



The Aquarist

THE
AQUARIUM & POND
MAGAZINE WITH THE
WORLD'S LARGEST
CIRCULATION

Volume XVI Number 3
June 1951

MONTHLY

One shilling & sixpence

Sherwood ^{Pet} Stores of Sidcup

Proprietors: FAIRBAIRNS AQUARIA LIMITED

Wholesale Suppliers of the following best selling lines

ANGEL, LITTLE WIZARD, ES-ES, SINGLETON BROS.,
METALKRAFTS, CHALLENGERS, HY-FLO, VICTOR,
CHARLES AUSTEN, STOKES FOUNTAINS, BROSIAM
PRODUCTS, EXOTIC FLAKES, TROPICO, SATRO,
CAPERNS, SPRATTS, FAIRWOODS, SLUIS FISH FOODS,
BLACK MAGIC, AQUAFERN, OZONIA AIR PUMPS,
WORM SHREDDERS, BOOKS AND ALL LEADING
MAKES OF AQUARIUM APPLIANCES.

Dealers !!

SEND NOW FOR OUR LATEST LISTS AND STOCK
THESE QUICK-SELLING APPLIANCES.

TROPICALS !! Large selection always in stock
GOLDFISH !! Small, Medium and Large
SHUBUNKINS !! Small and Medium (Highly Coloured)
TORTOISE !! Fresh Stocks arrive weekly

ORDERS RECEIVED BY PHONE OR POST DISPATCHED ON THE DAY
RECEIVED. OUR VAN DELIVERS IN THE S.E. LONDON AND KENT AREA.



SERVICE · QUALITY · SATISFACTION
252 SHERWOOD PARK AVENUE,
SIDCUP, KENT

Telephone: BEXLEYHEATH 7217

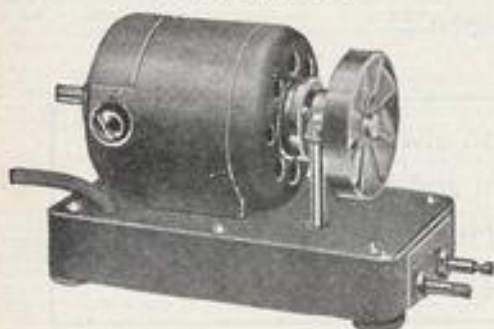
Insist on AUSTEN PUMPS AND BUY THE BEST

THE AUSTEN V COMPRESSOR



50/- each. Post free

THE AUSTEN DYMAX COMPRESSOR



£6 10 each. Post free

Reasons why you should insist on the Austen V pump:—

1. Valves and diaphragms of latex rubber, for long life.
2. Double enamel wire coil, wound in three different voltages, 200/220, 220/230 and 240/250, to ensure quiet running, and low current consumption.
3. Laminations of special silcor.
4. Armature made from special non-retentive Swedish iron.
5. Diaphragm spring of phosphor bronze, tempered.
6. Pressure plates and other parts made of brass.
7. Base of aluminium alloy.
8. All metal parts nickel plated against corrosion.
9. Case, moulded in high grade Phenol to Spec. B.S.771.
10. Six months' guarantee.

POINTS TO REMEMBER

1. This pump has an A.C./D.C. universal motor, built to B.E.S.A. Spec.170/1939.
2. Eccentric fitted with special grease retainer ball race.
3. Diaphragms and valves of latex rubber to ensure long life.
4. Air filter fitted as standard to all Dymax.
5. Variable resistance, fitted to regulate the speed.
6. All metal parts plated against corrosion.
7. Six months' guarantee.
8. Supplied in 12 volts, 110 volts, 200/250 volts.

These pumps can be obtained from your local dealer or direct from us.

AUSTEN PUMPS are the only pumps that have been in production for over fifteen years, and have the largest sales in the U.K.

DEALERS PLEASE NOTE. We can now give immediate delivery.

PHILIP CASTANG LTD.

(Established over 200 years)

WHOLESALE AQUARISTS' SUPPLIES

91 Haverstock Hill, Hampstead, London, N.W.3.

Phone : PRI 1842

WHOLESALE AQUARIUM SUPPLIES

Introducing

THE WAVERLEY AIR PUMP

RETAIL **36/-** PRICE

NO RADIO OR TELEVISION INTERFERENCE
6 MONTHS' GUARANTEE—AIR REGULATOR

TRADE ENQUIRIES INVITED

AERATORS		THERMOSTATS		HEATERS	
Challenger	... 25/-	Evans	... 25/6	Evans	... 16/3
Scott	... 36/-	Angel	... 26/6	Angel	... 16/3
Prockter	... 50/-	Little Wizard	25/- & 28/6	Little Wizard	... 16/3
Ozonia	... 57/6				

Also Nets, Thermometers and all other appliances

ALL LEADING BRANDS OF FISH FOOD, BROSIAM, META VEGA, HYKRO, ETC.

