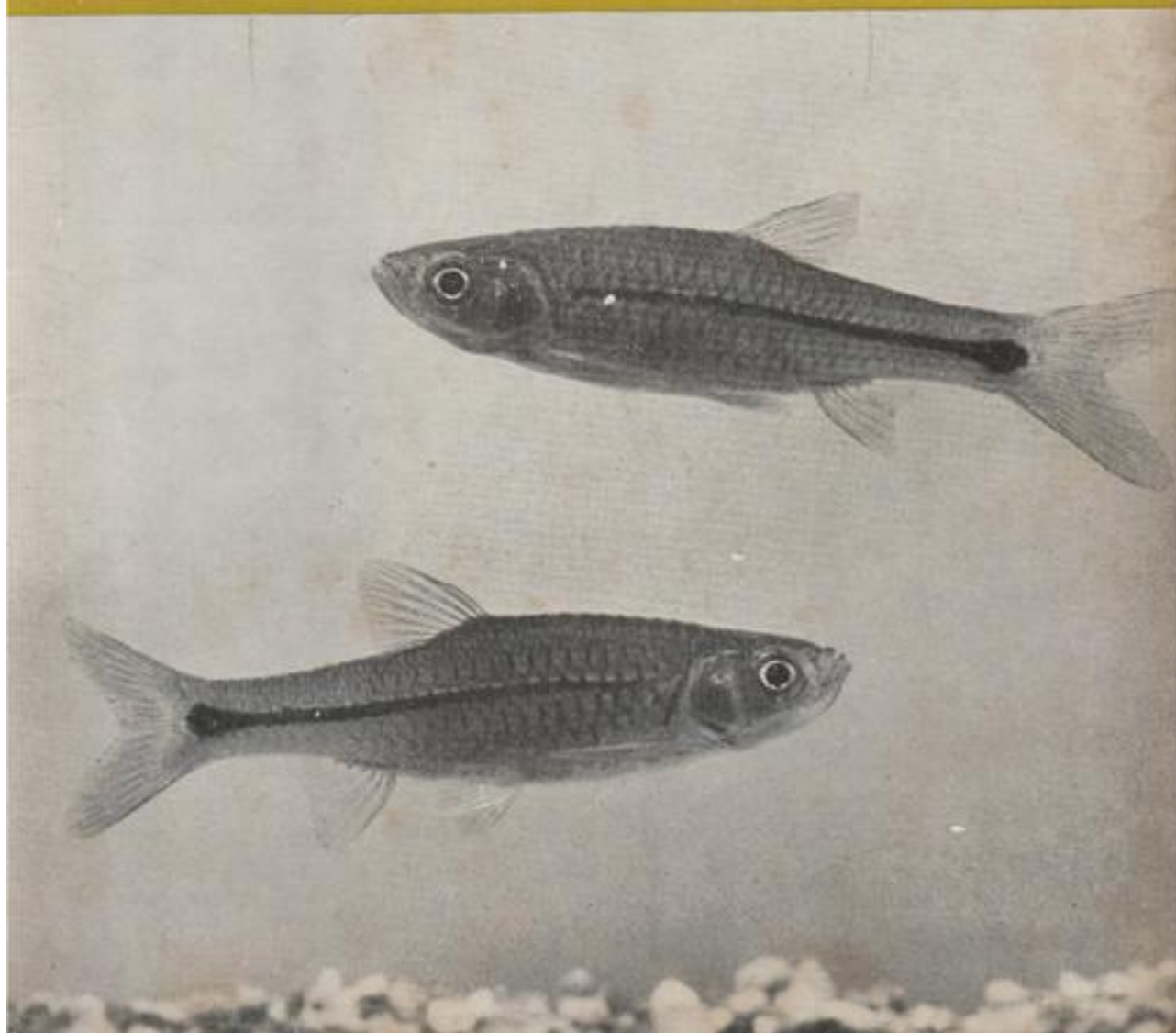


April
1969

2/6
monthly

the
Aquarist
and Pondkeeper



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open 8.30 pm — 6 pm

over 200 species of tropical fish usually in stock and a large selection of tanks and equipment including Gro-lux lighting. We also specialize in garden pools, plants and coldwater fish and have a vast stock for your inspection

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M. & R. (DOG-FISH) LTD.

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Marine Tropicals, plus the usual large varieties of tropical fish.

Always in stock Eheim filter, Ozonisor, Reactor, Wisa pumps, Metaframe tanks, etc. And now Gro-Lux tubes 24" and 36".

(cannot be sent by post)

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Telephone: *IDROX* 3615

Open Sundays 11 a.m.—2 p.m.

Scottish Agent for Aqualite Tanks.

WARNING!
H₂O+230 volts
can mean DANGER

DOESN'T IT MAKE SENSE TO PAY THAT LITTLE BIT MORE FOR A CHILD-AND-PET-SAFE LOW VOLTAGE PUMP FOR FOUNTAINS AND WATERFALLS?

**A STOKES GOLIATH
SAFETY PUMP GIVES
YOU MUCH MORE
POWER, TOO!**

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SPA PUMP

- Ideal for Aquariums
- Recommended for filling Motor Mowers & Garden Sprays
- Pumps or Siphons
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only 6/9 each
(subject to Trade discount)
Larger types also available

Leaflet from Sole Importers
COLLEY NOCKOLDS LTD
126 Spa Road, London, S.E.16



We've made our fish food last a little longer

Now our high-protein Flaked Fish Foods are available in three larger sizes—so you can buy more at a time and save money as well.

These scientifically prepared foods are top value and quality—a staple diet

equally as nourishing as living food.

And remember, Only Phillips Fish Foods contain *saprolegnii* to protect against fungus disease. So always ask for Phillips Fish Food—next time in a larger size!

Tins 1 1/2 oz.	4/-
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Two types / Cold Water and Tropical, same size, same price. Also 6oz. 1/10d

Phillips Flaked Fish Foods

Made by Phillips Yeast Products Ltd, Park Royal, London, N.W.10.



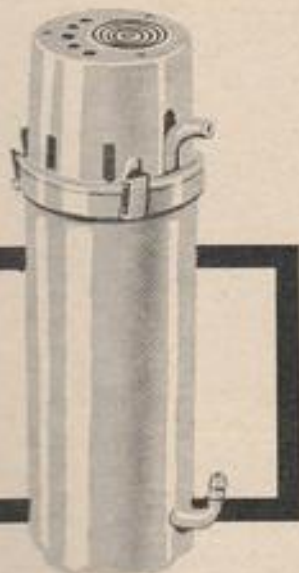
POWER FILTER SYSTEMS

For aquariums upto 100 Litres

No. 386 S for fresh water
No. 386 SE for salt water

Diameter	110 mm (4.33 ins)
Height of filter	310 mm (12.2 ins)
Capacity of container, approx	1 Litre
Output	150 Litres/Hour
Current consumption	28 Watts

AC ONLY



The filter medium is contained in perlon bags thus making the exchange of filter mediums quick, clean and simple.

The return jet pipe supplied with the filter creates a powerful return to match the vital requirements of most animals living in freshwater, and in particular of those living in seawater. When the jet return pipe is correctly fitted the incoming water will carry along air in a compressed state and thereby provide the aquarium with the required oxygen.

For aquariums upto 200 Litres

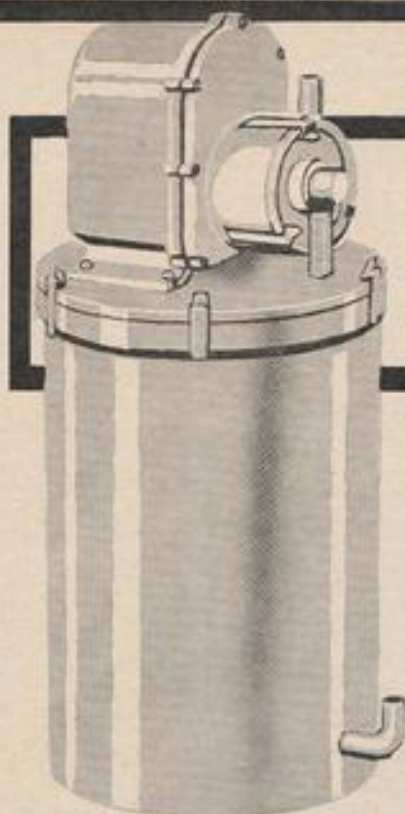
No. 386 S for freshwater
Nr. 386 SE for seawater

Diameter	160 mm (6.30 ins)
Height of filter	370 mm (14.6 ins)
Capacity of container, approx	2 Litres
Output	240 Litres/Hour
Current consumption	28 Watts

AC ONLY

*Sole Distributors: SCAN, Old Bath Road,
Colnbrook, Slough, Bucks.*





For aquariums upto 500 Litres

486 S for fresh water
486 SE for salt water

Diameter	205 mm (8.0 ins)
Height of filter	440 mm (17.3 ins)
Capacity of container, approx	6 Litres
Output	500 Litres/Hour
Current consumption	50 Watts
AC ONLY	

All EHEIM power filters are supplied complete with all accessories, mediums, etc. ready for immediate installation. We recommend that only genuine EHEIM filter mediums be used in EHEIM power filters.

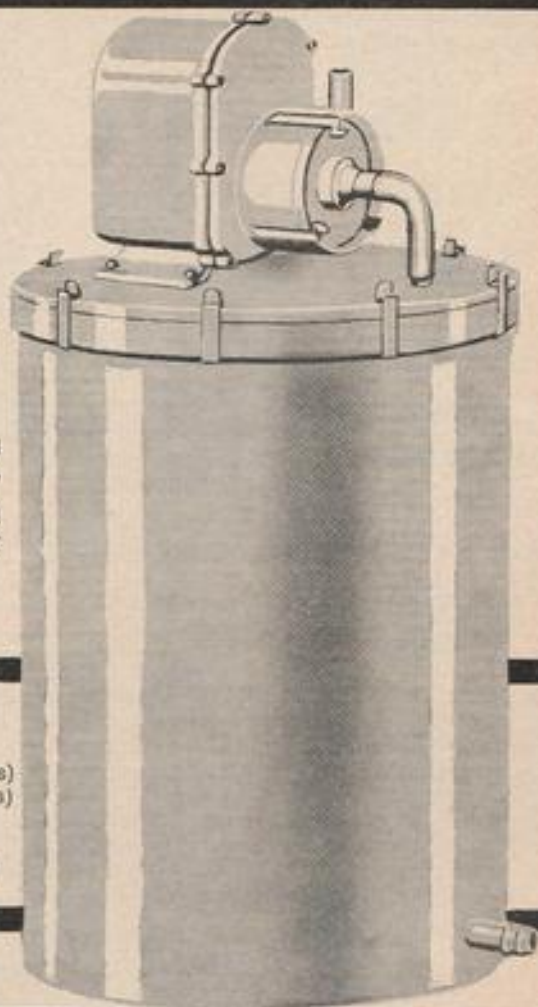


For large aquariums

No. 586 S

Diameter	310 mm (12.2 ins)
Height of filter	580 mm (22.8 ins)
Capacity of container, approx	20 Litres
Output	1,000 Litres/Hour
Current consumption	90 Watts

From all good aquarium suppliers



One of the Great Foods of our time!

new
'SPLIT'

The tried, tested and proven flake food

SPLIT IS ALREADY A FIRM FAVOURITE IN THE U.S.A. (SEE THE ADS IN THE TROPICAL FISH HOBBYIST) AND ON THE CONTINENT OF EUROPE. NOW WE PROUDLY INTRODUCE IT INTO BRITAIN

**NOTE
THE PRICES**

SIZE 1	1/11	SIZE 2	3/-
SIZE 3	6/9	SIZE 4 (1 litre)	22/6
		SIZE 5 (4 litre)	85/-

Just as in 1966 we introduced the very first freeze-dried miracle fish food which revolutionised fish feeding (and still continues to do so) now we believe that new "SPLIT" will do the same for those who prefer a flake food.



ASK FOR IT AT YOUR PET SHOP

SOLE UK DISTRIBUTORS TFH/Miracle TFH Publications (London) Ltd 13 Nutley Lane Reigate Surrey

1969 THE YEAR OF THE KOI

We would like to thank all those who wrote to us following our recent advertisement. The response was most encouraging in as much as we heard from Koi keepers and would-be Koi keepers all over the country.

For those who are not as yet keeping these remarkable fish may we suggest that you remedy the defect soon. Spring is the ideal time.

It may seem a little early but why not make a date to come and see our display of Koi at The Aquarist Fishkeeping Exhibition at the Alexandra Palace in July. It will be right by the main entrance on Stands Nos. 1, 2, 3 and 4. We will be pleased to see you and we feel sure that you will be delighted with the Koi pool which will contain a number of larger Koi specially imported from Japan.

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13 Nutley Lane, Reigate, Surrey.
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SUITABLE FOR ALL BREEDS



**TWO NEW
HIGH PROTEIN FISH FOODS**

(60% Protein Content)

- ★ Freeze-Dried DAPHNIA
in 3gm containers 3/3 each
- ★ Freeze-Dried FISH EGG MEAL
in 6gm containers 3/3 each

New Freeze-Dried DAPHNIA, and FISH EGG MEAL are particularly suitable for small breeds and young fry.

MAGIC WORMS

Freeze-Dried Tubifex Cubes

(55% Protein Content)

It's 'Magic' to watch your fish go for them
in 5gm containers 3/- each

PETCRAFT Freeze-Dried Fish Foods are Freeze-Dried by a special process which preserves the fresh flavour and nutritional value—they NEED NO REFRIGERATION. Packed in sealed plastic screw-top containers to retain freshness.



**AND YET ANOTHER
NEW ITEM!**

DRIED MOSQUITO LARVAE

(46% protein Content, 24% Fat Content)

in 15gm containers 5/- each

Your Fish will love the flavour of this new food

FEED WITH CONFIDENCE — FEED VARIETY

FEED  FISH FOODS

(See p. xxi BIORELL FLAKE FISH FOOD)

AVAILABLE FROM YOUR LOCAL PET OR AQUARIST STORE





NOW! THE NEW KING BRITISH AQUARIUM REMEDIES

RANGE OF

THE KING BRITISH CURE-IT RANGE

A range of well-tested,
quick-acting cures for
MOUTH FUNGUS,
BODY SLIME, VELVET,
WHITE SPOT, FUNGUS



KING BRITISH pH Tester & Adjusters

To create the best conditions
for fish and plants, to stimulate
breeding and induce the best
colours from your fish it is
essential the pH factor of your
water is correct. To test and
adjust, use regularly the KING
BRITISH

pH Tester Kit
pH Adjuster - acidity
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that have been thoroughly
TESTED FOR 12 MONTHS
on over 500,000 fish in our own aquariums

AND OTHER KING BRITISH ITEMS ESSENTIAL TO GOOD AQUARIUM CARE

"REST IT" a highly effective sedative, vital when introducing
new fish into your aquarium.

SNAILS "DESTROY IT" rapidly rids the aquarium of snails,
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Best quality eggs from San Francisco Bay. Have a high hatching rate
and, if necessary, complete hatch can be available in under 48 hours.

ASK AT YOUR LOCAL PET OR
AQUARIUM SHOP, TO SEE THE
COMPLETE RANGE OF NEW
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It stands for fine quality and
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A LEADING NAME IN THE AQUARIST WORLD

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If you have any difficulty in obtaining the King British product you require, please write direct to us.

TURN TO PAGES xxiv AND xlii FOR OTHER INTERESTING NEWS FROM KEITH BARRACLOUGH TROPICAL FISH



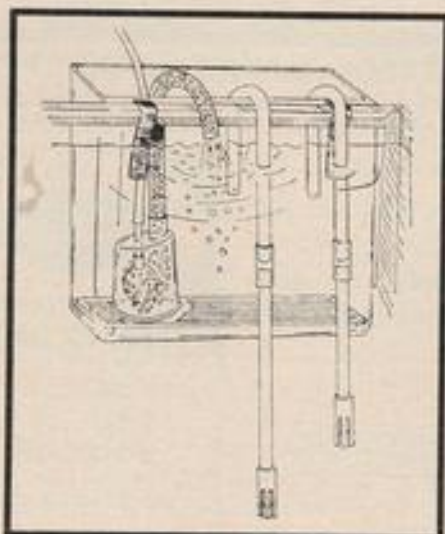
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The successful Airstream Slimline

- ★ A Compact filter — fits in a gap only 2" wide
- ★ Can be used inside or outside the tank
- ★ Adjustable hanger ensures perfect fit on frames up to 1½" wide
- ★ Outlet discharges from either side

Price 12/6



The New Airstream Cascade

- ★ Has the same advantages as the Airstream Slimline plus
- ★ Diffuser action giving twice the flow of the Slimline — plus aeration
- ★ Two syphons help good circulation

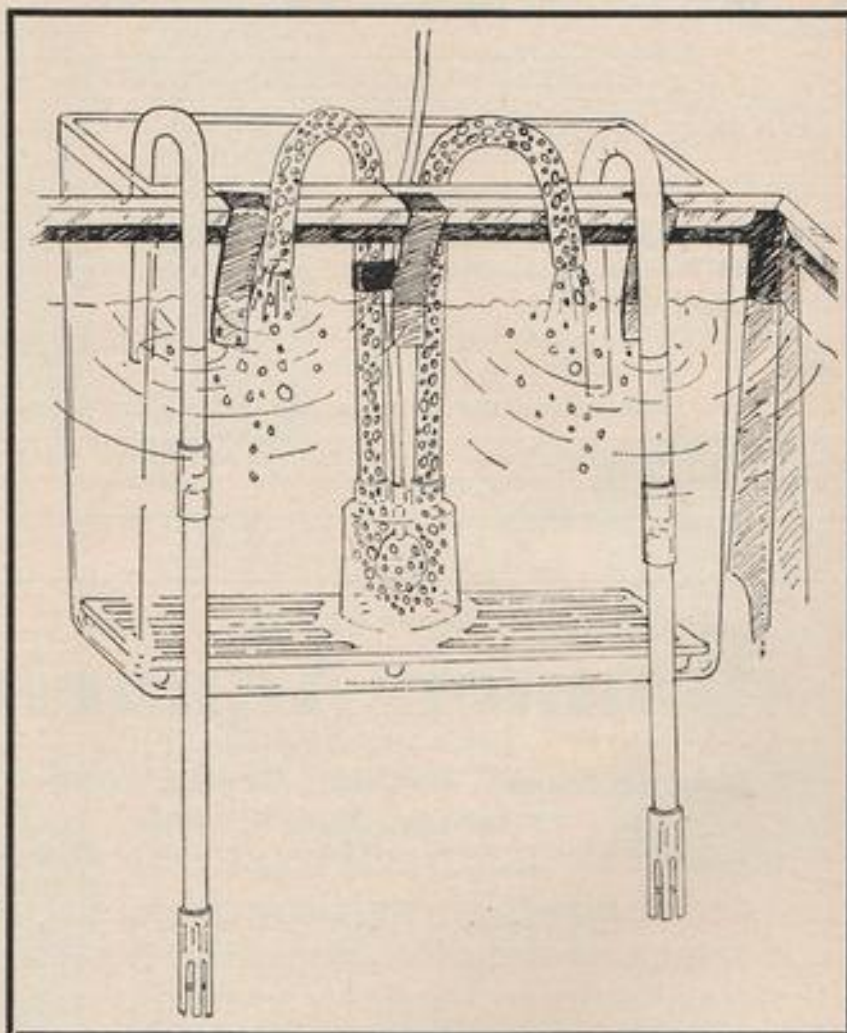
All Airstream Filters are British Made by a British Company therefore you get value — no hidden duties, freight charges or royalties

Price 25/-

NOW!... THE BIG FILTER WITH THE BIG ACTION!

AIRSTREAM SUPER TWIN

Filtrate and aerate with the AIRSTREAM SUPER TWIN



ALL THIS
FOR ONLY
39/6

- ★ Big Box—11" long × 2½" wide at top
- ★ SUPER Filtration—large surface area
- ★ TWIN outlets and TWIN syphons give excellent circulation

- ★ Strong diffuser action aerates
- ★ Adjustable hangers—fits frames up to 2" wide

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at 13 Cricklewood Broadway, London, N.W.2

Telephone: 01-452 4875 & 2955

OPENING SHORTLY - ASIATIC IN NORTHAMPTON

Hours of business: 10am-6pm Monday to Saturday. Sunday: clubs only by prior arrangement.

CLUB VISITS NOW REOPEN

Please book in advance to avoid disappointment. Contact Mr. J. Williams at the above address.

PLANTS—Cryptocoryne: Ciliata, Lucens, Thwaitesii (Brown), Nevillii, Beckettii, Walkeri, Petchii, Willisii, Cordata, Griffithii, Affinis, Wendtii Green, Wendtii Brown, Wendtii Grey. Lagenandra: Lancifolia, Thwaitesii, Ovata.

1 dozen Assorted Cryptocoryne by Post 24/- plus 2/6 post and packing. The above Plants are also sold individually. Send S.A.E. for list. Regular stock of "bread and butter" plants.

Full selection of fish and plants available to callers only.

WHOLESALE ENQUIRIES WELCOME FOR FISH, PLANTS AND TANKS, ONLY HEADED PAPER ACCOMMODATED SPECIAL CONCESSIONS TO NEW WHOLESALE CLIENTS IN GREAT BRITAIN

The shop for the beginner and the experienced aquarist . . .

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Open: Monday—Friday 9 a.m. to 8 p.m. Thursday 9 a.m. to 1 p.m.
Saturday 9 a.m. to 6.30 p.m.

48 tanks on display. See the fish in picture book colours. Good selection of **quality** tropical and coldwater fish, plants, tanks and accessories always available.

now in stock

Gro-Lux lighting complete with ballast units. Tube sizes
18" £3 6 6 24" £3 12 6 36" £3 15 0 48" £3 18 0

**We are direct importers of Quality Tropical Fish and Plants,
trade supplied . . . telephone or call anytime,
Thursday by appointment only.**



BROAD GREEN AQUARIUM



Natural Coloured Cornish slate bonded to fibre glass and coated with a clear resin.

Completely inert for coldwater or marine tanks.

Completely weather and water proof for indoor or outdoor use.



Panels all sizes from:
12" x 2" straight or
curved 4/4 p. & p. 2/4
or custom made to
specified dimensions.
Quotations by return.

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It is quite easy to get to Buckhurst Hill. By tube train on the Central Line thirty-five minutes from West End, and we are three minutes from Buckhurst Hill station.

OPEN SIX DAYS A WEEK 10.00 a.m. TO 5.45 p.m. (CLOSED TUESDAYS)

KILLIEFISH IN STOCK

Aphyo australe
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ALL ENGLISH BRED

WE NOW STOCK GRO-LUX TUBES AND UNITS 18 in. - 4 ft.

SEAQUARIUMS LTD.

65 SOUTH END, CROYDON

Telephone: 01-688 9488



A VIEW OF OUR LUXURY SHOWROOM

Married Hobbyists please note the thick pile carpet and luxury chairs. A little bit of applied psychology never did anybody any harm.

Incidentally, this photograph doesn't show the other *four* huge show tanks, or our large basement quarantine room. All set up on the SeAquarium System.

Watch this space Our Research Department has rashly promised to produce a new item for the improvement of marine aquarium technology every month, from now until December, 1969.

THIS MONTH'S NEW PRODUCT

CUPRAZIN This new product, a compound of four different salts, one of which is copper, has been used exclusively in our Quarantine Room since October 1st 1968. To date we have imported over 5000 fishes and have not had one loss attributable to oodinium disease. CUPRAZIN even destroys the particularly virulent Red Sea oodinium strain.

Packed in a new, foolproof dispenser, together with easily understood dosage instructions, CUPRAZIN is vital for the treatment of all newly-purchased marine fishes if the rapidly fatal oodinium disease is to be avoided. PRICE 11/6 for a pack which treats 150 gallons. Obtainable direct or from all good dealers in Marines. Postage and packing 1/- extra.

Watch this space The following stock will be out of quarantine and ready for sale by the time you read this advertisement.

Chaetodon larvatus, Chaetodon mesoleucas, (Cynics beware—we mean Chaetodon mesoleucas, the beautiful Red Sea butterfly, not the diabolically-difficult Chaetodontoplus mesoleucas from Malaysian waters), Chaetodon semi-larvatus, Acanthurus bleekeri, (—called by some the most beautiful Surgeonfish in the world), Rhinacanthus assasi, Sufflamen albicaudatus, Amblyrhynchotes diadematus, Fissilabrus gutmanni, (—the gorgeous new Neon Cleaner Wrasse), Acanthurus chrysurus, Cephalopholis miniatus.

"SYNTHETICA" SEA SALT At the moment this salt is still only available direct from us at 25/- for a 20 gallon bag + 4/6 p and p. However, we are busily establishing dealer networks all over the country so that you can buy "Synthetica" from your local dealer.

Remember—we were the first ALL-MARINE specialists in Gt. Britain. We won't always be the only marine specialists because there will be imitators. But this will be good for all concerned. There's nothing like competition for sharpening your wits.

Meanwhile, best wishes from all at SeAquarium and Good Fish-keeping, (MARINES of course.)

HOURS OF BUSINESS—Monday, Tuesday & Thursday, 9.0 a.m. to 5.30 p.m. Wednesday, closed all day, Friday, 9.0 a.m. till 8 p.m. Saturday, 9.0 a.m. till 6.0 p.m. Sunday, 2.0 till 5.0 p.m.

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Garden Pools are Inexpensive and so Easy to Install

Butyl, PVC, Polythene

36 page "DO-IT-YOURSELF" catalogue FREE on request

SPECIAL OFFER

Heavy Gauge Polythene for a pool 9 ft. x 8 ft. x 18 ins. deep
6 yards (18 ft. x 12 ft.) Blue 46-
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Post and packing free for cash with order

Stewarts Dept. W.E.
FERNDOWN NURSERIES
BROOMHILL, WIMBORNE, DORSET



VISIT THE SPECIALISTS FOR ONE OF SCOTLAND'S LARGEST DISPLAYS OF TROPICAL FISH AND PLANTS, ALL OF OUR FISH ARE FULLY QUARANTINED FOR AT LEAST SEVEN DAYS PRIOR TO SALE.



