies, male: 1 & 2, Mr G. Whoraker; 3, Mr D. Gue; Guppies, female: 1, Mr R. Lawrence; 2, Mr & Mrs M. Williams; 3, Mr W. Broom; Killifish: 1, Mr R. Tonne; 2, Mr R. Chapman; 3, Mr R. Lawrence; and Tropical: 1, Mrs S. Osdon; 2, Mrs I. Strang; 3, Mrs K. Martin.

Brooders, egglayers: 1, Mr G. Castle; 2, Mr R. Chapman; 3, Mr G. Farber; Livebearers: 1 & 3, Mr C. Tonne; 2, Mr J. Ferguson; Seed pairs: 1, Mrs B. Pedersen; 2, Mrs K. Martin; 3, Mr R. Osdon; and Egg-layers, juv.: 1 & 3, Master N. Owen; 2, Master R. Bost; Livebearers, juv.: 1, Master A. Price; Twinstail: 1, 2 & 3, C. J. & H. H. Bell; Goldfish & Hemirhamphus: 1, Mr R. Pinnock; 2, C. J. & H. H. Bell; 3, Mr R. Pedersen; and Pond & river: 1 & 2, Mr R. Lawrence; 3, Mr J. Phillips.

In Brief . . .

. . . **AFTER** winning in their zone, **BARRY AS** went forward into the Cymru National Aquarist Association Grand Final where they were placed third, Rhondda AS being the winners by one point over RATA. Winning pair from Barry were Mr M. C. Guthrie and Mr H. Evans.

. . . **AFTER** a trial period **ABINGDON AS** has decided to return to alternate Thursday evenings (12th July, 25th July etc.) as meeting nights since many members found that a Friday evening meeting clashed with weekend plans. A steadily increasing membership means more club activities and plans are under way for an inter-club show, film nights, excursions and a trip to The Aquarium Show '74 in London. The newly formed library is growing steadily and is proving very useful. Meetings are held in the billiard room at the Hatley Mow, West Saint Helen Street, Abingdon. New members and visitors welcome.

. . . **THE** Champion of Champions table show held by **PETERBOROUGH FA** was won by Mr R. Fairchild (2, Mr J. Butler; 3, Mr R. Walden)—judge was Mr D. Page (FBAS). Mr J. Butler is the Points Champion (68); 2, Mr R. Butler (85); 3, Mr R. Walden (75).

. . . **AT** a very well-attended meeting of aquarists on 23rd April a club was formed to be known as **DARLSTON & DAS**. Officers elected were: president, Dr P. Hammet; vice-president, Mr J. Fox; chairman, Mr T. Lowe; vice-chairman, Mr D. Harton; secretary, Mr A. Horne; show secretary, Mr D. Penwright; assistant, Mr K. Hall; P.R.O., Mr G. Coney, 53 Castlebridge Road, Wednesfield, Wolverhampton. Staffs Meetings will be held on the 4th Tuesday of every month at the Ee-Servicecars Club, Dorset Road, Darlston, Staffs. Anyone is welcome to join the club or to attend as a visitor.

. . . **CROYDON AS** extends its hospitality to future members and invites them to join with its members for interesting meetings and enjoyable lectures. The club meets every 2nd and 4th Tuesday at the Woodside Social Club, Enmore Road, South Norwood. Information from club secretary Mr L. S. Derrick, 3 Glenborne Avenue, Shirley.

FILTER WITH 'ALGARDE'

... AN interesting slide show on anabantids by Mr R. Hampson rounded off a busy evening when **HORSFORTH AS** held their AGM. It was decided to increase subscriptions to: adults, £1.25; juniors, 50p and joint members £1.75.

RECENT activities of **WREXHAM TFS** have included a slide show on the aquarium section of Chester Zoo, a Snakes and Ladders (or should it be a kuhli loach and air lift?) Quiz organised by junior members, Master B. Roberts, Master I. St. Clare and Master W. Davies; talks by Mr R. Mathers and Mr E. Jones on 'Anabantids' and 'Aquarium Books'. Table show results, judged by Mr C. Pritchard, were: Characins: 1, Mr F. Oliver; 2, Mr T. Pound; 3, Mr E. Jones. Anabantids: 1, Mr B. Roberts; 2 & 3, Mr F. Oliver. Fighters: 1, Mr F. Oliver; 2, Mr R. Smith; 3, Mr R. Mathers. Highest pointed junior: Master B. Roberts.

