Over 20 years ago, Dr. Baensch, founder of Tetra Werke, began breeding tropical aquarium fish. The difficulties surrounding winter feeding—such as the lack of live fish—led him to the idea of creating his own dried food—TetraMin. Originally it had only four ingredients, but today TetraMin is made with over 40 fresh, natural substances, each thoroughly tested for nutritional value.

Years of painstaking research have produced a comprehensive range of Tetra foods—available for virtually every type of aquarium fish. For 70 per cent of all aquarium fish, TetraMin Staple Food is the ideal basic nourishment. For most other fish, there is a variety of special foods available.

Both feeding and management are made easier with Tetra’s colourful Feeding and Temperature Table which details 100 different species of aquarium fish.

Ask your local supplier for a copy and while there, also ask him for a can of Tetra fish food. Your fish deserve the best!

TetraMin (UK) Ltd.
Colley Lane, Paulton, Bristol, Somerset.
Telephone: 0272 827272
Telex: 40239 BMTH FRINTO

SYMBOL OF QUALITY

Please mention PFM when writing to advertisers
Comments and Quotes

- Lonely fish and alcohol
- This month’s Show in London
- Co-operation over showing rules

Never Drink Alone

It is not unknown for the experienced aquarist to smile a little superciliously when the non-fish-householder who has suddenly become a goldfish owner after a visit to the local fair hurries along to the pet shop to acquire a second fish because the first one ‘looks lonely’. However, research work being carried out by Dr Donald Goodwin, Dr Carol Dowd and Dr Samuel Guze of the Washington University School of Medicine, actually on the effects of alcohol on behaviour, in which goldfish were used, has shown that the fish were better adjusted creatures when placed two in a tank than when they were kept on their own. Twenty-four goldfish, divided into two sets of 12, were placed singly in small tanks, 12 of which contained 0.8% alcohol solution and 12 of which contained only water. The way in which the fish adapted to their new surroundings was then tested by the speed of their reaction to a sudden bright light. In the tests a small number of fish did not react to the light at all, the larger proportion (23%) of the non-reactors being in the non-alcoholic group as against only 9% of those in alcohol. The report of the work, in Nature, explains that the consistency with which these two results appeared caused the researchers to carry out a separate test to find the cause of the difference; they discovered that when the fish were placed two to a tank the number of non-responders in the untreated group dropped to the same percentage as the number of non-responders in the alcohol. In other words alcohol has the same effect as a tank mate in helping a fish to regard its surroundings as ‘normal’! At the ruling prices of spirits a visit to the pet shop is still the cheapest way to keep your pet happy though!

The AQUARIUM SHOW ’71

The AQUARIUM SHOW ’71 opens in London at the end of this month (Friday 29th October to Sunday 31st October). Full details will be found on other pages in this issue. As in the three preceding annual shows the Tableaux section will be the Show’s biggest attraction for the non-specialist visitor, and if you have not visited the Show in previous years don’t miss out this time—see you there!

One Set of Rules

ATTAINMENT of unity between nations is a notoriously long drawn-out business and one doomed frequently to be halted by setbacks. Progress towards fuller co-operation between the major aquatic groups in Britain, it seems, must likewise suffer the limping advancement of international treaty-making. Commonsense and efficiency demand that all the showing and judging of fishes in this country should be done under one set of show rules acceptable to all. After constructive talks to this end between the Federation of British
Decor of Marine Tanks

RECENTLY I have seen some tropical marine aquaria that were well-established tanks alleged by the firm displaying them to be in perfect condition for the fishes. I'm sure conditions were fine for the fishes but I was appalled at the appearance of the tanks. Base and corals were covered with brown and green growths of algae in 'sheets'—the very state that we have done our best for years to avoid in freshwater aquaria because of the unsightliness of these growths. I personally find them no more attractive in marine tanks and when I compare the appearance of an 'established' marine tank with that of a well-planted freshwater tank, despite the colours of the marine tropics I say give me freshwater aquaria every time! Can some marineist convince me that you can keep marines without these ugly algae?

Slough, Bucks.

P. WOODWARD

GSGB Building Fund

TO all people interested in keeping and breeding any type of goldfish the work of the Goldfish Society of Great Britain is not unknown. One of the first aims of this Society, some 23 years ago, was to purchase premises as a headquarters, with library etc.—something to encourage others, in particular youngsters, to pursue this hobby, to carry on the traditions of the GSGB.

A fund has now been opened for this purpose, and the response from our members has been wonderful, far beyond my wildest dreams. A list is being made of all subscribers, one day to be kept in our headquarters for all time, as a lasting tribute to the many people who have given so much of their time to build this Society. I will not mention names, there are too many.

After much consideration it has occurred to me that many of our friends outside may welcome the opportunity to join us in this venture, and I would like to extend to all our friends an open invitation to do just that. Cheques, P.O.s etc. can be sent to me, crossed G.S.G.B. Building Fund, at the following address: P. S. Kadwell, Organiser G.S.G.B. Building Fund, Claremont, Ongar Rd., Standon Massey, Essex.

To our many friends throughout the world our best wishes.

P. S. KADWELL
Goldfish Society of Great Britain

Cradle of the Deep

WITH regard to Arpee's comments on 'strict' and 'clinical' in relation to cleanliness in marine aquaria (PFM, August), since the strict derivation of 'clinical' is 'at the bedside' perhaps those who advocate clinical conditions mean us to conclude that marine tanks can be kept only in our bedrooms.

Edinburgh
R. FAWLEY

It Takes all Types

GENERALLY speaking, guppy specialists are blessed with a sense of humour, and they need to be otherwise they would be bald from tearing

Continued on page 264
See You There!
Friday 29th
Saturday 30th
Sunday 31st October

THE AQUARIUM SHOW '71
Royal Horticultural Society Old Hall
Vincent Square  London S.W.1

SPONSORED BY PETFISH MONTHLY AND ORGANISED JOINTLY
WITH THE FEDERATION OF BRITISH AQUATIC SOCIETIES

Aquarium Society Tableaux  Specialist displays of Goldfish,
Killies, Guppies, Reptiles, Native Fishes, Cacti and Succulents
* Latest Foods and Equipment  * Competitive Fish Classes  *
Furnished Aquaria

and this year

The F.B.A.S. 1971 Supreme Championship

How to Get There
By TRAIN: to Victoria Station (5 min. walk) or to Victoria Under-
ground via Circle, District and Victoria Lines from main-line stations
By BUS: 10 or 149 to Vincent Square (Horseferry Road); 2, 2A,
20, 36, 36A, 36B, 181 or 185 to Vauxhall Bridge Road
By CAR: From North, West and East follow “West End” sign-posts
to Marble Arch, then Park Lane, Hyde Park Corner, Grosvenor
Place, Victoria. From South and South-east cross Thames by Vauxhall
Bridge or Lambeth Bridge. Multi-story car park in Rochester Row
(2 min. walk from show)

Public Opening Times
Friday 29th 1 p.m. - 9 p.m.
Saturday 30th 10 a.m. - 9 p.m.
Sunday 31st 10 a.m. - 6 p.m.

ADMISSION 30p:
children 10p

Special rates for school and club parties booked in advance

"I saw your advertisement in PFM"
CULTURE GARDENS

TREAT YOUR TROPICAL FISH, GOLDFISH, MARINE FISH AND REPTILES TO A HEALTH-GIVING LIVE FOOD

Live Cultures Easy to Raise: With Instructions
1. Micro Worm 25p
2. Grindal Worm 25p
3. White Worm 27½p
4. Fruit Fly (Wingless) 37½p
5. Adult Brine Shrimp 37½p

—The best cultures in England
—More new products coming shortly

Send cash with orders (p. and p. paid on all cultures)
CULTURE GARDENS (Dept P)
London Sales Office 109 TIMOTHY ROAD,
BOW, LONDON, E.3

J. Lewis & Son
(Walthamstow) Ltd

Largest suppliers of aquarium gravel in the South

Best Dorset Dried Gravel—Grades "1/8" "1/4" "3/8" "1/2" "1". "RAINBOW" Aquarium Gravel—nine colours. Westmorland Rock and Best Devon Black Rock. Large Selection of Glass Rock.


Manufacturers of Bird Cage Sand Sheets.

WHOLESALE ONLY
119/121 Gloucester Road,
Walthamstow, London E17 6AF
Tel: 01-527 6540

Neals garden and pet centre
Heathfield Road London SW18
telephone 01-874 2037
open 8.30 am-6 pm

Attention!
Come and visit our new
TROPICAL FISH DEPARTMENT
Grand selection of tropical fish and plants at very competitive prices
Extensive parking facilities available in our 5 acre Nursery Showground and aviaries

HONG KONG & KOWLOON AQUATICS
BUY DIRECT AND SAVE
TROPICAL AND GOLDFISHES
MARINE & FAR EAST SPECIES

• 100% on Delivery • Lowest Prices
• Prompt Dependable Service
• Direct from Storage Tanks
• Experienced Air-Shipper
• Ship to All Parts of the World

WRITE FOR FREE PRICE LIST
P.O. Box K2745, Kowloon, Hong Kong
Cable “HKAQUATICS” H.K.

Please mention PFM when writing to advertisers.
WALTER R. SMITH LTD

Hyware, Gold Seal, Gem, Juwel and Angle Iron Aquariums
Tropical, Coldwater and Tropical Marine Accessories
REPTILES ... GARDEN PONDS ... AMPHIBIA

TROPICAL FISH HOBBYISTS
All available 'Back Issues' stocked, commencing 1959
Later issues—22p.
Prices EACH inc. postage

Suppliers to Educational and Municipal Authorities throughout the British Isles
Trade enquiries welcomed
CLOSED EVERY SUNDAY AND MONDAY

39 TIB STREET, MANCHESTER M4 1LX
Telephone: 061-832 2961

Brosiam
Foods & Remedies

Worried by Whitespot?

Known in the Aquarium Hobby
for over 30 Years

BROSIAM have a Remedy to cure all types of Whitespot
on Tropical or Coldwater Fish
Liquid, Powder or Tablets

Brosium Whitespot Remedy • Fuwal Powder • Fuwal Tablets
Methylene Blue and Viride Malachitum

Put one tablet of Brosiam Anti-Chlorine to every three gallons into the aquarium
before treating for whitespot

IT WORKS LIKE MAGIC

Ask your dealer for BROSIAM products today!

"I saw your advertisement in PFM"
JOHN HUTCHINSON TROPICAL DISPLAY TANKS

Shop units with a choice of three sizes

(a) 8 JUWEL AQUARIA Tanks.
   Tank 24" x 12" wide, stands 7' 3" high and 51" wide, 12" deep.
(b) 8 GEM AQUARIA Tanks 18" x 10" stands 6' 7" high x 38½" x 10"
(c) 4 JUWEL AQUARIA Tanks
   36½" x 12" x 12", stands 7' 3" high, 38½" x 12".

All sizes approximate.
Prices on application

Constructed of metal square sections fitted with "new" plain finish side panels and back which are waterproof and flameproof, PVC coated asbestos sheeting, adjustable feet, sliding blue plastic panels to allow easy access.

PF Quinn equipment is used and supplied with all these units.
Heaters, Thermostats, Filters, Pumps, Air Line Tees, Lighting Grolux with independent switch. Fish tank ready wired for immediate use.

Free delivery to any address
Credit Terms available for tank units

NEW Now available in black or white finish and eight sizes

Please mention PFM when writing to advertisers
NEW ADDITION TO THE RANGE
Smaller units for the home with 4 tanks, size 18" x 10" x 10" or 24" x 12" x 12", complete with all PETCRAFT equipment to run and maintain your tank as described and illustrated in the Aquarium Kit below.
Prices on application

PETCRAFT AQUARIUM KIT Comprising
a) Heater, Thermostat, Thermometer, Filter, Air pump, Air stone, Tees, Clamps, clips, food and tubing.
Price £3.85 plus £1.05 carriage (carriage free ordered with PETCRAFT TANK AND HOOD)

PETCRAFT TANK AND HOOD
b) Size (at top) 18" x 10" x 10" deep, ideal for tropical fish £2.05 (+ 45p postage)
Size (at top) 12" x 8" x 8" deep, complete £1.05 + 45p postage.
Lighting can be supplied with tanks if ordered at same time. £1. extra.

c) AQUATIC ACCESSORIES
PETCRAFT "44 HUNDRED" AIR PUMPS
BRITAIN'S BIGGEST SELLING AIR PUMP
Silent in operation, robustly constructed, 12 months guarantee spare diaphragm included.
Price £1.25 postage 40p.

PETCRAFT "AQUARIUS" HIGH VOLUME AIR PUMP
d) Fine quality British pump. An ideal pump for the Aquarist who prefers that little extra quality. Guaranteed for 1 year.
£3.15 postage 40p.

PETCRAFT COMBINED HEATER/ THERMOSTAT
e) Simple and easy to fit.
Readily adjustable by simple external control. Neon indicator. Available in 100w and 150w.
Guaranteed for 1 year.
100w. £1.48 150w. £1.48 postage 20p.
60" Air Line 50p. post free

John Hutchinson (Pets) Ltd
Export enquiries welcomed.

JOHN HUTCHINSON (PETS) LTD., 39-41 WICKER, SHEFFIELD 0742-24513

"I saw your advertisement in PFM"
The New ALGAE MAGNET

A New Device from Holland for Cleaning the Algae from your Aquarium walls

Simply place the Special Cleaning Pad inside the Aquarium and the POWERFUL MAGNETIC ACTIVATOR on the outside and slide it up and down

★ No disturbance to the fish
★ Non-rusting, non-toxic magnets
★ Depth of tank no problem

Price £1.44 for this valuable aid to Trouble-free Fishkeeping

Interpet Dorking - Surrey Tel. 0306 3202

Please mention PFM when writing to advertisers
LETTERS

Continued from page 254

their hair out in handfuls at the remarks of the uninitiated.
Peter Unwin's recollection of my encounter with
the schoolboy (Guppy World, PFM, August) once
more raised a smile and also reminded me of a
more recent incident. Chatting with a new
acquaintance I was becoming impressed with the
clarity of his remarks and his sensible approach to
generalties, until we got to discussing boredom in
retirement. 'That doesn't worry me,' I said.
'I'm a guppy breeder,' 'Oh yes?' he answered. 'I
have a friend who keeps tropical fish. He breeds
guppies, too—he feeds them to his other fish.'
The moron!
Bury, Lancs.
FRED CAMPBELL

The Secret of it All

THANK you for giving us 'the secret of it all'
in mathematical form in your August issue.
However, without the key to the meanings of the
symbols and the units employed it's a bit difficult
to make use of the formula. On second thoughts
perhaps you were right to omit them!

Guildford, Surrey
L. WHITE

Is it New to You?

UNUSUAL importations arriving
at the present time are the fish
being called 'bleeding-heart tiger
barbs'. Other than in body shape
and size these barbs have nothing
in appearance to relate them to tiger
barbs, for although at first sight
they appear golden a closer look
shows them to be very transparent,
their transparency revealing the
blood-redness responsible for the
popular name as well as the redness
of the gills.

Their abdominal area shows a
dark-red hue, mainly in the upper
and posterior parts, but this is
variable in different specimens be-
cause in some fish the redness is
obscured in patches by silvery
plaques, presumably where the
integument is opaque. The bright-
ed irregular 'bleeding' blotch above
the abdomen is seen between the
lobes of the swim bladder, which is
clearly visible. In fish of about
1½ in. body length the dorsal fin
shows a red edge and the central
fins are red; other fins are without
colour. The iris is silver with a
dark ring. They are quite eye-
catching fish in a shoud. Conditions
for keeping them are those generally
advocated for barbs. Identity at
present uncertain. Price is around
30p each.