WE ARE MANUFACTURERS OF AQUARIUMS AND STANDS, SPECIAL SIZES MADE TO ORDER AT NO EXTRA COST.

Closed all day Wednesday Sunday opening 12.30-5.30 p.m.

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Atlantis Aquarium
449 Wimbourne Rd., Winton, Bournemouth
Telephone 53593

Open daily 10.30 a.m.-6 p.m.
(Late Night Friday 8 p.m.)

- ★ Over 200 tanks and ponds
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- ★ Beautiful plants and all accessories
- ★ Rail service available
- ★ WHOLESAL and RETAIL

I've Got Millions!

WORMS! FOODS! COMPOSTS! RESULTS!

EUGLENA	3/6—With 8 page instructional booklet
MICROWORMS	3/6—Complete with feeding powder
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GRINDALWORMS	3/6—Miniature W. Worms Easy to breed
GRINDALWORMS	30—Mature cultures in wooden boxes
GRINDAL FOOD	3/6—High protein content. Rapid results
GRINDAL COMPOST	3/6—Finely ground with organic base
WHITE WORMS	3/6—With complete instructions
WHITE WORMS	30—Mature cultures in wooden boxes
WHITE WORM FOOD	3/6—Exclusive formula. No mildew
WHITE WORM COMPOST	3/6—Compounded for quicker breeding

Breeders' packs: five times 3/6 quantity for 1/6

Prices include free delivery.

E. ARNOLD, 80, HONEGA ROAD, LONDON, E.7.

The House of Fishes

APRIL This is an ideal month to try your hand at tropical marines; we have all the gear. Other ideal months are May, June, July, August, September, October, November, December, January, February and March.

DISCUS Oh my gorsh! that free pukka gen line!! We have been inundated with enquires and answering will take sometime. Please bear with us—all will be answered.

AERATION Thinking of buying a new air pump? Our nearly 21 year old son, a budding electronic boffin, tests all our pumps enabling us to give performance figures on any particular model.

GRAVEL—PUREWATER We previously advertised demineralised water at 1/- per gallon—this is still available but the price is for collection from the shop. We now supply superior lime-free gravel at 1/4 inch mesh—much easier to wash. 5d. per lb. collected. We will be pleased to arrange carriage at cost for either item.

INDOORS—OUTDOORS Been keeping coldwater indoors? Now is the time to make a pond with one of our liners or moulded efforts. Let your finny favourites really enjoy themselves. The empty tank can then be stocked with tropes from our vast collection—sounds a splendid idea.

77 HIGH STREET HEMEL HEMPSTEAD HERTS. phone 4723

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(LONDON)

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Established 1949

Member P.T.A.

You must see our display of fish and plants in the most original setting. All fish sold are fully quarantined. We have ninety quarantine tanks, plus ninety-five sparkling show tanks.

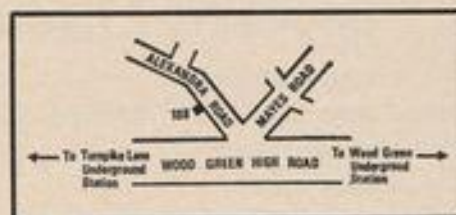
We are receiving an increasing amount of letters from customers who are unable to obtain many accessories and remedies. We feel, for every letter we receive, there must be perhaps ten to fifteen people experiencing the same difficulty.

We have therefore produced lists of all products we stock and are offering a by return, post paid mail ordering service. It is however impossible to send some items on a post paid basis (rock, gravel, etc.). Our catalogue gives complete details of these items. Our lists are very comprehensive, but should we not list any items you may require we will in every case endeavour to obtain your requirements.

Please send 6d. stamp for catalogue.

Our fish selection is as good as usual and as we are not giving details this month you are invited to send for our current list. 6d. stamp please.

Please remember to send S.A.E. with other enquiries.



Hours of Business:

Monday to Saturday 9 a.m.—6 p.m.

Thursday 9 a.m.—1 p.m.

108 ALEXANDRA ROAD,
HORNSEY, LONDON, N.8

WHICHEVER



WAY



YOU



LOOK AT IT



THE "DUMPY" THERMOMETER IS IN A CLASS ON ITS OWN

WITH EXCLUSIVE '12 O'CLOCK READING' FEATURE

JUST INSTALL WITH THE 12 O'CLOCK POSITION OCCUPIED BY THE TEMPERATURE NUMERAL CORRESPONDING TO YOUR THERMOSTAT SETTING. THE RED POINTER WILL REMAIN VERTICAL WHILE THE CORRECT TEMPERATURE IS MAINTAINED. EASILY SEEN FROM ACROSS THE ROOM.

- The "DUMPY" relies on no adhesive for watertightness — It is vacuum sealed.
- It is no bigger than a florin and is without doubt the least conspicuous of any thermometer.
- It presents no hazard to fishes. No sharp projections to damage scales. No toxic properties. No gap 'tween itself and the aquarium glass to trap them.
- The "DUMPY" fits so close to the aquarium glass that no scum or algae can obscure its dial.
- Each "DUMPY" is individually set to a fine degree of accuracy against a N.P.L. tested 'master' thermometer.
- Its casing is corrosion resistant and the PVC suction ring will not perish. If damaged when scraping the aquarium glass a spare ring (price 6d) can be fitted in a few moments.

AVAILABLE IN FAHRENHEIT OR IN CENTIGRADE SCALE



Price 7/2d

FROM YOUR DEALER ONLY

It is regretted that we cannot undertake to supply direct.

SINGLETON BROS (Electronics) LTD
TRURO HILL,
PENRYN,
CORNWALL

NUOVA

TURBO-FILTER

A NEW CONCEPT IN AQUARIUM ACCESSORIES

U.K. Distributors

Tradefish
(Aquarium) Co.
Burdon Road
Sunderland



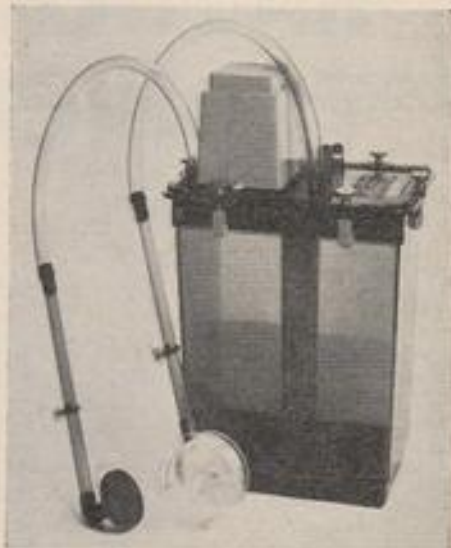
*The ultimate in
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*Fast flow combined
with efficient filtration.*

600 litres per hour.

Multiple extraction.

*Filter chamber 4 litre
capacity.*



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WE ARE DIRECT IMPORTERS OF TROPICAL FRESHWATER FISH AND PLANTS.
OVER 20,000 FISH IN STOCK AT ALL TIMES. FRESH SHIPMENTS EVERY WEEK.
PRICE LIST SENT WEEKLY.

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FRESHWATER TROPICALS

WHOLESALE OF:

SAN FRANCISCO BAY BRINE SHRIMP, etc

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NORFINE NETS

ARISTOCRAT PRODUCTS

All trade enquiries welcome
WHOLESALE ONLY

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TROPICAL AND COLDWATER FISH
LIVE FOODS, AND PLANTS
LARGE SELECTION OF EQUIPMENT

37 Essex Road, Basingstoke, Hants.

Telephone: Basingstoke 22010

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Boas, Pythons, Monitors, Tegus, Skinks, Zonures,
Geckos, Plated Lizards, Tortoises, Terrapins, Frogs,
Toads, etc, etc.

Write for stock list. Trade enquiries also invited.

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*For top value coldwater and
tropical fish, plants, reptiles,
amphibia and equipment.*

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Open 9.30 a.m. to 7.30 p.m.

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Imports from all Continents

Write for current price list

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First awards at the 1966, 1967 & 1968 International
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See our large selection of tropical
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Delivery Service—Provident Cheques accepted

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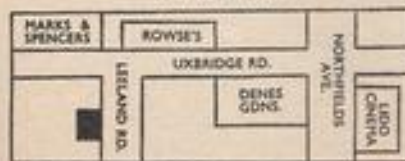
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The Editor accepts no responsibility for views expressed by contributors.

Editor: Laurence E. Perkins

April, 1969

1

THE WATERLILIES OF LATOURL MARLIAC

by Philip Swindells

ONE OF THE greatest plant hybridizers of all time, Joseph Bory Latour-Marliac, the son of a prominent French botanist, was born at Granges in 1830. He studied classics in Paris until the revolution of 1848, when he decided to return home and manage the family estate. A few years later he married and settled down at Temple-sur-Lot, where he amassed a vast collection of tropical forest bamboos. In 1858 his interest was aroused by an article on tropical waterlilies by Professor Leveque who expressed deep disappointment that the bright colour and shapes of the tropical species did not exist in any of the hardy forms. At this time only the white flowering *Nymphaea alba* was commonly grown outside, but Marliac decided that it should not be impossible to obtain coloured hardy varieties by judicious cross pollination of this with various coloured tropical species. So with this in mind he started to collect different species from all over the world and embarked upon a breeding programme.

For several years he worked hard, producing and flowering hundreds of seedlings with little success, until 1879, when *N.X. marliacea rosea* was evolved. It is believed that this was a hybrid which used the red sport of *N. alba* (known only from one lake at Nerike, Sweden, and which now grows under government protection) and a seedling from a *N. odorata/ tuberosa* hybrid. Having obviously discovered the technique of successfully hybridising hardy *Nymphaeas*, a secret which he took with him to his grave, new varieties were produced thick and fast.

In the same year *N.X. pygmaea helvola*, the first miniature hybrid, was bred. It is believed that this delight-



Above the *Nymphaea escarboucle*

ful little yellow variety was the result of a union between a form of the hardy white *N. tetragona* and the tender South American *N. mexicana*. The latter was also a parent in the production that same year of the canary-yellow, *N. odorata sulphurea*. Crossed with the North American *N. odorata*, it produced a very useful plant with stellate, slightly fragrant flowers and handsome olive-green foliage, heavily mottled with maroon and brown. This, however, is seldom seen in cultivation today, having been superseded in 1888 by the larger flowering *N. odorata sulphurea grandiflora*.

1881 saw the introduction of yet another yellow variety, *N.X. marliacea chromatella*. Of uncertain origin, this magnificent waterlily is still widely planted and produces its bright yellow flowers amidst handsome dark green foliage that is splashed and stained with purple and brown.

It was about this time also, that Marliac was working on what were to be his *Laydekeri* hybrids. These small growing varieties, named after his son-in-law Maurice Laydeker, involved *N. tetragona* as one parent, and probably seedlings of an *N. odorata* form or hybrid as the other. Ideal for the smaller pool, these charming subjects have retained their popularity and although there are only five different named kinds, can be obtained in nearly all the same colours as their larger counterparts. *Nymphaea X laydekeri purpurata* is probably the most outstanding, with rich vinous red flowers and small purplish-green leaves it makes a wonderful display and is a continual source of attraction from late April until the first hard autumn frosts. *Nymphaea X laydekeri fulgens*, with glowing crimson blooms, and the pearly white *N.X. laydekeri alba*, are both strongly scented with an aroma reminiscent of a newly opened packet of tea, whilst *N.X. laydekeri*

AMPHIBIANS AND DECOR

by Peter Burns

THE LACK of popularity of keeping amphibians in captivity, when compared with tropical fish for example, may be due in part to the rather unattractive and unimaginative surroundings in which they are almost invariably kept. Such sights as cracked, rusty aquariums containing a few rather decrepit frogs and perhaps a somewhat lugubrious toad sitting in one of the corners can hardly be conducive to recruiting many amphibian enthusiasts. Such a state of affairs, however, is not always analogous with keeping these animals since their quarters can be made to look quite pleasing provided that a little care is expended on the matter.

Perhaps the commonest type of furnishing for an amphibian cage is a flooring of soil with pieces of flower-pots as retreats—neither of which is particularly appealing aesthetically. And neither can such an environment be termed a reproduction of the natural habitat, since most terrestrial species live in habitats providing a high humidity—taking the Common Frog (*Rana t. temporaria*) as an example. After spawning, the frogs generally frequent long grass for the rest of the summer. And again, the Fire Salamander (*Salamandra salamandra*) is said to inhabit damp woods—the floors of which would probably be characterised by leaf litter, moss and perhaps pieces of bark and it is these last-mentioned items which can be utilised to great effect in vivaria. Where the cage is fairly large, say 3 ft. x 2 ft., the interior can be made more attractive by placing a strip of bark (e.g. 18 in. x 4 in.) near the back and putting more earth between the bark and the back wall and this area can then be carefully planted with moss. Wall Screw Moss (*Tortula muralis*) is an admirable type for the purpose since it is hardy and can be found almost anywhere on walls, stones and by the

side of paths. If it is removed carefully from its substrate it will live quite satisfactorily on the soil of the vivarium. Where a small converted aquarium is being used, if sufficient moss can be found the entire floor can be planted and an interesting background may be provided by a large, single piece of bark up against the glass. There are, however, problems. First, of obtaining the piece of bark of the right size and second, of flattening it to make it usable. The first may be solved by finding a large, dead tree—this is none too easy and almost impossible in towns and cities. But if you live in the country, you should have little difficulty. Once found, the bark is generally fairly easy to remove. Next comes the flattening which is usually rather tricky. If the bark is loosely wrapped in wet rags and put under a stone or half-brick—this is generally quite effective.

For most of the year a pool of water is not generally a necessity for the more terrestrial amphibians such as most toads and salamanders. However, a small pool is often used by many of the commonly kept species such as the Edible Frog (*Rana esculenta*) and also helps to maintain a humid atmosphere inside the vivarium. If a pool is to be provided, it is best to make it as attractive as possible. An example of an improvement over the tin-lid or small sunken dish is to copy the methods used in making garden ponds using pool liners—though on a considerably reduced scale, of course! If the flooring is perhaps two inches in depth, remove all the soil leaving only the thinnest layer of soil to just cover the bottom. Then lay a plastic bag (cut open) in this depression and place small pieces of rock around the edge and simply fill with water.

By nature, amphibians are principally nocturnal and are consequently difficult to see in their cages without disturbing them to a considerable extent. Fortunately, this can be overcome quite satisfactorily in the case of wooden cages. In essence, this consists of arranging (i) a retreat in the form of a totally enclosed area—i.e. a cavern in miniature, (ii) a viewing window in the side of the cage as one of the side-walls of the retreat and (iii) a wiring arrangement

such that, on opening the sliding door on the outer side of the glass, a small light is switched on inside the retreats.

It is best, first, to cut away the relevant part of the cage wall and glue in place the four wooden slats ($\frac{1}{2}$ in. x $\frac{1}{2}$ in. is suitable). The glass to be used is ordinary window glass and hardboard is quite adequate for the sliding door. The width of the narrow piece of wood separating these two will depend on the width of the cage wall (if this is $\frac{1}{2}$ in., for example, the separating piece of wood will need to be between $\frac{1}{8}$ in. and $\frac{1}{4}$ in. in width).

An easy mistake to make is to forget that the two outer slats and the sliding door come higher up the side of the cage than the glass or the inner slats, since it is above the latter that a further piece of wood must be fitted on which is to be the wiring (this is B in Fig. 2 but is not shown in Fig. 1 for the sake of clarity). Two pieces of wire are required for this part of the circuit (ordinary single-strand copper wire is ideal)—one piece is glued on the underside of B up to halfway along it so that this end is left bare and the other end is connected to the small bulb holder screwed to the inside of the "cave-to-be". The other piece of wire is glued along the other half of B so that there is a small gap between the two exposed ends of wire. The rest of this piece is glued along the back of the same piece of wood (for neatness principally) and thence can be connected to the battery which can be positioned at the most convenient place in the cage. The two remaining connections (one on the bulb holder and one on the battery) can then be joined by using more wire. Because of the space between the sliding door and the glass, it is possible to position (by glueing) a small piece of wire on the former so that, on lifting the door, it completes the circuit and the light is switched on. It will be noticed that only glue has been mentioned where perhaps tacks or nails could be used—Evo-stick is one of the best adhesives for the purpose and is neater than the above and just as efficient on this rather small scale since the system is quite successful even with the glass measuring only 3 in. square and the retreat

measuring only 8 in. x 5 in.

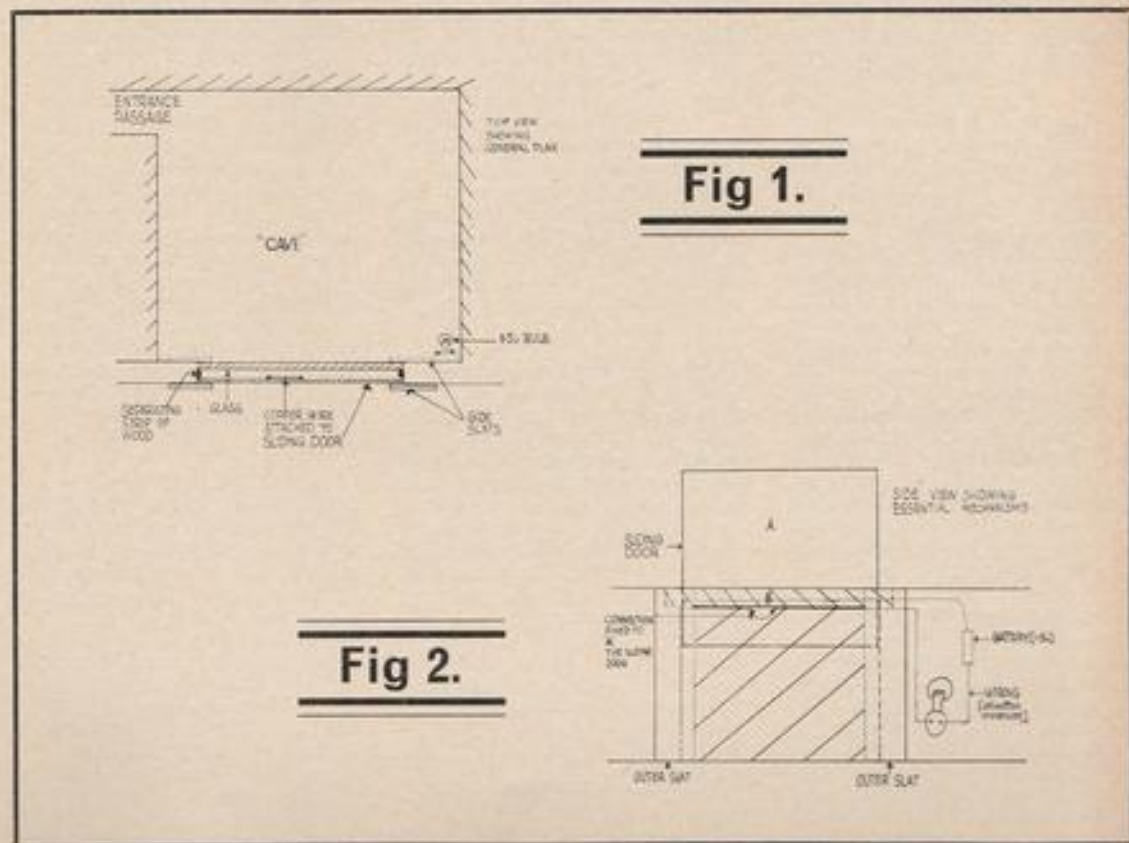
As for arranging the "cave" itself, it is best to have only a thin layer of soil as flooring (as compared with the general depth in the rest of the vivarium) and pieces of bark are suitable for the walls. An entrance passage (as shown in Fig. 1) is advisable, not only to make it more attractive but also to keep the light out, making it more favourable for the amphibians. The rather low roof can be formed by using a piece of slate and on top of this, perhaps, a thin layer of soil and then a carpet of moss over the top of the entire cave. Thus the general effect, from above, should be a gradual upward slope (if the set-up is at the end of the vivarium) and the narrow entrance (to keep out the larger and therefore more clumsy toads) some distance from the viewing panel so that it does not look

more false than it has to.

With reference to lighting in the cage as a whole, this is not to be recommended generally since amphibians as a rule detest excessive light, notable exceptions are the Edible Frog (*Rana esculenta*), and the Marsh Frog (*Rana ridibunda*). However, if the light bulb can be suitably concealed, an interesting (almost eerie) effect can be obtained by use of green light though this should not be used for more than a couple of hours; during the evening is the best time.

Up to now only the land vivarium has been considered since this gives greater scope than water and it is also probable that more amphibians are kept on land than in the water. Newts, however, show their greatest colour and are liveliest in the water during early summer. Perhaps the best maxim is to follow the ideals of

the tropical fish keeper. Thus overhead lighting shows up the colours of such an attractive species as the Alpine Newt (*Triturus alpestris*). Aquariums housing newts all too frequently lack growing plants in sufficient quantities. A reasonable variety of hardy aquatics can be found in many ponds or, if this is not practical, plants such as *Myriophyllum*, *Elodea canadensis* and *Callitriche* (Starwort) can be obtained from most aquarist shops. Most newts will thrive in such an aquarium though the water should not be heated. There are two amphibians which soon make a mockery of tasteful planting and crystal clear water; these are the Axolotl, (*Siredon mexicanum*) and the South African Clawed Toad (*Xenopus laevis*)—especially the latter whose large size and lively nature at feeding times make regular water-changes essential.



KEEPING YOUR MARINE TANK CLEAN

by "Marstud"

"Les corps ammoniacaux sont toxiques, ils doivent être éliminés rapidement, ou être transformés en corps moins toxiques (urée, acide urique) pour éviter leur accumulation dans l'organisme."

H. Delauney, 1931.

Introduction

Marine aquaria have long been regarded as being more difficult to maintain than their freshwater counterparts. This is due notably to the fact that little information has been available to the aquarist on the ways and methods of removing the complex end products of metabolism when one tries to keep a cross section of the ocean confined within five sheets of glass. With the advent of Ionic exchange resins came the first breakthrough in the field of removing the by-products of protein catabolism from closed systems, though even these are not 100% efficient as we shall discuss in a later chapter.

Now, before delving more deeply into the methods of removing end products, or excrements, it is as well to discuss exactly what these are comprised of and which of our animals (assuming we have more than just Teleost fishes in our aquaria) produce which type of excrement, as these are by no means the same with all species and vary both in type of material and quantities produced. In addition we must bear in mind that certain materials pass through the system in an indigestible form and are released in the same form into the tank water.

Ammonotelism and Uricotelism

Ammonotelic animals produce ammonia as the major end product of protein catabolism, whereas Uricotelic animals produce Uric acid as the main nitrogenous end product.

Teleost fishes tend to be ammonotelic but many produce appreciable quantities of urea, sometimes amounting to as much as one fifth of their total output. Large

amounts of Teleost excrements are produced as Trimethylamine oxide, part of which is produced from their detoxification NH_3 , part originating in the food.

Predominantly ammonotelic invertebrate groups are: sipunculoids, amphipods, isopods, decapods, echinoderms, brachyopods, lamelli-branches, cephalopods and gastropods, and although ammonotelic animals also produce small quantities of urea and uric acid these are derived largely from their use of nucleic acids. Other ammonotelic animals such as echinoderms and crustacea excrete fairly large quantities of amino acids, whereas elasmobranchs are peculiar in the fact that they produce large amounts of uric acids, but these also seemingly retain a high percentage of urea in the blood.

The toxic materials themselves

From the information above it can be seen that, of the materials to be eliminated, urea, uric acid, and ammonia constitute the bulk of toxic wastes, but other chemicals produced in far smaller quantities also have to be removed from your biosystems to ensure the health and well-being of the occupants. These are listed below together with the major by-products of excretion.

Urea
Uric acid
 NH_3 (as NH_3 and Non-protein N)
Trimethylamine oxide TMO
Nucleic acids
Amino acids
Allantoin
Allantoic acid
Purines
Creatine

Creatinine and other very minor end products.

Amino acids are deaminated with the formation of ammonia by enzymes known as deaminases. Protein degradation and synthesis of particular excretory products are catalysed by enzymes at all stages. However, as shown, some groups excrete the nitrogenous excrements from metabolism as ammonia whereas some species convert the latter into urea or uric acid. Invertebrates also come under the heading Purine metabolism, as unlike fish they do not degrade purines all or part of the way to urea. Some of them possess specific enzymes, adenase and guanase which deaminate the purine bases adenine and guanine converting these to hypoxanthine and xanthine. These in turn are often oxidized to uric acid by xanthine oxidase. Certain invertebrates possess enzymes enabling them to break down Uric acid through a series of steps to ammonia.

Ways of removing the toxins

Of the eleven compounds referred to in the chapter on the materials themselves, ammonia (NH_3) in any of its form is probably the most dangerous of all, and as it is produced in quantity by many organisms needs our attention. Fortunately, from the aquarist's point of view though it is normally changed by aerobic bacteria to nitrite, this can then be oxidized to nitrate and or reduced to nitrogen. This solves the ammonia problem only to confront us with several others—how to eliminate the breakdown products of the ammonia itself. We shall discuss ways of removing these, together with the remaining toxins below.

Method No. 1. Removal by Ion Extraction (G. Eheim type) Resins. If your marine biosystem is filtered externally then you should be able to adapt your filtration unit to take ionic exchange resins. These polystyrene resins, when a supply of seawater is passed over them, remove the major by-products of excretion. According to the resin used one can predetermine which products they are capable of extracting. Only one series of resins is of current use to the aquarist however, due to the limited capabilities of certain resins. This is a two-component resin (two parts, that is. In fact it contains about six separate resins)

produced by Messrs. Guenther Eheim of Western Germany. It is rechargeable, and we have found effective in the removal of Urea, Uric acid, NH_3 , TMO Allantoic and Amino acids, Creatine and Creatinine, Purines and Allantoic acid. And other minor colloids. They do not extract nascent N. (Nitrogen). One drawback to the use of ion extraction resins is, however, that they are used up easily and require recharging now and again. One has no indication as to how frequently without resorting to elaborate colourmetric water testing equipment.