... **BRISTOL AS** members had an enjoyable evening discussing the fish that had been taken to the meeting. There were also several reports of early spawnings of fancy goldfish. It is with great regret that the death of Mr R. G. Watson is reported. A member in the early days of the Society and one of its past presidents, he was responsible for the first outline drawing of the Bristol shubunkin, copies of which were available in the early days, with the initial R.G.W. in the corner, for one shilling.

... AT the AGM of the **SITTINGBOURNE & DAS** the following members were presented with trophies won during the year: Mr J. Bean, Fighter Cup and Swordtail Cup; Mr P. Floyd, Barb trophy and Characin trophy; Master A. McDonald, Guppy Cup, Challenge Cup and Junior Challenge trophy; Mr B. Newman, Anabantid trophy, Fish of the Year and Points trophy; Mr J. Walby, Home Aquaria trophy. Mr J. Perry, retiring chairman, was elected vice-president as a mark of the regard the Society has for him.

THE Midland Aquatic Show Committee, exhibition organisers of the MIDLAND AQUARIUM & POOL SOCIETY, are planning a great reorganisation and new look for this year's Open Show at Bingley Hall. It is to be called the MIDLAND AQUATIC FESTIVAL '74 and the Committee are putting all their know-how and resources into making the Show a great success. The main change will be on the tropical side, where, as at the BAF, entries will only be acceptable through a society and it is the society who will be presenting their stands. All societies entering a stand will receive £5 for expenses and there will be cash prizes of £15, £10, £5 and £2 for the winning stands. The system for coldwater entries will not be changed as it is considered that these are usually sadly neglected at most open shows these days and exhibitors have always welcomed the opportunity to display their best coldwater fishes in competition at Bingley Hall. The Show is to be held from the 15th to 17th August and enquiries for schedules and from specialist societies and traders should be directed to Mr J. Wits, 120 Franklin Road, Kings Norton, Birmingham 30; phone 021-458 5655.

... AN interesting and informative talk on the various types of food available, both commercial and home-made or cultured, was given by Mr L. Littleton to members of **NAIUSA & DAS**. Results of the table show were, Swordtails (open and novice): 1, Mr M. Bywater; 2, Mr P. Stamp; 3, Mrs P. Genge. Mollies: 1, Mr R. Crew; 2, Mr W. Holland; 3, Mr Kenwood. Novice: 1, Mr R. Crew; 2, Mr Kenwood; 3, Mrs P. Genge.

... THE speaker at the May meeting of **SOUTH PARK AQUATIC (STUDY) SOCIETY** was the well-known coldwater fish judge and breeder, Mr Bob Eason, who gave a most interesting lecture illustrated with his own colour slides on various coldwater fishes found in the British Isles, Europe and America. All cold-

water enthusiasts within reach of Wimbledon (London) are most welcome at meetings. For details please phone Mrs Dudley, 01-540 3662.

... MEMBERS of the **ASSOCIATION OF GOLDFISH BREEDERS** and their guests much enjoyed an evening of slides and a talk by Mr A. Lawman on Japan, which he recently visited. He saw many goldfish breeders and was able to acquire knowledge of their breeding methods and the way they feed their fish. Table show results: Singletails: 1, Mr B. Cook; 2 & 3, Mr L. Clements. Young fish: 1, Mr G. Fleming; 2, Mr D. Nutt; 3, Mr R. Eldon.

... MR T. HALLETT of the **FGA**, Manchester section, reports, 'We have had a very busy schedule so far this year with film shows, lectures and slide shows. At the April meeting a movie film was shown and a lecture given by our very able treasurer and stand-in chairman for the day, Mr A. Charlton. Meetings are now back to normal, i.e. the first Sunday of the month at the Longsight Hotel, Belle Vue Gardens (rear entrance), Manchester, 2.30 p.m.'