FRESHWATER flounders are as
flat as the name signifies and are
jelly little bottom-dwellers that do
very well in a tank of slightly
brackish water with a fine sand base.
They promptly disappear into the
sand but close inspection will reveal
their eyes raised above its surface.
When they get used to their tank
they will make occasional forays up
and down the aquarium glass,
showing their whitish uncannily-
tagged 'under' sides. Adding tubifex
to the tank also brings them out of
hiding quickly enough when they
are used to feeding procedure.
Specimens of about 1½ in. body
diameter are in the shops at 30-40p
each.

Garden Ponds—Thoughts for Autumn

POND fishes will be likely to start
going off their food at this time
and will not need much food until
the weather warms up next spring.

In the south of Britain 18 in.
depth of water, and elsewhere 24 in.
depth, is considered to be safe for
fish in winter. Ensuring that there is
always an ice-free hole is presumed
to be very necessary to prevent the
escape of noxious gases from pool
water in long spells of wintry weather.
Floating a ball in the pool is
one method said to ensure that a
hole remains in the ice. This is not
my experience. I found a child's
plastic ring better than a ball.

Friends who have concrete-lined
pools tell me that having a floating
ball in the water during winter
prevents cracking of the concrete
when ice forms. I suggest that with
plastic-lined pools no such device is
necessary. In my pools—lined with
butyl sheet there is always a gap
measuring about ½ in. between the
ice and the sides of the pools.

It is the duty of the pool specialist
to advise on correct siting of garden
pools but it is not always possible to
act according to his recommendations.
A new pool I am about to
construct will have to be sited where
branches of a large apple tree will be
over a part of it. To prevent falling
leaves from fouling the water a small
mesh nylon net will be draped across
the pool. Having a tree near the pool
can sometimes provide a bonus. A
neighbour with a plum tree alongside
his pool gives the boughs a shake
now and then in summer. Aphis
and small caterpillars tumble into
the water and are taken greedily by
the fish!
TWO WEST AFRICAN COUNTRY COUSINS—2

Aquarium Breeding of Dwarf Cichlids

By MATT MOOR

Very closely related to the aquarium kribensis described in last month’s article is its country cousin *Pelvicachromis taeinitus*, an equally beautiful fish of similar habits and temperament. Unfortunately, however, it is not so easy to come by and the relatively few specimens that become available every now and again are eagerly snapped up by dwarf cichlid enthusiasts. Until the recent revision and recategorisation of the West African cichlids, this fish was listed under two different names: *Pelmatochromis taeinitus* and *Pelmatochromis klugei*. Indeed, it was generally thought that there were two different species, a misconception no doubt aided and abetted by its being illustrated in a well-known American volume on tropical fish in its non-breeding colours under the first name and in its breeding colours under the second! Nevertheless *taeinitus* and *klugei* are one and the same species, *klugei* being a junior synonym for *taeinitus* and therefore invalid. It has now, of course, been along with *pulcher* and its other near relatives in the new genus *Pelvicachromis*.

That this fish is very closely related to *pulcher* is obvious at first glance. It is exactly the same shape and size, and except that the caudal fin of the male is rounded instead of being extended to a point, its fins are the same shape too. Moreover, although the actual colours are quite different, the patterns formed by the distribution of these colours are quite similar. In fact, until the young are over 1 in. in length they can be distinguished only by the trained eye.

Although *taeinitus* comes from the same rivers as *pulcher* and appears to be almost as widely distributed, only one form or ‘race’ is known, and the species exhibits much less variation in colours and markings from individual to individual. When examined under colour-matching fluorescent lighting, adult *taeinitus*, when not in breeding colours and not excited, can be described as in the accompanying summery, though it should be noted that *taeinitus* shows an even greater capacity for continuous colour changes than the aquarium kribensis, making a standard description difficult to arrive at.

Like *pulcher*, *taeinitus* becomes completely transformed when courtship begins. The male’s olive brown changes to a beautiful shade of pale violet, his golden lips and the orange bands below his eyes becoming deep carmine. At the same time his pectoral fins become tipped with red and the white, then yellow, and the remaining colours on his fins deepen and intensify. The female’s body, except for the belly region, changes to gold, and the golden areas on her dorsal and caudal fins take on a

**Pelvicachromis taeinitus: the aquarium klugei**

**Males:** Total length 3½–4 inches. Body elongate and only moderately compressed laterally. Upper half of the body olive brown, lower half pale olive brown suffused with pale yellow around the belly region. Iris black. Eye bordered with a ring of pale blue. Gill plate olive brown above and pale gold below with an orange band below the eye and a black metallic spot edged front and rear with bright green. Lips deep yellow. Dorsal fin greatly extended to a fine point and bordered along its upper edge with black, with an inner border of pale yellow, the extension also carrying an outer border of deep red; the body of the dorsal forward of the extension has olive brown fin rays, the extension having two, three or four oval black spots bordered with orange in its upper half and a series of wavy horizontal olive brown bands in the lower half. Caudal fin rounded, its upper half being deep orange and carrying from five to twelve, but normally six or seven, oval black spots; the lower half, bordered with black with an inner border of pale blue, carries a series of wavy vertical olive brown bands. Pectoral fins pale yellow. Ventral pale blue bordered along the front edge with a broad black band and along the rear edge with a narrower band of the same colour. Anal fin violet bordered with black.

**Females:** Total length 2½–3 inches; distinctly deeper bodied than the males. Upper half of body olive brown with a darker brown band down the centre of the back from above the eyes to the caudal peduncle, the forehead carrying two lateral bands of the same colour. Lower half of the body pale olive brown suffused with pale green about the belly region. Gill plate olive brown above and pale green suffused with yellow below and carrying a horizontal orange gold bar immediately below the eye. Iris black. Eye bordered with a ring of pale blue. Lips golden. Dorsal not so greatly extended as that of the males and gold throughout except for a narrow black border and the presence of one or two round black spots in the region of the extension. Caudal fin gold above, with from one to three oval black spots, and colourless below except for gold flecks radiating outwards along the fin rays. Pectoral fins colourless. Ventral fins pale green bordered with black. Anal fin violet bordered with black.
glittering metallic lustre. Meanwhile her belly and her ventral fins change to deep mauve; her sides just above her belly become an iridescent emerald green. Not only when breeding, but at all times, this beautiful fish shows a remarkable capacity for continual colour change almost second by second, if in perfect health and kept in congenial conditions.

Breeding the Country Cousins

_P. pulcher_ and _P. ternetii_ are so similar in temperament and behaviour that the breeding procedure is precisely the same for both of them. Temperature should be in the upper seventies or lower eighties (°F). The pH can be anywhere between 6 and 8, though sudden changes must be avoided as the fish cannot tolerate them. In this connection it is noticeable that broods bred in acid water tend to have a preponderance of males and those bred in alkaline water a preponderance of females.

Water hardness is not critical, though it should not exceed 200 p.p.m., and the fishes can be bred equally successfully in peaty rainwater, ordinary tap water and water to which a teaspoonful of rock salt per gallon has been added. But whatever water is used it should always be well aged, for these fishes do not take at all kindly to sudden transfer to recently warmed fresh water as their bodies seem unable to adjust to the high concentration of dissolved oxygen such water normally contains. Compatible pairs spawn readily enough even in a community tank with other species, though under these conditions they rarely rear their young successfully. In a small tank set aside for themselves and left undisturbed they will hatch and rear broods numbering from a few score to over 200, the older pairs breeding less often but having the larger broods.

_P. pulcher_ and _ternetii_ belong to the 'egg-hidding' cichlids and prefer to spawn under rocks or within small caves, the usual flowerpots with holes drilled in their sides therefore being ideal. Digging takes place within the cave but seldom, if ever outside it, so the tank can be well planted; indeed it should be, because the fishes are ill at ease and less likely to breed in a tank without plants.

Whenever possible only pairs that have mated naturally from among a shoal of young fish should be used for breeding, for although males will accept almost any female offered and vice versa, the breeder can expect fewer broods and a greater incidence of domestic quarrelling, egg-eating and generally unsatisfactory brood care among pairs that have been put together artificially than among those that have paired naturally.

When a well-matched pair are placed in a breeding tank, the male will almost immediately take possession of one of the flowerpots, excavating the gravel within it and ejecting it outside. The female may in turn adopt another flowerpot for herself, though she is less inclined to dig and will spend much more of her time outside it. Sometimes they may both share the same flowerpot; but if they do, this does not mean that they are preparing to spawn but that, on the contrary, they are not!

It is always the female who takes the initiative in courting by attempting to arouse the male by what can only be described as an erotic dance! She stations herself outside the entrance to the male's nest, extending her magnificently coloured fins to their utmost so that the metallic areas flash with reflected light. At the same time she corkscrews her body sideways into a crescent and, swimming slowly backwards and forwards in slow circles, every fin rapidly quivers, she attempts to stimulate him into a state of passion. Should he respond—and alas! he often does not—he invites her into his nest, where the eggs are laid.

From this moment onwards the female takes over the nest, fanning the eggs whilst her partner remains on guard outside. Only rarely does she allow her mate to share in the duties of fanning the eggs; though often he will attempt to do so, immediately being driven off for his pains. But once the young are free-swimming both will share in herding the shoal and leading it round the tank. Unfortunately pairs of both species in the unnatural confines of a small tank are prone to sudden outbreaks of quite vicious domestic quarrelling, quite often leading to the death of one or the other. It is therefore advisable to move either of the parents—it makes no differ-

Rearing the Fry of the Dwarfs

It is most essential that the fry are reared in well-aged but crystal clear water. The slightest degree of pollution arising from the decay of unedible food or other foreign organic matter rapidly leads to bacterial infection and a high mortality rate, _ternetii_ young being even more susceptible than _pulcher_ young in this regard. The fry will take finely divided dry foods and newly hatched brine shrimp within 48 hours of becoming free-swimming and will grow quite quickly. Within a few weeks they will have to be transferred to larger quarters into well-aged water, the pH of which has been previously adjusted to that of the water in the breeding tank.

Though most hobbyists must continue to breed these species by placing individual pairs in separate small breeding tanks, the best results are obtained if about four or five well-matched pairs are placed in a very large pool or tank, at least 6 feet long by 4 feet wide and around 1 inch deep, very heavily planted and provided with dozens of alternative breeding sites. Not only do the pairs breed more frequently— it seems that the proximity of other pairs acts as a stimulant—but domestic quarrels never lead to serious injuries as the losing partner merely retreats to distant waters until tempers have cooled. The pairs seem always to be able to protect their young successfully and the larger water area provides healthier and more natural conditions. Furthermore, once the young cease to shoal they are never killed by their parents but merely driven away from the immediate vicinity of the spawning site. It is surprising how rapidly the young grow in such an environment, even when little
Coping with Condensation

By P. K. BROWN

CONDENSATION occurs in most buildings, but it is often never seen. However, in a fish house the problem is more apparent, with the walls streaming with water and timber either rotting or warping. The main danger with condensation is that it causes deterioration of the fish house structure, and eventually whole new pieces of timber must be introduced. I have seen many fish houses that have been in a state of ruin because preventive measures against condensation have not been taken. Another important point is that most fish houses are heavily insulated against heat loss, and most if not all insulators work only if they are dry.

There are two types of condensation, surface and interstitial, but before these are discussed let us see how condensation is caused. All bodies of air are able to hold a certain amount of water in the form of vapour. The amount of vapour increases as the air warms. It can thus be seen that there will be a large amount of vapour in the air of a fish house. If the air comes into contact with a surface cooler than the air, the air will be cooled, and the amount of water vapour it can hold is decreased. If, at this stage, the air contains more water than it can hold at that temperature, condensation will occur. The point at which condensation occurs is called the 'dew point'.

In the above explanation it is assumed that the air has a relative humidity—the amount of water a body of air is holding expressed as a percentage of what it can hold; i.e., fully loaded is 100%. Surface condensation occurs when the water vapour condenses on a surface, for example a wall. Interstitial condensation is when condensation takes place actually within the wall. This occurs because water vapour can pass through most building materials.

Prevention of Condensation

Surface condensation can be reduced by raising the temperature of the affected area. This means that when the air touches the surface it is still cooled, but not to such an extent that it reaches its dew point. This may be achieved by attaching to the area polystyrene sheets between 3 and 5 mm thick. The sheets used for packing fish boxes, or ceiling tiles, should serve the purpose. Obviously the above remedy may not be applicable in many circumstances, and in these cases the affected area, if wood, should be well painted with a gloss paint, or the whole area covered with polythene (polythene should only be resorted to in the last instance, because condensation may occur behind the polythene).

Interstitial condensation is rather more difficult to deal with, as one does not know it is happening until it is too late. My fish house ceiling was covered with fibre-board; eventually signs of damp began to appear and within a week the ceiling was falling down. This was directly caused by condensation in the ceiling.

As water vapour is the direct cause of condensation, the obvious way to stop interstitial condensation is by stopping the water vapour getting to the building material. This is done by the use of a 'vapour barrier'. This is a material that will not allow vapour to pass through it, such materials including aluminium foil, polythene, gloss paint on plaster etc. Polythene is probably the best for fish house use.
The diagrams show the construction and placing of vapour barriers, insulation etc., for two types of construction—a garden-shed type and a brick (solid wall) fish house with flat roof. Diagram 1 shows the position of the vapour barrier—this should ensure that the insulation is kept dry, and by treating the hardboard its life should be increased. The insulation behind the hardboard should raise the temperature such that the surface condensation should not occur on the hardboard. By placing the polythene in front of the hardboard instead of behind it greater protection should be given, but the sheet is then liable to be torn and also looks unsightly. The ceiling material (diagram 2) should be protected by a gloss paint and Synthrapol on the reverse side. Polythene may be placed over the joints and insulation so as to enclose it fully, so that the insulation would be protected if the roof leaked.

**Points to Remember**

1. Before treating to eliminate condensation, remember to protect the wood with a suitable preservative, as once the insulation, ceiling or hardboard is in place it is too late (unless one wants to take it to pieces) to start again and paint.

2. Try to remove as much of the vapour as possible by ventilation.

The precautions and preventions listed should generally work; however, because of varying factors in construction, difficulties in curing condensation can arise. The following leaflets (published by H.M.S.O. at 4p) may be found of assistance: Condensation; Vapour Barriers. There are also many specialist books on the subject available at libraries.

---

**Breeding Dwarf Cichlids**

*continued from page 263*

An attempt is made to supply special fry food other than frequent helpings of brine shrimp. All that is required to maintain such a continuous breeding community is the removal of as many young as possible once they cease to shoal, thus maintaining the population to the minimum.

Such larger water areas than are available in a normal sized aquarium provide an environment much closer to that appertaining in Nature, and the behaviour of the fishes differs quite radically from that which manifests itself in the totally artificial environment of a typical tank. It is interesting, for instance, that under such conditions the breeding pairs frequently exchange partners from one spawning to another and although this leads to a certain amount of sparring between rival males and rival females, injuries are almost never sustained.
Guppy Types

IN the days when the guppy was more noted for its propensity for keeping down mosquito larvae than for being the idol of certain fishkeepers, the imported wild specimens of Lebistes reticulatus were very colourful, if somewhat small by today's standards.