Method No. 2. Removal by continuous water change. It would seem that by far the simplest way of removing these toxic materials would be by regular frequent changes of water in the system—a precaution normally used in conjunction with methods 1 and 3. This is not actually as simple as it at first sounds for several reasons. Firstly, certain animals we are likely to be keeping produce very large amounts (proportionally) of toxic wastes, and would, due to this fact, require very many (and frequent)

changes of water or a continuous flow from a large reservoir. Secondly, this being possible, unless the water replacing that in the system were exactly identical in temperature, salinity and chlorinity (not to mention pH), the occupants would be subjected to a series of osmotic shocks every time this occurred.

This method, although used previously, is not suitable for continuous use and has been outdated in all but the largest public aquaria.

Method No. 3. Removal by continuous algal and bacterial filtration.

Aerobic bacteria oxidise ammonia and ammoniacal by-products in excess of their own nitrate and nitrite requirements and as such can perform a useful job in a closed circuit aquarium. These are then adsorbed by algal beds either inside or outside the tank. The construction of such systems has been described in the book 'Aquarium Hygiene' by Hellmuth Wachtel and in a recent article on 'The Marina System' in this magazine. This system, in our opinion, is the one giving the highest success rate with marine fishkeepers.

Glossary

Protein catabolism	The use of protein by living animals.
Amino acids	Complex food products, sometimes produced as by-products.
Deaminases	Enzymes which break down amino acids.
Adenases	Enzymes which break down adenine.
Guanases	Enzymes which break down guanine.
Xanthine oxidases	Enzymes which break down xanthine and hypoxanthine.
NH_3	Ammonia.

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THE MADAGASCAR LACE PLANT

Aponogeton fenestralis

by J. W. Kail

THE LACE PLANT OF MADAGASCAR is one of the most beautiful of aquatic plants whose propagational problems seem to have been sadly neglected by writers. Therefore, I hope my contribution may be of some assistance to many readers who, I am sure, have at some time been tempted by its beauty.

I started off by reading accounts of which there seemed very few. The best two articles I came across were in back numbers of the *Aquarist*, January and February, 1962, by Dr. R. O. B. List. Shortly after reading these articles, I managed to acquire some sprouting corms and one I planted in a 4-in. plastic pot in a

mixture of potter's clay and smashed car-windscreen chippings, in equal parts. The idea of glass chippings was because I knew if I used gravel it would harden the water considerably and this I wanted to avoid. I placed the pot in a tank of rainwater on the bench in a shaded part of the garden shed, with no heater or thermostat, the temperature being a constant 68°F. I suspended a 40 watt clear bulb over the tank which I kept lit for five hours each evening.

At first small leaves sprouted, grew larger and more appeared until after about three months the plant consisted of about 25 leaves and was some 8 ins. high above the pot. I should mention at this point that about every three weeks I had been draining off one-third of the water and replacing with fresh rainwater raised to 68°. This was as suggested by most writers and seemed to be correct because the plant was looking very well. It was at this stage that the first flower-bud appeared on a stalk, which rose to about 2 ins. above the water, then burst open revealing a twin spiked white flower

about 2 ins. long. This was followed in quick succession by four more.

To assist pollination, each day I lightly brushed the blooms up and down with a fine camel-hair brush and after about a fortnight the blooms died away and in their place seed pods began to form up the spikes. These were green at first then changing to mauve, each one being the shape of a tiny pyramid containing 3 or 4 seeds.

I waited some three or four weeks hoping these would burst and eject the seeds, but they didn't and by this time they were hanging over dangerously near the water and I feared that if they went in they might rot away. So, throwing caution to the wind, I removed the pods, one at a time from the spikes, with tweezers and picked out the seeds, which I floated on the surface. These also were a bright mauve, but after a few days the seeds discarded their mauve skins and sank to the bottom, a bright green in colour and then began to shoot both root and foliage.

continued on page 10

WHAT IS YOUR OPINION?

by B. Whiteside



AT LAST I SEEM to be getting a good response to some of the questions asked in recent issues and letters have been received from as far afield as America, Netherlands and, believe it or not, even Northern Ireland. I was beginning to think that the many aquarists in this part of the British Isles were not keen to share their knowledge. We are a rather reserved people despite what the mass media would lead one to believe in recent months.

From Portrush, in N. Ireland, came a letter from Mr. C. Knight, on the subject of keeping large and small aquaria clean. Mr. Knight has twelve tanks ranging in size from 16 in. \times 8 in. \times 8 in. to 6 ft. \times 15 in. \times 15 in. and he finds that the bigger the tank, the easier it is to keep clean. In the smallest tank Mr. Knight keeps bumble bee fish and finds that the tank needs to be cleaned once per week and that the plants are poor. His 3 ft. tanks need cleaning every two weeks and the plants are fair. He keeps from 8 to 20 fish in tanks of this size. 4 ft. tanks, housing about 20 fish are cleaned once every three weeks and the plants are good. The 6 ft. tank only needs cleaning once every six weeks and plant growth is very good. This tank holds 45 small fish, and is a real show-piece. The glass in all of the tanks may need cleaning more often than the base. Water is part changed every six

months and all tanks are kept at 78-80°F., and all are lit with "Gro-Lux" lighting for eight hours per day in winter and six hours in summer.

Mr. W. N. Cliff, from Oegstgeest, in the Netherlands Z.H., sent a letter in which he tells of how, back home in Scotland, he used to have two 24 in. \times 12 in. \times 12 in. tanks which he now feels were overstocked with fish but which were always sparkling and which were full of plants which grew like wildfire, especially Amazon swords, *Vallisneria*, *Sagittaria* and *Cryptocoryne neovellii*. He did not use aeration and the lighting was 30 watts of strip-light (tungsten) which used to burn out very quickly.

In Holland, Mr. Cliff has a large 40 in. \times 20 in. \times 20 in. tank, lit by a 36 in. "Gro-Lux" tube (in very common use there). For a year he had a lot of trouble with this tank and he gives the following as the reasons: (1) the increased depth of water, and (2) the fact that the water was different. A lot of species familiar to Mr. Cliff began to die off and he did not know whether to blame the water, the unusually constructed tank or the lighting, or even incompatible plants. (He had an Amazon sword which grew to about 20 in. high and produced flowers, small plants, etc. It has now died down to a weedy 3 in. high object and he cannot find the reason except to assume that it is being affected by the secretions of another plant). In his opinion the increased size of the tank leads to more fish being kept. Their excreta is consequently more copious, and it builds up at the bottom of the tank and is not absorbed as quickly as in a small tank unless the tank is thickly planted. In addition to this, in a deep tank the water at the bottom must become stagnant more easily and not mix as much as in a small tank. This will naturally happen if the heater is kept higher than the lowest point in the tank, i.e.: the heater is normally kept at the back of the aquarium above several inches of gravel and not at the front glass, level with the front frame of the tank's base. Water thus circulates with its lowest point of circulation level with the heater above the gravel at the back, and the water in the front few inches remains coolest and at rest. Also the depth of the water will cut

down the intensity of the light which reaches the bottom of the tank—unlike that in a smaller tank. The layer of mulm will also cut down the light intensity which reaches plants on the bottom.

His answer was an under-gravel filter about 9 in. \times 4 in. which was switched on only at night normally, and left on permanently when Mr. Cliff was on holiday. On his return, after three weeks, his tank was overgrown, particularly with 3 in. high *Vallisneria*. This filter keeps the water clear, circulates the water, doesn't need changing and really disposes of the sediment. Mr. Cliff agrees that gravel of at least $\frac{1}{4}$ in. grade, is best, and that this kind of filter cuts down plant growth but he asks who wants a jungle anyway? (I must admit that I like my tanks very heavily planted).

Mr. Cliff strongly advises a big tank and says that his next will be about 56 in. \times 20 in. \times 20 in. but he thinks that he will either add another "Gro-Lux" tube or add incandescent bulbs to modify the spectrum, as he thinks that the effect of the "Gro-Lux" is rather unnatural.

A shorter letter comes from Mr. E. W. McFarlane, of Newcastle upon Tyne, who is Chairman of the N.G.L.S. He considers that a clean aquarium depends upon mathematics and he says: "One must bear in mind that a tank of the proportions 18 in. \times 10 in. \times 10 in. is almost half the size of a 24 in. \times 12 in. \times 12 in., and this is just about a third of the size of a 48 in. \times 15 in. \times 12 in. in volume; so if we relate the size and number of fish, the quantity of light, the number of plants and the size of everything in ratio, we will find that no matter what the size of the tank, the outcome will be the same."

Mr. S. R. Winter, of Hatfield, Herts., thinks that the larger a tank is, the easier it is to keep clean because the water rarely becomes polluted, while in a smaller tank this can easily happen. He also points out that there is more room to wield a siphon tube in a larger tank and that the amount of water removed, and later replaced with fresh stuff, is a small proportion and thus is less likely to affect the fish. Mr. Winter also thinks that the Amazon sword plant, which he considers to be the loveliest aquarium plant, can only be kept in large tanks

as can a multitude of other plants which give a continually changing picture. This is something difficult to achieve in the smaller tank. (Sorry, Mr. Winter, but I disagree with what you say about plants). Mr. Winter's 36 in. x 15 in. x 15 in. tank is lighted by two 60 watt bulbs, moderately thickly planted and contains about 15 small fish. It is kept at 78°F. and needs to have the algae removed from the front glass every two weeks, to keep it crystal clear. The external filter keeps the water clear and the water is only partially changed every three months. Every two weeks the base is cleaned with an air-powered cleaner.

From Wellington, Salop, comes the regular letter from Mr. Peter K. Brown who keeps small, medium and largish sized tanks. He has a power filter which he uses on any tank that is looking a bit dirty. After an hour's use, a dirty tank is clean. This filter is, of course, a supplementary one. His 18 in. tanks have a plate-like undergravel filter which is left permanently on, but he is not too keen on this type of filter as he finds that it restricts plant growth. He uses 1 in.-1½ in. of ½ gravel over the filters and keeps 6 neons and two black neons in one tank and not more than six fish in each of his other 18 in. tanks.

He finds it harder to keep his 24 in. tanks clean as they are too large for an efficient undergravel filter. The best type of filter is an outside one with charcoal and nylon wool, or a corner type. If this is used an air stone should be used to stir up the dirt. He points out that the effectiveness of a filter depends upon its position. Mr. Brown finds his 3 ft. tanks are by far the easiest to keep clean. He uses two corner filters or a large outside filter capable of filtering over 20 gallons per hour. 15 to 36 fish are kept in this size of tank. The glass of his tanks needs cleaning every two to three weeks, depending upon how long the light is left on. As for water, tanks are topped up whenever necessary but some water is siphoned off every six weeks. This does not increase the hardness of the water to any noticeable degree but Mr. Brown warns that if one lives in a hard water area, topping up without siphoning out some water can have a bad effect upon the fish and plants.

In the lounge of Mr. G. S. Dawson's house, at Huncote, Leicestershire, are three tanks in regular use and of course they must be kept clean and decorative. Mr. Dawson's wife is almost as keen on the hobby as he, and so she looks after the cleaning of the glass of the aquaria and of their topping-up. Undergravel filters are used and these amply look after the base of the tanks. Since using this type of filter, Mr. Dawson's tanks have never suffered from water trouble.

His three tanks are 4 ft., 3 ft. and 30 in. long. The largest one contains the largest fish, i.e., angels, gouramis, etc. The 3 ft. tank is also a community tank and houses guppies, various tetras, etc., and the smallest tank, at the moment, is used as a breeding tank for dwarf gouramis. Tank decoration has always been important to Mr. Dawson, and he has had no trouble with tanks up to three feet, although with smaller tanks he thinks that he found it difficult to produce a "living picture" and had a lot of algae trouble. His 4 ft. tank was a different kettle of fish as its length fooled him for some time. He has now had it for six months and although it looks much better now, he's still not satisfied.

Rock formations play a large part in his decorations and in a tank of 4 ft. two formations can be used with ease. He decided upon this and tried for a "wide view" effect. This was his biggest mistake and only about five weeks ago did he realise what was wrong—that the two rock formations were too far apart, leaving too much centre space. It has now been rectified and with the addition of more rock, Mr. Dawson is nearly satisfied. All he has to do now is sort out the plant selection.

The following letters are on the subjects of feeding fish whilst on holiday, the most popular type of fish, and the reasons for the greater popularity of tropical fish over cold-water fish.

Mr. I. Bolton, of Sutton Coldfield, Works., writes that his favourite fish is the black widow tetra (*Gymnocorymbus ternetzi* for our overseas readers). His reasons are that it is an easy species to breed and is very prolific; it is an extremely colourful fish, especially when young; even when they get older they are still

colourful; and they are a shoaling fish and look very well against a wall of green plants. He keeps twelve in a 3 ft. tank, thickly planted with *Vallisneria* and *Aponogeton*.

From Leigh, in Lancs, Mr. J. Boardman writes to say that he likes the zebra danio and the tiger barb equally because both are strong, colourful, always active and nearly always healthy. When going on holiday, Mr. Boardman laid out one parcel of dried food per tank, per day. His young fish and his killies were fed with daphnia from his own daphnia pond. In the case of the dried food, the result was a total loss of forty adult breeders. The main cause was a heat wave for the first three days, when no food was eaten and it just decayed in the tanks. Mr. Boardman considers tropical fish keeping to be, in some ways, easy compared with coldwater fish keeping. He states that there are hundreds of different tropical fish available compared with about only a dozen or so coldwater species which are practical to keep and BREED.

A long letter came from Mr. R. C. Mills, of Perivale, Middx. Before going on holiday, Mr. Mills feeds his fish well on extra live food for a couple of weeks. He also sets the thermostat a couple of degrees lower and leaves the lights off and finds that these measures help to slow down the fishes' metabolic rate and dull their appetite. On returning home he has only to switch on the lights and raise the temperature to normal. The fish are then fed. It may take the plants a few hours to straighten up again from having been bent towards the front glass for all the available light, but he has found no ill-effects from this procedure, and it is quite safe to leave the tanks thus for up to two weeks. Livebearers may also supply live food during holidays. If there are fry to raise, then the matter needs to be resolved another way, either with an automatic feeder or with an obliging neighbour with prepared amounts of food and strict instructions.

On the subject of the popularity of tropicals, Mr. Mills answers with two words—space and proportion. The aim of most aquarists is to keep fish in a good state of health, breed a few species perhaps, but certainly to grow their fish to a reasonable size. All coldwater fish keepers are not blessed

with a large space for pools or fish houses in which to raise coldwater fish. Mr. Mills points out that a tank which would hold a community of tropical fish, would only hold a few coldwater fish comfortably. As regards proportion, it is easy to furnish and populate a tropical fish tank and have it looking correct but the larger coldwater fish would need a proportionally much larger tank and this could not be accommodated in Mr. Mills' lounge. He also points out that in a tropical tank one can have bottom, top and mid-water swimmers, whereas even a bottom dweller in the coldwater tank, is going to take up a fair amount of room, and if a surface swimmer is added, e.g., a dace or an orfe (not an ideal choice for a tank anyway) there will not be much room left for a middle-of-the-road tribe. Another reason, too, for favouring the smaller fish is perhaps a reflection on the attitude of today's society where a lot of people like a lot to show off. On the question of the most popular fish, Mr. Mills thinks that the average aquarist would mention the fish with which he was having the most success at the moment of being asked.

The last letter in this batch comes from a student, Mr. Graeme Gould, of St. Andrews, Fife. He thinks that the most satisfactory arrangement for having fish fed whilst on holiday is to have a relative or friend who has some knowledge of the hobby, to visit the house regularly to meet the fishes' needs. Otherwise he would suggest that the lighting system be

wired up to the heater and thermostat. This would provide rest periods for both fish and plants. However, he states that the two main defects of his idea are that it would cause overloading in large set-ups and so it is most applicable to smaller units, and that if the heater or thermostat broke, then the light would remain off (or on) perpetually until the owner returned. If a food distributor were coupled with this set-up then most of the fishes' needs would be catered for. Mr. Gould thinks that it would do little harm to leave the pump on for the whole of the holiday, although it could be operated like the lights. Mr. Gould thinks that the question of a favourite fish should not arise with the serious hobbyist, as he ought to be fascinated by all life-forms in the spectrum of tropical fish, just as the naturalist, who studies, enjoys and often keeps, some of the creatures that stimulate his interest. Mr. Gould goes on to say that the hobbyist who remains uncommitted to a family of fish, or a single species, has grasped the spirit of tropical fish keeping. Tropical fish are more popular, he thinks, because of their great variety. The wide choice of plants and the many possible combinations of fish and plants stimulate interest and allow scope for the individuality of every hobbyist to find expression. Perhaps its relative popularity is partly due to the mere exoticness of a tropical set-up in the house. Mr. Gould ends by saying that he thinks it a pity that, due to a

lack of response to more specialised questions, I stick to generalities. Might I reply that the pity is not that I stick to generalities, but that I find it necessary to do so, because of the poor response. However, there is no advantage in being pretentious by asking super-scientific questions which will not bring any answers or, if they do, the answers to which will be either of no interest to, or unintelligible to, the majority of readers. However, I do include specialist questions fairly often, and many of these are sent by readers. If Mr. Gould, or any reader has an interesting question which he would like asked, please send it to me and it will be included if room can be found.

Now for a few questions: (1) What are your experiences with the growing of *Aponogon* species, and what conditions do you find best? (sent in by Mr. Bolton). (2) Have you found any plants which dislike "Gro-Lux"? (suggested by a comment of Mr. Cliff's). (3) At what age, why and how, did you obtain your first fish, and how long have you followed the hobby? (4) What do you think of freeze-dried fish foods and do you consider them to be good value for money? (5) Having bred quantities of one particular fish, how do you dispose of the extra ones? (6) Have you written any good poems about the hobby?

Our thanks go to those people who answer our questions. Please keep the letters—either questions or answers—coming, and please print your name clearly.

MADAGASCAR LACE continued

So now I was faced with the problem of what medium to plant these seedlings in and here I made my first mistake. I chose to plant most of them, which numbered 140, in clay and a dozen in sand. But it seems that clay is much too heavy a medium for these seedlings, because in a very short time their roots had rotted away and they died. But the dozen or so planted in sand are growing better than my wildest dreams, each having two leaves and being about one inch in height. So sand for the seedlings seems the answer.

I feel at this point of conclusion I must point out that the aforementioned instructions of 68°F, no fish or gravel only applies if one wishes to successfully propagate this plant. My experience has shown that this plant can be kept quite well if potted in the medium mentioned and kept at around 75° along with any small, peaceful fishes providing that you initially fill the tank with rainwater and replenish evaporation loss with same.

The tank concerned can have two or three inches of preferably lime-free gravel, in which one can root plants needing similar requirements, i.e., the Indian Ferns, "Ceratopteris," and

most other *Aponogon* species. Under these conditions of increased temperature and slightly harder water, the leaves seem to attain a greater width, but the plant itself seems reluctant to flower.

Don't forget
Alexandra Palace
10-13 July 1969

BREEDING GOLDFISH

THE SPAWNING

by A. Boarder

IF THE INSTRUCTIONS I have given in previous articles have been carried out, the goldfish should spawn once the weather gets a little warmer. There will be no doubt in the mind of the pondkeeper or aquarist when the fish actually begin to spawn. This usually takes place during the mornings and it is not often that much spawning takes place after 2 p.m. A lot of activity in the pond will be observed as the males chase and nudge the female fish. This chasing may continue for some time before any eggs are laid but providing the fish are in good condition it should not be long before some eggs are laid. After a continuous chase all around the pond the female is forced into a mass of water weeds and with a thrashing of tails the eggs are laid and fertilised. Then another chase will begin, ending with another thrashing in the weed.

During the excitement of the chase the fish are usually oblivious to any other disturbance and one can get quite close to them. It is however better to keep away from the fish whilst they are actually spawning. After an hour the bunch of weeds can be inspected to see if many eggs are present. To the uninitiated the eggs appear as very small bubbles of jelly, about the size of a pin's head. They are laid singly and adhere to anything with which they come in contact. If eggs cannot be seen it is a good idea to lift the bunch out of the water when any eggs will show up more plainly, generally with a slightly amber tint.

If a goodly number of eggs are seen, the bunch can be removed to the hatching tank together with some water from where the bunch was anchored. Another bunch of weeds can then be placed in the same spot and after a short time the fish will soon be spawning again on the fresh bunch. I have often found that once a fresh bunch is introduced the

spawning recommences at a faster rate. The fish appear to know when there are enough eggs on a certain bunch.

The water plants used for the spawning nest should be those with fine leaves if possible, although the fish are not particular and will choose anything on which to spawn if they are in the right condition. One of the finest weeds I know for the reception of eggs is blanket or flannel weed. This is not the best weed to introduce into a pond but where it exists there is no doubt that it is a favourite type for fishes in which to lay their eggs. Not only do the eggs stick to this weed strongly but it is probable that in such a position they are not as likely to be found and eaten by other fishes. Some pondkeepers use bunches of nylon for the nests and whilst it is certain that the matter does not contain any troublesome pests or diseases, the nylon will not give off any oxygen as would the blanket weed. This supply of oxygen is most necessary for the development of the eggs. One is inclined to imagine that this is not necessary except for the fry when they emerge. However many eggs fail to hatch just because there has been insufficient oxygen in the water of the hatching tank.

Goldfish in garden ponds can be expected to spawn in late April or May. This can depend on the position in the country, the more southerly the earlier can this event be expected. If the water conditions are not right it is probable that the fish will not spawn until late in the summer. What actually triggers off the spawning is a problem. It is certainly not the temperature of the water as I have had spawnings from my fantail goldfish in the open pond when the water temperatures have been from 50°F to 75°F. The average has been 61°F. As this variation in temperature is so great it appears to me that this is not the deciding factor. Over many years of experimenting I have found that the weather does not effect the spawning as much as one might expect. I thought at one time that the fish only spawned at the beginning of a warm, fine spell, but I have also had several at other times when the weather has been showery. One point seems to me to be very important, it is that the water must be very pure and well oxygenated. It is very unlikely that the fish can be expected

to spawn in water which is in any way foul. If the condition of the water in the pond is suspect, most of it should be removed and fresh run in. It is often after a large quantity of fresh water has been added to a pond that the fish spawn the following morning. The presence of a fountain or a water-fall will often help to keep the water in a better condition but this is not always so. If the pond contains a quantity of decaying matter the fact that it is kept in motion by a fountain or water-fall will not necessarily mean that the water is pure. The foul matter may be kept in suspension and just circulated about causing more trouble.

Having made sure that the water is in good condition, that is having no bad smell nor bad colouration, the fish should be the next query. Are they in tip-top condition and ready to spawn. Correct feeding may help a lot to this effect. Plenty of broken garden worms and some Bemax every other day will help to get the fish in breeding condition. Sometimes it helps if no fish appear ready to spawn to divide some of them off. If one is not sure of their sexes, this does not matter as the mere fact of a temporary separation often brings about the desired effect.

Having obtained some eggs the next step is to ensure that they have a good chance of hatching. The temperature of the water is not all that important but it is a fact that the warmer the water within reason, the quicker will the fry hatch. I like to maintain one of about 70°F, and do not like it to rise above 75°F. Neither do I allow it to drop below 65°F, if I can help it. A small tank heater with a thermostat to control it is very useful or the hatching tank can be housed in a greenhouse if one is available. If aeration can be supplied this will be of great value as without an almost constant supply of oxygen the eggs will fail to hatch. Within about twenty-four hours of being laid any infertile eggs will become white and then go fuzzy. The good eggs will be very difficult to see at this point and it is probable that some aquarists could think that none were fertile as the bad ones show up so plainly that any others can be overlooked. If sufficient oxygen has not been provided the embryos can be seen dead in the egg after four days or more. If this happens it is almost

PLANNING LONDON'S BIG FISHKEEPING EXHIBITION

July 10th to 13th
at Alexandra Palace

AQUARISTS FROM all corners of the country will be converging at Alexandra Palace, Wood Green, London N.22, in July for what promises to be the largest southern aquaria exhibition in recent years. Organised and sponsored by The "Aquarist and Pondkeeper" in association with the Federation of British Aquarist Societies, the Exhibition will cover floor area of nearly 20,000 sq. ft. and include a comprehensive range of attractions and competitions. These have been planned to cover the widest range of interests, from classes for individual and club entries, to special competitions for Schools and attractive displays and novel exhibits for the general public—from whom the Exhibition is expected to draw new recruits to the fishkeeping hobby.

Among the many classes for which handsome tropical prizes will be awarded are those for Tropical and Coldwater and Marine Furnished Aquaria, a special class for Furnished Aquaria entered by schools; Plants, in two classes (cuttings and rooted); Pairs competitions covering Mollies, Platys and Swordtails; and other sections as set out in the schedule.

Specialist Societies have been invited to set up their own non-competitive stands, and some unusual presentations are promised from these displays which cannot fail to have a favourable influence on memberships.

Schools will be prominent in the Exhibition programme, for in addition to the special class for Furnished Aquaria, arrangements are in hand to widen the educational appeal by inviting essays on fishkeeping as a hobby, or on experiments and research associated with fish.

Novelty exhibits of general interests will include a large pool of Koi Carp, a special marine exhibit, and a display of native fishes which will have a particular attraction for envious anglers.

Trade exhibits will be a prominent feature, and in such a large area will present an extensive range of fish, plants and all aquarium accessories and information that in itself will

THE AQUARIST & PONDKEEPER FISHKEEPING EXHIBITION

make a visit to the event worthwhile.

Full particulars of classes and all details are given in the Show Schedule available from:

Mr. S. Mooney, Show Secretary,
44, Coniston Road,
Muswell Hill,
London, N.10.