... **TOTTENHAM & DAS** will hold their Open Coldwater Show this year on 4th - 5th August, in conjunction with Haringey. GSGH judges will officiate.

... THE **BRITISH CICHLID ASSOCIATION NOTTINGHAM AREA**, have started meeting on the first Tuesday of each month. Any member or anyone wishing to join is most welcome, but as venue and time are yet to be determined please contact Mr P. N. Berry, 131 Sherbrook Road, Daybrook, Nottingham, for details.

... THE second leg of the two-way inter-club competition between **MID-SUSSEX AS** and **BRIGHTON AS** was held on the home territory of Mid-Sussex. Over the two meetings, Brighton won by 13 points and were awarded the trophy by Mr D. Soper, chairman of Mid-Sussex, who had also provided the quiz for the evening's entertainment.

Dates for Your Diary

6th July. **BASINGSTOKE & DAS** Open Show, Carnival Hall, Basingstoke, Hants. Details: Mr R. Rice, 93 Puckett Road, Basingstoke, Hants.

7th July. **LYTHAM** AS Open Show, Ansell Institute, Woodlands Road, Ansell, Lytham-St-Annes, Lancs. Schedules: Mr P. Ham, 1 Wyndeshe Grove, Freckleton, Preston, Lancs. phone Freckleton 53112.

7th July. **BELLINGHAM** AS Open Show. Details to follow.

12th-14th July. **ROMFORD & BEACON-TREE** AS Dagenham Town Open Show. Further details: Mr A. V. Wakeman, 71 Harlow Road, Romford, Essex.

21st July. **THE SANDGRUINDERS' AS** Open Show, Mole Cop Secondary School, Southport. Details: Mr Y. Tasker, 44 Kensington Road, Southport.

27th July. **GSGE** General Meeting, Conway Hall, Red Lion Square, Holborn, London WC1, 2.00 p.m.

28th July. **ELY & DAS** Tropical Fish Exhibition, Bedford House, St. Mary's Street, Ely. Open 10-6. Details: Mr S. Porter, 54 Cambridge Road, Stevenage, Ely, Cambs.

28th July. **ABERBROTHGAWY & DAS** Open Show, Menai Community Centre, Main Street, Menai. Details: Mr W. Clarke, 20 New Street, St. Asaph, nr. Barmouth, 573 7 EJ; phone Fawar 7469.

28th July. **HUNTCORN** AS Open Show, Parish School, Church Street, Ramcorn. Schedules: Mr P. Hill, 13 Eskdale Close, Beechwood West, Ramcorn, Cheshire WA7 2JX.

3rd-4th August. **TOTTENHAM & DAS** Open Coldwater Show. Details: Mr S. Townson, 1 Haslem Court, Waterfall Road, London N11 1NJ; phone 01-368 2091.

4th August. **TONBRIDGE & DAS** Open Show. Details: Mr L. T. Mathison, 11 Northern Way, Five Oak Green, Tonbridge, Kent.

10th August. **NEWPORT** AS Open Show, St. John's Hall, Victoria Avenue, Maund Newport, Mon. Details: Mr W. Gibbon, 65 Dunstable Road, Newport, Mon.; phone 7493.

11th August. **GRIMSBY & CLEE-THORPES** AS 3rd Open Show, Memorial Hall, Cleethorpes. Schedules later.

15th-17th August. **MIDLAND AQUATIC FESTIVAL '74**, Rugby Hall, Broad Street, Birmingham. Details: Mr J. Wills, 120 Franklin Road, Kings Norton, Birmingham 39; phone 021-458 5655.

17th August. **ANSON AQUATIC CLUB** Open Show, Kings Hall Community Association, 155 Harlequin Road, Wilmslow, London, NW10.

18th August. **STROUD & DAS** Open Show, Stroud Subscription Rooms. Details: Mrs D. Cole, Avignon, The Mill, Rendwick, Stroud, Glos.

18th August. **BUDDERSFIELD TFS** Open Show, Padlock Youth Centre, Birch Street, Buddersfield. Details: Mr H. Ackroyd, 31 Warrainside, Delphion; phone Buddersfield 3797.