Occasionally an odd male would appear that displayed a beautiful tracery pattern in its tail, and this much sought-after guppy was soon given the name of English lace, by aquarists and dealers in Great Britain.

In 1938, William T. Innes wrote and published his now famous EXOTIC AQUARIUM FISHES and in it he illustrated many of the fishes with his own paintings. One such showed a group of some nine males and one female guppy, and it is interesting in that the author described the pierced caudal pattern of one as being 'lace' or 'peacock'.

Though many breeders reproduced this pattern on a combination of finnage shapes, the first time I saw it on a broadtail was during a visit to a southern breeder in 1958: Abe Abraham, from Bedford, owned one of the tidiest fish sheds in Britain at that time, and we in the FGBS used his set-up as a show-piece and encouragement to the beginner, because he was also a great one for experimentation.

On this visit I spotted three 10 gallon tanks containing veiltails—not unusual as Abe was then making his mark with a black veil strain. What was interesting was that by crossing guppies displaying the English lace with his grey veils he had produced two new varieties in both lavender and emerald green. Because of their resemblance to the body markings of the leopard he had given his fish that name. I headed back to Manchester the proud possessor of some green leopards—the progeny of which we used in the Belle Vue A.S. furnished aquaria at the B.A.F. in 1939.

Before we trace the next step in this chain of guppies displaying unusual body markings we must pause to discuss a pattern first explained by Professor O. Winge, working in his laboratories at Carlsberg. Among the many he described was one displaying from two to five bars on the posterior portion of the male guppy's body, and named zebrinus (Ze). The gene responsible was a dominant, autosomal one and expressed itself by being evidenced only on the male. Though the female guppy could carry this gene she didn't display it.

Its sudden appearance in the tanks of guppy breeders was easily explained genetically. If you crossed an ordinary guppy lacking this gene with a female carrying zebrinus, a quarter of the resultant male progeny had the vertical bars. It wasn't long before enterprising guppy traders had added these bars to the leopards and thus was born the 'snakeskin' variety.

On the other side of the Atlantic, top breeder William Hartung had been making a name for himself with a bronze strain, what we in Europe refer to as gold-laced.

Using the bronze, Bill placed on the market three types of snakeskin: bronze with yellowish caudal fins, bronze with red and double swordtails. As if this wasn't enough of an achievement his patience also added another 'first', the albino snakeskin. Chinese breeders later added both top and bottom sword snakeskins.

On his 1953 visit to Britain, I accompanied Paul Hahnel when we visited Mr Abraham's home again and P. H. expressed a great deal of interest in some three-quarter black snakeskins that Abe had produced. Paul had to refuse the offer of three pairs as he was leaving us to visit Germany to receive the Gold Medal they had awarded him for his services to fishkeeping.

We kept in touch with his travels on the continent and found that on his flight back to the States he would have to change planes at London Airport. Imagine his surprise when doing so to find us waiting for him with a parcel containing the guppies he had so reluctantly left behind.

Back in New York, the father of the fancy guppy realised that if these fish ever contaminated his strain of red fangs they would ruin them, so he passed on the snakeskins to a close friend and fellow enthusiast, Fred Reitz. Fred worked with the strain for some time, then handed some of his stock to Mac, towards this end, John Cardillos, both from the Mac Guppy Hatchery.

These top experts crossed the males with some of their females with a great deal of work and frustration they gave the world yet another superb guppy with attractive body markings—the king cobra. A full account of this fish was published in T.F.H (March, 1965) accompanied by excellent colour pictures.

No. 14: The Leopard, Snakeskin and King Cobra

These early cobras were in the ranges of blue and green but it wasn't long before the hatchery gave what I consider to be the pièce de résistance: the sunset king cobra—a golden body resplendent with a blood-red tail.

Today, various versions of all these body markings are found all over the globe, some pure, some admixtures of all the different patterns. We have travelled a long road from those apparently insignificant wild 'rattails'.

In the States show classes are held for both the snakeskin and the cobras. The rules state that the latter must display three or more vertical bars on the body.

In Britain, where preference in show classes is given to outline, these guppies can be found in almost any class sporting a variety of dorsal and caudal shapes, though, since the introduction of the Colour Class, they have tended towards this.

It seems strange that the snakeskin and king cobra, although such popular guppies, don't rate a single word in the Standard Handbooks of both British specialist societies—FGBS and FGA.

J.K.
The Mbuna—2

Three Malawi Cichlids

Conditions for rearing Pseudotropheus auratus, Labeotropheus fuelleborni and L. trewavasae in captivity and details about these fishes

By D. TERVER
Laboratory and Museum of Zoology
Aquarist Circle of Nancy, France

In last month's article we briefly traced the history of the importation of Mbuna into Europe. Available ecological data enabled us to describe the environment of the Malawi cichlids and the physicochemical state of their natural habitat. A brief list and descriptions of the principal species imported were also given. In this article I propose, after giving general details of the conditions necessary for successful rearing, to limit the detailed presentation to the three species whose behaviour and reproduction I have observed most often.

Aquarium Conditions

Our stock of Mbuna is held in four aquaria—three of 600 litres (152 gallons) and one of 700 litres capacity, and is on public view in the entrance hall of the Museum of Zoology. These tanks operate on a closed circuit system and are planted mainly with Vallisneria to reproduce as closely as possible the fishes' natural biotopy. Numerous hiding places have been incorporated into a decor composed of flat stones (slate), crystalline blocks and lava rock. The bottom is silica grit (size 2–3 mm) with here and there a stretch of heavier gravel. Temperature is maintained at a minimum of 78–80°F (26–27°C) by means of a thermostatically controlled water heater. In each aquarium a second thermostat sets off an electric bell if there should be an abnormal decline in temperature. This is absolutely indispensable since L. fuelleborni, and particularly the young, are extremely susceptible to any drop in temperature, even to a slow and relatively minor drop.

Lighting consists of four fluorescent tubes (Grolux, Osram and Natural White) controlled by

In a later article I will include other species such as Pseudotropheus tropheops, which we have also bred. Unfortunately this fish has such a variety of forms (polymorphism) that it is difficult to define it precisely. We are indebted to the kindness of Professor H. Peters, director of the Laboratory of Zoophysiology of the University of Tübingen (Germany) for a new batch of 20 or so specimens of P. tropheops which he committed to our care on his return from a trip to Malawi. Our observations on P. zebra, P. fuscus and P. elongatus are too fragmentary to be dealt with in the present study.

Photographs by the author

Female Pseudotrophus auratus showing typical female pattern during incubation of eggs
a time-switch operating 12 hours a day and gives completely natural lighting to the four tanks.

Filteration is achieved in part by a bottom filter made of an angled plastic tube, the undergravel portion of which is pierced along its length with many small holes. An outside filter made from a small-sized tank (18 in. by 10 in. by 10 in.) completes the purification process, the water from the aquarium is led there by a wide-bore (35 mm) siphon tube and passes through the filter medium (2 in. of glass wool and 2 in. of silica grit originally; now a single layer of polyester foam of 2 in. thickness, washed about once a week and put back into place). The water is pumped back (110 gallons/hour) and it re-enters the tank as a fine spray from holes in a length of plastic tubing that runs along the length of the aquarium. This set-up achieves an extremely efficient filtration and aeration system. A diffuser in each aquarium completes the system and maintains aeration if the water pump should break down.

The tanks were filled initially with mains tap water (pumped in from the Moiselle and ozonised). The water is fairly soft at the outset (10 French on average). The pH, frequently adjusted, is maintained as far as possible at neutral or slightly alkaline. Should any disturbing variation take place (above pH 8 or below pH 6) an open circuit (in which the water enters the aquarium in a thin trickle and leaves by an overflow pipe fitted on the filter) maintains a slow and continuous renewal of the water; at the same time this method prevents the formation of too great water hardness. Finally, 20 or so smaller tanks (30-200 litres) are sufficient for the isolation of the females when breeding.

Feeding

Fryer classes our three species among the algae-eaters—indeed the shape of the mouth of the Labiotropheus appears well adapted to this method of eating. Facing downwards, and shaped like a horseshoe, it enables the fish to scrape algae from the rock surface while it keeps its body parallel to the ground. This can easily be seen in the aquarium where the fish are working over the rockwork or plants. However, all the usual types of food will be taken (to which the addition of thread algae is very much appreciated); blood worms, which they love, and tubifex form their basic nourishment. (These five foods are given only after some 48 hours under running water to minimise the risk of introducing parasites or germs.) Daphnia, cooked shrimps and mussels, the marine ragworm (Nereis) and from time to time dried proprietary foods complete a varied diet, which is given at least twice a day. The young are fed from birth, and for 2 or 3 weeks afterwards, mainly on brine shrimp (Artemia) nauplii followed by small daphnia, tubifex and small blood worms.

Details of Species

Pseudotropheus auratus (Boulenger, 1887). This species is reported by Fryer as being very abundant in the rocky zone. Its vivid characteristic colouring aids easy identification. The sexual dimorphism, apparently very obvious, is in fact very complex in detail. Determination of the sexes is often not possible right up to the moment of breeding and incubation, since coloration seems to vary for each individual with the reproductive cycle and emotional state (fright, threat, show) and with age.

All the young, and typical females, have a basic golden yellow colour, more or less bright according to the physiological state, and they carry three dark longitudinal bands edged with blue. The first one is on a level with the lateral line and stretches from the front of the head to the caudal fin; the second is found at the base of the dorsal fin along its whole length. The third one, characteristic of females according to Fryer, runs along the edge of the dorsal fin. However, we have observed in those fish born in the laboratory and those that have bred at least once considerable variations. In some circumstances some females, with their overall dark colour and absence of band on their dorsal fin, resemble males. However, at the moment of egg-laying, in the presence of the male, they all again took on their typical appearance.

Typical males have a fundamentally dark tinge, grey-blue or black, and carry two light bands similar to the two dark bands of the typical females. The dorsal fin is always more or less clear, often with a bluish tinge. In the presence of a female or in the course of a struggle with an equal they darken considerably to a lustrous black and the clear bands along the flanks (in particular the one at the middle) take on a pale blue metallic tinge. This characteristic tint can be relatively stable (an imported male did not vary in the course of a year in a community tank) or, on the contrary, very unstable. In this case confusion with a dark female is possible.

However, a pretty certain indication of a male is the marking on the anal fin; it consists of a vivid yellow-orange spot with clearly defined contours which is nearly always missing in the female. So sexing these fish must be undertaken with great caution and it is often only possible when spawning is imminent.

Labiotropheus fuelleborni Ahl, 1927. According to Fryer, this species, which reaches a size of 4-5 in., is very abundant in the rocky zone. One of its essential characteristics is the particular shape of its mouth, placed ventrally and shaped like a horseshoe. It is furnished with a number of two- or three-pointed teeth, which enable the animal to pull algae from the rocks quite easily while its body remains parallel with the ground.
Female *Labostrophus trewavassei*. This specimen exhibits the speckled pattern of yellow and black.

In spite of this apparently significant specialisation it is perfectly happy in captivity with all the usual live foods—daphnia, blood worms, tubifex and even dried commercial foods. Sexual dimorphism is sufficiently obvious to allow easy identification of the sexes. Males possess six to eight transverse dark blue bands, which come and go on a fairly light blue background according to their physiological state. When the fish are frightened, the contrast between the dark-blue cross bands and the rest of the pale blue body is particularly striking. Females are polymorphic: we have been able to pick out two forms. The first, striped, has the same pattern as the males, but with a more drab coloration, rather grey-green. The second, flecked, shows speckling made up of orange and dark brown flecks.

In both sexes the anal fin and even the hind part of the dorsal are ornamented with spots made up of two or three yellow or orange specks.

*Labostrophus trewavassei* Fryer, 1956. At first sight this species closely resembles the preceding one. The shape of the mouth as well as the general coloration are identical, at least in the males. These have an overall darkish blue tinge and carry six transverse dark bands. Yellow-orange spots on the anal fin are also present. However, the general shape of the body is less stocky and more elongated than that of *L. fuelleborni* and the presence of a fairly conspicuous red border along the length of the dorsal fin differentiates them sharply.

As far as the female is concerned, Fryer has reported that a polymorphism identical with that of the *L. fuelleborni* exists in Nature. According
expense can be reduced. Carefully washed and even boiled to remove any unstable dye, it can be made into various sized mops, which may be weighted and sunk into the tank, attached to corks which float on the water surface, or suspended from wires across the tank. They may easily be sterilised by boiling after each time they are used and will last indefinitely. Nylons pot scourers, which have been discarded as being past their prime, may be teased out, boiled to remove all traces of detergent and grease and then used similarly in breeding tanks for egglayers or to provide cover for livebearer fry.

Personal COMMENT
by ARPEE

WHEN I wrote recently about the Madagascar lace plant and the unlikelihood of my doing any better with it than most other fanciers, I noted, in a quite different context, that I had introduced a red-tailed black shark into the same tank. There was every sort of reason why both of these moves, against the book in almost all conceivable ways, were likely to bring about disaster or some form of minor dissatisfaction. In the first place the tank has been prone to recurrent algae build-up; most of the plants are cryptocorynes and similar large-leaved species, from which I have consistently to strip away heavy and slimy layers of algal growth. The rocks and cork bark were also encrusted and required special exercises to restore them to a presentable state. Since the Madagascar lace plant is particularly susceptible to algae, which gleefully reproduce themselves in the innumerable crannies afforded by its structure, I knew that I was taking a risk and even considered introducing red Planorbius snails as some form of countermeasure. In the event I decided against this, reasoning that the cure might be less bearable than the disease.

As regards the red-tailed black shark, here was I introducing a 3 inch specimen into a tank populated by small tetras including half a dozen junior neonics. This, again, was a calculated risk. I have witnessed some terrible feuds involving sharks and had considerable trepidation as to what might happen. The comments about sharks on page 334 of PPM for December, 1970 made especially depressing reading. In fairness, however, I have kept sharks with angels and smaller cichlids for some time now and have found them perfectly circumspect in their relations with other species. It is within the family that I have found them notably quarrelsome.

So far, against all the prognostications, it has been a success story. The shark took up position behind a piece of cork bark and proclaimed it as his territory and none of the tetras saw fit to dispute this. Having established his position he proceeded to inspect every single plant and rock in the tank and within a few days there was ample evidence that the algae growth was being nibbled away. Within about a month the rockwork had been cleansed to its foundations and there was scarcely a piece of algae visible on any of the plants. The shark's routine runs over the Madagascar lace plant also prevented any build-up here and we were rewarded by the emergence of numerous new leaves from beneath the gravel—beautiful pink shoots which quite rapidly spread themselves into the broadness of mature leaves, greening in the process.

As regards relationships, there seem never to have been any disputes. There are no ragged fins about and numbers have been maintained. When the shark swims around in his curious rolling fashion he is met with respect and deference rather than animosity, even by the bleeding-heart tetras and featherfinns, which are a near match in terms of size. The reputation of the shark as an algae-eater is thus greatly enhanced so far as I am concerned. I have looked long and hard at this problem for some time and at one period pinned my faith on the Otoinclus, since the Gymnorchistus aymonieri (or Chinese algae-eater) could, because of its size and temperament, become something of an embarrassment. Mollies and platys and their relatives were also possible solutions but I never really fancy them, on account of their heavy build, as partners in a tetra collection. The Otoinclus could never be dispensed with on account of their utter charm as fish, but as algae-removers they are individually not very heavy workers.