Other enquiries to:

The Show Organiser,
The Aquarist and Pondkeeper,
The Butts, Half Acre,
Brentford, Middlesex,
Telephone: 01-560 6221.

Further news in our next issue of an event that will rate as London's premier aquatic attraction—The "Aquarist and Pondkeeper Fishkeeping Exhibition."

BREEDING GOLDFISH, continued.

certain that the fault is with you and not the fishes. The water can get too hot and the eggs can become almost cooked when they die. It is therefore necessary to ensure that strong sun rays do not penetrate the glass side of a hatching tank. Also it must be remembered that the warmer the water the less oxygen will it hold.

Hatching tanks need not be deep, and a plastic washing-up bowl is quite good. The pondkeeper who has a few tanks which have held one or two goldfish for the winter will find that these make good hatching tanks once the fish have been removed. It is almost certain that such tanks will be free from some of the pests which could eat the eggs or harm the fry. Another excellent idea for the aquarist with spare tanks is to watch the fish

as they spawn and then catch a female and one or two males as they are spawning in the pond and transfer them carefully into one of the empty tanks. If this is done quickly and carefully it is probable that the fish will spawn again within a few minutes of being moved. By this means the pondkeeper is able to choose the spawners and so if good specimens are kept in the pond with poorer quality ones, it enables him to obtain eggs from the actual fish from which he wishes to breed.

When bunches of weed with eggs have been taken from a pond it is important to watch the tank carefully to see that no unwanted pests have been introduced with the eggs. There may be the larvae of certain insects or eggs of newts which could cause trouble later on. If some bunches of weed are kept in a separate container so that they are reasonably

clear of pests, these can be introduced into the pond when the fish are actually spawning. They can then be expected to be safe for the eggs and fry.

The aquarist who intends to breed in a very controlled manner will use tanks in which to spawn individual fish pairs. When doing so he must make sure that the tanks are large enough to allow plenty of movement for the fish and that they are well oxygenated, and not over-crowded. In such controlled methods it will be found that the breeding of good quality strains of fish is much easier than the hap-hazard open pond method. However if one has just one strain of fancy goldfish in the pond, then the general breeding method will be quite all right as no other type can spoil the results.

My next article will deal with the rearing of the fry.

GRAVEL *Cryptocoryne haerteliana* AND HARDNESS by R. C. Mills

IN PRESENT DAY SPAWNING records, every aspect of preparation and consequent events are faithfully noted and yet despite the most diligent attempts, things go wrong for some unexpected reason.

Mature, well-coloured fish are chosen, fully conditioned and obviously ripe for parenthood. The tank is scrupulously cleaned and disinfected, as are the plants and, in the case of the more demanding fish, the exact requirements (according to the books) of water conditions are strictly adhered to; the result? NOTHING!

At one time I attempted to spawn some Glowlight Tetras, only to meet with dismal failure. (For those "clairvoyant" readers, this is not going to have a "How I triumphed over all odds" ending.) I had tried to set up the correct conditions and yet something was wrong somewhere. In attempting this family of fish I had paid some attention to the chemical make-up of the water and had become involved in things like pH and DH.

I found that the pH was changing from that which I had contrived to set up for the happy pair, as was the hardness. On discussing the problem with other aquarists, the blame was attributed to *Cryptocoryne haerteliana*, a handy scapegoat at that time. (Refer to F. Partington—Dangers of *Cryptocoryne haerteliana*, *Aquarist*, December 1967). Whilst I could conceive that plant-life could affect the pH, I couldn't quite see how hardness was affected.

I had a tank already set up with "normal" plants and gravel and soft rainwater; on testing the hardness I was interested to find that the figure had risen from around 3 to 18 degrees of hardness. (The Test Kit I used was the Durognost.) This eliminated *C. haerteliana* as far as I was concerned, but to be on the safe

side I now omit it from any tank set up to specific conditions.

At this point, the only other culprits could be the plants or the gravel. The tank had not been set up long enough for evaporation to necessitate topping up, which would of course increase the hardness figure. I decided to test the gravel and see if there was any free lime present. This I did by a simple process, handy to perform in any household. I tipped some vinegar over the gravel and was not surprised to hear a fizzing sound. Nothing violent but quite audible. Vinegar contains acetic acid and it was this that was acting on the lime; to further the research, I tested another sample from a different source and quite a spectacular result was achieved. The second sample was of a much finer nature, about 1/16 in. size; this meant that a far larger surface area was available for reaction and a 1/2 in. head of froth was obtained!

Having arrived at this stage, the next step was to find a solution to the problem. Could the gravel be treated in some way? A recent article in the *Aquarist* suggested Spirits of Salts to slake out the lime, but whether this is a permanent cure or only a short-term measure, I am not sure. Perhaps a substitute for gravel could be found?

Various substances have been used as a compost in tanks with some startling effects but I was not too keen on the idea of pulverising enough coal even for a two foot tank let alone my four foot, and the thought of soliciting monumental masons for granite-chippings appeared morbid to me!

The lime-free potting grit used by nurserymen was one avenue I explored, but it was difficult to locate and I presume that in this modern age a synthetic compost, vermiculite for instance, is used for plant propagation where lime is not wanted.

Bedford sand seemed to fit the bill, but I was not too keen on the light colour as I think fish prefer to swim over a dark surface. It seems to give them a sense of security, and also the sand was on the fine side and this may have packed down too firmly for adequate plant growth.

I obtained some sharp sand from a nurseryman to try, but whilst it seemed quite reasonable there were pieces of sea shell in it, a good source of lime, and also by the time it had

been washed a fair proportion of the sand would have been washed down the drain. Short of touring all the local gravelpits with a bottle of vinegar, the quest seemed quite unending! However, one nurseryman I spoke to gave me the name of a sand company, and a telephone call to them proved fruitful.

I was told that they supplied aquarium compost and that it was quite lime-free. I decided that it might be interesting to follow up this lead so I visited their offices and was staggered at the courtesy, service and interest extended to me. Anyone would have thought that I was bringing a bulk order of several hundred tons instead of a tentative query about aquarium gravel! I was shown the complete range of sands quarried, treated and cleaned by their works; this ranged from pebble size down to fine powder, and the two grades that they sold especially for aquariums were excellent. The size was approximately 1/2 in. and golden in colour. When asked about the lime content, analyses were forthcoming and showed that the sand (as opposed to usual aquarium compost which is gravel) was 96-98 per cent silica and that the all important lime content was as low as 0.8 per cent.

This was most encouraging and a quantity was purchased. A tank was set up and left for a few weeks. When the hardness was again tested, no increase had occurred. I had installed a sub-gravel filter to accelerate any effect. The pH had changed from slightly acid (original rain water) to just about neutral. This will show different readings anyway, depending upon what time of day readings are taken. It will be more acid in the morning (after a lengthy period of darkness during which the plants give off carbon dioxide which dissolves to form carbonic acid), and more alkaline in the evening, when the plants have absorbed carbon dioxide under the influence of light.

This meant that now I had reasonable hopes that any conditions that I set up for the different requirements of fish stood a good chance of remaining static.

Undaunted I took the plunge and set up my four foot tank with the new sand. I planted *vallisneria*, Amazon swords and some varieties of *cryptocorynes*. After a week to let the tank

settle, the fish were introduced; half a dozen medium sized Angels, *Festivum* cichlids, and a few neons and cardinals were "risked". It had been my intention to have an Angel tank, and the *Festivum*, being natural companions to the Angel in the wild, seemed to be an obvious choice. The Neons were introduced to see the effect of being kept in soft acid water.

The colours of the latter have become radiant, and twice since settling in I have noticed spawning activity. I have a suspicion that eggs were laid, as the other fish took a sudden interest in the compost below the neons! Plant growth has continued unabated (I have kept to my practice of sub-gravel sized and the amazon swords have grown extra leaves within a few days of introduction. However, now that I had eliminated one source of hardening from the tank, I decided to experiment and see if I could find out something about the other mysterious element, *Cryptocoryne haerteliana*.

I set up a number of jars in the following manner: two had only compost in, plus rainwater, one with normal gravel, the other with lime free sand. Two more jars had compost and *C. haerteliana* (again the composts were of differing kinds) one jar with *C. haerteliana* only, and one jar containing water only as a control. These jars were stood in a heated tank, tops placed on the jars to cut down evaporation, and left.

The pH and DH readings of the original water put into each jar at the start of the experiment were 6.5 and 2 degrees respectively. By comparing the readings from various jars I hoped to see what effect ordinary gravel, *C. haerteliana*, and a combination of both, would have on the water.

I expected pH changes and was looking forward to the hardness figures to see if this *Cryptocoryne* was as black as it had been painted. Incidentally, when I had changed the gravel in my four foot tank, I had removed over six dozen *C. haerteliana* plants, and I was loath to think that this beautiful plant that grew so well was an undesirable.

What other results did I expect? For one thing, I expected the water in the jar with only normal gravel to harden; again, a similar result in the jar with the normal gravel and

the plant, with any deviation being due to the plant. About the plant in the jar alone, I assumed that plants which are normally rooted used the roots to draw nourishment from the compost as well as to anchor the plant, and so I expected little change in the readings. Whether or not the plant would feed in water only was pure speculation. The plant was also rooted in the new sand to see if it derived any benefit from the lime in ordinary gravel, in which case it would not flourish so well as in the other jar. Of the jars containing only the new sand, and only water, I expected little or no change.

This would have to be a fairly lengthy experiment, but I had hopes of early results as in previous experience the pH and DH had changed quite rapidly. Here then the curtain falls, to rise again "sometime later".

I tested the jars at weekly intervals, and after a month or so a pattern seemed to be emerging so I decided to tabulate the latest readings against the original figures.

	Original Water	Gravel Only	Sand Only	Gravel & Plant	Sand & Plant	Plant Only	Water Only
pH	6.5	7.2	7.0	7.2	7.0	6.5	6.5
DH	2 deg.	4+	2.5	6.0	3.5	2.0	2.0

Allowances would have had to have been made for some differences in DH figures in case of evaporation despite the jars having tops on, but on removing the tops all the water levels were the same so any evaporation that had occurred had been uniform over all jars.

On subtracting column 1 from column 7 we find no change; this proves that the control jar of water worked and that the water had not changed on its own.

1 from 2 gives a rise in hardness and an increase in alkalinity.

1 from 3 gives a very slight rise in hardness and again a change towards alkalinity.

1 from 4 gives a large rise in hardness and a change towards alkalinity.

1 from 5 gives similar results to 1 from 3 but with a slightly higher hardness figure.

1 from 6 shows no change from the original water conditions.

From these figures we can see that the normal gravel certainly hardened the water more than the silica, but

the interesting thing is that when *C. haerteliana* was present it hardened the water still further!

Again referring to the table of results, column 6 shows that the plant did not affect the water on its own (there was root growth on the specimen, so the plant hadn't died), so that it seems that this plant utilises something in ordinary gravel and also something to a lesser extent in the silica, for its growth-needs, which affects the hardness of the water in the process. It is my contention that this "something" is lime and that soft water, if it is needed to remain soft, should be kept away from ordinary gravel and *C. haerteliana*, either separately, and certainly a combination of both!

For devotees of fine grain gravel, as I pointed out earlier in the vinegar test, because of its larger effective surface area it will harden water more quickly than the larger sized compost. In fact, the tank I took the sample from also had *C. haerteliana* in, and on testing the water the hardness

figure was an incredible 27 degrees! This was after only a month or so and the original hardness figure was 3-4 degrees.

Another point to bear in mind is that in small tanks losses due to evaporation are greater and frequent topping up affects the hardness more than in larger tanks.

Up to what figure the hardness eventually rises is, another interesting point to pursue, and it may be that at this figure life in the tank becomes too much of a struggle for the inmates; even perhaps the cause of the sudden wilting of *Cryptocorynes* that happens for no apparent reason (to which *C. haerteliana* succumbs too, hoist with its own petard, so to speak).

It must be pointed out that these experimental jars contained no other contributing factors such as fish or other livestock, and there is still a lot to be learnt about the changes of pH and DH in our tanks and how they affect the fish and plants, or conversely how the living creatures affect them.

OUR OWN FASCINATING MARINES

By D. W. Sanderson

The underwater scene

The scene is lit by a warm light which filters through the bright green foliage of the sea lettuce spreading below the surface. The continual movement of the water makes a rippling pattern on the sand below.

Anemones stud the rocks with blobs of colour—red, green, brown and white. Fine plumose tentacles stretch out in hundreds to ensnare the microscopic life. High on the tallest rock a scarlet strawberry anemone provides a splash of tropical brilliance, while below, the dahlia's thick banded arms unfold expectantly—a deathtrap for unwary prawns.

The seaweed jungle too, is dotted with colour. Periwinkles and dog-welks in shells of black, scarlet, yellow or white, some plain, some striped, meander amongst the fronds. The former graze on algae, but the latter are searching for bi-valve victims whose shells they will bore through and whose bodies will be digested in their own safe homes. Upon the sand, a scattering of empty shells, all neatly drilled, bear witness to the dog-welks' activity.

Even the rocks themselves are covered with life. Multitudes of barnacles are busy snatching food from the water, their curved "legs" kicking rhythmically. Suddenly the kicking stops. A shadow has fallen across the rock. Like an erratic mountaineer, a blenny traverses the rock face. Here is the clown of the sea-shore; the fish with a permanent grin. He rarely swims but skips around on large pectoral fins, climbing up and down the rocks like an accomplished acrobat. With his head on one side he surveys the barnacles for a moment, then with a sharp twist he wrenches one from the rock. He crunches it thoughtfully as if wondering if it will harm his digestion.

A few crumbs fall to the sand

below and a small green shore crab darts from the shelter of the rock, eager for his share. His pointed claws wave menacingly, but they do not frighten an edible crab which has appeared upon the scene. He carries his heavy claws close to his body like a boxer on guard. He advances towards the shore crab who, though only half as big, adopts a threatening attitude. A ponderous black claw shoots out, closing like a trap on the green crab. There is a brief skirmish, then with ruthless efficiency the larger crab proceeds to disarm his opponent by pulling off his legs, one by one. This done he cracks open the hard carapace like a nut and starts to feed. His multiple jaws work with machine like rapidity, reducing the white flesh to shreds.

The sudden break in the always-temporary truce has aroused several neighbours. The sand shifts and a previously unseen flounder comes into view. He does not stay for long however. Like a dive-bomber from the weeds above, a sea-scorpion streaks down. The flounder takes off into mid-water and then settles back onto the sand. With a few frantic flaps he disappears from sight. Even the crab retreats a few steps and waves his massive pincers angrily. The scorpion fish remains unperturbed and with one gargantuan gulp claims the lion's share of the meal.

Other fish are now attracted to the feast. A small rockling gathers fragments in the background and a slender butterflyfish slides into view. His movements are reminiscent of the deadly tropical sea-snakes, but he is quite harmless and must be content to hover on the fringe and gather what crumbs he can.

The meal is almost over when a wicked looking black head emerges from beneath a stone. In spite of appearances, the eel is a shy creature. He rarely comes into the open, except at night. Having secured a tasty morsel he soon retires from sight and may not show himself again for several days.

The water is full of tiny fragments and the barnacles are back at work. Delicate fan worms extend their plumes and the anemones burst open ready to catch whatever comes their way. Even the sponges though apparently inactive are getting their share of food. The whole scene is one of life and colour. Creatures more

*"And often,
standing on the shore
at low tide,
has one longed to walk on
and in under the waves . . ."*

Charles Kingsley, 1855.

strange than any seen on land are hunting and being hunted in the merciless way of the sea.

Where did I see all this? Under the sea? In a rock pool? No, it all happened in just eight gallons of water in a small plastic aquarium.

Just eight gallons of water

Just an eight gallon plastic tank, an air pump, a filter, some gravel and sea-water is all you will need, and you are ready to start collecting some of our fascinating marines. (For a total cost of under £5).

I use an under-gravel filter with fine aquarium gravel mixed with coarse sand from the beach. This is combined with an air-stone. Both are worked from a Rena Super air pump. The result is a water surface that really boils. The water is normally crystal clear, but the fish stir up enough debris from the bottom to feed the fan worms and plumose anemones which have now been in the tank for over six months.

The rocks, complete with growing sea-weed, were taken straight from the sea. All the animals were collected from a few hundred yards of rocky shore. (The foot of the Little Orme at Llandudno in fact). One visit at a very low spring tide was enough to stock a complete tank.

All the animals, except the fish, were transported in wet sea-weed. The fish were carried, two to a bucket, in about an inch of water which was put in clean at the start of the journey. (Most important).

The water has now been in the tank for nine months. When collected it had a density of 1.018. It is now 1.020. The close-fitting lid and drip tray cut down evaporation to almost nil, and no further water, either fresh or salt, has been added.

I have not done anything to correct the pH, and the inhabitants of the

and are still in perfect health. Should their condition deteriorate, I will give them a change of water. After all, eight gallons are easily collected.

Feeding is a simple matter. Chopped cod scraps form the staple diet, at a cost of 2d. per week. In summer earthworms and daphnia supplement this diet. Feeding is normally twice a week. The only problem is that the scorpion fish

dominates the tank at feeding times, and has also been responsible for the demise of some of the lesser members of the collection.

Although the tank is situated in a heated living room the temperature rarely rises above 60°F. The insulating properties of a plastic tank can help to keep heat out as well as in. In fact there is only one thing which I really dislike about keeping British marines, and that is putting my hand

into the practically glacial water of the tank.

In the past eight years I have been lucky enough to keep marine aquaria in the Mediterranean and the tropical East, but I can honestly say that I have never found any greater interest than I have in keeping a British marine tank. To all jaded aquarists who are looking for something different, I say, "Try it, and I'm sure you'll never regret it".

KILLER DISEASE HITS TOWN'S FISH

Extract from
the Evening News.

ALMOST THE WHOLE of the fish population of Bolton aquarium has been wiped out by a killer disease. The worn state of the tanks is blamed for spreading the infection, and there is no guarantee that the disease will not strike again when new fish are put into the tanks. By the time the trouble was spotted, just before Christmas, the disease was already rampant and 300 fish died or became so badly infected that they had to be destroyed.

"This disease is endemic in wild fish and it may have been because one was not sufficiently quarantined that we suffered this epidemic", Mr. Vincent C. Smith, the Director of the Museum, told the *Evening News*. "Mild weather in December may also have contributed".

It is believed that the fish were, in fact, suffering from two diseases, one a protozoan infection and the other a fungoid illness. "We spotted the first outbreak on 18th December, and although we tried to contain it, it jumped three tanks and broke out again on 23rd December", said Mr. Smith.

"The tanks are lined with rocks and concrete that has become very porous with age and there is a strong build-up of bacteria. Work has been going on constantly to disinfect the tanks and fill up the cracks but the spores of the infection live in the bottom of the tank and can survive for years.

Worn tanks blamed— and it may strike again—

Risk

"It's as if you left the water running into your bath for twenty years without stopping. You can imagine what the surface is like. Even after sterilisation and patching up the cracks in the rocks re-stocking will be a calculated risk. We may have beaten the disease and we may not".

As a trial run the aquarium will first be stocked with inexpensive fish and if these survive, other varieties will be introduced. It is hoped that the aquarium will be working again by the end of March.

Hoping

"What has happened is tragic," said Mr. Smith. "The old eel which has been in the aquarium for a long time was one of the casualties but the pike survived in spite of eating some of the infected fish".

Two men have worked non-stop trying to beat the fish disease at the aquarium since it was spotted. "We didn't know a lot about fish when we started, but we're learning," said Mr. Andrew Boyle.

"We were hoping for a completely new aquarium but the £20,000 for this has been refused," said Mr. Andrew Boyle, who is in charge of the operation. "The rocks in the tanks at present are difficult to clean and allow the fish to hide.

"We are trying to fill in all the holes so that the tanks can be cleaned easily

in the future and if there is another epidemic we can get the fish out quickly. It is a long hard job to fill in every crack. Even when we have sterilised the tanks several times, changed all the gravel and filled in the cracks there are no guarantees that the disease won't return".

Mr. Boyle and his assistant, Mr. Bruce Campbell, have also had to design a new filter system so that any disease is not spread from tank to tank with the water as it used to be. "We now know that this disease can be treated with common salt if it is caught early enough," said Mr. Boyle. "Many children especially are very upset about what has happened to the fish".

FIND THE PLANT

The first is in CHURCH and also in CHAPEL.

The second is in PEAR and also in APPLE.

The third is in BOX but not found in TIN.

The fourth is in LOST but is not in WIN.

The fifth is in MANY but not in FEW.

The sixth is in BLACK and also in BLUE.

The last is in JANE and MICHAEL BANKS.

Solution on page 25

THE AQUARIST

Colour
Supplement
to the
Aquarist
and
Pondkeeper



*Aphyosemions:-
a large and
showy genus*

by Jack Hems
photography by
Karl Knaack

THE APHYOSEMIONS ARE a large and showy genus of freshwater fishes found mainly on and in the neighbourhood of the Guinea Coast of West Africa. They belong to the family *Cyprinodontidae*, popularly known as killiefishes, and average some 2 in. to 3 in. in length. The chief characteristics are a rather elongated body, with the top of the head flattened, and the dorsal fin and the anal fin set fairly well back towards the tail. In all species that aquarists know the male may be distinguished from the female by his brighter and greater array of colours.

Essentially aphyosemions are fishes of leafy-shaded ponds and streamlets and temporary pools formed by prolonged rain or rivers overflowing

Top: *Aphyosemion spurrellii*
Left: *Aphyosemion chrystyi*

their nests. That species inhabiting areas where the waters dwindle to nothing or next to nothing in times of drought have not become extinct is explained by the fact that they lay their tough-shelled eggs in the mud and bottom-debris, and the period of incubation of the eggs often extends over several months or, put in another way, until the return of the rainy season.

In point of fact some of these egg-burying aphyosemions may well be bracketed with the true annuals, that is to say with those fishes that complete their entire life cycle within the space of a year. Incidentally, the longest known of the annuals (among the cyprinodonts) are the pearl fish (*Cynolebias*) that occur in the small pools that disappear and reappear (according to the season) in the seemingly limitless plains or pampas of south-east South America.

But be all this as it may, egg-burying aphyosemions are not the only members of this fascinating genus available to the tropical aquarist. There are indeed a far greater number of species to be had that deposit their eggs in vegetation either near the surface or just clear of the bottom, and live their lives less briefly. Among the loveliest of these species are *A. bivittatum*, *A. chrystyi*, *A. ipirelli*, *A. cognatum* and *A. vexillifer* (names currently used by aquarists, but not in every case by ichthyologists, to distinguish one species from another).

On average the fry of the above and closely related species take from about a fortnight to three weeks to break free from the egg. As in the fry of livebearers, that are normally born with the yolk sac already absorbed; so, too, the aphyosemions. They emerge from the egg ready and able to take tiny living food. Fine-sieved *Daphnia*, freshly hatched brine shrimp, and the like, may all be given for the first two or three weeks, after which bigger food should be supplied as often, within reason (bear in mind that over-generous feeding of live food can deplete the oxygen content of the water and bring about pollution), as possible.

Spawning is not all over and done with after some relatively brief body-pressings or rushes in the plants, but lasts over a period of a week or more. During this time eggs are laid daily or almost daily. Hence



Aphyosemion bivittatum

Aphyosemion cognatum



fry are of all sizes or stages of development, and must be sorted every now and again to prevent the larger ones depriving the smaller ones of their fair share of food.

In the main aphyosemions are non-aggressive (excepting some males towards one another) and may be introduced into a community tank. But because they are seldom at ease in the company of other fishes and shun a bright light, they are best kept by themselves. A tank about 18in. long will make a suitable home for a pair or trio (a male and two females). Soft water strained through peat or standing over a peat floor is desirable though not essential. A temperature range of from about 72°F (22°C) to 75°F (24°C) is recommended. Feeding presents few difficulties. Some species will accept the first-class dried foods quite freely. The majority, however, demand live foods or suitable substitutes. A point to bear in mind is that all aphyosemions are good jumpers, and it is asking for trouble to leave their aquarium uncovered.

In general aphyosemions are not addicted to cannibalism, but the wise aquarist guards against the fry being eaten by hatching the eggs in a separate container. As the fish will spawn as readily on bunched nylon threads as in tangles of feathery foliage it is no trouble to harvest the eggs. It is of great importance, however, to place the eggs in water similar in quality to that in the spawning aquarium. Also, the eggs must be protected from bright light. It is interesting to note that no harm will come to the embryos if the eggs are detached from the spawning medium. Naturally enough the eggs should be under close observation, and any which are attacked by fungus or turn white must be removed without delay. The fry, also, must be protected against the possibilities of the spread of disease brought about by unfavourable conditions. Thus, the water in which they are living must be kept free of all putrefying matter and changed (if there is not much of it as, say, when the fry are kept in the initial stages of their development in 2 lb glass jars) quite often, with the precaution that the temperature of the fresh water is raised to the level of the old. For the rest, their requirements are the same as their parents. In most species, growth is quite rapid.

THE CLOWNFISHES

by T. Wild

Photography by Karl Knaack

THESE DIMINUTIVE beauties must have graced every marine aquarium in the country and this is not very difficult to understand. Clownfishes are virtually unaffected by the rigours of the long journey from the tropical waters of the coral reef to the aquarium of the British mariner. Their shape and colours ensure them a regular place on the import lists as well as their "reasonable" prices which must have a great bearing on the popularity of a fish.

Clowns are prolific in the coral gardens of the Indian and Pacific oceans, especially around the coasts of Singapore and Ceylon. Here they are frequently (if not constantly) found in and around the various actinians (anemones). Many theses have been offered attempting to explain the relationship of clowns with sea anemones, but as yet no concrete proof has been established to prove or disprove the validity of any of the myriad theories which exist. Up to now, the best theory about this relationship is that the anemones remove *Oodinium* parasites from the skin of the clown as a source of nourishment, and the removal of these creatures from the clown prevents a possible fatal ailment from affecting the fish. It was previously thought that the clown was unique in this habit but related fishes, the damselfishes, are often seen in the midst of a clump of anemones.