25th August. **REDWORTH AQUARIST & POOL SOCIETY** Open Show, Nicholas Chamberlaine School, Baulkingham Lane, Redworth. Schedules: Mr J. Salisbury, 261 Oakley Street, Newcastle.

25th August. **CASTLEFORD** AS Open Show, Castleford Civic Centre.

25th-26th August. **GT. YARMOUTH & DAS** Tropical Fish Exhibition, Youth & Adult Centre, St. Nicholas Road, Great Yarmouth. Tropicals, marine, coldwater, freshwater aquaria, trade stands. Details: Mr P. Watson, Petase, 31 Common Road, Hensley, Great Yarmouth, Norfolk.

31st August. **PLYMOUTH** AS Open Show, Y.M.C.A., Plymouth. Schedules: Mr M. Leader, 3 North Down Gardens, Keyham, Plymouth.

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31st August. **WESTON-SUPER-MARE & D TFC** Open Show, St. John's House, Oxford Street, Weston-super-Mare.

1st September. **NEWBURY & DAS** 2nd Open Show, The Pines, Market Place, Newbury, Berks. Schedules: Mr G. Foster, 19 Jubilee Road, Newbury, Berks.

1st September. **BETHNAL GREEN** AS Open Show, The Institute, 229 Bethnal Green Road, London, E2. FBAS Singapore Championship class W (and coldwater).

1st September. **PETERLEE & DAS** Open Show, Schedules: Mr B. Houghton, 40 Marlborough Road, Hastings Hill, Sunderland, Co. Durham.

1st September. **WELLINGBOROUGH & DAS** Open Show, Queensway Hall, Goldsmith Road, Wellingborough, Northants. Schedules: Mr P. Wallis, 11 Cherry Walk, Ransall, Northants.

2nd September. **HARLOW AS** Open Show, Moot House, The Stew, Harlow. Schedules: Mr P. Mardock, 21 Brook Lane Field, Harlow, Essex.

7th September. **FRAS ASSEMBLY**, Conway Hall, Red Lion Square, Holborn, London WC1, 2.30 p.m.

8th September. **BRACKNELL, DIDCOT & READING** AS Combined Open Show, Students Union, Reading University. Details: Mr J. Harvey, 4 Wickham Cross, Woodley, Reading, Berks, RG3 3JE; phone Reading 66917.

8th September. **CLEVELAND** AS Open Show. Details: Mr B. Willford, 1 Railway Terrace, North Shelton, Saltburn, Yorks.

13th-14th September. **BREISTOL** AS Open Show, Bishopston Parish Hall. Details: Mr F. Bowden, 12 Stoneleigh Walk, Knowle, Bristol BS4 2RL.

14th-15th September. **LITTLEHAMPTON & BOGNOR** AS Annual Exhibition, The Marquee, Bognor Regis. Open to public both days. Inter-club competition 12 noon Sunday.

14th September. **HOUNSLOW & DAS** Open Show, Youth Centre, Cecil Road, Hounslow. Details: Show secretary, Mr H. Pratt, 23 Woodlawn Drive, Feltham, Middlesex; phone 01-894 0023.

15th September. **NELSON** AS Open Show, Civic Centre, Stanley Street, Nelson, Lancs. Details: Mr H. Hingworth, 94 Barrowford Road, Colne, Lancs.

21st September. **EAST LONDON A & PA** Open Show, Ripple Road School, Ripple Road, Barkingside, Essex. Details: Mr J. Vicker, 13 Irons Way, Ryeleigh, Essex.

22nd September. **BUXTON & DAS** Open Show, Pavilion Gardens, Buxton. Schedules: Mr A. Holland, 8 Melland Terrace, New Mills, via Stockport, Cheshire.

22nd September. **HASTINGS & ST. LEONARDS** AS Open Show, St. Clements Church Hall, Croft Road, Hastings. Enquiries: Mr M. Penfold, 44 St. Marys Road, Hastings, Sussex.