It remains to be seen whether success will continue. I may yet decide to add a few Otoinclus in the hope that many mouths will make light work. If experience is anything to go by, the worst possible thing would be to introduce another red-tailed black shark. I have, however, done sillerier things than this.

To round off the summer holiday we took the children to the Cotswold Wild Life Park at Burford, which is a delightful little place on the
A40 in the heart of some of the finest country in England. I hate 'touristy' places and avoid them like the plague, and was only tempted to visit this place because the claims of the children and the existence there of an aquarium somehow tipped the balance. The Park is reached by turning into the A362 at the main roundabout at Burford, from which point it is only a couple of miles from the main road. I was greatly impressed with the spaciousness of the whole area, with its stone country house forming the centre of an extremely thoughtfully planned concept. There is a limited range of mammals, birds, reptiles and fish, but they are in such well chosen and tasteful surroundings that everything achieves maximum impact. There are ample feeding and picnic facilities as well as an assault-course-type of pleasure and adventure playground for the children. There are plants and shrubs abounding, most of them mercifully labelled, and you can buy many of them at the small garden centre which is integrated into the Park.

The aquarium will be of particular interest to marinists, since in two enormous tanks there are species from batfish to damsels, all in abundantly good health. The décor of the tanks was interesting if not completely conventional and I should be interested to hear comments from any readers who have visited this installation, particularly experienced marinists. The freshwater section was less well done and suffered because of a low-tone reddish lighting which was mindful of a fairy grotto rather than a public aquarium. It was clear from the plant life that better use could be made of the available resources, and I understand that the problem is one with which the management is currently considering against its other financial commitments.

Throughout I was most impressed with the obvious devotion and competence of those whose business it is to run this place. They clearly have a feel for living things and the right concern for their well-being. At the same time they are courteous and helpful to the visitor, who, in such surroundings can so often be the most fearful headache. I shall go again, with my camera, if only to photograph those otters. I hope you will be able to go along, too.

The large department stores always seem to have sales on, for one pretext or another. One of the items which commonly gets pushed to the forefront, though all too often ignored, is the common plastic bucket in the 2 to 3 gallon size. Their sale price is sometimes staggeringly low and when this is so I often take one or two home with me. Quite apart from the (exclusive) use in topping up tanks, either marine or freshwater (a separate one for each if you are using salt water), I find that they are eminently suitable as planting containers in ponds. True, you have to introduce a number of holes into them—this can be effected with a soldering iron or a hot poker—but their principal asset is the carrying handle with which they are all equipped. One of the things I most dislike in pondkeeping is groping about in mud and slime for a long-lost conventional planting crate, which is usually covered with algae, anchored to the bottom with gigantic roots that have penetrated its walls, and is as slippery as a wet eel to land.

I have therefore for some time used buckets with handles, into which it is quite simple to grappling a metal hook joined to a length of cord. Gentle but firm pulling on the rope enables the bucket to be eased away from the pond floor, whereverupon you can either inspect and return the plant in question or divide it. Do, however, choose buckets with decent handles which are properly integrated into their sockets, otherwise you will have a neat collection of handles, and it will be back to groping around again for the bit that matters, for which readers are unlikely to thank me or to remember me kindly.

---

**Meetings and Changes of Officers**

**BORDER A.S. New Society, Secretary.** Mr and Mrs R. Jones (27 Wanborough Road, Carlisle, Cumbria). Meetings are on the fourth Wednesday in each month. All interested fishkeepers welcome.

**BRIGHAM & SOUTHERN A.S. New Secretary.** Mr M. Whittington (21 Southford Road, Gravesend, Kent).

**BRITISH KILLIFISH ASSOCIATION.** New Secretary: Mr K. Jenkins (21 Whinfield Road, Whitchurch, West Lothian, Scotland).

**BRITISH ROYAL AQUARIUM SOCIETY.** Chairman, Mr C. D. Forster; vice-chairman, Mr D. C. Price; secretary, Mr G. R. Sewell; treasurer, Mr H. M. Allen (27 The Avenue, Peterborough); vice-­president, Mr J. J. Taylor (14 The Avenue, Peterborough); secretary, Mrs K. J. Taylor (14 The Avenue, Peterborough).

**DERBY A.S.** New Secretary, Mr R. Harlow (16 Mansfield Road, Derby).

**ELLIS A.S.** Chairman, Mr W. Andrews; secretary, Mr E. G. Woods (8 Friendswood Road, Watford, Hertfordshire); show secretary, Mr J. H. Smith (104 Luton Road, Chesham); assistant secretary, Mr J. H. Smith (104 Luton Road, Chesham); treasurer, Mr G. Smith; meetings: Every other Tuesday, the Angling Club Rooms, Station Road, Strood, Kent.

**HARROGATE & D. A. S. **Chairman, Mr J. D. Tyler; vice-chairman, Mr D. Porter; secretary, Mrs F. Smith; treasurer, Mr J. A. Smith (9 Rupert Avenue, Harrogate); meetings: Every second Tuesday at Conservative Rooms, 42 Park View, Harrogate, X 9 p.m.

**TORRINGTON A.S.** Change of venue. Meetings are now held alternately Wednesdays, 8 p.m., the Clive Club, Werne Hill Road, Bugsworth, Devon, Secretary, Mrs J. J. Smith (13 Newland Road, Newton Abbot).
THE INTERTIDAL AQUARIUM—5

‘Spiny Skins’ for Marine Tanks

The ‘spiny-skinned’ animals of the shore are the echinoderms, members of a phylum containing the starfishes, sea urchins, sea cucumbers etc. All have either spines or spicules of calcium carbonate held within the skins. In sea urchins, for example, a complete skeleton of limey plates is present; in starfishes a limey framework supports a very leathery skin, and in sea cucumbers the spicules are scattered over a soft body. The most characteristic feature of this phylum is the large number of tube-feet by which the members move and anchor themselves to hard surfaces. Movement is by a ‘hydraulic system’.

Starfishes generally have five arms, although our sunstar may have up to thirteen. Arms may be lost for various reasons, but if in good health an individual has the power to regenerate such a lost appendage. Discarded arms must be removed from aquaria because they will foul the water very quickly.

Starfishes, brittlestars and sea urchins are the echinoderms most

By H. J. VOSPER & G. J. VOSPER

Photographs by H. J. VOSPER

Above: Common starfish (Asterias rubens L.) climbing the tank glass. The numerous tube feet are easily seen under these conditions, each forming a sucker by which the animal can move easily in all directions

Left: Common or edible sea urchin (Echinoi esculentus L.) showing the spines and tube feet (one of the latter is arrowed). The spines move on a ball and socket joint and can project in any direction: the tube feet can hold the urchin to any solid, but it usually travels with ventral surface towards whatever it is walking on so that foods encountered come within easy reach of the mouth.
likely to be found along the lower shore. Brittlestars should not be collected. The most useful animals are those described below. Starfishes other than the following are probably best left alone.

**Starfishes**

Of the many echinoderms, the common starfish is the one most frequently found but several relations are also available and provided they are fairly active while in the carrying jars and have no visible damage they may prove good tank inhabitants. Should there be any doubt about their health when they are first collected they ought to be left alone because they die speedily and as quickly foul the water.

**Common starfish Asterias rubens** L. Often abundant in and near mussel beds, this is a highly variable species and the colours may range from a very pale red, to orange, to brownish or (more rarely) violet and mauve. Arms are rather rounded in cross-section but not entirely so and may be well flattened dorso-ventrally, fairly well tapered towards the tips, quite rough skinned and with a line of short spines down the middle. A light-coloured disc of skin, off-centre on the body, known as a madreporite, must not be damaged in specimens taken for aquaria (this is the entrance into the 'hydraulic system' mentioned above). Feeds largely on bivalves, perhaps mainly mussels (over which they bunch themselves while exerting a continuous pull until the valves part), but they will also take the flesh of fishes and even table meats when they are well established in a tank. They might also attack their own kind.

**Starlet Asterina gibbosa** (Pennant). Also known as the little cushion star, this seldom grows larger than about 25 mm (maximum 100 mm) and is a stiff, rather yellowish or yellow-brown cushion star with broad arms. It has infrequent varieties of greenish, red and cream. It is found on the lower shore, beneath boulders and overhangs, where it is generally can penetrate human skin but can be removed fairly easily. Most species will attack each other if especially hungry: burrowing irregular sea urchins (heart urchins etc.) eat organic matter contained in the sand.

**Edible sea urchin Echinus esculentus** L. Growing to a maximum of about 50 mm, but generally found on the shore at half that size, the often very bright colour of the edible sea urchin is very distinctive. It feeds on worms, molluscan flesh and, indeed, almost anything it can masticate with its powerful teeth, which are situated centrally on the ventral surface. Damaged specimens, whether of shell or teeth, should not be collected.

**Purple-tipped sea urchin Echinus migatus** (Gmelin). Also known as the common sea urchin, this is probably our most common British species, being often abundant in small groups and practically living colonially from time to time. It grows to a diameter of around 50 mm and has brightly purple tips to the spines, though basically the urchin is green in colour. It inhabits the lower shore, under boulders particularly, where it lives a secretive life, often clinging to pieces of seaweed and small shells etc. by means of its tube feet, thereby gaining excellent camouflage effects.

The sea urchins will take mussel flesh quite readily but will also act as scavengers.
First food was Infusoria made from lettuce. Two weeks later this was supplemented with shrimp nauplii. Now it's on with the cardinals. I wish the Giltings the best of luck!

***

Congratulations to that great lady of the New World aquatic scene Helen Simkaitis. A name that needs no introduction to British readers, so world-wide is her fame. Against some tough opposition in a list of nominees that reads like the aquatic world’s ‘Who’s Who’, she was awarded the 1970 Anchor Award presented by the San Francisco Aquarium Society.

She now joins such distinguished previous recipients of the honour as W. T. Innes, Albert J. Klee, Benez Wittmer and August M. Roth.

The 43-strong Anchor Awards Committee is international, two of the Europeans representing Britain coming from the staff of my favourite magazine: the Editor of PPM, Anthony Evans, and—guess who?

Do some fish species change when taken from the wild and given the security of our domestic set-up? Yes, say the U.S. Interior Department’s Bureau of Fisheries and Wildlife. One criticism of some hatchery-reared fish is that they are actually domesticated, with less than a normal ability to survive if returned to the wild. Current work by the Department is aimed at techniques for breeding ‘wilders’ back into hatchery stock. If successful, it might answer the letters I receive from breeders asking where they can obtain some ‘wild’ stock!

If you are interested in that unassuming fish going by the name of banded leporinus (Leporinus fasciatus), read what Dick Griffiths from Toronto has to say. He claims that his observations of this fish have shown it to prefer an omnivorous diet, and that unless plenty of algal-covered rocks are provided for it to browse upon this fish will never attain the maximum growth of 12 in.

When a partial change of water is effected his Leporinus tries to mate with another similar species in the aquarium. A position is taken up about a in. from, and parallel to, the other fish. Both then form S loops as they turn and twist, moving forwards and backwards through the water.

Though eggs have been produced from such matings, the eggs have invariably been eaten, but Dick lives in hopes.

***

An innovation over the past few years has been teach-yourself discs. Diction, languages, cooking, the list of topics appears endless. One enterprising manufacturer even sold a disc on how to teach your budge to talk.

Now, Pet Products Inc. have introduced a series of 45 r.p.m. records called Pet Care’, whose titles include both coldwater and tropical fishkeeping. Designed to appeal particularly to the 6 to 14 age groups, they purport to impart in a pleasing manner all the basics a young pet owner should know. Price (in Canada and the U.S.) around 10s (50 p) per record.

***

The patient visiting the New York psychiatrist was complaining that his relatives were unjustly trying to have him committed to an asylum. 'Why do they think you insane?' asked the doctor.

'Because I like tropical fish,' said the patient. ‘But that is ridiculous’ replied the psychiatrist. ‘Why, even I like tropical fish!’

' Do you?' said the patient, his face lighting up. 'Boiled or fried?'
Madagascar Rainbow Fish

Bedotia geayi Pellegrin

In the photograph above the male is the lower fish

By RUDOLPH ZUKAL

In 1953 the aquarium hobby was greatly enriched, for in that year this wonderful fish, which is a representative of the family Atherinidae, was brought to Europe from Madagascar. Their breeding was successfully achieved for the first time in Czechoslovakia in 1959 by a dental mechanic from Eger, Herr Watzke. It was when the offspring of these fish were distributed that we in Brno received our first colony. I was at once immensely interested in them because they so much resembled, both in build and indeed also in character, the Australian rainbow (Melanotaenia maccullochi). They reach a size of 4½ in. The upper part of the body is brownish yellow and olive-coloured, the male’s colouring being the darker. A heavy black horizontal stripe runs from the jaws to the tail fin. On the underpart of the body behind the gills the second, grey-blue, stripe begins and extends towards the rear of the body. The belly region is whitish. The eye is large, the iris gold-coloured with a red ring.

Sex differences are not always easily recognisable in adult fish. Usually the male’s caudal (tail) fin is bordered with dark red, edged with black, but some males do not have the red border and their caudals have different colour variations. The female is somewhat smaller, fuller in the belly and usually her tail fin is colourless.

We keep our fish at a temperature of 72°F (22°C). The water for these fish should not be acid, but neutral or even slightly
This picture shows the 'butting' of the female (upper fish) by the male when she appeared unresponsive to his display of swimming and colours in front of her.

alkaline. *Bedotia geayi* are ideal fish for a community tank, since they are peace-loving. They avoid bright light and are at their best in a tank of at least 20 gallons capacity and one that is shaded from the light. They are very susceptible to disease, especially to parasites of *Oodinium*, and they often show fin rot although this can be prevented by frequent partial water changes and a slight salination of the replacement water. They are also extremely sensitive to being moved. Very often transported specimens, particularly older ones, die suddenly of shock. Therefore I can really only recommend this beautiful fish to experienced aquarists. It is not, in my opinion, a suitable fish for a beginner.

For breeding, a medium or large tank should be used. Ordinary tap water can be used, slightly salted and well aerated so that it is rich in oxygen. At a temperature of about 76°F (24°C) the fish will spawn in a similar fashion to Australian rainbows. The spawning takes several days and the eggs hang on little cords like Christmas balls. The brood hatch after about 8 days. At first, when the fry leave the egg sac, they swim obliquely through the water but 24 hours later they are already swimming normally. Food will not be picked up from the bottom by these fish. The parents can be left in the tank throughout the hatching period for they will not eat the eggs or attack the young, but when the young fish themselves begin to grow they must be sorted out according to size or they will attack each other.

Spawning of *Bedotia geayi* can take place just beneath the water surface above the water plants. Only a few eggs are released at each mating of the pair and the procedure is repeated with intervals over a period of several days.
**Water Plant Propagation**

**Cryptocoryne blushii de Wit**

**By J. ELIAS**

This species is amongst the most beautiful of the cryptocorynes and makes a pleasing addition to any tropical aquarium. It is found in nature in Thailand, where it grows mostly in the upper reaches of streams whose courses, though changing continually over the years, never actually dry up. The water level in these rivers fluctuates from 6 in. to 4 ft. but emergent plant growth is never seen. It is this factor that enables the plant to become quickly acclimatised to aquarium existence.