To be scientifically correct, the clowns should be called *Amphiprion* species. At a guess I would estimate the number of species of *Amphiprion* to be about eleven although of these only four, or perhaps five, species are commonly imported. Of course, many of the rarer species are occasionally imported in twos and threes, but on the lists of exporters I have seen, the more unusual ones are not listed and those that are received have been sent by error or as alternatives.

Strange to say, the clown is not fussy about the species of anemone it frequents. In fact, some have been known to live with our own native coldwater anemones, although many experts believe this to be impossible. I have myself seen a clown in the company of a coastal beadlet anemone (*Actinia equina*).

Anemones are rather messy creatures but they certainly add interest to the saltwater tank. The clowns, too, appear to be happier when in the company of a sea anemone. An anemone's presence gives them a strong feeling of security knowing that whenever danger threatens they can dash into the arms of their host.

Unfortunately, when a clown is not kept with an anemone, it becomes very susceptible to *Oodinium*. This need not worry the owner, though, as copper sulphate cures the fish. Copper is very toxic to an anemone though, and so should not be used in a tank which contains anemones. The procedure then is to isolate either the affected fishes or the anemone and then treat the fish separately. Yet another disadvantage with the anemones is their high cost. At a show recently the anemones on sale ranged from £3 10s. to £8 10s. As can be seen from these examples, they are not cheap and so price alone will prevent aquarists from buying these invertebrates.

In the aquarium, clowns make ideal fish in that they are always available in the shops which sell marine supplies and they are good feeders. All clowns I have owned have taken freeze-dried brine shrimps and most other marine-dried foods. They appear to have a great liking for small portions of earth worm and live brine shrimp (preferably adult). If live foods are scarce, then a piece of canned shrimp (well washed) or a small lump of beef suspended on a length of nylon thread will make for enjoyable



Amphiprion xanthurus



Amphiprion ephippium

viewing as the fish buffers and pulls at the food.

Recently clown fish have been in the news due to a remarkable occurrence. In one aquarist's tank, a pair of common clowns (*Amphiprion percula*) decided to spawn, so comfortable were their surroundings. Sadly, the eggs only survived a few hours and ended up as a snack for their parents. So if any of you freshwater aquarists want a real challenge, try spawning clowns. One day home-bred clowns will be kept and I hope it will be in the very near future.

As previously mentioned, only a few of the species of the clownfish family are imported in any numbers. Top of this list is *A. percula*, the common clown. This pretty fish is the one most people envisage when clownfish are mentioned. Three white stripes on an orange background make up a sensational little fish.

The price, however, seems to have gone up recently, and few clowns are seen much under two pounds. They are reasonably tough, though, and so there is little to be afraid of if you intend buying a pair. Next to the

percula the other clown which is most often seen is the chocolate clown, *A. sebae*. The body of this fish varies from a rich brown to black and is very attractive. This species is very prone to infection by *Oodinium* and one specimen I had was so bad nothing could help it. It was partly my fault as I might have left treatment of the disease rather late. Otherwise it is a good fish but a strict quarantine period is a necessity.

Another species commonly kept is the tomatoe or fire clown. Specimens of this fish are often deep crimson with a solitary bluish white stripe behind the eye. The exact specific name is a debateable point. Some call it *A. melanopus* whilst to others it is *A. ephippium*.

One which is rarely imported and which I have seen only once is *A. akallopis*. A lovely fish, resplendent in bright lemon with one long white stripe running down the back. Due to this stripe it has been christened the pine-skunk-clown because of that infamous mammal with B.O. which also possesses a stripe. Very rarely seen, it is doubtful whether the ordinary aquarist will come across this fish.

Yet another rarity in this country is *Amphiprion latidorsus*. Having never kept this species, I am unable to estimate its adaptability to aquarium life. From accounts I have read though, it sounds a tough fish but would be expensive if seen for sale.

Many others are imported from time to time but I cannot comment on these. A few are excellent fish being very hardy but sadly, rarely seen in the stock tanks of our importers. *Amphiprion xanthurus*, better known as the black clown is sometimes seen, and is worth paying a lot for, as is *A. polymnus*, a fish almost identical to the *sebae*. The clowns are a mixed bunch but the one thing common to them all is their beauty and I earnestly urge the neophyte to start off with clowns.

THE KOI (JAPANESE COLOURED CARP)

by K. Fawcett

FROM TIME TO TIME a word seems to creep into a language until by frequency of its use it becomes part of that language. One such word that readily comes to mind is the word "quitting" which, had it been mentioned pre-war, would have had no significant meaning. Several other examples of a post-war nature can easily be quoted; who for instance, outside a select few, knew anything about a "command module" prior to Christmas 1968 and who can have failed to have realised its meaning by now? Often such words have become part of the general language; less frequently a word is absorbed into a language but its use is more or less restricted to a particular facet of that language—such a word is "KOI"!

Pre-war western aquarists knew nothing of its existence and only recently have articles, notes, pictures, and adverts relating to Koi begun to appear in the Aquatic Press.

How then has this aspect of fish-keeping been a closed book to us for so long? For Koi keeping and breeding has been going on for centuries in Japan. Basically, the answer is that the supply of Koi in Japan has been insufficient to meet the needs of Aquarists and pondkeepers outside that country but during recent years more and more have been exported with the result that Aquarists in the U.S.A. and the United Kingdom are getting their first sight of these fascinating and colourful fish. In the U.S.A. at least one company has been formed to deal exclusively in Koi and to promote their keeping in that country. This company now has a stock of over 25,000 Koi. No doubt others will follow and already interest has been shown by United Kingdom dealers.

Perhaps at this point it would be as well to mention something of the history of Japanese Koi. To do this it is necessary to understand the Japanese character. Whereas we tend only to undertake projects wherein

we can see an end-product within a reasonable time, to the Japanese such haste is unthinkable. Who, for example, has not admired a Japanese Bonsai tree perhaps two or even three hundred years old but when we admire do we ever spare a thought for the man, long since dead, who first planted, trained and dwarfed that tree. This Japanese national characteristic of extreme patience no doubt accounts for their undoubted success in the production of such goldfish varieties as shubunkins, veil-tails, fan-tails, bubble-eyes, orandas, etc., which are much more familiar to British Aquarists. It is perfectly logical to realise that their efforts would not have been restricted to just one variety of fish and it seems reasonable to suppose that the development of Koi has been going on for just as long a period in Japan. In his book "Colourful Koi" Hyrohei Hirooka states that coloured Koi are derived from black Koi (Ma-Koi) and they were first bred in Japan during the Heian period (784-1191). Suffice it to say that whatever their derivation the numerous coloured varieties of Koi available today are indeed as brilliant and varied as are the names the Japanese have given them. Here are a few of them:

Morning Sky (Asaki)
Orange Blossom (Orenji Ohgon)
Sunbeam (Ki-Utsuri)
Moonbeam (Orenji-Utsuri)
Whitebeam (Shiro-Utsuri)
Red Mantle (Kohaku)
Red Prince (Beni-Koi)
Silver Streak (Gin)
Gold Dust (Ohgon)
Yellow Mountain Flower (Yamabuki)
Showa Tri-Colour (Showa Sanshoku)
Taisho Tri-Colour (Tiaish Sanshoku)
German Gold (Doitsu Ohgon)
German Silver (Doitsu Gin)
German Orange (Doitsu Orenji)
German Red Mantle (Doitsu

Kohaku)
German Snow White (Doitsu Shiro)
German Blueblood (Shusui)
German Yellow Mountain Flower (Doitsu Yamabuki)
Grey Black (Showa)
Gold Crescent (Ohgon-She)
Solid Blue (Ao-Koi)
German Red Prince (Doitsu Beni-Koi)
Gold Crescent (Ohgon-She)
German Variety
Solid Blue (Ao-Koi) German Variety

To try to describe the various colours of the above listed Koi would indeed be an impossible task and it is to be hoped that the coloured illustrations accompanying this article will go some way towards overcoming this deficiency. Even so, a colour photo cannot really do the fish justice.

Although it is undoubtedly possible to keep Koi in large aquariums their true beauty is seen at its best in a garden pool. This, no doubt, accounts for the fact that nearly all Koi photographs, both in colour and black and white, in Japanese literature on the subject are taken from above rather than from the more conventional side view. They are, therefore, in my view essentially and ideally a pond fish especially when one bears in mind that they can eventually grow to a size of between 12 and 18 inches and are extremely long lived with an age of 15-20 years certainly not exceptional.

In this day and age the construction of a suitable pond for those not already owning them need be no deterrent. All that is required is the energy to dig a hole and this can then be lined with a suitable liner, such as Butyl sheeting. An excellent pamphlet on this subject is obtainable from Butylmade Ltd., of Haywards Yard, Brockley Road, Crofton Park, London, S.E.4. Alternatively, there are a number of ready-made fibre

glass pools already on the market which can be suitable containers for Koi.

Before leaving the subject of the various colours of Koi it would be as well to point out that an eminent American authority is of the opinion that as yet the finest Koi are not to be seen outside of Japan itself. The author has at the present time in his ownership approximately 350 Koi of some 30 varieties some of which were imported direct from Japan, others from the previously mentioned American source. The illustrations with this article are of some of these fish but by comparison with colour illustrations in Japanese books it is obvious that the most highly prized colour variations and patterns are retained by the Japanese breeders themselves. This indeed is not surprising as they fetch extremely high prices (up to £1,000 for a single show fish) and are greatly valued by professional breeders. Thus, my personal experience would appear to bear out the contention that the finest Koi still remain in Japan. One particular point regarding their coloration should be emphasised: their colours are extremely definitive and do not appear to merge as with the fancy varieties of goldfish. This abrupt division of colours emphasises rather than detracts from their beauty.

Koi were originally kept only by the Japanese nobility but with the passing of time became more widely known; now they are kept throughout the country and a number of fish-farms are devoted entirely to their propagation. It has been estimated that the annual production of Koi in Japan is somewhere between 10 and 20 million. From photographs the fish-farms appear to be vast in size and the industry is certainly a thriving one although much secrecy surrounds it. In fact, to the Japanese, Koi are a symbol of determination and accomplishment and there is even a National



Koi Day on 5th May each year. The Japanese then fly paper Koi to bring honour and success to their sons it is for this reason that Koi are sometimes called "success" fish in the belief that they can bring good fortune. They are also greatly admired for their strong swimming capabilities.

With the spread of Koi keeping in the United Kingdom perhaps a few basic observations would not come amiss. A great deal of conventional "good fish-keeping" practice is as equally applicable to Koi as to other fishes. Firstly, they should not be overcrowded or kept in polluted water. They will succumb as rapidly as any other variety of fish to the evils attendant upon these two. In this respect there are, however, certain warning signals for when Koi are in distress as a result of pollution or oxygen deficiency they then come to the surface of the water raising their mouths above the water level to gulp the atmospheric air. This is known as "muzzle raising". They will stand a wide variation of temperature from freezing to 90° thus they can certainly be kept in outside pools in this country the year round (the author's second consignment of fish arrived from Japan during a particularly freezing spell of weather and some of these fish were for a while in an aquarium which froze all round, thus they were swimming in water completely enclosed in ice. No ill effects were observed).

They should be given a wide variety of food both live and dry. They enjoy a mixed diet of both animal and vegetable foods and are particularly fond of such natural foods as earthworms, shrimps, mosquito larvae, etc. One authority advises the use of floating foods if one wishes to observe the swimming of Koi in the upper regions of the water. The author has found that his own Koi enjoy a mixed diet of flake food, freeze-dried Tubifex and a proprietary brand of pelleted pool fish food. Feeding is obviously linked to water temperature and the normal procedure of reducing the amount of food during cold weather should be observed, in fact, food should be withheld altogether during extreme cold. Japanese authorities advise that Koi should be fed during the early morning, at noon and certainly no later than 4 p.m. This is advised because more oxygen is needed by the Koi whilst assimilating the food and if they are fed just before darkness falls two evils are combined in as much as the fish are needing extra oxygen at the very time when, in darkness, it is least available owing to the well known oxygen/carbon dioxide reversal process in the water plants.

Once Koi are widely available in this country it is obvious that aquarists will seek to breed them. Little has been written about the breeding of Koi. This is largely due to the fact that individual Japanese breeders

guard their breeding secrets as a matter of economic necessity. Koi have already been bred in this country but it must be borne in mind that they grow to a large size and are extremely long lived and therefore we cannot expect to breed immediately from fish a few inches long and probably not more than a year to 18 months old. It is believed that males will breed at two years of age and females at three years of age. Perhaps at this point a plea for good sense in breeding them would not come amiss bearing in mind the numerous varieties of Koi. It is to be hoped that indiscriminate breeding will not be resorted to especially when we think of the time, patience and work that has gone into the production of various varieties and colour patterns.

It would be invidious to complete an article about Koi without mentioning one particular quality that they possess which may not appear to be all that important at first glance, but which, I am sure, will add greatly to the pleasure of owning them. The particular attribute of Koi that is entirely unique is the manner in which they can be tamed. Something approaching the affinity that can exist between a man and his dog can be duplicated with Koi and this to my mind is certainly not possible with any other variety of fish. In time, following a period of training, Koi will readily swim to the water surface and take food from their owner's fingers. (The author spent some time during July 1968 in the U.S.A. and whilst staying with Dr. Axelrod was able to feed his Koi with freeze-dried Tubifex by hand. They swam rapidly towards the food raising their heads well clear of the water surface to gulp it down). Koi will also gambol in the water and will swim fearlessly to one's hand but do not expect very tame behaviour from the very outset. It only comes



after patient and, above all, quiet training. One Japanese expert writes at some length about this training and lists a series of procedures one should adopt to achieve the desired results. Slow and quiet movement by the pool is always required and the training is linked at all times with feeding. It is stated that one has only to tame an individual fish and once one has achieved this the other fishes will soon follow the original leader.

I am fully aware that this article leaves many questions regarding Koi unanswered. What exactly is the history of Koi? Where exactly were they first produced? How many true varieties are there in fact? What is the best method of breeding them and how can one best maintain or even improve existing colour varieties? Are they capable of even further development as were the goldfish? Are we to see "London" and "Bristol" Koi or even veil-tailed Koi? All these and many other questions immediately spring to mind but surely therein lies part of the pleasure of fish-keeping. It is the unknown that fascinates and presents a challenge and no doubt the gradual accumulation and dissemination of knowledge will prove to be pleasurable and instructive to us all.

Whilst on the subject of questions the author has noted on several occasions the apparent death of a Koi when netted (and this has also been observed by the Editor of this maga-

zine). The fish appear to go rigid with absolutely no sign of life but if allowed to remain in the water will soon be swimming around in a perfectly normal fashion. Is this some inbuilt escape mechanism? In any case, it is as well to bear the fact in mind lest a Koi be discarded as being dead when in fact it is only feigning death.

The author sincerely hopes that these few notes on a remarkable, colourful, and fascinating variety of fish will, although of necessity brief, promote interest in this undoubtedly new aspect of fish-keeping in general. Who knows, in time we may see Koi-keeping in Britain as popular a hobby as it is in Japan with Koi clubs, Koi classes at Shows, Koi standards just as we now have goldfish standards, and an even great public awareness of the pleasures to be derived from such a hobby. All who take up Koi-keeping as a part of their general fish-keeping hobby or even as a hobby in itself are assured of a tremendously interesting and rewarding pastime and I hope, success. After all, Koi are known as the "success fish".

AUTHOR'S NOTE:

The author of this article has in his possession two most excellent Japanese books on the subject of Koi. These books are invaluable for the sheer beauty of their numerous colour illustrations but obviously much more could be learned if the text could be translated.

WATERLIFE PESTS AND FRIENDS

by Bill Simms

THE FRESHWATER PEARL MUSSEL.

OCCASIONALLY, an aquarist who keeps coldwater fishes decides to add a mussel to the collection of living creatures in the aquarium. This is often a mistake, for the death of a mussel is not easy to detect until too late and then the water may be heavily polluted. However, the mussel does sometimes live there successfully, and then it keeps the water very clear for it syphons the water through its system and retains all the organic matter that it can consume. But there are some mussels that are not suited to the still waters of an aquarium and one of these is the Pearl Mussel (*Unio margaritifera*) which can grow to a length of 5 inches or so. It might attract because it occasionally grows pearls, but the aquarist would be well advised to keep it out of a balanced aquarium.

The Pearl Mussel lives in fast-running rivers but only where they are perfectly clean and have a low lime content. The shell is coloured dark brown to black and usually shows signs of heavy corrosion on the domed part because this is the oldest part. This corrosion is caused by the acid in the water acting on the thinnest part of the shell.

Inside the pearl-lined shell the colour is a yellowish-pink but it is smudged here and there with a dull green. The fleshy parts are greyish, with touches of a dull brick-red. Altogether, the whole creature is not particularly attractive.

Because of its production of the occasional pearl this freshwater mussel was much sought after at one time. In the Perthshire Tay district the local people made a practice of searching all the mountain streams but this was during the eighteenth century, when the demand for these pearls was at its highest. Even then, though, it was necessary to open about a thousand mussels in order to find



Unio margaritifera

one moderately good pearl, and really fine ones (worth about £4 at that time) were far more rare. Most of those found were misshapen and badly coloured, and only in about one per cent of the mussels could even these be found.

Since then there has been very little real interest in these pearls except as

minor curiosities and because of this the pearl mussels were able to build up a reasonable population once more. Nowadays, alas, the pollution in most of our rivers, and even in some mountain streams, has cut down the numbers of this mussel and because of its sedentary habits, it is not easy to locate even small colonies.



14" baby nurse shark imported from the Caribbean by Sea Aquarium Ltd and exhibited by that company at the New Year Show at Olympia this season

OUR EXPERTS' ANSWERS TO YOUR QUERIES



COLDWATER QUERIES

by A. Boarder

My daughter has several tanks of fishes, both tropical and coldwater. She has some fantails but would like to get some veiltails. However, we have never been able to obtain any of these graceful fish. Can you give any advice, please?

It is possible to obtain some veiltails from advertisers who offer them in *The Aquarist*. I know that there are very few really good show specimens about of this variety but for a tank one need not be so particular as if the fish were required for exhibition purposes. However, I find that fantails are a much better fish for an indoor tank than veiltails. The former move about better as I find that most veiltails are sluggish in their movements and are inclined to "sit" on the bottom of the tank for long periods. Young veiltails can be more active but as they mature they appear to slow down considerably.

In our school fish-pond we have a number of fancy goldfish. During the last few days three fish died. The fish appeared to be infected with fungus disease but on a scraping being put under a microscope it was found that there were many parasites. A sketch is enclosed and they look like small transparent creatures with a sucker at one end and a mouth at the other. A boy brought some tubifex from a pond to feed the fish with. Is it probable that the parasites came with these and what is the cure?

From your sketch it is certain that the parasites are flukes, possibly *Gyrodactylus*. There is little doubt that they were introduced into the pond with tubifex worms. It is so very dangerous to take anything from ponds or rivers for putting into a garden pond. It is not easy to clear fish of these parasites whilst in the pond. If the fish can be caught they can be given a bath in a solution of either Dettol and water or T.C.P. in water. The strength must only be about the same as that recommended for a throat gargle. The fish must only be immersed in such a solution not more than a few minutes and the fish must be removed if it turns over. When returned to freshwater the fish soon recover and the pests killed. Not more than a half teaspoonful of Dettol should be used to each gallon of water, as this is a strong disinfectant.

I have a lot of blanket weed in my garden pond and cannot seem to get it down. If I remove the fish, is there any way of killing the weed?

The trouble with such a problem is that if there are any water plants in the pond they could also be killed by any chemical which was used to destroy the blanket weed. A strong application of permanganate of potash could do the trick, as could copper sulphate crystals in a bag, dragged through the water. After any such treatment it would be necessary to empty and clean the pond before refilling. There are substances on the market which are recommended for killing weeds and Algae in ponds which do not contain plants and fish. One such is *Paraquat*, but I have had no personal experience with this liquid, but I know that it has been used for clearing ponds on golf courses of Algae, etc.

I have heard of a fish called a meteor minnow. What is this fish like and what is its scientific name?

The meteor minnow was developed in Canada from a long-finned strain of the White Cloud Mountain minnow (*Tanichthys albonubes*). We have not heard anything about this fish for several years, and believe the strain has been allowed to die out.

We have a well set-up tank with filter and aerator but there is a lot of black substance on and near the base of the tank. What is the cause please?

This black mould is usually caused by overfeeding with dried foods. By this I do not mean that the fishes have eaten too much but that food has been left uneaten and this has turned foul and caused the mould. Even with a filter and an aerator the foulness can occur. Try and siphon off as much of the black matter as possible and remove any sand or gravel from the base which is also discoloured. Replace with some clean gravel and then stop all dried-food feeding for a fortnight. The fish will be all the better for the rest from this and the tank should soon get quite clear. A little live food can be given. If too much food is not given the fish will work over the base of the tank and pick up any food they can find before it turns sour.

I have six goldfish in a tank and sometimes they go mad and dash about in the tank. What is the cause and the cure?

There is more than one reason why goldfish dash about at times. It is sometimes because they have some type of parasite on them causing irritation but this is not always the case. Sometimes the water gets heavily charged with minerals and

this can upset the fish. Parasites such as flukes can worry a fish but if these are present on fishes there is usually other signs such as closed finnage, lack of feeding, mouthing at the surface and then later blood streaks on the body and emaciation. If the fish appear to be in good condition other to their rushing about, try changing most of the water for fresh. Every week some of the water in a fish tank should be changed when the servicing is carried out. It is surprising how fish will react to this change. When they have been feeding sparingly for a time they usually buck up and feed well once a quantity of the water has been changed for fresh. The amount taken depends on the condition of the water but in siphoning out the mulm from the front base of a tank it is probable that up to three gallons of water may be removed from a 24 x 12 x 12 in. tank. This is then replaced with water of about the same temperature and the fish will benefit from this.

Please could you tell me what is wrong with two of my goldfish in an outdoor pond. They get small round spots on the body which are inflamed. These get a little larger and seem to go deeper?

It appears that your fish have been attacked by fish lice (*Argulus*). These creatures are free-swimming when first hatched and they then find a fish as a host, attach themselves to it and suck its blood. A wound is caused which can turn to a bad sore. The lice are almost transparent like a tiny piece of jelly about a quarter of an inch in diameter. These can be picked from a fish with tweezers or if the fish is placed in a solution of Dettol or T.C.P. for a couple of minutes the lice will quit the fish. The strength must not be strong but about that recommended for a throat gargle. The fish must be watched whilst in the solution and removed to fresh water if it looks in trouble by turning over.

I lost all my fish from a pond during the autumn floods. What kinds shall I re-stock with, the pond holds about 5,000 gallons?

Stock with common goldfish, comets, shubunkins and fantails and then have a few golden orfe. A

couple of tench, green or golden will be all the others that you need. The British coarse fishes are usually too dark on the back to be very showy in a pond the size of yours, but the green tench will act as scavengers if the goldfish leave any food uneaten. Stock in the spring when the water plants are in good growth.

Is *Vallisneria* hardy enough for an outdoor pond?

In the south of England it is probable that the plant will survive the winter. I have had some in my pond for several years and although it has not made a lot of growth it is still alive.

Could you please tell me the best way to plant *Elodea* in a pond?

There are at least three species of *Elodea* which are usually grown in ponds. They are *Elodea canadensis*, *Elodea crista*, now known as *Lagarosiphon major* and *Elodea densa*, now called *Egeria densa*. The first named can become very massed in growth if unpruned but the second one is excellent for a pond or as a spawning medium. All have tender stems and these can be broken very easily when carelessly handled or planted. Shoots soon make roots and even if just thrown in the water, they soon send out roots, often to a couple of feet in length. However it is better to plant them so that they are partially anchored on the bottom. Shoots may be struck in small plastic containers and kept in a tank until growing well. The container can then be placed in the pond. Bunches can be made up, tied carefully together and weighted with a piece of lead strip or a stone. Do not tie too tightly or the stems will be cut.

I have had a pond in my garden for some years with no trouble. I have now found five goldfish, each about two inches long with their heads eaten off. There is no other mark on the body. What do you think is responsible?

It is difficult to be certain what has killed these fish. The fact that only the head has been eaten suggests that the fish were attacked by a small animal such as a water vole. There are several pests which could damage fish in a pond such as the larvae of dragon flies, beetles and their larvae,

or some kinds of fish such as cat-fish. Why only the head should have been eaten is rather a mystery. If a Terrapin was in the pond this could be the cause but I do not see why other parts of the fish were not eaten. A grass snake would eat the whole fish if it found one. If there is natural water near you, something may have come out to your pond and so all I can suggest is to watch out occasionally at night, by quietly approaching the pond with a strong torch. You will find that most pests can be spotted by this means.

TROPICAL QUERIES

Are gouramis short-lived? I have never been able to keep any species alive for more than a few weeks to a few months!

Gouramis are no shorter-lived than any other popular species. Even the species with the shortest life-expectancy, such as the dwarf and croaking gouramis, should live for at least eighteen months to two years. The quickest way to shorten the life of any gourami is to keep it with boisterous and/or bullying fishes in a thinly planted tank maintained at a temperature in excess of 76°F (24°C) for the greater part of the year.

How can I tell when my pair of *Pelmatochromis kribiaensis* are ready to spawn? I have a guaranteed pair in an 18 in. by 12 in. by 12 in. tank furnished with deep sand, plenty of plants and an overturned flower pot, but all the fish seem interested in is in keeping out of sight.

Most of the small cichlids are retiring by nature and it is advisable to respect their need for privacy. You will know when they are about to breed by the female's bloated sides and intensified colours and the pair's marked comings and goings into and out of and around the flower pot. But bear in mind that the fish do not like their movements spotlighted by a bright light.

Please tell me the scientific name of a sausage-shaped catfish with a pinkish-white body, pink eyes, eight barbels on the transverse mouth and dorsal and anal



fins that look like narrow ribbons attached to the dorsal and ventral surfaces, and a small rounded tail-fin.