Aquafern and Colorfern ... packets 1/- and 2/-

Plantaqueous (Red and Green) ... 1/-

NORTHERN AND MIDLAND DEALERS

A POSTCARD WILL BRING A VAN TO YOUR DOOR

STUART ERSKINE

WEAMAN STREET, BIRMINGHAM, 4

Member of A.T.A.

Telephone: CENTral 5997

CITY AQUARIA

MEMBER OF THE A.T.A.†

Telephone: **CHANCERY 3605**

RETAIL

WHOLESALE

Hours of Business: Mon.-Thurs. 9.0.-5.30. Fri. 9.0.-6.30. Sat. 9.0.-1.30.

A GOOD SELECTION OF TROPICAL FISH
AND PLANTS

COMPREHENSIVE STOCK OF EQUIPMENT

SHADES. 24" x 12" x 12"

HALF SHADE 15/-

OVERALL 27/-

GOOD SUPPLIES OF DAPHNIA AND
TUBIFEX

MICRO, GRINDAL AND WHITE WORM
ALWAYS IN STOCK

● **CITY WORKERS.** We will be pleased to take your orders for fish, and store fish until you go home in the evening. Cans loaned.

TRADE ENQUIRIES FOR PLASTIC GOODS
AND TROPICAL FISH

76, RED LION STREET, HIGH HOLBORN, W.C.1.

2 Mins. from Chancery Lane and Holborn Tubes.

Buses: Nos. 7, 7a, 8, 17, 22b, 23, 25, & 25b

Another BROSIAM Success!



Mr. R. R. Brough winner of the "Best Fish in the Show" trophy, presented by Kemsley Newspapers Limited, for this event at the British Aquarists' Festival, Manchester.

**The Best Fish in the British Aquarists' Festival
Show was reared on BROSIAM FISH FOOD**

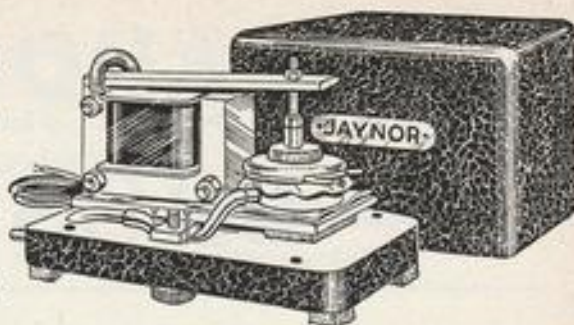
The "JAYNOR" de luxe AIR PUMP

Electric Vibratory Compressor

200/250 Volts A/C Mains Only

PRICE **35/-** Guaranteed for 6 months
from date of purchase

Obtainable from your local Aquarist supplier or
direct from James North (London) Ltd. 316, Lee
High Road, S.E.13



The "JAYNOR" "MISTACLEAR"

(PATENT APPLIED FOR)

Filter and "Mistaclear" Filter Extension.—Extension will fit into corner or outside fitting filter. "Mistaclear" Extension ensures all of the water in the aquarium being filtered and not just one corner. Corner filter complete with glass wool and charcoal, 8/-. "Mistaclear" Filter Extension 3/- each. Outside-fitting filter (not illustrated), complete with "Mistaclear" Filter Extension, 28/-. Twin stick-on Worm and Dry feeding ring, 2/- each. Twin stick-on Worm and Dry feeding tray, 3/6 each. Please note:—One "Mistaclear" Filter Extension is usually sufficient for an aquarium up to a capacity of 24 x 12 x 12 in. (unless very heavy feeding is practised) but over this size better results are obtained by fitting two or more to the filter. These are connected together easily—either in a straight line or round a corner if so desired and a connecting piece is supplied with each model. Dealers send for Wholesale terms. Orders under £1 postage and packing 1/- extra.

Increased price: The "Mistaclear," Due to the great need and demand for this very popular useful little gadget we completely used up our original material, and having had to purchase fresh stocks on an increased purchasing market, we regret that we have reluctantly had to increase the retail price to 3/-.