22nd September. **TORBAY** AS Open Show, Torquay Town Hall. Schedules:

Mr J. R. Davis, 41 Haldon Road, Torquay, Devon.

29th September. **HUCKNALL & BULLWELL** AS Open Show. Details to follow.

29th September. **CHESTERFIELD & DAS** Open Show, Clay Cross Social Centre, Chesterfield Road, Clay Cross, Chesterfield, Derbyshire. Details: Mr J. Tomlinson, 24 Broadbury Drive, Warrington, Chesterfield S42 6SL.

3th October. **HAMPSTEAD & DAS** Open Show, Blackfriars Hall, The Priory, Southampton Road, London NW2. Details: Mr T. Woolley, 20 Coppits Close, N. Finchley; phone 01-368 4874.

5th October. **CARDIFF** AS Open Show, St. Margaret's Church Hall, Roath, Cardiff. Details: Mr C. Turner, 146 Arvon Street, Roath, Cardiff.

6th October. **NEWCASTLE GUPPY & LIVEBEARER SOCIETY**, 40 Lyseburne Open Show, Civic Hall, Gosforth, Newcastle-upon-Tyne. Schedules: Mrs J. Remson, 124 Dunstan Tower, Garth 18, Killingworth, Newcastle-upon-Tyne, NE12 0TN.

6th October. **VAUXHALL MOTORS RECREATION CLUB AQUARIST SECTION** Open Show. Details: Mr A. D. Philip, 15 Hollybush Road, Luton, Beds, LU2 9HG.

27th-29th October. **THE AQUARIUM SHOW '74** at the Royal Horticultural Society's Old Hall, Vincent Square, London SW1. Presented by the Federation of British Aquatic Societies. Aquarist society fish-keeping exhibits invited. Details from the organiser, PFM, 554 Garratt Lane, London SW17 0NY; phone 01-947 2805.

26th-27th October. **THE IRISH TROPICAL FISH SOCIETY** 3rd Open Show, The Mansion House, Dawson Street, Dublin 2. Schedules: Mr J. P. Nisameth, Kilsbinnin, Sandycroft, Co. Dublin.

27th October. **DONCASTER & DAS** Open Show, Broadworth Miners Welfare, Welfare Road, Woodlands.

2nd November. **GSGE** General Meeting, Conway Hall, Red Lion Square, Holborn, London WC1, 2.00 p.m.

10th November. **HALIFAX** AS Open Show, The Forest Cottage Community Centre, Green Lane, Ilkley, Halifax. Details: Mr D. Shaddy, Cuddesburn, Gaisner, Kings Cross, Halifax; phone Halifax 6018.

10th November. **WALTHAMSTOW & DAS** Open Show. Details to follow.

17th November. **BRADFORD & DAS** 27th Open Show, East Bowling Unity Club, Leinster Street, Wakefield Road, Bradford. Details: Mr E. J. Brown, 8 Garden Field, Wyke, Bradford; phone Bradford 6777.

1st December. **HORSFORTH** AS Open Show, New Civic Hall, Stanningley Road, Pudsey.

7th December. **FRAS ASSEMBLY**, Conway Hall, Red Lion Square, Holborn, London WC1, 2.30 p.m.

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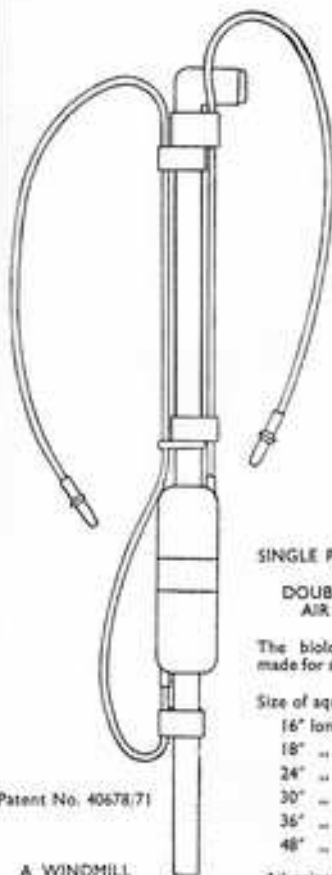
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