We feel fairly certain your fish is *Clarias batrachus*, that is said to occur in a greyish as well as an albino form in southern south-east Asia.

I am a young aquarist and I have made a leakproof aquarium out of an old tin, glazed on five sides, and measuring 12 in. by 12 in. by 12 in. How many tropical fishes could I keep in this tank without the aid of an air-pump to supply additional oxygen?

Your aquarium will support some six to eight small fishes. We suggest you make your choice from the following peaceful species: neon tetras, lemon tetras, enamel fins, flame fish, bloodfins, zebra fish, opalescent fish, and harlequin fish.

I have just acquired a fish that my dealer says is called *Xenotodon concila*. I cannot find any reference to this fish in the major books devoted to aquarium fishes. Please can you help me to find out something about it?

Xenotodon concila is one of the less-frequently imported fishes from south-east Asia. It may attain a length of 12 in. and is therefore not suited to a small aquarium. It frequents the upper levels of the water and is quite a jumper; so take warning and keep its tank well-covered. It flourishes best in slightly brackish water maintained at a temperature of about 75°F (24°C).

I should like your advice on the care and successful breeding of *Apistogramma pertense*.

This little cichlid flourishes best in a tank made shady with lots of plants growing in soft, neutral to acid water maintained at a temperature in the middle seventies (°F). Room must

also be found for some pieces of non-calcareous stone arranged in the form of a cave, inside which the fish will retire to spawn. As a rule they will only spawn when the mood moves them, but a temperature in the high seventies or low eighties (°F) and a diet richer than usual in chopped earthworms and meaty livefood will help.

My dealer told me that tropicals from mountain streams are always more difficult to keep in the aquarium than those from lakes and ponds. Do you think this is true?

What your dealer meant was that fishes from still or sluggish waters are less demanding in their need for oxygen than fishes from waters racing around and over boulders and deriving the maximum oxygen from the contacting atmosphere and oxygen-carrying spray. Another thing, fishes that live in waters with little or no movement are used to differences in temperature in different layers. There are no such differences in fast-running water. In short, fishes from fast-running waters are not so tolerant of temperature change.

Could you please tell me the scientific name of the skunk catfish?

The skunk catfish is none other than our old friend *Corydoras arcuatus* from the upper reaches of the Amazon.

Can you tell me something about Griem's tetra?

Griem's tetra (*Hyphessobrycon griemi*) is like a very pale flame fish (*Hyphessobrycon flammeus*). Yet against a dark background and in the conditions that suit it best—soft acid water and a temperature in the upper seventies (°F)—it can look very beautiful. It is peaceful and eats anything.

I have a young pair of *Astronotus ocellatus*. Later in the year I should like to try and spawn them. What size tank do you recommend and is the species difficult to breed?

You will need a tank at least 4 ft. long. The Oscar, to give this fish its popular name, is a typical cichlid inasmuch as it can be moody and unpredictable in its behaviour. Some

pairs breed without any trouble at all, and may be left in the spawning tank with their fry; others fight and if, and when, they do spawn are quite likely to eat the eggs or fry. The best thing you can do is to observe the fish very carefully and be ready to save the eggs or fry or one of the pair from sudden disaster.

I have just bought a fish called *Osphronemus olfax*. Please give me some details as to the length this fish will grow, the food most suited to it, and its country of origin.

This fish, which is sometimes listed as *Osphronemus goramy*, is from the Greater Sunda Islands and in the natural state reaches about 2 ft. in length. It is thought highly of as a food fish. It needs a large aquarium, naturally, and will eat almost anything. Small specimens are prettily marked.

Would a 24 in. by 12 in. by 12 in. tank kept at a steady 75°F (24°C) make a suitable home for an electric catfish?

Tank and temperature will prove quite suitable for an electric catfish. But in case you do not know much about this species we would warn you that it needs smaller fishes to eat and plenty of meat. Also, it is light-shy and is most active at dusk and after. In the natural state it may attain a few feet in length, but in the aquarium it seldom grows to more than a foot if that.

Would two young bitterling (*Rhodens*) live contentedly in my tropical tank?

This species is a room-temperature fish and not a tropical by any stretch of the imagination. Be this as it may, a temperature in the lower seventies (°F) would not kill it, but its demands on oxygen and swimming space would be far greater than that of the average tropical.

Would kuhli loach spoil the appearance of my community tank by uprooting the plants and stirring up the sediment? Also, are they suitable for keeping with other fishes?

Acanthophabus kuhli is too delicate in body and movements to uproot established plants or muddy the water. As for the disposition of this species, it is quite inoffensive.

OUR READERS WRITE



Scorpion Fish Ban

You will be pleased to hear that the Borough of Bromley has now lifted the ban on the sale of scorpion fish, following my appeal against this decision which was made without due consideration of the facts.

While adult scorpion fish can and do inflict serious stings, the young fish 3-4 ins. commonly sold in this country do not, to my personal knowledge give a serious sting. I discovered this myself when feeding the marine fish in one of my aquaria as a scorpion fish *P. Volitans* come up too rapidly to take the food and I was stung on the tip of my finger. The injury was about the equivalent of a wasp sting and I did not treat it in any way. The pain from the sting disappeared after 20 minutes, and I suffered no other ill effects. The Borough of Bromley Chief Health Inspector had based his ban on information supplied by the British Museum which, with all due respect to that institution, has little knowledge of keeping these fish but passed on the information which is common knowledge in respect of adult fish.

The Pet Animals Act of 1951 is designed specifically to protect animals from humans, i.e., it lays down that pets must be kept in suitable conditions, adequately fed, heated if necessary and with sufficient space and exercise, etc. An Order in the Act states: "in addition to such other considerations that the local Authority shall decide." The interpretation that the Borough of Bromley put on this was to protect humans from animals in my view quite an incorrect interpretation of the Act, which if allowed to go unchallenged might lead to the ban on dogs which might

bite, cats which might scratch, let alone other pets such as parrots, mice, rats, etc.

J. ATTENBOROUGH,
The Kingfisheries,
Beckenham.

Barbus species

In reply to several comments on the subject of the genus *Barbus*, I should like to point out that the scientific names of fishes exist and are altered to aid the easy and accurate identification of any fish, and not simply to confuse the aquarist. To describe a fish as belonging to the genus *Barbus* denotes only that the fish is a barb of some sort, and that it could come from any part of the barb-inhabited world. Given the name *Puntius* (not *Puntices**, to which Mr. Winter refers) one would know instantly that the fish named was a Siamese or Indonesian barb without barbels.

To me, this seems a far more logical system than that of keeping all the many barbs in the one genus, which is, in itself, confusing.

G. N. BROWN,
Huddersfield.

*Printer's error and not Mr. Winter's (Editor).

More Accuracy Needed

The article by D. B. Easingwood in the issue of February prompts me to appeal for a greater degree of accuracy and conscientiousness on the part of writers for the aquarium press. Sloppy writing and erroneous information will neither help the hobby forward nor enable the beginner to make a success of his first aquarium. Mr. Easingwood stresses the importance of furnishing the aquarium with a non-calcareous compost, yet a few hundred words on he advocates the use of hardcore and marble to add to the attractions of a decorative aquarium. I know nothing about the mineral make-up of hardcore, but marble, like sea shells, lumps of coral, uncured cement "rocks," plaster mermaids, crocodiles and similar rubbish should be avoided (in the freshwater aquarium) like the plague. Furthermore, Mr. Easingwood on the subject of water informs his readers that distilled water is obtained by boiling tap water. I trust that no one in need of distilled water for aquarium or other purposes will follow this piece of nonsensical advice.

JACK HEMS.

All-Glass Tanks

Further to the previous correspondence in your columns regarding all glass tanks made with silicone rubber sealant. Mr. T. Wild appears to have had rather bad luck with his efforts and Mr. D. Bevan appears to be a little over confident.

I believe I was probably one of the first people to use Dow Corning 780 Sealant for this purpose. In 1961 I made my first tank when a friend, who first thought of the idea, approached me to check the material for toxicity. At this time Dow Corning could offer us no advice on the use of the sealant for this purpose.

Recognizing the value of this type of aquarium, very shortly afterwards I formed a company to manufacture and distribute aquariums made in this manner. I sold my interest in 1965 after we had made and sold hundreds of standard units ranging from five to thirty gallon sizes and many special larger units.

During this time I found many tricks in making these tanks, as well as finding the practical limitations. In the first place all glass tanks of this type, made without the use of jigs, should be limited to a maximum water depth of 16 in. The glass must be cut as accurately as possible with clean square edges and the joints must allow for a film of sealant across the glass thickness which must not be squeezed out by pressure during assembly. .020 in. is the recommended finished sealant thickness. To use glass which is too thin is a very common mistake.

These tanks are actually stronger than the light angle frame types in that they form a rigid unit which can safely be supported on two blocks one at each end with nothing under the centre. Bear in mind that glass thinner than 32 oz. is not practical. Use glass 5/32 in. thick for a 24 x 12 x 12 to 1/2 in. thick for a 30 x 12 x 16 and 3/8 in. thick for any tank longer than 36 in.

The great advantages of this all glass tank is that it can be drained and stored without danger of leaking when they are reused. They are ideal for marine aquariums and are completely free from any danger from chemical or metallic contamination.

HAROLD BENN, 89 Strachan Street,
Port Hope, Ontario, Canada.



WATER INSECTS THAT BITE

by Bill Simms

WHEN HE IS COLLECTING water weeds from a pond, the aquarist may occasionally receive a bite that can be quite painful. Sometimes he may find the water insect that has done the biting, but often it will be concealed by the mass of weeds, and he may think that he has pricked his thumb on a thorn.

If the insect is *Ranatra linearis* it is unlikely that it will be noticed easily, for this creature, which is sometimes called the Water Stick-Insect, is just like a piece of stick when it keeps still—as it usually does when frightened. This water-bug, which has a body about 1½-2 inches long, has the build (roughly) of a daddy-long-legs. It has a slender body, and very long thin legs. At the rear end is a breathing tube as long as the body, and the tip of this is pushed up through the surface film of the water to take in air. At the front end of the Water Stick-Insect are two long "catching" arms, equipped at their ends with caliper-like grips. These shoot out to catch the prey so rapidly that it is difficult to see the movement. They then retract slowly to bring the victim into contact with the beak, or mouth parts.

The beak is a short sharp piercing instrument which, after cutting

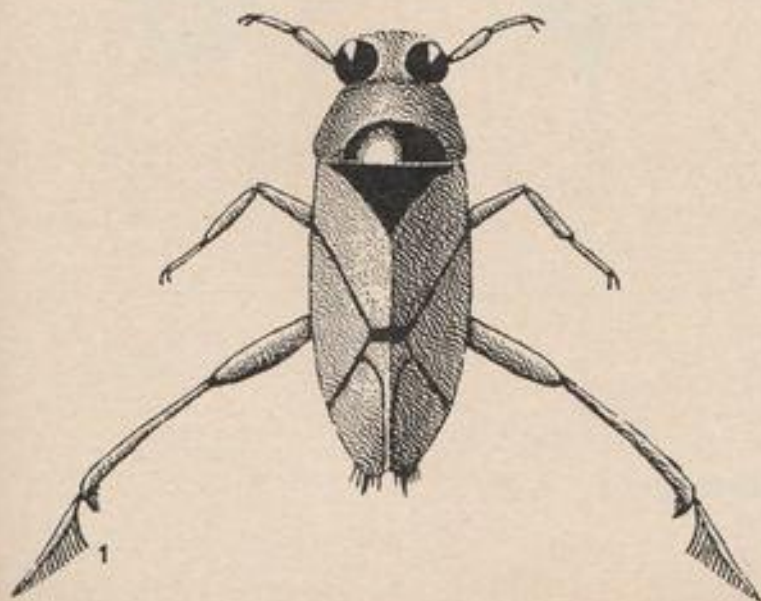
through the skin, proceeds to suck out the victim's juices. It is this beak that causes the pain we think of as a bite, and with certain modifications it is typical of a "bug's" mouth parts.

Water Stick-Insects are found normally in the southern parts of Britain only, where they clamber about on pond debris below the waterline. They can swim reasonably well, but usually do not venture out into open water, preferring to stay where they can clamber about on the water plants. In spring the female lays her eggs just inside the skin of plants quite near the surface, and then she fashions a long filament from the eggs to the surface so that they can have air. During cold spells the eggs take longer to hatch out, and this fact probably has some influence on the lack of these insects in the north. Although it appears to be unlikely with such a thin creature, the Water Stick-Insects can fly quite well. It clammers out of the water onto some stem reaching above the water line, uses its hind legs to open out the wings, and then flies off. It is by this method that *Ranatra linearis* manages to populate very small ponds.

The Water Scorpion, *Nepa cinerea*, has a totally different appearance from the previous insect, being broader and shorter, but it functions in a similar manner. Its legs are not much help when swimming, so that it prefers to climb about on water plants. This shield-shaped water insect, with sturdy calipers at its front end, is very common, and in many instances will be the main source of any accidental bites. Many people think that the long tube at the insect's rear is the stinging part, but this is not so. These long rear filaments are air tubes, by means of which the creature replenishes its air supply. That is why it approaches the water surface rear-end first, and then pierces the surface film with the tube.

The Saucer Bug, *Ilyocoris cimicoides*, is a fat-looking water bug just over an inch long, that can cause a most painful wound. It swims very well indeed so finds no difficulty in catching its prey. This is any kind of small water creature, so the aquarist should take great care that these predators are kept out of any aquarium.

Velia caprai, a Water Cricket, is a small insect that runs about on the water surface, and as such it might well be scooped off an aquarium surface



April, 1969

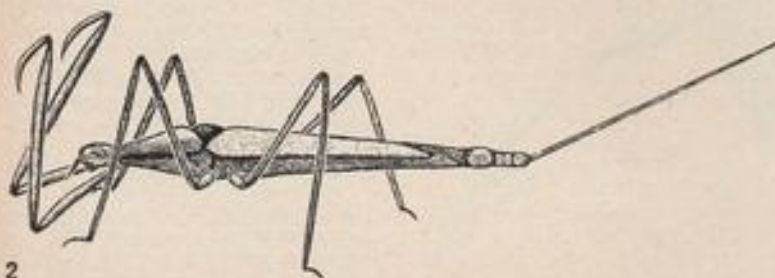
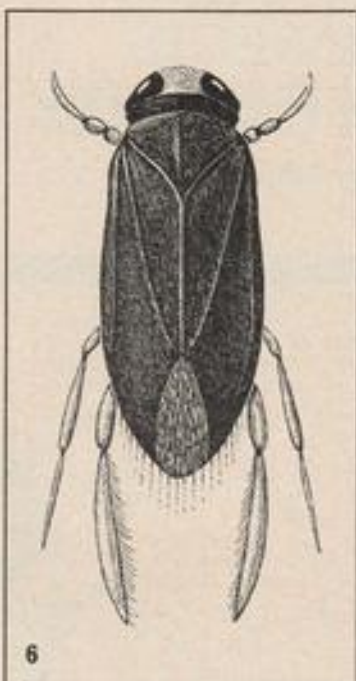
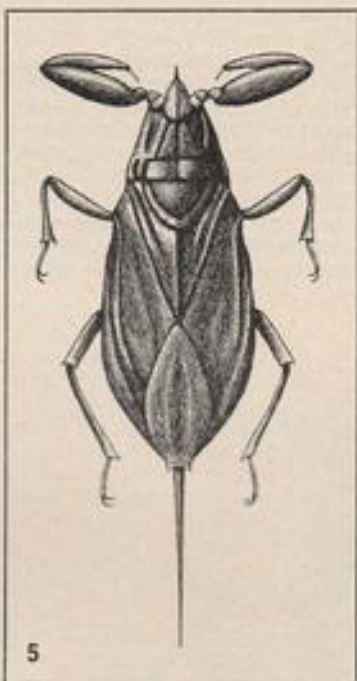
by hand. But although it is small (only a quarter of an inch or so long) it also is a member of the bug family and can pierce tender skin.

True Water-boatmen, of the *Notonecta* species, are the kinds of water-bugs that swim upside down. This is because of the manner in which they carry about their store of air. Underneath the water-boatman is an arrangement of four rows of stiff hairs leaning towards one another in such a fashion that they form two tunnels. In these two tunnels the air is stored, and therefore the insect is turned upside down when under water by the buoyancy of the air. On the flattened ends of the hind legs are long hairs that help to transform these limbs into most efficient swimming organs, and with their aid the water-boatman travels swiftly, though jerkily through the water. The wound inflicted by this creature is painful, and can cause inflammation.

The Lesser Water-boatmen, of which *Corixa punctata* is but one of the thirty or more kinds, swim along the right way up. Because their air is stored all around the body it does not upset their normal balance. The bite of these lesser water-boatmen is not so painful as that of the upside-down ones, but it is not to be ignored.

Like the previous water-boatman, this lesser one can fly well. It shoots itself out of the water with vigorous strokes of its hind legs and opens its wings at once to fly away. In addition this insect can make a chirping noise which it does by rubbing a bristly leg against its head.

If you do get a stab from one of these water insects there is very little that can be done about it. But knowing which are the troublesome ones is some help, for they are comparatively easy to recognise. So keep your eyes open when handling water weeds.



- 1 Water-Boatman (*Notonecta* species)
- 2 Water Stick-Insect (*Ranatra linearis*)
- 3 Water Cricket (*Velia caprai*)
- 4 Saucer Bug (*Ilyocoris cimicoides*)
- 5 Water Scorpion (*Nepa cinerea*)
- 6 Lesser Water Boatman (*Corixa punctata*)

PLASTIC POOL FOR ALL

by H. J. Gilbert

WATER GARDENING HAS always been part of our national heritage. Firstly it was practical necessity, as witness the fish ponds of our monasteries and ancient manors, to provide food which would be acceptable on religious festivals as well as other days throughout the year. Then as more prosperous times came to these islands the landed gentry employed architects and landscape artists to build our "stately homes," always with some form of water-gardening as decoration. Perhaps all this with the beauty and fascination of our native streams and rivers contributes to the urge we all feel from childhood onwards to stop and stare whenever we see a pond, however small.

Until recently if one has been sufficiently moved to think of owning a pond, even a small one, it has meant a great deal in blood, sweat and tears. Usually in that order as unaccustomed hands and backs dig holes and line them with concrete which, when filled with water, may leak, but will most certainly go green and look very unpleasant for a very long time. I know there are various proprietary products to overcome both these snags but somehow in the hands of the amateur (but enthusiastic) pond owner they never seem to work quite as the manufacturers claim. Now with the advent of plastics many of these snags are overcome, even the hole digging effort is reduced because no allowance need be made for the thickness of the concrete when deciding the depth of the pool. The "green water" problem is also somewhat reduced, because there is no "free lime" to contend with. This is always present for a very long time in a concrete lined pool, even after treatment to overcome it.

Which then, of all the types of plastic pools should one choose? Bearing in mind that one should always decide to have the largest pool one can fit in, compatible with its

surroundings, of course. Depth is also very important, not only from the always noted comfort of fish under ice idea but also the temperature fluctuation is less in a comparatively deep pool and this is beneficial to both fish and plants. However, the depth and surface area of pools are inter-related to a certain degree; bearing in mind the foregoing remarks it should be stated that no pool need be more than 30 ins. deep, 18-24 ins. being a fair average with shallow plant ledges. Some books give 6 ins. of fish per sq. foot of surface area but because of the variety of fish species available and to allow for growing it is as well not to exceed 3 ins. of fish per square foot when stocking the pond.

We will then consider the cheapest and the dearest in this type of pool lining. Polythene sheet is the obvious one which comes to mind as the cheapest, even in the heavier gauges which it is essential to use. Unfortunately natural polythene deteriorates after about two years, whilst the life of black is around six years and blue comes about midway, but even this is short in the life expectancy of a pool. One of the features of the deterioration is that the polythene becomes brittle and thereby renders it particularly likely to be pierced by any root growth in or outside the pond. There is no effective way, either, of repairing this material, so any puncture can have disastrous results. Therefore use this material for a temporary pool in stone free ground only. If, however, on the grounds of expense, it is polythene or no pool, go ahead by all means using the heaviest gauge you can afford and prepare the site with extra care, i.e., lining the hole in the ground with a good layer of damp sand or sifted earth and an extra layer of polythene at the danger spots.

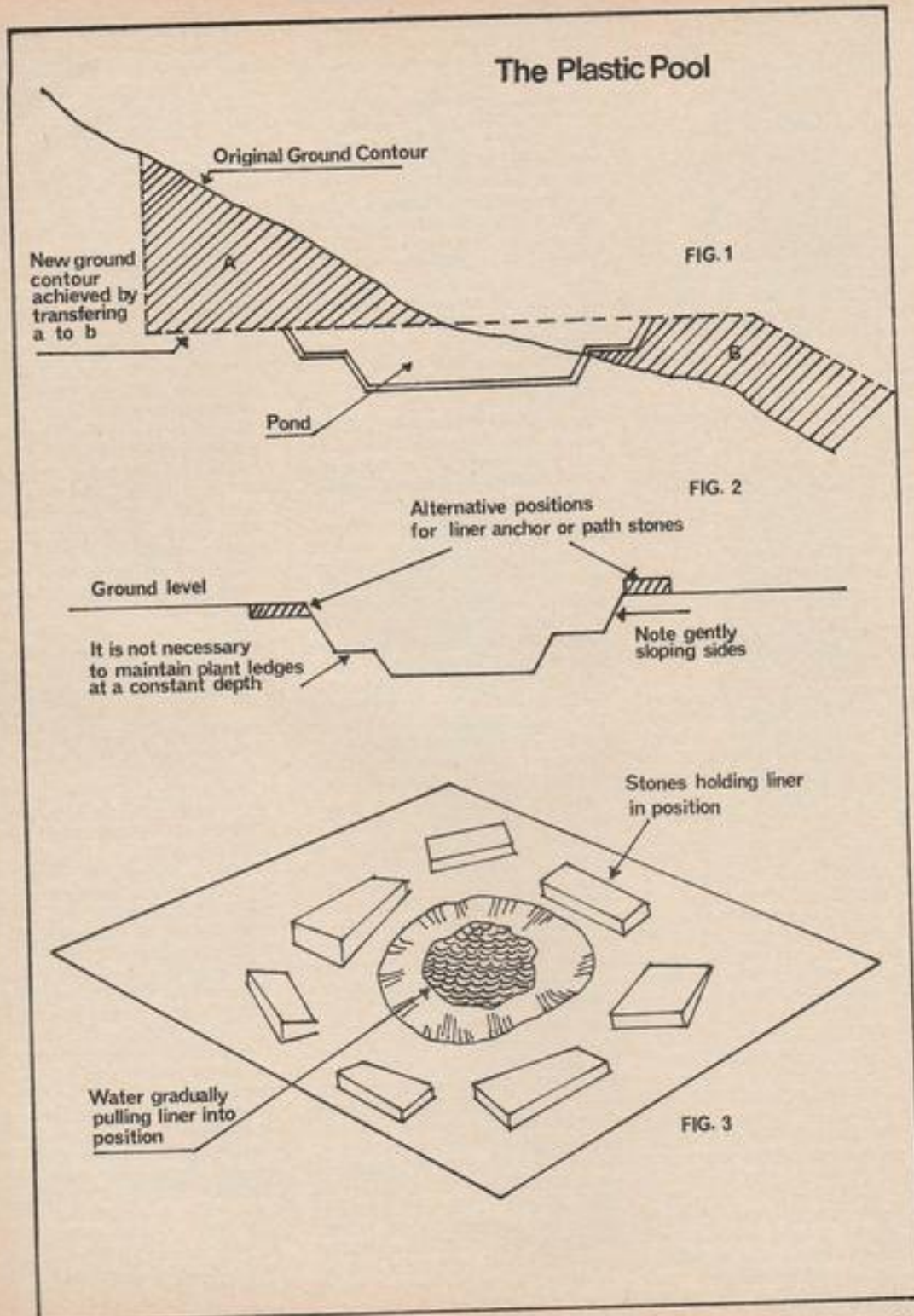
Our next type of pool liner has two drawbacks. Fibreglass pools are the most expensive and one is limited as to the sizes and styles made available by the manufacturer. One enterprising firm has, however, tried to overcome this latter snag by making sections available which may be bolted together to form a variety of shapes. A further variation has artificial rocks moulded along the pond edge. Also available are fibreglass cascade or waterfall units, which, whilst they lack a certain amount of realism may be suitably camouflaged and at least have the merit of being

waterproof. It is most difficult to build a waterproof unit with natural materials—but is absolutely essential if one is not to be continually topping up one's pond. Structurally, fibreglass pools are extremely strong and will last indefinitely. In preparing the site, however, it is essential to provide firm support under the base and any built-in plant ledges otherwise distortion may take place causing cracks to appear in any weak spots. The sides must be back-filled where necessary and the earth used must be rammed extremely well otherwise dangerous holes will appear on the pond surround. This may not occur for some months, or until a period of heavy rain and if your pond has either a crazy paving or stone flagged path around it the holes will not be apparent until an accident happens.

This brings us to the most practical of pool liners. There are three materials which come into this category and there is little to choose between them apart from a slight variation in price. Firstly, there is black butyl rubber sheeting followed by two types of P.V.C. sheet, one being reinforced with terylene and so obviously this is the strongest. Each of these three particular materials may be repaired in case of an accident with simple patches of the same material and a suitable adhesive. This property also enables one to increase the size of sheets although these are big enough for all practical purposes in an ordinary garden pool. Dealers will usually advise one as to sizes available.

Having decided on your flexible plastic pool liner, mark out the site of the pond. Bearing in mind that most materials are in rectangular sheets it will be seen that a similar shaped pond will be the most economical, material-wise. Slight variations such as kidney, or figure of eight shapes may be carried out without too much wastage but intricate systems of bays and headlands should be avoided. A good plan is to lay out the shape you favour either with the garden hose or a clothes line so that modifications may be carried out before excavation starts. Next, make sure the site, whether it is lawn or bare ground, is level. A constant parallel lip is the sign of a well-planned pool. In extreme cases it may be necessary to level as in Fig. 1 before starting on the pond.