"FERRAMASTIC" THE AQUARIUM GLAZING COMPOUND

1 lb Tins . . . 1/6 4 lb Tins . . . 5/- Postage and Packing extra. Orders over £1 Post Free.
2 lb Tins . . . 2/9 7 lb Tins . . . 8/9 Aquatic Dealers and Pet Shops send for Wholesale Terms.

Pond bred and reared breeding pairs and trios of Goldfish, Shubunkins, Comet Tails, Golden Orfe, Golden Rudd, etc., etc. Also oxygenating, spawning, marginal plants, lilies, mussels, snails, etc., etc. now in stock. Messrs. Stokes' "Garden Fountains" and Stuart Fountain Pumps in stock.

TO THE TRADE

Wholesale Distributors to the Trade of all leading aquarium products. Dealers send on letter heading for latest wholesale catalogue

TO THE ENTHUSIAST

Retail call and inspect full range of fish, accessories, aquariums, etc., or send S.A.E. for latest catalogue showing a full range of all goods available

JAMES NORTH (LONDON) LTD.
316 LEE HIGH ROAD, LEWISHAM, LONDON, S.E.13

Telephone: LEE GREEN 3577

MAKE YOUR AQUARIUM MORE BEAUTIFUL
WITH A RARE
APONOGETON, ULVACEOUS or UNDULATUM
4/- each. Post free Six for 20/- . Post free

"SURESEAL"

AQUARIUM GLAZING COMPOUND

*The Amateurs Guide to a
Clean, Easy and Sureseal job*

1/4 LB. POST EXTRA AT PARCEL RATE

ANGLE IRON FRAMES

1 in. x 1 1/4 in. x 1/8 in.

18 x 12 x 12	15/-	30 x 12 x 12	23/6
24 x 12 x 12	18/-	30 x 15 x 12	25/6
24 x 15 x 12	20/-	36 x 15 x 12	28/-

Any size to order

"SUREGROW"

FISH FOODS

Not just another food, but something different. Containing the Green Vegetable so vital to your fishes diet. Keeps indefinite, packed in airtight jars

Standard	1/-, 1/6, 2/6, 4/6
Fry Food	1/6, 2/6
Tonic Flakes	2/-

Invaluable for conditioning breeding pairs

VISIT OUR STAND AT

N · A · S

HORTICULTURAL HALL,
LONDON, S.W.

JUNE 14th, 15th & 16th

RARE TROPICALS are becoming common at S.C.A. SHOPS

Imports arrive weekly. All fish
quarantined 7 days. Also good
selection of home bred fish

CASH WITH ALL ORDERS PLEASE

S.A.E. FOR LISTS

IF ITS AN S.C.A. PRODUCT IT
HAS BEEN DESIGNED OR PRO-
DUCED BY AN AQUARIST FOR
AN AQUARIST.

SOUTH COAST AQUATICS

443 ASHLEY ROAD, PARKSTONE, DORSET

64 KING'S ROAD, READING
Telephone: 3632

29 BERNARD STREET, SOUTHAMPTON
Telephone: 2202

Telephone:
PARKSTONE 3521

Make certain you are buying genuine "Aquafern"
and "Colorfern"

"AQUAFERN"

THE FINEST SPAWNING MEDIUM OBTAIN-
ABLE. ITS NATURAL BEAUTY ADDS CHARM
TO THE AQUARIUM

NATURAL AND PRACTICAL

Tested and Proved by Commercial Breeders

PRICE 1/- AND 2/-

"COLORFERN"

NO AQUARIUM IS COMPLETE WITHOUT
THIS NEW WONDER FERN IN COLOUR
NATURAL GREEN & BEAUTIFUL RED

STOCKED BY ALL LEADING DEALERS

PRICE 1/- AND 2/-

Both "Colorfern" and "Aquafern" are packed dry and weighted for immediate use.

Requires no attention. Will not decay. Satisfaction guaranteed. "Colorfern" and "Aquafern" is produced exclusively by Aquafern Products Co. Refuse imitations and substitutes. The name "Aquafern" is prominently displayed on every packet and is your assurance of quality and safety.

TRADE ENQUIRIES WELCOMED

AQUAFERN PRODUCTS CO.
113 LEIGH ROAD, LEIGH-ON-SEA, ESSEX

SOLE AGENTS (U.K.)



The AQUARIST AND PONDKEEPER

Founded in 1924 as "The Amateur Aquarist"



THE BUTTS, HALF ACRE, BRENTFORD
MIDDLESEX

PUBLISHED MONTHLY

Editor: ANTHONY EVANS

Advisory Editor: A. FRASER-BRUNNER

SUBSCRIPTION RATES

The *Aquarist* will be sent post free for one year to any address for 19/6. Half yearly 9/9. Canada and U.S.A. \$3.00 yearly; \$1.75 half-yearly.