In the deep aquarium, plants can be seen growing to a height of 24 inches. The leaf stem is normally a little longer than the leaf itself, which resembles a spear in length and width. The leaf usually measures between 4 and 6 in. in length and is from 1/ in. to 2 in. wide. The top of the leaf is a greenish-reddish brown colour with a surface sheen; the under-side is wine-red. The flower stem is tipped with transversely rippled golden leaves. At a first glance C. blushii looks very like C. griffithii Schott.

**Soft Water Preferred**

These plants do particularly well in soft water but water up to a hardness of DH 12-14° is suitable. Almost all Cryptocorynes love warmth, the best temperature range being from 72° to 79°F. Plants grown in the greatest depth of water are very robust and their colouring differs somewhat.

From our own experience and successful results we have found that the plant does not need a rich bottom soil to grow luxuriantly. But we do place a tablet of nutrient salts amongst the roots underneath the compost. Normal aquarium lighting is quite adequate but the plants should receive some side illumination to encourage side growth and prevent the leaves growing up to the water surface and above.

Start with only strongly growing specimens. The plant spreads by sending out runners forming up to five new plants. In deeper, larger aquaria it is better to prune and replant only very rarely. It will survive perfectly well in a dense clump without the typical leaf disintegration of these conditions taking place. If the temperature should fall transiently the plant will usually suffer no harm; it will, however, react to being replanted in a new environment and for a time its growth will be stunted, though this should not last very long. If stunting persists then the tank conditions must be regarded as unsuitable for its growth.
Readers' Queries Answered

Size in Mollies

I am having no success at all in growing on my saltine molly bread. The female parent is a magnificent fish but the youngsters she has produced so far are very indifferent in quality.

Although you give no details it sounds very much as though your female is imported stock and you have a difficult task ahead to try to rival the size of these. They are grown on under ideal conditions in vast farms in Florida where the fish have unlimited swimming space available and plenty of vegetable matter to eat. To give your fish the best chance, pick out half-a-dozen likely looking youngsters (the biggest available at 2 weeks old), place them in the largest tank you have available (preferably a 3 ft. tank) with a little sea salt in the water, fed frequently with dried food, daphnia, and white worm occasionally and plenty of shredded vegetable matter and replace a third of the water at least once every 3 weeks.

These Don't Mix

I have a 24 in. by 12 in. by 12 in. coldwater tank containing six 2 in. fish (fantails and black moors) and three medium-sizes red-eared turtles. There is a raised platform for the turtles to have their 8-hour daily sunbath under a Grobus lamp. Recently the biggest turtle has become aggressive towards the fish and has torn at the fins of the moors, dragging one down to the bottom. I feed the turtles daily on finely chopped raw meat and dried turtle food and, as the other turtles take no notice of the fish, this would not seem to be the root of the trouble. Could this just be a passing phase?

We are sorry to say that this is much more than a 'passing phase' and urge you either to remove your terrapins from this tank or house the fish in another one. The natural food of large terrapins is fish, and it is only a matter of time before the rest of the fish will be attacked. Moors and fantails, with their prominent finnage and stately movements, will be particularly liable to damage. Our general advice is never to keep fish and amphibians or aquatic reptiles in the same tank.

Pond Mud

Thank you for your answer to my letter concerning green water in my 2-year-old pool, which has indeed now cleared itself. I find, however, on close inspection that there is a certain amount of mud on the base of the pool which gets disturbed and clouds up the pool again for a while. Is it best to clear the pool out this autumn and should I obtain a pool filter?

The first thing to do is to find out how the mud is getting into your pond and to try to remedy it. If it is washing in from the surroundings it would be advisable to make rockwork a feature of the surrounds to prevent earth reaching the pool. Once steps have been taken to prevent more mud accumulating, it would be better to leave what mud is already there and allow the plants to bind it up with their roots. Pond filters can be a great aid in a small pond, but it should not be necessary to use a pond filter in a large pond and in any case it would be asking too much of equipment of this type to remove heavy deposits of loam.

Blue Limia

I would like some help over my female blue limia. Quite a lot of young are born from it but it never seems to be anything but gravid. I have only the pair in a community tank—would it be better to have several females to the one male?

It is always a good idea to have several female livebearers to one male, but your female limia is undoubtedly not gravid all the time, only looking as though she were. Blue limias are also known in some parts of the world as black-bellied limias (the translation of melangaster) and the female sports a very large 'gravid' spot, which does not disappear even after the young are shed and may spread to cover half the belly.

‘Conditioning’

I don't understand what is meant by 'conditioning' fish for breeding. I feed my fish well all the time, I believe, so what else is necessary?

Doubtless the fishes in your community tank are well fed, and many of them may even be spawning, though it is unlikely that fry from egglayers will be reared there. Fish that are specially 'conditioned' to breed are those on which the fishkeeper is prepared to lavish extra care in order that they can be brought into breeding condition at a certain time in a special tank to fit a specific breeding schedule. If the aim is to breed a certain pair of fish, it is known that this can often be more easily achieved by separating the sexes for 2 or 3 weeks before the spawning is planned and feeding each fish or group on a good mixed diet, one particularly high in protein and a stimulant to activity such as that provided by live and fresh foods. For this purpose, earthworms, chopped or whole according to the size of the fish being fed, are particularly suitable together with bloodworms, mosquito larvae, glass worms, Daphnia—and tubificif if this is customarily used for feeding. A slight increase in temperature will help the breeding preparations by increasing their metabolic processes. After 2 or 3 weeks of this treatment the fishes will be in peak condition; provided that they are mature their sex cells will now be 'ripe' and when they are brought together for the spawning their increased vigour should help to ensure success. With some coldwater fishes increased lighting is known to play its part in conditioning for breeding but with ‘tropica’s’ this factor seems to be less important.
International Show in GERMANY

AT this year’s 3 days’ show of the DKG, the first International Show held by the German Killifish Association, 10 classes received 216 pairs of killies. Entries came from all over the world and judging, by I. Christensen (Denmark) and Dr W. Foersch (West Germany), took over 6 hours. Unfortunately entries from East Germany were delayed in transit; 33 entries were received from Denmark and 28 entries from the U.S.A. A lot of new species were on show.

Representing the U.K. in person were Mr Tom Glass and his wife and Mr Len Emsden, members of the British Killifish Association, who were met by Mr G. Cattanach of the DKG, at whose house they saw about 100 tanks of egglaying toothcarps, many of them rare species.

On the second day of the Show there was a large attendance of members at the DKG meeting and show winners from the U.K., U.S.A., Denmark and Germany received their prizes. The kilie judged best in the show was Austrodichthys dichroepus (Herr D. Luhring of Worms). Speaker at the Meeting were Herr D. Luhring, Mr I. Christensen, Dr W. Erb, Dr W. Foersch, Dr Fredich, Herr Herzog and Herr M. Röm, the three last named describing fishes and fish locations in the Cameroon. A social get-together of members at a party took place in the evening after the meeting. At a general auction at the end of the show all the fish were sold in an hour and this raised approximately 1200 DM (about £105). Plans for next year’s show in Germany are already being made and greater numbers of entries will be sought. Aquarists in the U.K. will be specially welcomed to enter.

(Reported by T. Glass.)

THE hard work that the members of MERSEYSIDE A.S. put into their exhibition at the annual Liverpool Show was really rewarded this year when the Society were awarded the Gold Medal for the presentation of their exhibit. Mr N. Petersen received the award for the best fish in the show with his yellow fin barb, as well as the M.A.S. trophy for best bred and M.A.S. Breeders’ trophy. Other special awards were: Liverpool Cup for individual furnished aquarium, Mr & Mrs Seymour; Coronation Cup for best livebearers, Mr J. Faulkner; M.A.S. trophy for best catfish and loaches, Mr J. Cobb; M.A.S. Junior Shield, and M.A.S. trophy for best cichlid, Master D. Moorcroft; M.A.S. trophy for best top minnow, Mr F. Eyres; Mersey Cup for best a.o.n.; Mr D. Moorcroft; M.A.S. trophy for best rasebora and danios, Mr D. Thomas; M.A.S. trophy for best labyrinth, Mr W. Smith; M.A.S. trophy for best characin, Mr R. Parkes. Detailed results were:

Individual Furnished Aquarium: 1, Mr & Mrs Seymour (73 points); 2, Mr A. Tewoldie (74); 3, Mrs K. Petersen (73). Livebearers:

Guppies: 1, Mr A. Lomas (74); 2, Mr J. Faulkner (73); 3, Mr R. Wilson (73). Platties: 1 and 2, Mr & Mrs J. Cornell (70, 70); 3, Mr N. Petersen (70). Moors: 1, Mr J. Faulkner (73); 2, Mr W. Smith (73). Swordtails: 1 and 2, Mr N. Petersen (73, 73); 3, Mr F. Eyres (70). Catfish and Loaches: 1, Mr J. Cobb (75); 2, Mr D. Thomas (73); 3, Mr W. Smith (70). Juveniles: 1, Master D. Moorcroft. Mini Furnished Jars: 1, 2, and 3, Mrs V. Faulkner (72, 72, 72). Breeding Livebearers: 1 and 2, Mr N. Petersen (70, 70); 3, Mrs J. Cornell (70). Breeding Egglaying: 1, Mr N. Petersen (70); 2, Mr D. Thomas (70); 3, Mr R. Wilson (70). Toothcarps: 1, Mr F. Eyres (70); 2, Mr K. Parkes (70); 3, Mr W. Smith (70), A.o.n.: 1, Mr D. Moorcroft (75); 2, Mr R. Parkes (75); 3, Mr M. Petersen (75). Rasbas and Danios: 1, Mr D. Thomas (72); 2, Mr N. Petersen (70); 3, Mr K. Parkes (75). Large Herbs: 1 and 2, Mr N. Petersen (70, 70); 3, Mr K. Parkes (70). Small Herbs: 1, Mr N. Petersen (70); 2, Mr B. Carter (72); 3, Mr R. Wilson (70). A.o.n.: 1, Mr D. Moorcroft (75); 2, Mr R. Parkes (75); 3, Mr M. Petersen (75). Rasbas and Danios: 1, Mr D. Thomas (72); 2, Mr N. Petersen (70); 3, Mr K. Parkes (75). Large Herbs: 1 and 2, Mr N. Petersen (70, 70); 3, Mr K. Parkes (70). Small Herbs: 1, Mr N. Petersen (70); 2, Mr B. Carter (72); 3, Mr R. Wilson (70).

Mersey members were particularly grateful to F.N.A.S. judge Mr Cliff Walker, who was unfortunate enough to have a bad fall immediately before the show. Unable to drive to Liverpool, Mr Walker asked a friend to drive him, and although he was in considerable pain from a very badly cut and swollen leg, he insisted on carrying out his judging of both fish and furnished aquarium, a 2-hour task at best. At hospital it was later proved that he had cracked a knee-cap and was suffering from water on the knee, cuts and abrasions. "Thank you, Mr Walker", say Merseyside A.S.—"We shalln’t forget it!"
THE best exhibit in show at SWILLINGTON A.S., sixth annual open show was a breeders team of barbquins entered by Mr B. Kuhn, who received the A.Y.A.S., Diploma, and the best fish in the show was a Pseudodosia exhibited by Mr P. Shipley. The Durliffa trophy for the society team gaining most points went to Castleford (46 points); second, York (16); third, Swillington (13). Other special awards were as follows: Swillington A.S. trophy for fish; Mr M. R. Brown; Swillington A.S. trophy for best barb, Mr B. Kuhn; Swillington trophy for best characin, Mr D. J. Thomas; Swillington trophy for best livebearer, Mr I. Stephenson; Coral Reef trophy for best breeders exhibit, and C. D. trophy for best cichlid, Mr H. Kuhn; Jessie Reynolds' trophy for best pair of fish, and Ladies trophy for highest-pointed lady exhibitor, Mrs H. Kuhn; furnished aquarium trophy, Mr P. Reynolds; Coral Reef Cup for best coldwater fish, Mr G. Thickmire; Robin Hood trophy for best a.a.v. tropical, Mr Sullivan; Longfellow trophy for best catfish or loach, Mr P. Shipley. Full results were:

Furnished jars: 1, Mr B. Kuhn, 5, Mr B. Aldred; 2, Mr B. Aldred, 4, Mr B. Aldred, 6, Mr B. Aldred; 3, Mr B. Aldred. 7, Mr B. Aldred. Planted tanks: 1, Mr B. Kuhn, 2, Mr B. Aldred; 3, Mr B. Aldred, 4, Mr B. Aldred, 5, Mr B. Aldred; 6, Mr B. Aldred, 7, Mr B. Aldred. Non-planted tanks: 1, Mr B. Kuhn, 2, Mr B. Aldred; 3, Mr B. Aldred, 4, Mr B. Aldred, 5, Mr B. Aldred; 6, Mr B. Aldred, 7, Mr B. Aldred. Cichlids: 1, Mr H. Kuhn, 2, Mr H. Kuhn; 3, Mr H. Kuhn, 4, Mr H. Kuhn; 5, Mr H. Kuhn, 6, Mr H. Kuhn; 7, Mr H. Kuhn. Barbs: 1, Mr B. Aldred, 2, Mr B. Aldred; 3, Mr B. Aldred, 4, Mr B. Aldred; 5, Mr B. Aldred, 6, Mr B. Aldred; 7, Mr B. Aldred. Catfish & loaches: 1, Mr B. Aldred, 2, Mr B. Aldred; 3, Mr B. Aldred, 4, Mr B. Aldred; 5, Mr B. Aldred, 6, Mr B. Aldred; 7, Mr B. Aldred. Woods & Barbs: 1, Mr B. Aldred, 2, Mr B. Aldred; 3, Mr B. Aldred, 4, Mr B. Aldred; 5, Mr B. Aldred, 6, Mr B. Aldred; 7, Mr B. Aldred. Freshwater: 1, Mr B. Aldred, 2, Mr B. Aldred; 3, Mr B. Aldred, 4, Mr B. Aldred; 5, Mr B. Aldred, 6, Mr B. Aldred; 7, Mr B. Aldred. Fishers: 1, Mr B. Aldred, 2, Mr B. Aldred; 3, Mr B. Aldred, 4, Mr B. Aldred; 5, Mr B. Aldred, 6, Mr B. Aldred; 7, Mr B. Aldred. Fusion: 1, Mr B. Aldred, 2, Mr B. Aldred; 3, Mr B. Aldred, 4, Mr B. Aldred; 5, Mr B. Aldred, 6, Mr B. Aldred; 7, Mr B. Aldred. Woods: 1, Mr B. Aldred, 2, Mr B. Aldred; 3, Mr B. Aldred, 4, Mr B. Aldred; 5, Mr B. Aldred, 6, Mr B. Aldred; 7, Mr B. Aldred. Other trophies: 1, Mr B. Aldred, 2, Mr B. Aldred; 3, Mr B. Aldred, 4, Mr B. Aldred; 5, Mr B. Aldred, 6, Mr B. Aldred; 7, Mr B. Aldred.

The fine efforts of judges Mr C. A. T. Brown, Mr H. Towell, Mr B. Baker, Mr F. C. Tomkins, Mr J. Stowell and Mr W. L. Wilson, at the HIGH WYCOMBE A.S. open show were much appreciated, as this enabled the show to be opened to the public on time. The best fish in show went to the C. E. T. Whitehead/H. K. Whitehead combination entered by Mr S. Cowell, who received the Chalford trophy and a gold pin. Other trophy winners were: Anne Seed Rose Bowl, Mr R. C. Speake; 8/7 Committee Trophy, Mr and Mrs Fagan; '68 trophy, Mr E. L. Little; '69 Bovingdon trophy, Mr C. Beavis; '71 trophy, Mr J. Bates; F.B.A.S. plaque, Mr P. Shepperd (Betta splendens); Turner trophy, Mr C. Pike. Details of results are:

The three members of the Castelford A.S. team with the Durliffa trophy won for the second year running at Swillington A.S. show.