The Plastic Pool



PLASTIC POOL FOR ALL Continued

It is time well spent levelling the site with spirit level, stakes and straight-edges because when the pool is filled, the water will find its own level and any discrepancy will always show in spite of any camouflaging you may do. Now having determined on the pool profile a few rough calculations are required to determine the surface area and also the average depth it will be necessary to dig your hole. To arrive at the size of liner required simply take the overall length and breadth of the pond and add twice the maximum depth to each of these measurements. It is not necessary to make any allowance for any plant ledges or even overlap at pond edges as the normal elasticity of the materials, together with the slight inward slope of the hole walls, will take care of these.

Whatever the profile of your pond, it is recommended that all the walls

slope slightly as indicated in Fig. 2. They should be covered with either sifted soil or sand to prevent damage. The pool liner is placed centrally over the excavation and held in place by paving stones or bricks Fig. 3 wrapped in thick newspaper. Water is then slowly poured into the centre of the liner which will assume the shape of the hole partly by stretching and partly by sliding from under the stones. When the pool is full any surplus material may be trimmed off leaving just sufficient to enable the edges to be firmly secured under paving stones or crazy paving. As far as possible avoid cutting the material to make it lay flat, it is preferable to make a series of small tucks around the edge and cover it by a further layer of the material to prevent damage by the stones. Some people may be tempted to finish off the pond edge with turf on top of the liner but this is not a good practice as the pool edge usually gets quite a lot of wear and tear, and the turves never really get rooted firmly on top of the liner edge. A refinement which may be added without too much trouble is a shallow trough to form a bog garden,

either all round or part way round the perimeter to form a barrier of foliage and flowers against marauding cats.

It is helpful in deciding the depth of your pond to consult the catalogues of aquatic plant dealers. These usually tell you not only the most suitable depth for planting but also what size you may expect your plants to grow. Reinforcing patches stuck on your pool liner where fountain units or plant containers are to stand are not absolutely necessary but may save embarrassment later on. Those in the centre or deepest part of the pool being stuck in position before any water is poured in. Any resting on the plant ledges are positioned and stuck as the liner is pulled down into the centre depression by the weight of the water.

In conclusion it must be emphasised that the main consideration in using a P.V.C. or Butyl-type liner is that more careful handling and preparation is necessary but the end result is almost as enduring as concrete and achieved with much less effort in a very much shorter time. Also, with the present prices of cement, sand and ballast the prices are comparable.

WEEDING A LARGE POND

by Dinah Castle

AS AN OWNER OF a natural pond covering one third of an acre, I was particularly interested in Phillip Swindell's article on the Potamogetons, (October 1968). There is one aspect that he did not deal with, however, that is how to rid one's pond of these plants when they grow too abundantly.

When we took over our pond it was in a very neglected state, invaded by reedmace and willow and so silted up it was on the way to becoming a bog. After draining and cleaning and having the willow roots winched out we let the pond refill. Water plants quickly made their appearance, yellow water-lily, water starwort, duckweed and amphibious persicaria. We stocked up with about fifty rudd and tench and a few goldfish and they did well and increased in the next two years.

Then we noticed the Potamogetons, the floating pondweed (*P. natans*) of which the broad leaves are decorative and seem to be liked as cover by the little fish; and then the Grassy pondweed (*P. obtusifolius*), which grew and spread with such rapidity that it practically covered the surface in a dense mass about a foot deep. As we saw nothing of the fish we decided to try and get some of it out.

Weeding with a rake from a small dinghy was neither comfortable nor very effective, but it was noticeable that where a patch of water was cleared the fish crowded into it as though to enjoy the space and light.

We then adopted a method which might be useful to other pond owners who have a similar problem. We attach the end of a long rope to a good sized hazel branch with plenty of twiggy side branches. Then we take the other end of the rope to the opposite side of the pond and tow the branch through the water. As it goes a great curtain of weed is picked up. As it drains on the edge, numbers of tiny creatures, beetles, shrimps,

worms and larvae, wriggle and jump to regain the water, so we hope that we are not destroying too much of the animal life of the pond.

We do not start this weeding operation until August, not wishing to disturb the families of mallard and moorhen which rear their broods on an island left for that purpose in the centre of the pond.

Answer to
Find the
Plant
Cabomba



from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 5th of the month preceding the month of publication.

AT the February meeting of the Newport A.S. members listened to a taped lecture on "White Spot" by W. L. Whitem, F.Z.S. The subject was well presented and clearly understood. Following the lecture there was some free discussion on the subject and from the questions and answers it was obvious the subject would remain a controversial one. Results of the Table Shows were as follows. Senior Classes. Swordtails: 1, H. Walker; 2 and 3 I. Phillips. Pairs: 1 and 2, H. Walker; 3, H. Walker. Junior Classes. A.V. Livebearer: 1, R. Fothergill; 2, J. Walker; 3, R. Hewlett. A.V. Egglayer: 1, J. Walker; 2 and 3, R. Hewlett.

A TAPED lecture on foods and feeding was the subject at the meeting recently held by the Hastings and Bexhill A.S. The tape lecture, lasting thirty minutes, started a discussion on this very important aspect of our hobby. Mr. K. Nutt, a speaker from the F.B.A.S. lectured the society on cichlids, how they spawn and how to raise the newly hatched fry. A table show for cichlids was held and judged by Mr. Nutt and resulted: 1, P. Martin; 2, P. Harbord; 3, J. Watson.

THE Longbridge and District A.S. has now been formed for one year and is developing into a strong society with a present membership of over forty. At the annual general meeting the following officers were elected to serve this year. Chairman: L. Astill. Vice-Chairman: D. Hodges. Secretary: L. Cottam. Assistant Secretary: D. Dyer. Treasurer: G. Shipman. Show Secretary: P. Massey.

During 1968 several table shows were held, and the "Ron Whitfield Challenge Shield" was won by J. Follows. The Society offers a varied programme for the coming year and extends a warm welcome to any new member who wishes to join. For details please contact the Secretary: L. Cottam, 13 Cottage Lane, Marlbrook, Bromsgrove, Worcs.

THE twenty-six members who braved the extremely bad weather conditions to attend the February meeting of Tonbridge and District A.S. were amply rewarded by two films borrowed from Unilever. One was on Genetics and the other on Hard Water. A third film, "Under the Seven Seas," was entertaining although not strictly relevant. Winners in the monthly table shows were as follows: Swords and Plates: 1 and 2, T. D. Aron; 3, R. Taylor. Molles: 1, J. Bellingham; 2 and 3, I. T. Marbleson.

THE officers elected at the Enfield & District A.S. annual general meeting were as follows: Vice-President, C. Watt; Chairman, J. Coleman; Treasurer, I. Young; Secretary,

E. G. Whitaker, 26 Shirley Road, Enfield, Middlesex; Show Secretary, B. Senior; P.R.O., J. D. Whitaker. The chairman reported on a successful year and looked forward to further success in the future. Meetings on the third Thursday of each month were well attended, and new members would be warmly welcomed.

The secretary gave details of future events which included film shows, panel evenings, and first-class speakers. T. Mann had won Fish of the Year, while M. Rose was first in the Tank of the Year.

At an earlier meeting there was a quiz and the table show was Barbs. 1, Mrs. Baggott; 2, J. Coleman; 3, Miss C. Collins; 4, J. D. Whitaker.

THE Trowbridge and District Aquatic and Pondkeepers Club is now actively engaged in preparing for their Open Show to be held on 3rd May when it is hoped to improve on last year's record entry of nearly 600 fish which came from a very wide area.

Attendances at the Club's monthly meetings are on the increase, and it is pleasing to see new faces. In order to make newcomers welcome the Club has appointed I. Scudamore as public relations officer. A programme of films and lectures has been arranged and should interest both the advanced and new fishkeeper. The February meeting was a great success and the colour slides of fish and plants supplied by V. Capaldi, with commentary by J. Wheeler, were greatly appreciated by the large attendance. Details of Club activities can be obtained from the Secretary, Mrs. S. Scudamore, 45 Trowbridge Road, Bradford-on-Avon, Wilts.

THE results of the Fish of the Month table show of the Bethnal Green A.S. were: 1, C. Fish (American Flag); 2, L. Smith (Black Molly); 3, B. Martin (Black Molly); 4, L. Goff (Veiltail Guppy).

THE first meeting in February of the Basingstoke A.C. consisted of a talk on diseases of fishes by D. V. Jones of Southampton A.C., which was well received by over forty members. M. Carter of Bracknell A.C. judged the table show, the results being as follows: A.V. Labyrinth: 1 and 3, A. Blake; 2, J. Mitchell. A.V. Fish: 1, A. Blake; 2, Miss K. Box; 3, F. Lange. A.V. Novice: 1, Miss K. Box; 2, H. Gough; 3, K. Winslade.

THE February meeting of the Barnsley T.F.S. was well attended by nineteen members and four new members came along. It was decided to change the name of the Society from Barnsley and District A.S. to Barnsley Tropical Fish Society and also to move to a new meeting place which will be the Alhambra Hotel, Barnsley (every second Tuesday of the month).

The table show for Cichlids was won by Mr. & Mrs. J. Howard, second place going to Mr. Claypole. The meeting was concluded with a quiz in the form of a crossword prepared by Mr. Scothern.

THE annual general meeting of the North Kent A.S. was held in January when a new Committee was formed: Chairman, G. Savage; Secretary, B. Bloss; Assistant Secretary, Members Spokesman, E. Hull; Show Secre-

tary, A. Randell; Assistant Show Secretary, J. Parker; Treasurer, C. Hunter; Social Secretary, P. Wills. The Club would like to offer its thanks to retiring committee members, Mrs. B. Hunter, T. Flint, B. Harvey and C. Wood for their services in the past year. New members would be welcome and for information please contact the Secretary, B. Bloss, 11 Lane Avenue, Greenhithe, Kent.

THE January meeting of the Llantwit Major A.S. was well attended, as the weather was good, compared with other parts of the country. The speaker was R. Wigg, who gave a talk on his methods for breeding and rearing Veiltail Guppies. A number of new members attended, so many questions were asked, especially about feeding the young fry. He stressed the point that one should start sexing the fry at three weeks old, and he gave one feed a day of brine shrimp, macro worms for the first fortnight and used screened daphnia and dried fry food. After about six weeks graded worms were fed about three times a week. He also stated that he used aeration, and changed a quantity of the water at least once every two weeks. The tank temperature varied between 68°F to 74°F. If the sun was fairly warm, it increased the temperature during the day up to 78°F.

At the February meeting the chairman was the speaker. He prepared himself for any unforeseen circumstances, such as inclement weather, by putting it on a tape. However, he had the pleasure of listening to himself, giving a talk on the numerous types of plants for the tropical aquarium. This proved of great interest to everyone.

IDEAS for the future of the Mid-Sussex A.S. were outlined by Vice-Chairman, David Soper, at the annual meeting held recently. They included chartering a plane to visit fish farms in Scandinavia (winning with a club in America to exchange fish and ideas); and building a club house.

The following were elected to the committee for this year: Chairman, R. Johnson; Vice-Chairman, D. Soper; Secretary, J. Reeve, 36 Rumbolds Lane, Haywards Heath, Sussex; Treasurer, C. West; Show Secretary, R. Smith; Committee members: Mrs. L. Jeffrey, N. Short, A. Jackson, B. Drewitt. B. Drewitt's place is new this year, all other members were re-elected.

The year's awards were presented to the following winners at the meeting. Exhibitor of the Year: 1, D. Soper; 2, C. West; 3, R. Johnson; 4, L. Jeffrey; 5, N. Short. Fish of the Year: 1, R. Johnson; 2, E. Jeffrey; 3, C. West; 4, S. Smith; 5, D. Soper. Home aquaria: 1, D. Rebbetts; 2, R. Johnson; 3, D. Soper; 4, E. Jeffrey; 5, M. Francis. Furnished jar: 1, N. Short; 2 and 3, D. Soper; 4, J. Reeve.

Novices class: 1, S. Price; 2, S. Cauderbank; 3, A. Prior; 4, N. Bridal; 5, Mrs. Jackson. Breeders' class: 1, 3 and 4, D. Soper; 2 and 5, J. Reeve. Cichlids: 1, 2, 3 and 4, D. Soper. Catfish class: 1, C. West; 2, R. Smith; 3, L. Jeffrey; 4 and 5, N. Short. Guppies (male): 1, 3, 4 and 5, D. Soper; 2, B. Dazial. Guppies (female): 1, 2, 3 and 4, D. Soper.

Livebearers' class: 1, S. Smith; 2, E. Jeffrey; 3 and 4, C. West; 5, A. Prior. Labyrinth class: 1, D. Soper; 2, 3 and 4, M. Spenshott; 5, J. Reeve. Barbs class: 1, C. West; 2, A. Saunders; 3, D. Soper; 4, N. Short; 5, R. Johnson. A.O.V.: 1, M. Spenshott; 2, C. West; 3, 4 and 5, D. Soper.

Characin class: 1, 3 and 4, D. Soper; 2, R. Johnson; 5, R. Johnson. Rasbora class: 1, J. Reeve; 2, 3 and 4, R. Johnson; 5, D. Soper.

Junior awards: Home aquaria, Master P. Miles; Exhibitor of the year, Master P. Miles.

THE following changes of the newly formed Club, Sydenham and Penge A.S. resulted from the first Annual General meeting held recently. Chairman: A. Tucker; Secretary: M. Alderson, 11 Princes Road, Penge, London, S.E. 20; Treasurer: L. Pickering; Show Secretary: P. Ridington.

Meetings are held alternate Wednesdays at the "Crooked Biller", Penge.

TWENTY one years ago ten people who were interested in keeping fish as a hobby met in

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Southampton and formed the **Southampton and District A.S.**

At the recent Annual General meeting of the Society this fact was pointed out and it is interesting to note that one of those original ten, R. V. Fish of Merridale Road, Bitterne is now President. Two others are still actively engaged in the tropical and coldwater fish business, one at Winchester and the other as director of one of this country's leading wholesale importing firms.

The Committee Report, indicating that members participation and success in various shows was on the increase was adopted. The Balance sheet showed a satisfactory reserve of funds but as the Treasurer pointed out this was really only because of the increase in subscriptions agreed last year. The rise in running costs had really justified this unpopular move. After some explanations and a brief discussion the Balance sheet was approved. Members also agreed that the Society should continue its affiliation to the Federation of British Aquatic Societies; it was felt that inter-club co-operation throughout the hobby was the best way to help all those interested in fish keeping.

The resignations of certain officers had to be accepted but as sufficient nominations had been received the following were appointed to run the Society's affairs during the coming year. Chairman: H. J. Gilbert; Vice-Chairman: D. Jones; Secretary: Mrs. M. Gilbert; Show Secretary: C. McCann; Treasurer: Mrs. Vincent. The Committee: Mrs. Grimley, Messrs. Mansbridge, Russell, and Schipper.

Mr. Gilbert thanked the retiring Chairman and Treasurer Mr. Hastings and Mr. Speirke for all they had done for the Society during their term of office, he remarked that over the years he had been Committee member as well as Secretary so this experience should help him in his new office.

THE Guildford and District Aquarist Club held their Annual General meeting at the February meeting, when the officers and committee were elected for the forthcoming year, and the Club's activities both past and present were discussed. It was decided that meetings would be held fortnightly, instead of monthly, for a trial period of six months. Membership has increased considerably over the last twelve months and this had enabled a wider and more varied programme to be arranged for the future. New members are welcome and the Secretary, J. Cole, 16 Weydon Hill Close, Farnham, Surrey, will gladly forward details of meetings.

THE Haverthorpe A.S. had a "Ladies Night" recently which was run by all the lady members of the Society. There was a darts match with two male teams, one junior and one ladies' team. The winner of each team played off for the highest score at the end. The winners were Master Kirkbright, Mr. Barker and Mrs. Dickinson. The "Champions of Champions" was Mr. Barker.

The speaker for the February meeting of the **Warrington A.S.** was K. Rigby, Chairman of the Liverpool branch of the F.G.A. With the aid of some coloured drawings, he went on to explain in detail the standards of the various types of Guppy accepted by the F.G.A.

At the February meeting of the **Coventry Pool and Aquarium Society** there was a slide show on M.A.L. and a table show. The first prize was won by C. Bates for the best fish in the show. The results of the show were as follows:—Cichlids: 1, 2 and 4, E. Sheehy; 3, T. Grant. Anabantids: 1, C. Bates; 2, 3 and 4, E. Sheehy. Breeders' Livebearers: 1, E. Sheehy; 2, T. Grant. Meetings are held at Wheatley Street School at 7.45 p.m. and the next will be on the 9th April.

THE Derby Regent A.S. held its Annual General meeting in January, when A. M. Drakin, F.R.A.S., A.Y.A.S., was once again elected President of the Society. Others elected were:—Chairman: P. Wilby; Vice-



1969

BRITISH AQUARISTS' FESTIVAL

18th and 19th October
at Belle Vue, Manchester

Chairman: R. Ellis; Secretary: P. Kendrick, 10 Cumberhills Road, Duffield, Derbyshire; Assistant Secretary: R. Bull; Treasurer: T. Jerram; Show Secretary: E. Haseldine, 57 Tewksbury Crescent, Chaddisden, Derby; Assistant Show Secretary: J. Beards; Librarian: H. Whitney. The monthly magazine is attracting an ever growing number of readers. A limited number of copies are still available each month, but members or interested persons from outside the Club are advised to place a regular order. Further details can be obtained from F. Wilby, 86 Balfour Road, Derby.

THE Cardiff A.S. will be holding their third Open Show on the 17th May at St. Margaret's Church Hall, Roath Park, Cardiff. Details from Show Secretary, Colin Harding, 168 Pearl Street, Roath, Cardiff.

Changes in the Committee are as follows:—Chairman: R. Gorwill; Secretary: Mrs. J. Churchill; Treasurer: J. Day; Show Secretary: C. Harding; Librarian: D. Wainman. These are due to John Parsons resigning and Mr. Townsend's ill health. New members and visitors are welcome at meetings which are held at the Wales Gas Board, St. Johns Square, Cardiff on the last Thursday of each month.

A VERY enjoyable club dinner marked the occasion of the completion of the first year of the **Ealing and District A.S.** when the trophies won during the past year were presented. Top of the Table Show points table was J. Healey, and the Best Fish in the Club's Closed Show held in January, was E. Tagg's Grasscuter Catfish.

At the Annual General meeting the new Committee elected was:—Chairman: C. Rainbow; Vice-Chairman: A. Ankin; Treasurer: A. King; Secretary: R. Barrett; Show Secretary: R. Savage; General Members: R. Sellers, C. Ankin; Junior Member: M. Sadler.

Meetings are held on the first and third Tuesday of each month at the Northfields Community Centre, Northcroft Road, W. Ealing, W.13 and new members are always welcome at this address on club nights. For further information please contact the Secretary at 8 Grove Court, The Grove, Ealing, W.5.

The main item at the February meeting of the **Burton and District A.S.** was showing and judging fish. After a short lecture by the Chairman R. Walker on fish standards and judging, the members formed small groups and carried out a judging exercise on the fish exhibited in the table show, comparisons then being made with the findings of the official judge.

The results of the table show were as follows: Guppies: 1, J. Toplis; 2, K. Smith; 3, P. Musk; 4, G. Mead. A.O.V. Livebearers: 1, G. Mead; 2 and 3, T. Bowler; 4, J. Toplis. Meetings are held on the second Thursday of the month at the Fox and Goose, Bridge St., commencing at 7.45 p.m.

At the recent Annual General meeting of the **Wolverhampton and District A.S.**, the officials elected were:—Chairman: R. C. Short; Vice-Chairman: E. Wallwork; Secretary: W. R. Bateson, 71 Orton Lane, Wombourne, Staffs. Telephone: Wombourne 3612. Minute Secretary: R. Crutchley; Treasurer: R. Hill; Show Secretary: F. Palmer; Committee: C. Barsby, F. Bolton, J. Denison, J. Gandy, D. Jaeger. The Table Show programme for 1969 will be:—1st April: Livebearers, Catfish and Loaches. 3rd June: Barb, Rasbora and Danios. 1st July: Anabantids and Cichlids. 2nd September: Characins and Junior Show. 7th October: Breeders A.O.V.

A most interesting talk-in supported by slides and projection microscope, "Local water supply and our aquarium fish", was given in February by Mrs. Blaxham, the Chief Chemist of the local Water Board. Other programmes include a slide show on "Cichlids" 15th April, and a lecture on "Guppies" 8th May. Future programmes are being arranged and will be announced as they are completed.

A REPORT on the winter activities of the **Gosport and District A.S.** mentions that there have been talks by members of the club on breeding various types of tropical fish, slide/tape lectures, movie films and a very interesting talk by J. Stillwell on the subject of genetics. A competition was also held in the rearing of platys, this being won by D. Bridgen. Recently table shows have commenced, the results for January being as follows: A.V. Livebearer: 1, Mrs. Ovens; 2, Mrs. Littlewood; 3 and 4, Mr. Clough. A.V. Danio, Misonow or Rasbora: 1, Mr. Littlewood; 2, Mr. Clough; 3 and 4, Mr. Ellick. The future programme includes a home furnished aquaria competition, table and film shows and talks on various subjects. If anyone is interested please contact the secretary, Mr. Ellick, 5 Ankerwyke, Rowser, Gosport, Hants., for details. All will be most welcome.

At the first meeting of the **Boreham Wood and District A.S.** which was recently re-formed a committee was formed as follows:—Chairman: P. Abbott; Secretary: L. Kain, 59 Furzehill Road, Boreham Wood, Herts.; Vice-Chairman and Treasurer: R. Coulter; Show Secretary: R. Woolveridge; Press Secretary: D. Roach; Members: T. Moriarty, B. Jones, Mrs. M. Abbott. A discussion was held on the future and aims of the Society, and the programme for current year was outlined. During the second

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A DAY, SENDS
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meeting a table show was held, the award winners being:—Guppies: 1 and 2, P. Abbott; 3, L. Kain. A.O.V. Tropical: 1, R. Woolveridge; 2, B. Romney; 3, B. Fitzjohn. At this meeting a party from Mid-Herts. A.S. was entertained. The Society which meets on the second and fourth Monday of each month at the Community Centre, Alden Lane, Boreham Wood extends a most hearty welcome to all fishkeepers.

FOR their February meeting the **Bedworth Aquarist and Pool Society** held a "Ride on the Judges Course". Unfortunately this coincided with a blizzard and no Judges arrived. The Society had the smallest turn out in its history, when only fourteen members braved the elements.

The Falmouth and District A.S. met at the "Trelawny Aquarist Shop" for their monthly meeting and held a discussion group, talking mostly about different ideas of fishkeeping, and buying various types of Marine and Tropical fish. The following officers were elected.—Chairman: M. Nicholson; Secretary and Treasurer: J. Jory; Show Secretary: I. Thomas; Public Relations Officer: J. Symonds; Librarian: Mr. Hammill.

The Society meets on the first Thursday of each month at the "Trelawny Aquarist Shop", 7.45 p.m., Trelawny Road, Falmouth. Anyone interested please contact the Secretary, R. J. Jory, 19 Greenwood Road, Penryn, Cornwall. They will be assured of a warm welcome.

The Salisbury and District A.S. held their Annual General meeting recently and it was well attended. The following officers were elected: Chairman: J. West, (re-elected); Secretary: I. Goddard, (re-elected); 106 Carmelite Way, Salisbury; Treasurer: S. Cook; Show Secretary: R. Brown, (re-elected). It was also decided that due to increasing membership to elect more committee members and five members were elected.

The Chairman stated in his report how well the Society had done in the past year both at home and in any open show at which the members exhibited. The Society still meets on the first and third Monday each month and new members are always welcome.

THERE was a large attendance at the February meeting of the **Harlech A.S.**, when the guest speaker was G. H. Jennings. The topic of his address was "Tropical Marine Fishkeeping" and was illustrated by over fifty coloured slides. To provide an additional visual background to the lecture members were also shown two 16 m.m. films—"Malayan Seashore" and "Between the Tides", the latter depicting marine life around the British coast.

An attractive programme has been arranged for future months, and amongst forthcoming attractions are lectures by J. R. Bateman, Keeper of Zoology, Natural Museum of Wales and R. Mc N. Alexander, Lecturer in Zoology, University College of North Wales, Bangor.

Additional information on the February meeting: Speaker: G. H. Jennings, 2 Garscombe Road, Tufnell Park, London, N.19. Films hired from Central Film Library of Wales, 42 Park Place, Cardiff, (Malayan Seashore) and British Transport Films, Melbury House, Melbury Terrace, London, N.W.1., (Between the Tides).

AT the **Uxbridge and District A.S.** annual general meeting the officers elected were as follows:—Chairman: P. Ginger; Vice-Chairman: H. Moore; Treasurer: J. Peters; Secretary: C. Funnell, 123 Woodend Green Road, Hayes,

Midx.; Assistant Secretary and Show Manager: R. Porder; Show Secretary: N. Lee, 46 Airdale Road, Haling, London, W.5.; Assistant Show Secretary: R. Funnell; Club Hostess: Mrs H. Moore. Telephone enquiries: R. Forde, UXB, 575.

The club has been successfully represented at a number of open shows over a large area. The annual awards were presented as follows:—M. T. Summers, Shield for the highest points from table shows. Breeders egglayers: H. Moore. Breeders livebearers: C. Funnell. Home Furnished Aquaria: H. Thompson.

INFORMATION given by the West London Section of the F.G.A. states that the South London Section of the **Fancy Guppy Association** has amalgamated with the West London Section. Officers elected for this year are as follows:—Chairman: J. Thorn; Vice-Chairman: H. Brock; Secretary: T. Hibbert; Treasurer: Mrs J. Thorn; Show Secretary: J. Milne; Assistant Show Secretary: Mrs J. Milne; P.R.O. and Publicity: Mrs G. Brock; Floor Members: M. Levi, J. White; Show Stewards: F. Chubb, J. Redford.

New members and visitors are welcome on the third Sunday of each month at the Community Centre, Clifton Road, Ilford, W.7., at 3.00 p.m. Telephone: Chairman 399 8635; Secretary 692 1146; P.R.O. Chobham 8761.

OFFICERS elected at the **Harlow A.S.** annual general meeting were as follows:—Chairman: G. Sarwell; Vice-Chairman: R. Kerridge; Secretary: J. Duncan; Treasurer: Mrs V. Duncan; Show Secretary: J. Jarvis; P.R.O.: B. Salisbury.

AT the February meeting of the **Ilford and District Aquarist and Pondkeepers' Society**, Ron Dodkins, a prominent member of the East London Society gave a talk on "Water" and from his very close study of the subject and his wide experience in breeding both tropical and coldwater fish, provided Ilford members with some extremely useful information.

Harry Berger, the Society's show secretary and his daughter Rita were again successful with their prize-winning goldfish at the Hackney Aquaria Show. The best fish in the show award was given to their lionhead goldfish and Mr Berger also took first prize with a veiltail.

On Monday, 14th April there will be an auction of fish, plants and equipment for members. Table shows will also be held.

THE Hampstead and District A.S. have changed their Venue to the Central Library at Swins Cottage, N.W.3. and the meeting night to alternate Wednesdays. At the recent Annual General meeting the following officers were elected for the year: Chairman: K. J. A. Pye; Secretary: J. Hiscok; Treasurer: J. Bradford; Show Secretary: T. Cusack; Assistant Show Secretary: E. Harvey. Speakers so far this year have been: B. Baker, (Plagues of the Amazon); B. Senior (Fishes I have bred); C. A. T. Brown (Killifishes); H. Towell (General fishkeeping) and R. Biggs (Corydoras). Enquiries for membership from anyone in or near the Camden Borough are welcome and details may be obtained from Mr Hiscok 485 2572 or Mr Bradford 485 9920. Mr Hiscok's address is 5 Maststone, Agar Grove, London, N.W.1.

OVER two thousand people visited the first ever Open Aquaria Show organised by the Baths and Civic Recreation Department of the Hackney Borough Council in association with The Essex, North and East London Aquarists Association to view the 2,600 fish which were on display.

The Mayor presented the Bedford Green A.S. Trophy for the Best Fish in the Show to T. Hill of Holloway; the L. Roberts Trophy from the Chingford A.S. for the Best Angel Fish to L. Pickering of Sydenham; the Infield A.S. Trophy for the Best Cichlid to M. Parmenter of Barkingside; the Tottenham A.S. Trophy for the Best Toothcup to S. Morgan of Harlow; the Harlow A.S. Trophy for the Best Characin to R. Kerridge of Harlow; the Walthamstow A.S. Trophy for the Best Coldwater fish to Miss R. Berger and the Federation of British Aquatic Societies award for the Best Club Furnished

Aquaria to the Walthamstow A.S. This Club also won the first prize for the Club Furnished Coldwater Aquarium and the Club Furnished Tropical Aquarium.

The winners of the first prizes in the remaining classes were:—Individual Furnished Aquarium: S. Mooney, Tottenham; Dania, Rasbora, White Cloud; S. Mooney, Tottenham; Goldfish, London Shubunkin: V. P. Vosey, Basingstoke; Native Coldwater: V. P. Vosey, Basingstoke; Foreign Coldwater: V. P. Vosey, Basingstoke; Singletails, Comets: R. Elden, Tottenham; Twintail with Dorsal fin: H. G. Berger, Barkingside; Twintail without Dorsal fin: Miss Berger, Barkingside; Fighter: D. C. M. Durrant, Stanford-le-Hope; Guppy: L. Goff, North London; Platy: J. Day, How; Swordtail: J. I. Cobden, South London; Molly: B. E. Mason; Corydoras: T. J. Summers, Hayes; Catfish or Loach: G. Greenhalf, Morlen; Harb: R. Kosck, Poplar; Sexed Tropical Pairs: G. Owen, Sydenham; A.O.S. Tropical: A. Collins, Hainault; Coldwater Breeders: D. Smalley; Livebearer Breeders: A. Gilman, East London; Egglayer Breeders: C. Scott, Woodford Green.

THERE were forty-eight members of the **Brighton and Southern A.S.** present at the Annual General meeting and prizegiving evening early in February. Officers elected for the coming year were as follows:—Chairman: J. Pelham; Secretary: B. Shelton; Show Secretary: V. Aldis; Open Show Secretary: B. Browning; Committee: A. Dawes, D. Shoulders, D. McParlane. Unfortunately a replacement was not forthcoming for Miss Pam Carr, who has decided to relinquish her position as Treasurer after eight years of excellent service to the Society.

The second February meeting saw the Society comfortably installed in the new headquarters at the British Legion Club, in Marine Parade, Brighton. At this meeting a table show for Characins was staged and a fine selection of fish was judged by J. Stillwell of Portsmouth A.S. He gave the members a very interesting talk on the keeping and breeding of Characins, including his Piranna, which has acquired an unfortunate taste for heater leads. At this same meeting it was confirmed that the sixth Annual Open Show will be held on 15th June, at the Marmion Centre, Marmion Road, Hove. Schedules for this show can be obtained from R. Browning, 34 Rowan Close, Poetslade, Sussex.

Anyone interested in joining the Society should contact the Secretary, B. Shelton, 45 Coventry St., Brighton.

THE programme at the February meeting of the **New Forest A.S.** consisted of two talks by club members. L. Membenett gave a most interesting talk on Garden Pools, which included some original ideas on pool construction and layout, and this was followed by a talk on "Sucking Catfishes" by R. Moseley. In his talk he attempted to shed some light on the various fish sold under this name.

The table show results were as follows:—Corydoras: 1, A. Williamson, Melanistius; 2, M. Aust, Juli; 3, K. Newton, Palesurus; 4, D. Hare, Melanistius; Special: D. Harding, Juli. A.O.V. Catfish: 1, A. Williamson, Microgannus; 2, K. Newton, Pimelodella vittata; 3, M. Aust, Pimelodella punctata; 4, R. Moseley, Loricaria parva. A.O.V. Tropical: 1, K. Newton, Redfin shark; 2, A. Williamson, Botia; 3 and 4, D. Hare, Clown Loach.

A MOST successful year is reported by **Heywood and District A.S.** In addition to normal activities it has now been decided to re-form the junior section, which it is envisaged will be run as a separate club by the young members themselves with just a little help from the seniors. G. Kershaw was awarded the Inter-club Shield and also the Wolstencroft Shield for Achievements. Mrs. L. Davies was awarded the Ladies Shield.

In addition to the show to be held on the 27th April, it has been decided that another show be held on the 9th November, but this will be a show with a difference in that it will be held in conjunction with the Heywood Horticultural Society at their two day event. This promises

Continued on page 30

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AQUARIST CALENDAR

6th April: Nelson A.S. Annual Open Show at Nelson Civic Hall 2 p.m. President B. Tate, Bingley 2963.

12th April: East Dulwich A.S. First Open Show, at St. Barnabas Parish Hall, Dulwich Village, London, S.E.21. Schedules and entry forms are now available from D. Sutton, 231 Priern Road, London, S.E.22. Tel: 01-693 5397.

19th April: Reading and District A.S. Annual Open Show, Brock Barracks, Oxford Road, Reading. Full particulars from Show Secretary, B. Grant, 26, Dover Street, Reading, Berks.

20th April: Sheffield and District A.S. Open Show, Meersbrook Ventry Hall, Sheffield. Show Secretary, B. White, 54 Flockton Road, Sheffield. Tel: Woodhouse 4412.

20th April: Gorton and Openshaw Fifth Annual Open Show, East Manchester Boys' Club, Meira Street, off Ashton Old Road, Nr. Openshaw, Manchester, 11. Further enquiries to Show Secretaries, Mr. and Mrs. G. Hodgkinson, 126 Gorton Road, Reddish, Stockport. An A.M.D.A.S. Show.

26th April: Winchester and District A.S. Open Show at the Congregational Church Hall, Jewry Street, Winchester. Schedules available from show secretary J. Mercer, 49 Avondale Caravan Site, Colden Common, Winchester, Hants.

26th April: Thurrock Open Show at Gypsy Lane, Grays, Essex. Show Schedules now available from Show Secretary, D. H. M. Durrant, 22 Kingsman Road, Stanford-le-Hope, Essex.

26th-27th April: Stockton-on-Tees A.S. Fourth Annual Show, St. Peter and Paul's School Hall, Durham Road (A177) near Mile House Hotel. Schedules may be obtained from T. Walls, 11 Wylam Road, Norton, Stockton-on-Tees.

27th April: Heywood and District A.S. Fifth Annual Open Show, Ambulance Hall, Bamford Road, Heywood. Schedules will be circulated to the Societies.

27th April: York and District A.S. Open Show. Show Secretary, P. Carey, 29 Yearsley Grove, York.

27th April: Sneybrow A.S. First Open Show in the Festival Hall, Peel Street, Denton, nr. Manchester.

27th April: Bury and District A.S. Annual Open Show at the Trinity School, Trinity Street, Bury.

1st and 3rd May: Southend, Leigh and District A.S. Open Show, Municipal College, Victoria Circus, Southend-on-Sea (close Southend (Victoria) Station). Full details from Show Secretary, R. Passmore, 39, Grafton Road, Canvey Island, Essex.

3rd May: Trowbridge and District A. and P.K.S. Open Show, Trowbridge Nelson Haden Girls' School. Show Schedules can be obtained from P. Penny, 122 Trowbridge Road, Bradford-on-Avon, Wilts.

4th May: Leigh A.S.

4th May: Dukeries A.S. First Open Show at the Winifred Portland Technical Grammar School, Sparken Hill, Worksop. Schedules available shortly.

4th May: Derby Regent A.S. Open Show at the Railway Institute, Siddals Road, Derby.

10th May: Usbridge and District A.S. Open Show at Meadow School, Royal Lane, Hillingdon, Middx. Schedules and full details are available from N. Lee, 46 Avidale Road, Ealing, London, W.5.

10th May: Beidgend and District A.S. Second Annual Open Show, Y.M.C.A., Beidgend.

11th May: Workop A. and Z.S. Open Show at North Notts College of Further Education, Blyth Road, Workop.

17th May: Cardiff A.S. Third Open Show, St. Margaret's Church Hall, Roath Park, Cardiff. Details from Show Secretary, Colin Harding, 168 Pearl Street, Roath, Cardiff.

18th May: Coventry Pool and Aquarium Society, Midland Aquarist League, Table Show, Foleshill Community Centre, Foleshill Road, Coventry.

18th May: Merseyside A.S. Open Table Show at the Montrose Social Club.

18th May: Rainworth and District A.S. Open Show at the Showrooms of H. Taylor and Sons, West End Garage, West Gate, Southwell, Notts.

18th May: Hull A.S. Second Open Show at the Railway Institute, Anlaby Road, Hull. Details from P. M. Shepherdson, 11 Beech Grove, Beverley Road, Hull.

24th May: Kingston and District A.S. Annual Open Show at St. Luke's Social Centre, Elm Road, Kingston. Schedules from G. H. Greenhall, 39, Garth Close, Morden Surrey.

24th May: Taunton and District A.S. First Open Show at Priory Secondary Modern School, Cranmer Road, Taunton. Schedules available from Show Secretary, D. J. Rumsey, 52, Parklands Road, Wellington, Somerset.

25th May: Warrington A.S. Open Show. Show Secretary, J. Higham, 42 Wood Lane, Warrington. Telephone Warr. 36939. Further details to be announced later.

31st May: Harlech A.S. First Annual Open Show at Gabbala Junior School, Colwill Road, Cardiff. Details from Mr. P. B. Garner, 71a Moorland Road, Cardiff.

31st May: Catford A.S. Open Show, Catford School, Stainton Road, Catford, London, S.E.60. Details from K. Owen, 196 Langley Way, West Wickham, Kent.

1st June: Boston A.S. First Open Show at Blackfriars Theatre, Boston, Lincs. Schedules from D. Moody, 56 Kingway, Boston, Lincs.

1st June: (Provisional Date) Nuneston A.S. Second Annual Open Show. Particulars from Show Secretary, G. Cox, 36, Manoe Court Road, Nuneston.

1st June: Bournemouth A.C. Annual Open Show at Kinson Community Centre, Pelhams Park, Kinson, Bournemouth. Show schedules and entry forms available after 1st April from Show Secretary, J. V. Jeffery, 30, Braemar Avenue, Southbourne, Bournemouth, BH6 4JF.

8th June: Stretford and District A.S. Open Show, A.E.I. Club, Moon Road, Stretford.

8th June: Lincoln and District A.S. Open Show. Show schedules available from E. Cassidy, 56 Hollywell Road, Cliff Gardens, Brant Road, Lincoln.

8th June: Glossop A.S., The Adult Education Centre, Talbot Road, Glossop, Derbyshire. Schedules, etc. from, The Secretary, D. R. Chambers, 86 Old Road, Hyde, Cheshire.

8th June: Loughborough and District A.S. Second National Open Show, Town Hall, Market Square, Loughborough. Schedules will be available later from the Show Secretary, I. Purdy, 61 Poplar Road, Loughborough, or from the Secretary, Fred Hopewell, 61 Motley Street, Loughborough, Leicestershire.

14th June: Southampton and District A.S. Open Show at St. Denny's Church Hall, Southampton. Details from Show Secretary, C. McCann, 7, Waterhouse Way, Southampton, SO1 3PA.

14th June: Llanswit Major A.S. Annual Open Show in the Llanswit Major Town Hall.

15th June: Brighton and Southern A.S. Open Show, Marmion Centre, Marmion Road, Hove. Schedules can be obtained from R. Browning, 34 Rowan Close, Portslade, Sussex.

15th June: Swillington A.S. Open Show.

21st June: Bracknell A.S. Annual Open Show, at the Primwood Community Centre, Priestwood Court Road, Bracknell. Show Secretary, Mr. Len Little, 126 Shepherds Lane, Bracknell.

22nd June: Salisbury and District A.S. Fifth Open Show. Details from Show Secretary, R. Brown, 20 St. Birinus Road, Woodfalls, Nr. Salisbury.

22nd June: Alfreton and District A.S. Annual Open Show, at the new Adult Education Centre, Alfreton Hall. Details from Show Secretary, Mr. S. Hill, 35 South Street, Riddings, Derbyshire.

22nd June: Open Show Coventry Pool and Aquarium Society, at Foleshill Community Centre, Foleshill Road, Coventry. Schedules from C. J. Grant, 26 Cecily Road, Coventry.

26th-28th June: Bristol Tropical Fish Club. Open Show. Details from H. Newman (show secretary), 71, Somerdale Avenue, Knowle, Bristol 4.

29th June: Medway A.S. Further details to follow.

6th July: Leamington and District A.S. 4th Annual Open Show.

6th July: Lytham A.S. Annual Open Show, Loather Pavilion, Loather Gardens, Lytham, Lancs.

6th July: High Wycombe A.S. Open Show at Boringdon Green Hall, Nr. Marlow, Bucks. Schedules available shortly from Show Secretary, Mrs. S. Thomas, Finsmore Wood Camp, Lane End, Nr. High Wycombe, Bucks. Tel: Lane End 659.

10th-13th July: Aquarist and Pondkeeper Open Show, Alexandra Palace, London, N.22.

12th July: Basingstoke Open Show incorporating the Three Counties and Three Counties Section F.G.H.S. Shows, to be held at the Carnival Hall, Basingstoke. Details from Show Secretary, A. Blake, 50 Bounty Road, Basingstoke.

12th July: Newport A.S. Open Show at St. Johns Parish Hall, Victoria Avenue, Malindee, Newport, Mon. Full details available from J. G. Phillips, Show Secretary, 34, Brangwyn Crescent, Newport, Mon. NPT.7 QY.

12th, 13th July: Renford and Beantonree A.S. Dagenham Town Show. Enquiries to Mr. Fyne, Show Secretary, 3, Ashvale Drive, Cranham, Uppminster, Essex. Tel: Uppminster 28435. Schedules available shortly.

20th July: Gosport and District A.S. Third Annual Open Show at Bridgemary Community Centre. Show Secretary, K. Clough, 16 Newport Road, Gosport, Hants.

20th July: Gosport and District A.S. Third Annual Open Show.

2nd August: Stroud and District A.S. Open Show, Archway School, Paganhill, Stroud.

2nd August: Hull Show. Aquarist Open Show at East Park, Holderness Road, Hull. Details from P. M. Shepherdson, 11 Beech Grove, Beverley Road, Hull.

9th-16th August: Portsmouth A.S. Open Show, Portsmouth Community Centre, Twyford Avenue, Portsmouth. Open to the public from 11th August. Show schedules and information obtainable from Mr. J. Stillwell, Show Secretary, 34 Salcombe Avenue, Copnor, Portsmouth.

24th August: Oram A.S. Open Table Show, Recreation Hall, Refuge Street, Shaw, Oldham.

6th, 7th September: Mid-Herts A.S. Open Show. Show Secretary Charles S. A. Withers, 15, Charnmouth Road, St. Albans, Herts.

14th September: Oldham and District A.S. Open Show, Wernesh Park, Oldham.

20th September: Hounslow and District A.S. Annual Open Show (date to be confirmed). Show schedules available from F. Smith, Anfra House, 7, The Greenway, Hounslow, Middx.

28th September: Hucknall and Bulwell A.S. Second Open Show to be held at Bulwell Youth Club, Coventry. Further details from T. E. Smith, Show Secretary, Longmead Drive, Daybrook, Nottingham, NG5 6DP.

18th, 19th October: British Aquarists' Festival, Belle Vue, Manchester.

9th November: Hartlepool A.S. Eleventh Annual Open Show, Langson Hall, Seaton Casew. Schedules available from J. D. Watson, 42 Sydenham Road, Hartlepool, Co. Durham.

14th December: Hereford A.S. First Open Show. Further details to follow.

News from Aquarists' Societies—continued

to be an excellent show at Heywood Civic Hall. Officials were elected for the year as follows:—Chairman: G. Kershaw; Vice-Chairman: A. E. Gardner; Treasurer: Mrs. M. Corra; Show Secretary: A. Havans; Assistant Show Secretary: T. Theaton; General Secretary: B. Wolstencroft, 1115 Middleton Road West, Chadderton, Lancs.; Public Relations: Councillor J. J. Davies.

NEW SOCIETY

THE South Bucks. A.S. was reformed in November 1968, and now has membership of twenty. Meetings are held on the first and third Tuesday in every month and details of membership can be obtained from the Secretary, M. C. Cleaver, 194 Sparring Road, High Wycombe, Bucks.

IN recognition of her service to the Southampton and District A.S. Mrs. L. Brown was made an honorary member. Only three other members have so far been so honoured, all men.

The question and discussion period of the meeting covered a variety of aquatic subjects from fish selection, habits and diseases to aquarium management. Afterwards the main item on the agenda was a comprehensive talk by R. Marley of Bournemouth on Livebearing Fish. He made the point that this species of fish, once regarded as only for beginners in the hobby, was now engaging the attention of the more experienced aquarists who have realised how interesting they really are if a programme of "line" breeding, to improve the existing strains, is carried out. Continuing the theme of the meeting a table show for Livebearers was well supported and judged by Messrs. Sprinks and McCann. The results were:—Advanced section: 1 and 2, Mr. Russell. The general section was split into three classes the result being as

follow:—Mollies: 1, Mr. Hearn; 2, Mr. Mansbridge; 3, Mrs. Russell. Swords and A.O.V.: 1 and 3, Mrs. Russell; 2, Mr. Mansbridge. Guppy: 1, Mrs. Russell; 2, Mr. Hearn; 3, Mrs. Hardwick.

OVER forty members attended the Keighley A.S. monthly meeting and were entertained with a slide show of tropical, coldwater and marine fish by Mr. Carr of Bradford A.S. The table show winners were:—Fish of the Month: 1, Mrs. Whitfield; 2, Mr. Crossley; 3, Mr. Bickle; 4, Master Taylor, A.O.V.: 1, Mr. Bickle; 2 and 3, Mr. Dearnsley; 4, Mr. Cummins. Novice A.O.V.: 1, 2 and 4, Mr. Crossley; 3, Mr. Place. Junior A.O.V.: 1, Master Bracewell; 2, Master Taylor; 3, Master Jackson; 4, Master Mosley. The judges for the evening were Mr. White and Mr. Webber.

SECRETARY CHANGES

Heywood and District A.S.—B. Wolstencroft, 1115 Middleton Road West, Chadderton, Nr. Oldham, Lancs.
Keighley A.S.—A. B. White, 1 Moss Carr Road, Long Lee, Keighley, Yorks.
Federation of Northern A.S.—W. T. Kelly, 31 Siddley Street, Liverpool, L17 8XU. Telephone: 051-727 1299.

BOTH February meetings of the Bradford and District A.S. were very much a success. The topic at the main one, "Marines" provided a complete change from the usual "freshwater" topics and at the third Wednesday meeting, discussion on "Foods and Feeding" proved to be both informative and interesting to the members. The speakers were P. Moorhouse and L. Taylor.

WITH seventeen new members in the last month and a regular attendance of over fifty at the club meetings the Merseyside A.S. picture

is very bright. Recently the Society had a lecture by Jim Kelly regarding the breeding of fancy guppies and this was followed at the next meeting by a well supported Table Show.

THE February issue of "Lateral Lines" the journal of the York and District A.S. contains reference to the January meeting when the main item of the evening was a film show. There were two films the first being "Journey into Spring" which gave a first class illustration of the animal and aquatic life which is to be found in the early spring and the second entitled "Wild Wings" which dealt with the Wildfowl establishment at Slimbridge.

TWENTY seven members of the Leamington and District A.S. recently enjoyed a Tape/Slide show of set-ups of members of the New Plymouth Society of New Zealand. These were slides sent to Rugby Society on an exchange basis, and kindly loaned. After the interval, members were again able to see the Home Aquarium slides, and gave a few comments for and against, with one or two members refusing to recognise their tanks. The Society welcomed three new members: P. Field and Miss M. Hinkley both from Warwick and A. J. Harris of Kenilworth.

THE Wellingborough and District A.S. Bulletin for March is larger than usual with a variety of notes and news of interest to outside aquarists as well as the members. There are also some interesting items for the beginners.

THE February issue of the Nottingham and District A.S. Bulletin deals with matters of general interest to the club but a special reference in the editorial concerns many outside friends as it mentions the continued ill-health of Mr. and Mrs. H. P. Lynn, Mrs. C. A. Jones, Mr. H. Walker and Mr. H. R. R. Odam.



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An Apology—It is regretted that supplies of T.F.H. books and magazines may be delayed for the next few weeks. This is due to the recent New York dock strike and its aftermath. We hope that by May supplies will have returned to normal.

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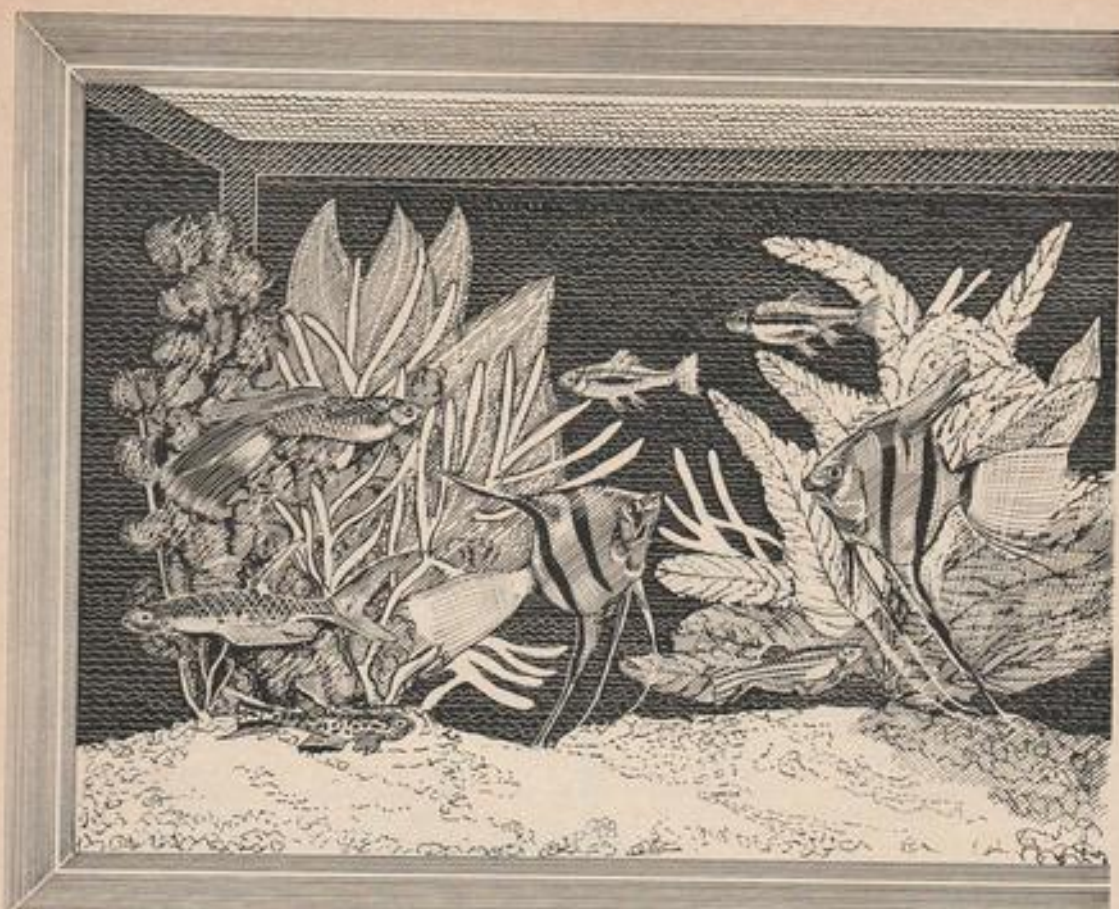
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Further particulars
on page 12

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