Three members of the Castelford A.S. team with the Durliffa trophy won for the second year running at Swillington A.S. show.

Guppies: 1, Mr and Mrs Brown; 2, Mr and Mrs Kuhn; 3, Mr and Mrs Kuhn; 4, Mr and Mrs Kuhn; 5, Mr and Mrs Kuhn; 6, Mr and Mrs Kuhn; 7, Mr and Mrs Kuhn. Pigeons: 1, Mr and Mrs Brown; 2, Mr and Mrs Kuhn; 3, Mr and Mrs Kuhn; 4, Mr and Mrs Kuhn; 5, Mr and Mrs Kuhn; 6, Mr and Mrs Kuhn; 7, Mr and Mrs Kuhn. Tropics: 1, Mr and Mrs Kuhn; 2, Mr and Mrs Kuhn; 3, Mr and Mrs Kuhn; 4, Mr and Mrs Kuhn; 5, Mr and Mrs Kuhn; 6, Mr and Mrs Kuhn; 7, Mr and Mrs Kuhn. Barbs: 1, Mr and Mrs Brown; 2, Mr and Mrs Brown; 3, Mr and Mrs Brown; 4, Mr and Mrs Brown; 5, Mr and Mrs Brown; 6, Mr and Mrs Brown; 7, Mr and Mrs Brown. Catfish: 1, Mr and Mrs Brown; 2, Mr and Mrs Brown; 3, Mr and Mrs Brown; 4, Mr and Mrs Brown; 5, Mr and Mrs Brown; 6, Mr and Mrs Brown; 7, Mr and Mrs Brown.
FROM all points north, east and south competitors and spectators poured into Aireborough to take part in the highly successful BLACKPOOL & FYLDE twenty-first Open Show. The announcement of the prizes was awarded to Mr J. S. Hall (Aireborough, 69) for Best Fish in Show and Mrs Cohen of Castleford (84 points), and the Jesse Fletcher Memorial trophy was awarded to the best fish in the show for Mr and Mrs Cohen of Aireborough. The competition was open to contestants in the north, east and south of England, and the judging was conducted by an impartial judging panel.

Mr J. S. Hall's rockfish was judged to be the best fish in the show, and Mrs Cohen of Aireborough's goldfish was judged to be the best fish in the show. The Jesse Fletcher Memorial trophy was awarded to the best fish in the show for Mr and Mrs Cohen of Aireborough. The competition was open to contestants in the north, east and south of England, and the judging was conducted by an impartial judging panel.

---

"ELEMENTAL Genetics" was the title of the talk given by Mr Alan Rudd to members of BRADFORD & D.A.S. 63, a biology master at Bradford school. He was well equipped to translate this complex subject into everyday language, illustrating his lecture with speed-up films showing the division of living cells. His recent guest speaker was Mr G. Fairclough, who spoke about "Anabandits" in general and sparkling gourami in particular, which had managed to breed, though unfortunately losing the fry because of lack of heat. For them, He had also been lucky with his uncommon chocolate gourami, which died from gill damage, due, he thought, to their being kept in water of a totally different pH to that in their homes.

Mr Alec Farrah led a discussion on methods of heating aquaria and fish houses. He had recently returned from his Continental holiday where he had been surprised to find that an all-glass tank in Germany cost far more than a fishbowl of the same size in the U.K. The evening ended with a discussion on the causes of a pond getting green.
FEDERATION  
NEWS  

**Championship Class Winners Eligible for This Month’s 1971 Supreme Championship Contest**

**Results Received**

**Class B Barbs**
- Corby & D. A. S. winner Mrs D. Cruickshank
- Independent A.S. winner Mr G. Greenhalgh
- Harlow A.S. winner Mr D. M. Dare
- Freelance A.S. winner Mr M. Strange

**Class C Characins**
- Harlow A.S. winner Mr M. Strange

**Class D Angras**
- Basingstoke & D. A. S. winner Mrs J. Pumphreys

**Class E Dwarf Cichlids**
- Oxfordshire A.S. winner Mrs H. Buxton

**Class F Betta Splendens**
- Harlow A.S. winner Mr D. M. Dare

**Class G Egg-laying Toothcarps**
- Harlow A.S. winner Mr D. M. Dare

**Class H Corydoras**
- Basingstoke & D. A. S. winner Mrs J. Pumphreys

**Class I Rasberras**
- Harlow A.S. winner Mr M. Strange

**Class J Danio**
- Worcestershire A.S. winner Mr H. A. Kinsey

**Class K M. A. S. Egg-layers**
- Walthamstow & D. A. S. winner Mrs S. Hedges

**Class L Pairs of Fish**
- Hendon A.S. winner Mr P. Grove

**Class M Playsets**
- Southend A.S. winner Miss W. Ryder

**Class N Single-tailed Goldfish**

**Portsmouth A.S. winner Miss W. Ryder**

**Class O T. O. Breeder Livebearers**

**Yeovil & D. A. S. winner Mr A. Blake**

**Fortcoming Championship Shows**

- **Ealing & D. A. S.** 1st October
- **Kingswood S.P.A.S.** 16th October

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 Society’s Old Hall, London, S.W.1, on 29th-31st October).

---

**SCHOOLS**
- entered by Mr T. Cruickshank of Ealing, but the standard in general was high that the judges [seven M.A.A. judges and one F.N.A.S. judge] awarded eight gold stars for competitors with 80 points or over.

- Mr Ralph Tedds, Bedworth secretary, took the prize for most entries. Rubery Select was the society with most entries and North Stafford members took the most awards. In the biggest class, for a.v. catfish, Mr D. Gregory had the best of 356 entries.

**THE BRITISH MARINE AQUARIST’S ASSOCIATION are very pleased that Mr Graham Cox has accepted the position of president of the Association. The Association is also pleased to have secured second position in the inter-society competitive display at the Autumn Open Show at Bingley Hall in Birmingham in August. The theme of the stand was a sunken ship with six all-glass tanks (four 2 ft and two 3 ft) placed amidst shalows on a sturdily, bolted, wooden stand. Members of the WEST MIDLAND GROUP of the B.M.A.A. built, erected and manned the stand and also supplied the tropical species, which included batfish, scorpion fish, a saffron tang, clown, electric blue damselfish, seahorse and sea anemone. In the 150 gallons of sea water were also displayed a wide range of native marine fishes and invertebrates sent to Birmingham by members Mr Lewis Dodgshon and Mr Adrian Carr from Torbay. Mr Graham Robertson from Aberdeen and a couple of fine squat lobsters.

**SCARBOROUGH & D. A. S.** enjoyed a very successful open show. Mr F. Cherry and Mr K. Colenhour judges and prizes were presented by Mr Reynolds of the A.Y.A.S. Mr J. Stepheon was awarded the Best in Show for his entry of a *Lepomis gibbosus*. Detailed results were:

- Guppies: 1. Mr G. Andrews (Hull); 2. Mr J. Stephenon (York); 3. Mr J. and Mrs Wells (Dunmster) (Petrh.)
- 1. Mr L. and Mrs Wells (Dunmster) (Petrh.)
- 1. Mr J. Stephenon (York); 2. Mr J. and Mrs Wells (Dunmster) (Petrh.)
- 1. Mr J. Stephenon (York)
- 1. Mr J. Stephenon (Hull); 2. Mr J. and Mrs Wells (Dunmster)
- 1. Mr J. Stephenon (York); 2. Mr J. and Mrs Wells (Dunmster)
- 1. Mr J. Stephenon (York); 2. Mr J. and Mrs Wells (Dunmster)
- 1. Mr J. Stephenon (York); 2. Mr J. and Mrs Wells (Dunmster)
AN interesting development in open shows is that taking place on 15th October at the Territorial Army centre, Farringdon House, Stoneywood Hill, Sutton, Surrey when KINGSTON & D.A.S. will be sharing the occasion with SOUTH PARK A.S.S. Both Societies hope for a record number of entries and are aiming to bring to the notice of pond keepers many coldwater species, particularly the exotic varieties of goldfish.

speaker, film or slide and tape show) there is also a table show, club library and friendly discussion over refreshments now that the club is taking advantage of new premises at the Amalgamation Club Room, Station Road, Strood. We have applied to the FRAS, to which we are affiliated, for one of our members to be considered for recognition as a 'B' class judge. On the social side we are visiting the London Zoo Aquarium on the 24th October. Club members would like to extend an open invitation to all fellow aquarists to attend any meeting if they are living in or visiting the area at any time.'

EDITOR of the MID-SUSSEX A.S. Newsletter, Mrs Sally Coe, hastily reports 'An editor's wish come true. We are expanding! Three new pages in this our third issue.' Table shows have been well supported. Mr G. Leach won the class for killifish and Mr D. Soper having at last managed to catch his sucking loach won the 2.0v. class of 21 entries. Mr D. Soper again came out on top with a sparkling gourami and 'his old faithful moonlight' came second, reports Mr J. Walker. Mr Walker himself won first in doryns and minnows.

... AFTER the success of their open show, DERBY REGENT A.S. took a short break, then put on an exhibit at the local Kingsway Hospital show with fish supplied by Mr Terry Jerrett and Mr Dave Gibson, organised by Mr Ernie Harmstone with the able support of a number of members. In July, Alfreton A.S. joined them for an inter-club show, Judge Mr B. Innis of Nottingham awarded the best fish in show award to Mr Hill of Alfreton from 112 entries. In August Mr Ron Trench spoke on fish foods and feeding and speakers during the coming months include Mr Roy Skipper of discus fame and Mr Ian Beards, the club's electrical expert. Other activities include regular weekend outings, a dinner, with a talk by Mr R. V. F. Tarrant on British waterways called 'The Gentle Roadway'.

In Brief

... BRIGHTON & SOUTHERN A.S. is expanding rapidly and more new members have joined the ranks since June of this year. In this period club activities have included a lecture on plants by Mr Ron Forde that proved popular and informative; and a table show for toothpicks and guppies that led to a very entertaining evening when judge Mr P. Gunter and local F.C.A. judge Mr David Soper discussed the problem of the rather poor quality of shows this year. The show has also had to be postponed due to the Society has acquired additional trophies for nine classes. Mr Bert Sheldon has had to retire from the office of secretary because of ill health and the club wish him a full and speedy recovery.

... SECRETARY of the newly formed ELLIOTT A.S. writes to us: 'We are now finding more and more interest in the hobby by being banded together in a Society and have a very interesting meeting every other Tuesday. In addition to the main item at meetings (a
... 185 entries were booked into the 10 classes held at the Show organised by CLEVELAND A.S., which formed part of the TEESIDE AGRICULTURAL CULTURAL SHOW held under canvas at Middleborough in July. Class winners were:
A.v. guppy; Mr Gray (Mount Pleasant, best fish in the show). A.v. livebearer, a.v. ciclid; Mr and Mrs Enright (Houghton). A.v. characin, egglaying toothcarp; Mr Smiley (Independent). A.v. barb; Mr and Mrs Attwell (Billingham). A.v. anabantid: Mr and Mrs Low (Cleveland). Catfish and loaches; Mr Greenly (Stockton). A.o.v.; Mr Douglas (Hull). Furnished jars: Mr Bailey (Sunderland).

... RIVERSIDE A.S. were host to the five other clubs of the NORTH WEST LONDON GROUP, at which members thoroughly enjoyed the quiz run by Mr Dobkin. The home team won this by a narrow margin. (Riverside and Independent, joint 52 points; Hendon, 40; Hampshire, 17; Hornsey, 5). Best fish in the show was a barb entered by Hendon A.S.

... SHOW secretary of the SOUTH THAMES AQUARIST GROUP, Miss P. Hammond, informs us that their 45th Open Club Show will be held on 12th October, 1971, and entries will be judged by Mr B. Baker. Further details may be obtained from Miss P. Hammond, 59 Richmond Terrace, Clapham, London, S.W.8.

... KEEGHLEY A.S. members heard an interesting lecture from the local Water Board chemist, Mr Prince, on water, discussing the different types found in local areas. Table show winners were; fish of the month (barba), Mrs Taylor, a.o.v., Mr J. Mosley, novice a.o.v., Master Mosley; junior a.o.v., Master Beckett.

... IN the inter-club show between DEREK REGENT A.S. and ALFRETON A.S. 112 fishes were benched. Best in the show award was made to Mr Hill of Alfreton by Mr B. Inman, who judged the exhibits. Points gained so far are: Alfreton, 45; Derby Regent, 33. The second leg will be held in October.

HENDON & D.A.S. have acquired splendid new premises for club meetings. These are at the Henry Burden Hall, Egeron Gardens, The Burrowes, Hendon, N.W.4 (opposite the Town Hall) and the Grand Opening Night is on the 21st October. An open invitation is extended to all aquarists and friends to join the Society on that night to celebrate the occasion.

Dates for Your Diary

2nd October. EAST LONDON A. & P.A. 45th Open Breeders Show. (Judges, Mr C. J. Brown, Mr R. Baker, Mr F. Tomkins.) Schedules; Mr F. Vickers, 13 Irina Way, Romford, Essex: phone 6333.


5th-6th October. BRITISH AQUARIST FESTIVAL at Belle Vue, Manchester.

10th October. REIGATE & REDHILL A.S. Open Show. Schedules from Mr J. Wood, 22 Rickman Hill, Coulsdon, Surrey. Change of date from 29th September.

15th October. STRoud & D.A.S. second annual Convention, Mid. Glo. Technical College, Stratford Road, Stroud, Glo., at 7.30 p.m. Details from Mrs J. Jones, 14 Erin Park, Lightpill, Stroud.

16th October. KINGSTON & D.A.S. & SOUTH PARK AQUATIC (STUDY) SOCIETY joint Open Show. Territorial Army centre, Farmhouse House, Stonecote Hill, Sutton, Surrey. Schedules; Mr G. E. Greenhill, 39 Garth Close, Morden, Surrey.


17th October. SUFFOLK A. & P.A. COLOUR FISH 71. Exhibition of tropical and coldwater fish at Suffolk Show Ground, Buckenhall Road, Ipswich.


31st October, BUXTON & D. A.S. first Open Show. St Thomas Moore's School, Palace Road, Buxton. Details from Mr J. A. Snaddon, Rosedale, 29 Dale Road, Dove Holes, Buxton, Derby.


London's Annual Exhibition of Fishkeeping

The AQUARIUM SHOW '71

Friday 29th October to Sunday 31st October

Royal Horticultural Society's Old Hall, London S.W.1

See advertisement on page 255

Show Organiser,
P.FM, 554 Garratt Lane,
London S.W.17
01-947 2805

1972

5th March. KEEGHLEY A.S. Open Show. Victoria Hall, Kightby.

21st May. OSRAM A.S. Open Show. Recreation Hall, Refuge Street, Oldham, Lancs.

14th May. DERBY REGENT A.S. Open Show. Burwood Forests Recreation Centre (Normanton Bridges), Osmond Road (A311), Derby. (Follow R.A.C. signs). Show secretary, Mr R. D. Orford, 88 Mansfield Road, Derby (phone 44324).

9th May. SOUTHEND, LEIGH & D.A.S. Open Show. Show secretary, Mr R. D. Orford, 88 Mansfield Road, Leigh-on-Sea, Essex.

8th June. ACCRINGTON & D. A.S. Open Show.

FOR HEALTHY TROPICAL FISH AND WELL ESTABLISHED PLANTS

AND A VERY COMPREHENSIVE STOCK OF AQUARIUMS AND ACCESSORIES

WINGATE 7 MARKET STREET WINCHESTER

Main stockists of JUVEL and GEM aquareas. Retail and Wholesale

Phone 2406
Classified ADVERTISEMENTS

AQUATIC SUPPLIERS
THE BEST IN TROPICAL FISH are at Stainer's Water Gardens. Also plants, tanks, equipment, foods etc. Open every day (except Mondays) until 7.0 p.m. at North Street, Martock, Somerset. Phone 3331.

FERNWOOD AQUARIUM, 132 Havant Road, Hayling Island. Open for the sale of fish and plants until 5 p.m. Sundays.

OVER 120 VARIETIES tropical, marine and pond fish—for personal shoppers only. Kingfisheries, 308 Croydon Road, Beckenham, Kent. Phone 01-650 3716. Closed Wednesdays.

PLYMOUTH TROPICALS for your fish, plants and equipment. North Hill Nurseries, Tavistock Road, Plymouth. Phone 62663.

M.S. TROPICAL FISH (Maurice Stray—Aquarist), Church Road, Bishops Cleeve, nr Cheltenham, Glos. We have the finest selection of tropical marines in Gloucestershire; also a comprehensive selection of freshwater tropicals, plants, and all other aquaria's requirements. Phone 0244-267 3077. Open till 8.30 p.m. weekdays.

FOR GOOD SELECTION MARINE FISH, comprehensive collection tropical and coldwater fish, and all your aquatic requirements, come to Aqua Hobby Ltd, 4 Bridge Road, Blundellsands, Liverpool 23. We also have wide range pvc tanks and frames, stands, hoods, reasonably priced. Telephone: 051-924 7947. Open till 8.00 p.m. Thursday and Friday. Barclaycards. Provided Cheques welcomed.

LIMESTARP TROPICALS. Not only do we milk cows here but we have a large variety of tropical fish, plants, equipment and live food, at Limes Farm, Stanford Bridge, nr Tarvin, Chester. Tarvin 40033. Open weekends 2-5 p.m. Tuesday and Friday evenings.

FISH
SUPERB VEILTAIL GUPPIES. Awarded "Water Life" diploma. Best in open show £1 per pair, carriage 10s. C. R. Perry, Professional Aquarist, 615 West Street, Crewe.

CLASSIFIED ADVERTISEMENTS
Rates: 40p per word (minimum charge 40p); Box no. 10p extra if required. Remittance with order to be sent to PetFish Monthly 554 Garratt Lane, London, S.W.17

REPTILES
REPTILES, AMPHIBIANS. Free list. J. & D. Naturalists, 51 Sandy Road, Seaforth, Liverpool, 21.

EQUIPMENT
AQUARIA FRAMES complete with aluminium hoods. 36 x 15 x 12 in. with hood, £17.00; 24 x 15 x 12 in. with hood, £14.50. From 1½ x 1½ x ½ angle: 48 x 15 x 12 in. £20.00, with hood £25.00; 48 x 15 x 15 in. £23.00, with hood £28.50; 60 x 15 x 12 in. £30.30, with hood £40.00; 72 x 15 x 12 in. £40.50, with hood £50.00. Stands plain and decorative. S.a.e. for full list any size. Carr. paid. Glassing compound 0.06 lb. Hockney Engineers, Derwent Place, Leeds 11. Tel.: 25061.

RUSTPROOFED AQUARIA, ornamental stands, glassing cement. Equipment manufacturers: a.e. Westbys, Barton, Ormskirk.

Miscellaneous
INSIDE LIVESTOCK FISH
FOODS and cultures. White, Grindal and micro worms, micro eels, Drosophila fruit flies and meal worms. All above items in culture forms with instructions. Also white and meal worms sold loose. Foods, plants, garden and aquarium accessories; prices reasonable; details on application. S.a.e. to Insie & Co., 55A Mabel Street, Woking, Surrey. Phone Woking 66477 and 3293.

D & V. TUBIFEX for regular supply. Phone 01-348 3011 day or night; or write 20 Coleridge Road, Hornsey, London N8 5DE.

BREEDING. Every Society needs bright enamel badges. For best service and badges contact R. E. V. Gomes Ltd., 14-15 Frederick Street, Birmingham B1 9HE.


GLASS FIBRE and CARBON. Double combined economy pack 15p post free. Send P.O. with order to Aqua-Filter, Brunswick St, Works, Brunswich Street, Queensbury, nr Bradford, Yorks.

SUPPLIERS REQUIRED. (Fish, Plants, Equipment) for shop opening near Manchester. Box no. 24.

BOOKS
BIND YOUR COPIES OF PETFISH MONTHLY as you receive them. Binders £1 ($3) each post free from FFIM offices.

WATER PLANTS
PERRY'S FOR PLANTS. 1st and 2nd Awards British Aquatic's Festival. Assorted selections tropical or cold, 7s 6d, 10s 6d, 12s 6d. Fanus, zebra, S. nanus, 7s 6d doz. Cryptocoryne beckettii, willii, hastaeformis, 2s 6d each, six assorted 10s. C. ballone, 4s. Water wisteria, giant hygrophila, 2s 6d. Post 1s. C. R. Perry, Professional Aquarist, 615 West Street, Crewe.

KING BRITISH
VIT-A-MIN
EVERY DAY
FLAKE FOOD
FOR TROPICAL FISH

GIVES YOUR FISH WHAT THEY NEED:
AT A PRICE YOU CAN AFFORD

King British VIT-A-MIN is now presented after
years of intensive research by Gordon Holmes,
the King British Technical Director. When you
get VIT-A-MIN, you will see it is a softer-texture
flake, acceptable more readily by all fish. When
you use VIT-A-MIN, you will see that some of
the blend sinks, allowing fish to feed at all
levels.

King British VIT-A-MIN Every
Day Flake keeps down the cost
of (fishes') living! ...... without
sacrificing anything in nutrient
value.

If you have any difficulty
obtaining your FREE SAMPLE
or supplies of King British
VIT-A-MIN, please write or
phone us.

CONTENTS
Mosquito Larvae, Shrimp
Meal, Soya Meal, Algae, Crab
Meal, Tubifex, Liver, Anti-
Oxidants, Whale Oil, Fish
Meal, Crustaceans and Bulk
Roughage.

Buy KING BRITISH VIT-A-MIN EVERY
DAY FLAKE in the sizes you are used
to, at prices you can afford.

SMALL . . 12.6 grammes 12p.
MEDIUM . . 25.2 grammes 20p.
ECONOMY . . 67.6 grammes 37p.
BREEDERS . . 450 grammes £2.15
JUMBO . . 900 grammes £4.20

Official independent
analysis. Facts confirmed
by leading Northern University.

SPECIFICATION

| Protein      | 49% |
| Minerals     | 10.9% |
| Crude fat    | 8.7% |
| Moisture     | 6.5% |
| Crude fibre  | 1.5% |

"I saw your advertisement in PFM"
**BRITISH AQUARISTS' FESTIVAL**

9th and 10th OCTOBER 1971 at

BELLE VUE, MANCHESTER

Saturday 10 a.m. to 8 p.m.
Sunday 10 a.m. to 6 p.m.
Admission 25p, Children 15p
Includes B.A.F. Zoo and Gardens

44 Classes, 44 Souvenir Trophies, 38 Major Awards
B.A.F. Lapel Badges
A & P Festival Prize Cards

**£460 PRIZE MONIES**

The Aquarist and Pondkeeper Champion of Champions £21
Best in Show £15.75

- Society Display Stand: 1st £50, 2nd £25, 3rd £15, 4th £10
- £5 to EACH UNPLACED Society in Stand Display
- To every Class Winner £1.50 when not awarded other monies

Plenty of snack bars & restaurants
Parking for thousands of cars & charros

Organised by THE FEDERATION OF NORTHERN AQUARIUM SOCIETIES

Hon. Show Secretary
Mr. G. W. COOKE, SPRING GROVE FIELD HILL, BATLEY, YORKS.

---

**For 1972: petfish aquarist's diary**

Pocket-size, with pencil, and containing

- PAGES OF TECHNICAL DATA AND GUIDANCE ON AQUARIUM AND POND-KEEPING
- GENERAL INFORMATION
- MAPS OF THE WORLD IN COLOUR

40p post free

To be published 29th October 1971
Order early to avoid disappointment

---

To PETFISH PUBLICATIONS
554 Garratt Lane
London, SW17 ONY

Please send ______ copies of the 1972 PetFish Diary for which I enclose

Name: ________________________________
Address: ______________________________

---

Please mention PFM when writing to advertisers
FROM DENMARK
FOR THE FIRST TIME

FISH ROE
FISH LIVER
MUSSEL MEAL
BRINE SHRIMP MEAL
COD-LIVER OIL
DEHYDRATED KELP
FISH MEAL
HYKRO
MULTI FLAKES
FISH FOOD
CANNOT CLOUD WATER
ALL IN ONE DRUM!!

LOOK FOR THE SPECIAL OFFER PACKS
AT YOUR AQUARIST AND PET STORES... Commencing August and whilst offer lasts

BREEDER SIZE... 5p OFF
Recommended Price 49p
SPECIAL OFFER PRICE 44p

LARGE SIZE... 2p OFF
Recommended Price 23p
SPECIAL OFFER PRICE 20p

STANDARD SIZE... 1p OFF
Recommended Price 14p
SPECIAL OFFER PRICE 13p

Distributed by
PETERAMA LTD  CHURCH ROAD  HAROLD WOOD  ROMFORD  ESSEX

"I saw your advertisement in PFM"
TROPHY PRODUCTS

ADVISE YOU:
DO NOT BUY AN AQUARIUM
UNTIL......
you have seen the
LATEST DESIGNS in
ALL-GLASS AQUARIA

on our Stand No. 5
at The AQUARIUM SHOW '71

LAURENCE DRIVE, STOVER TRADING ESTATE, YATE, NR. BRISTOL TEL: 0454 312454

Selected Aquatics from ERIC WOODS (ROSEWOOD) LTD.
ARLESTON, TELFORD, SHROPSHIRE.
Telephone WELLINGTON 2261/2.

TUBIFEX KEEPER

VITAWIL

GLORY PUMP

Keeps Tubifex fresh
Built in Airlift
Variable Feeding Rate
First of its kind

★ Soft Nourishing Flake
★ Scientifically prepared
★ Readily acceptable by tropical fish
★ Silent
★ Efficient
★ Reliable

Retail 20p
Retail 53p
Retail £2.25

Please mention PFM when writing to advertisers
INKY SAYS
ISN'T IT ABOUT TIME
YOU STOPPED
FISHING AROUND

"If you visit us once,
you will want to
come again and again
so remember the name!"

HENDON AQUATICS

19 FINCHLEY LANE, NW4

Visit us any day of the week from 9.30 a.m. until 6.30 p.m. except Wednesday when we are closed all day, and by popular request our store is open every Sunday morning from 10 a.m. until 2 p.m.

You can reach me by telephoning 01-203 4829

We guarantee to offer you only the top quality fish and plants, at prices you can afford to pay. We have over 50 large aquariums packed with all varieties of tropical fish, beautifully aquascaped with rocks and plants. You will find a complete range of aquariums, pumps, filters and all other accessories including all live foods.

Expert advice and personal service is given willingly to all our customers.

"I saw your advertisement in PFM"
**New from Algarde**

**AQUARIUM POWER CLEANER**
A powerful, stylish, highly efficient cleaning aid. Complete with extension tube. Operates in any depth of water between 8 and 16 inches (23-40 cm).

£1.05
(Recommended Retail Price)

**PUSH BUTTON TONGS**
The handiest tool yet. An invaluable aid to planting. Removes snails, leaves, debris, dead fish, etc. You will probably find uses for these we haven't thought of!

62p
(Recommended Retail Price)

Ask your retailer to show you these and other Algarde Aquarium accessories.

Made in England.

**ALGARDE 401A RIPPLE ROAD BARKING ESSEX. 01-594 1899**

Trade enquiries invited.

---

**MURKY GARDEN POND?**
**CLOUDY AQUARIUM?**
**DIRTY GOLD FISH BOWL?**
**WHITE SPOT TROUBLE?**

Bioquatic Laboratories produce a unique range of quality aquatic products which effectively deal with these problems. If unobtainable in your area write direct and include 5p for post and packaging.

**ACUREL® E** will keep the water CLEAR in your garden pond. 2 oz. to treat approx. 500 gals. Retail 43p. 4 oz. to treat approx. 1000 gals. Retail 70p.

**ACUREL® F** will keep your aquarium CRYSTAL CLEAR and improve filter efficiency by over 500% Retail 43p.

**ACUREL® GOLD** will keep your goldfish bowl CLEAN for many weeks without having to repeatedly change the water. Retail 25p.

**ACUREL® Q** is a well-established, reliable cure for WHITE SPOT fungus and algae. Use it regularly as a disinfectant and preventative. In capsule form for accurate and easy to administer dosages. Retail 34p.

**ACUREL® products** are chemically pure and if used as directed will not harm your fish, plants and live foods etc.

**TRADE ENQUIRIES TO:**
Bioquatic Laboratories
161 Rustlings Road.
SHEFFIELD S11 7AD

Please mention PFM when writing to advertisers.
The Tropical Fish

PALACE IN WONDERLAND

Following our customers’ spectacular successes in the international shows and then at Ally Pally our premises have again had to be extended to comply with the ever-increasing demand for fish and equipment. This work has now been completed and in appreciation of the fantastic public response to our

GRAND SUMMER RE-STOCKING SALE

this will now be extended to 31st October

—See you at the Palace

CHAMPION HOUSE
10 HIGH ROAD, WILLESDEN GREEN
LONDON, N.W.10. Tel.: 01-459 5549

OPENING TIMES:
Mon., Tues., Wed., Fri. 10–8.0 p.m.
Thurs. 9.30–1.00 p.m.
Sat. 9–9 p.m.

EASY PARKING FACILITIES
Stations: Willesden Green and Dollis Hill. Bus routes: 8, 52, 176, 226, 260, 266, 719

"I saw your advertisement in PFM"
The House of Fishes

WHEN THIS ISSUE HITS THE STREETS we will be displaying once more in quantity some of the choice African aquarium fishes—Congo tetras, Synodontis catfish, Julidochromis cichlids, Lamprologus etc. Stocks of discus will never have been better with local-bred stock, Bangkok tank-bred stock in many colour varieties, wild stock including beautiful Heckel and a few matched pairs.

AS VISITORS TO OUR SHOWROOM WILL CONCUR, every possible inch of room is taken up with fish stock—very little remains, so that displays of aquaria are minimal. Do not despair, however, We have additional premises a stone’s throw away where we have ample room to display the best brands of aquaria, be they in angle iron stainless steel, anodised aluminium, plastics or whatever.

Please remember: if you have been promising yourself a ‘special’ (size-wise that is) for Christmas it ought to be ordered now.

77 HIGH STREET, HEMEL HEMPSTEAD, HERTS Phone 0442 4723
Open 9 a.m. thru 7 p.m. closed Wednesday and Sunday.
(and he still makes a living?)

Bonner Aquaria
19 Bonner Street
Bethnal Green
London E.2
Tel. 01 980 1488

Aquarius Tropical
Now at Two Locations—
76 Monarch Parade London Rd,
Mitcham Surrey Phone: 640-0160
and
91 South End Croydon Surrey
Phone: 681-1105

We are 10-7 Mon-Sat, 10-2 Sun (Mitcham)
Open: 10-8 Mon-Sat, 10-5 Sun (Croydon)

The Aquarium Show ’71
Friday 29th—Sunday 31st October
Royal Horticultural Society
Old Hall, London, S.W.1
All details from PetFish Monthly

Please mention PFM when writing to advertisers
To keep your fish in super condition, you can rely upon Gussie flakes. Light and delicious, they have a guaranteed analysis, with the essential balance of protein, fat and fibre. Gussie flakes float a long time, to satisfy your surface feeders, then they sink slowly so that all your fish get a chance to relish their goodness — even those reputed to take only live foods. Gussie flakes do not cloud the water or soil the gravel. Special formulations for Tropical Fish and Coldwater Fish.

Super

Gussie

FISH FOOD FLAKES

Stay on Top

Compare the value
TROPICAL FISH FLAKES 12p, 17p & 37p.
COLDWATER FISH FLAKES 8p & 12p.

Plus Special Economy Breeder Packs from £1.27 (Recommended prices)

Other top quality Gussie Products include:
- Non-flake aquarium and pond fish foods
- Daphnia • Ant Eggs • Shrimp • Aquarium Gravel

ARMITAGE BROS. LTD. COLWICK, NOTTINGHAM, NG4 2BA

The Firm that cares for your fish

"I saw your advertisement in PFM"
ES-SEAL SILICONE RUBBER AQUARIUM ADHESIVE AND SEALANT

PROPERTIES:— SMOOTH AND EASY TO APPLY • CAN BE APPLIED UNDER WATER • HIGH STRENGTH 350 lbs. per sq. in. • WILL LAST FOREVER IN ALL CONDITIONS !!! (well almost!)

MAKES THE PERFECT MARINE AQUARIUM

Each tube comes with complete instructions for building all-glass aquariums by a simple method which we have devised, and which requires no equipment. We also recommend glass sizes and thicknesses for two sizes of aquarium.

50cc Tube £2.50p, 75cc Tube £3.70p
Send remittance (65p or 90p) direct
if your dealer does not stock ES-SEAL

ASK FOR ES-ES PRODUCTS
All the best dealers stock ES-ES

SINGLETON Bros. (Electronics) Ltd
PENRYN • CORNWALL

Edmonton Aquatics

237 Fore Street
Edmonton, London, N.18

We have a full range of tropicaals
We also have Marines
We keep a wide choice of accessories and tanks including Juwel and Gem
We also have Reptiles and Birds

NOVICE OR SPECIALIST—VISIT US WITH CONFIDENCE!

01-807 0927 Proprietor: J. Laws

NEW from McLYNN’s

FORTIFIED DAPHNIA

GIVE YOUR FISH A TREAT AND CHANGE WITH THIS NEW FOOD

Not just a plain Daphnia but one with Extra Proteins added, Fed with McLYNN’S Tropical Fish Food

this helps promote quick growth and good health in your fish

Look for the Plastic Box with the Blue Lid

Manufactured and Distributed by

McLYNN’S PET FOOD CO.
SQUIRRELS LEAP, WOODFIELD LANE,
ASHTEAD, SURREY phone: Ashtead 72009

Please mention PFM when writing to advertisers
‘Esha’
Plus Pumps
will take greater
care of your fish—quietly
This is a new and complete range of fish
tank pumps. Made in West Germany, the
‘ESHA’ Plus Pumps have been tested over
a long period under the most taxing
conditions. They have all passed these
tests, and we have every confidence that
‘ESHA’ Plus Pumps will take the utmost
care of your fish. Ask us for the name of
your nearest stockist—all good aquatic
shops stock ‘ESHA’.
Plus one—ultra-quiet running
Plus two—six month guarantee
Plus three—immediate spares supply
Plus four—prompt service

100 PLUS 3-5 defuses
Rec. retail price £2.00

200 PLUS with regulator 8-12 defuses
Rec. retail price £5.70

300 PLUS without regulator 15-20 defuses
Rec. retail price £7.35

400 PLUS with regulator 20-25 defuses
Rec. retail price £9.75

‘ESHA’ PLUS PUMPS
The most advanced pumps yet devised
Made in Western Germany by
Schwarzer & Hammerschmidt.
Sole UK Distributors
Gazelle Plastics Limited
Colley Lane Estate, Bridgwater
Somerset Tel: 0278 82212/3
Telex: 46230 Cables: Pronto BWTR

"I saw your advertisement in PFM"
When the best fish foods

As Phillips Fish Foods are cheaper than most other comparable kinds, you might think they’re not so good. Whereas, in fact, they’re better. Better, because they’re the result of scientific research and comprehensive trials in experimental aquaria. Not to mention continual quality control. And they’re cheaper.

Flaked Fish Food

Cold Water Granules
A highly nutritious scientifically formulated mixture for feeding cold water fish. In drums. 11p.

Phillips Fish Foods
Phillips Yeast Products Ltd.
cost less, where's the catch?

because they're made right here in Britain. (Which means there are no import charges or big transport costs.)
So, when it comes to fish foods, all you have to remember is that 'British is best'.
Your fish will fare better. And you'll save yourself a lot of new pence.
Take a look at what we offer and you'll see what we mean.

Maxiflakes
Another scientifically balanced staple food, specially designed for hand-feeding large tropical and cold water fish. 1 oz 35p.

Multifreeze
A 100% freeze-dried mixture of seven nourishing foods, that retain the full nutritional value of live foods with the convenience and cleanliness of dried food. In drums. 28p.

Aquatabs
Made to press on the side of the tank so you can enjoy watching the fish feed themselves. Contain freeze-dried roe, shrimp, liver, beef heart, spinach and lettuce, cod-liver oil, milk powder, brewers' yeast and seven vitamins. They come in tubes of 24. 15p.

-the best that cost less.

Park Royal Road, London, N.W.10.
TACHBROOK

A Selection from Our

Plants specially imported by Tachbrook Tropicals, as well as a full range grown at the extensive private fish and plant nurseries owned by Tachbrook Tropicals, are available for selection by customers at our London showrooms.

Aglaonema simplex 15p
Alternanthera sessilis 5p
Ambulia spp. (Limnophila spp.) 4p
Aponogeton crispus (x A. undulatus x A. natans etc.) 10p
  - natans 10p
  - rigidifolius 5p
  - ulveus 37p
  - undulatus 10p
Azolla spp. (fairy moss) 5p
Ceratopteris cornuta (floating fern) 7p
  - thalictroides (Indian fern, water sprite) 12p
Cryptocoryne affinis 12p
  - balansea (syn. C. somphongsi) 15p
  - beckettii 15p
  - blasi 27p
  - ciliata gigantis 10p
  - ciliata minor 10p
  - cordata 27p
  - griffithii 15p
  - haerteliana (de Witt: C. affinis) 12p
  - lucens 15p
  - nevillii 7p
  - petchii 15p
  - thwaitesi 20p
  - walkerii 15p
  - wendtii 15p
  - willsi (2 syn. C. undulata) 15p
Echinodorus brevipedicellatus (small-leaved Amazon sword plant) 17p
  - cordifolius (syn. E. radicans) 27p
  - (Calliphane sword plant) 27p
  - grisebachii (syn E. intermedius) 12p
  - madagashensis (syn. E. intermedius) 12p
  - (dwarf Amazon sword plant) 47p
  - marci (ruffled sword plant) 12p
  - paniculatus (syn. E. intermedius) 17p
  - (narrow-leaved Amazon sword) 17p
  - paniculatus var. rangeri (Amazon sword plant) 17p
  - pervensis (Black Amazon) 27p
  - spp. Hormatioides £1.25 to £2.25
  - tenellus (miniature chain sword) 12p
Eleocharis vivipara 8p
Eleodes crispa (Lagarosiphon muscoideus) 4p
  - densa (syn. Egeria densa) 4p

Visit us on Stand 8 at The AQUARIUM SHOW '71
29th-31st October

Left top and centre: Ground floor equipment sales area and Aquaria Section. Below: Interior of one of Tachbrook's plant houses near London.
TROPICALS LTD
Quality Aquatic Plants

*SPECIAL OFFERS*

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternanthera sessilis (red ivy)</td>
<td>5p each 50p doz.</td>
</tr>
<tr>
<td>Ambulia</td>
<td>4p each 30p doz.</td>
</tr>
<tr>
<td>Apoecotrichon crispus</td>
<td>10p each 3 for 25p in foliage</td>
</tr>
<tr>
<td>&quot; undulatus</td>
<td>10p each 3 for 25p in foliage</td>
</tr>
<tr>
<td>&quot; bulbs</td>
<td>5p each 30p doz.</td>
</tr>
<tr>
<td>Cabomba</td>
<td>4p each 30p doz.</td>
</tr>
<tr>
<td>Cryptocoryne affinis</td>
<td>12p each 3 for 30p</td>
</tr>
<tr>
<td>&quot; balansae</td>
<td>15p each 4 for 50p</td>
</tr>
<tr>
<td>&quot; beckettii</td>
<td>15p each 4 for 50p</td>
</tr>
<tr>
<td>&quot; blasi</td>
<td>27p each 4 for £1.00</td>
</tr>
<tr>
<td>&quot; ciliata</td>
<td>16p each 3 for 25p</td>
</tr>
<tr>
<td>&quot; cordata</td>
<td>27p each 4 for £1.00</td>
</tr>
<tr>
<td>&quot; nevillii</td>
<td>7p each 30p doz.</td>
</tr>
<tr>
<td>&quot; petchii</td>
<td>15p each 4 for 50p</td>
</tr>
<tr>
<td>&quot; walkeri</td>
<td>15p each 4 for 50p</td>
</tr>
<tr>
<td>&quot; willii</td>
<td>15p each 4 for 50p</td>
</tr>
<tr>
<td>Elodea densa</td>
<td>4p each 30p doz.</td>
</tr>
<tr>
<td>Hygrophila polysperma</td>
<td>21p each 21p doz.</td>
</tr>
<tr>
<td>Ludwigia</td>
<td>5p each 50p doz.</td>
</tr>
<tr>
<td>Microsorum pteropus (Java fern)</td>
<td>30p each £3.25 doz.</td>
</tr>
<tr>
<td>Nymphaea stellata bulbs</td>
<td>5p each 50p doz.</td>
</tr>
<tr>
<td>Sagittaria, dwarf</td>
<td>5p each 50p doz.</td>
</tr>
<tr>
<td>Vallisneria torta (straight)</td>
<td>5p each 50p doz.</td>
</tr>
<tr>
<td>Vallisneria spiralis (twisted)</td>
<td>2p each 27p doz.</td>
</tr>
<tr>
<td>Hygrophila stricta (Nomaphila stricta) (giant Hygrophila)</td>
<td>10p</td>
</tr>
<tr>
<td>Ludwigia natans (syn. L. mulleri)</td>
<td>5p</td>
</tr>
<tr>
<td>Najas spp.</td>
<td>5p</td>
</tr>
<tr>
<td>Nitella spp.</td>
<td>5p</td>
</tr>
<tr>
<td>Nymphaea stellata (dwarf lily)</td>
<td>17p</td>
</tr>
<tr>
<td>Nymphoides aquaticas (underwater banana plant)</td>
<td>18p</td>
</tr>
<tr>
<td>Pitsia stratiotes (water lettuce)</td>
<td>10p</td>
</tr>
<tr>
<td>Sagittaria estoni (syn. S. lortonii)</td>
<td>5p</td>
</tr>
<tr>
<td>&quot; &quot; s. pusilla (pygmy sag.)</td>
<td>5p</td>
</tr>
<tr>
<td>&quot; &quot; s. platyphylla</td>
<td>5p</td>
</tr>
<tr>
<td>Salvinia auriculata</td>
<td>10p</td>
</tr>
<tr>
<td>Spatiglyrnyum</td>
<td>15p</td>
</tr>
<tr>
<td>Syntemna triflorum (water wisteria)</td>
<td>10p</td>
</tr>
<tr>
<td>Vallisneria gigantea (giant vallis.)</td>
<td>12p</td>
</tr>
</tbody>
</table>

Above and below: two views of the split-level first floor showroom

NEWLY AVAILABLE THIS MONTH
Underwater banana plants
18p each, 3 for 50p
Cape Fear Spatterdocks
40p each, 3 for £1.00

Plants for Callers Only
244 VAUXHALL BRIDGE ROAD,
LONDON S.W.1. 01-834 5179
—2 minutes from Victoria Station
SHIRLEY AQUATICS LTD
WATER PLANT NURSERIES AND FISH HATCHERIES—Phone: 021-744 1300
Stratford Road, Monkspath, Shirley, Solihull, Warwickshire

NEW TROPIC MARIN
THE ARTIFICIAL SEA SALT WITH GUARANTEE

For success with
Marine Tropicacls
NEW TROPIC MARIN
Artificial Sea Salt with guarantee
5 gallon size—55p. 10 gallon size—£1
20 gallon size—£1.85
Postage 23p on any quantity
This salt makes artificial sea water almost
indistinguishable from natural sea water

NOW AVAILABLE TO
Traders from Main
Wholesalers and to
Hobbyists from most
Good Dealers
In case of difficulty write to us for the name of
your nearest supplier

IN AUGUST OVER 6 TONS OF
THIS EXCELLENT SALT WAS SOLD

THE NEW SANDER OZONIZER
Incorporating a new and revolutionary ozone chamber. Now distributed by Shirley Aquatics Ltd.
INVALUABLE FOR MARINE OR FRESHWATER AQUARIA
No. 2 Large enough for 4 sixty gallon aquariums Price £15.75
No. 3 Large enough for 8 sixty gallon aquariums Price £17.85
WHAT DOES OZONE DO IN THE AQUARIUM?
Burns dangerous protein and kills bacteria. The Cilia of Protozoa are burned, thus preventing them
from swimming and feeding, so that they die

WHAT IS OZONE?
An unstable molecule comprised of three atoms of oxygen which readily breaks down to release
active atoms of oxygen
WHAT IS THE OVERALL EFFECT?—CLEANER, SAFER WATER
Direct from us post free or from all good dealers—Trade enquiries invited

PLEASE NOTE.—All enquiries requiring a reply MUST be accompanied by S.A.E. Our premises are situated on the main Stratford—
Birmingham road, 8 miles from Birmingham, Midland “Red” Bus No. 150 from Bus Station, Birmingham, pass the door, slight at
HOURS OF BUSINESS.—Weekdays 10 a.m.—5 p.m. Sundays 10 a.m.—12.30 p.m. for sale of plants only (we must adhere strictly to this rule).
Closed on Sundays after January 1st, 1972.
CLOSED ALL DAY EVERY MONDAY
TERMS OF BUSINESS.—Cash with order please. Fish sent by rail. Tropical minimum order £7.50, insulated container and carriage
£1.00. Coldwater minimum order £2 plus £1.25 car and carriage. Plants by post (minimum order £2.50) please add £1.25 post and packing.

PRINTED BY ADLARD AND SON LTD., BARTHOLOMEW PRESS, DORKING