QUERIES

Postal replies are made to all specialised queries accompanied by a stamped, addressed envelope. This privilege is afforded only to registered readers and direct subscribers. Subscription forms can be obtained on application. In all cases letters should be addressed to the Editor.

Correspondence with intending contributors is welcomed.

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

The Editor accepts no responsibility for views expressed by contributors.



Gwerth School, Cheshire, children visitors to the British Aquarists' Festival last month were among those who gave donations to "The Aquarist's" Hospital Aquarium Fund

VOL. XVI No. 3

1951

Editorial

IT is no new departure for *The Aquarist* to raise its voice in defence of the tortoise. From our early days we have agitated for better treatment for these reptiles, with some success in obtaining improvement in transportation to this country, but the fact remains that the tortoise is still the most exploited "pet animal" we have.

Twice already this year have reports been made of finding large numbers of tortoises, dead and dying, jettisoned by persons unknown who had evidently become embarrassed by their unprofitable burden. One batch of these sub-tropical animals turned up on a London bombed site on a bitterly cold winter's day. Many were dead, many more had to be destroyed. Last month 1,500 dead tortoises were found in baskets on the foreshore at Barking. It can be imagined that for every such incident where the numbers of animals involved are of such magnitude to warrant mention in the National press, quite a few others occur that do not receive such publicity.

Just how many tortoises have been imported in the past two years is a figure that cannot be ascertained. Only recently one consignment of 100,000 was advertised. One fact we can be sure—only a minute fraction of the total number ever survives the first winter in this country. Rarely are these long-suffering creatures in good condition when they arrive, and although they are not difficult to keep, their needs and requirements are quite different from those of the usual run of pets and beyond the experience and interests of their average casual purchaser.

What can be the state of their numbers in the countries from which they originate? Is the natural rate of tortoise breeding adequate to meet the inroads made through the years by native collectors eager to supply these doomed cargoes at small cost to themselves? We doubt it. It seems likely that we are witnessing yet another ruthless and senseless extermination of a harmless and interesting form of animal life which because it is without voice, lacks fur or feathers and is quite defenceless, can be traded without fear of interference from authorities usually so active where cruelty to more conventional pets is suspected. Cannot this traffic be stopped before it is too late?

Can Tobacco Smoke Kill Fish?

Experiments with guppies provide fresh facts



IT has several times been said that fishes do not live for long in aquaria situated in club and smoking-rooms, places where the atmosphere becomes charged with tobacco smoke for long periods at a time. How much truth is there in this?

Tobacco smoke contains resins, nitrogen, carbon dioxide, carbon monoxide and hydrogen sulphide gases, prussic acid, ammonia and nicotine. All the harmful substances are present in insignificant amounts, nicotine being the only compound that could be regarded as capable of exerting much effect. Direct experiment by Schuster-Woldan showed that 10 milligrams of nicotine to every litre of aquarium water killed guppies in five minutes; four day old fishes were killed in two minutes. Three to five milligrams to the litre proved fatal within twenty to sixty minutes.

Male guppies were more susceptible to nicotine than females but pregnant females tended to abort their young. Of 80 *Lebistes* exposed to weak nicotine solutions 11 hours a day for 25 days only 32 were alive after 50 days; the normal life is three or four years under best conditions. Normal females produce about 80 to 150 youngsters a year but those exposed to one and a half milligrams of nicotine in a litre of water produced only 15 young in a year, and many youngsters were still-born or deformed. Higher concentrations of nicotine killed the females or made them sterile.

More recently, experiments have been made by Dr. H. Mann of Hamburg Institute of Fisheries, who used tobacco smoke instead of pure nicotine solutions. In each cigarette there is known to be between two and six milligrams of nicotine; cigars contain about 17 milligrams each. Cigarette smoke was blown through glass tubing into the

aquarium water. At first the guppies swam nervously around, and then after about 10 minutes their pectoral fins were partly paralysed so that balance was impaired.

A period of stimulation was seen to follow, in which irregular movements occurred, but these decreased gradually and death occurred after 30 to 45 minutes. During this period smoke from two or three cigarettes had been blown in. Nicotine is rapidly changed to harmless substances in dilute watery solution and water through which cigarette smoke had been blown was not harmful after keeping it for six days. It is purified more quickly by blowing air through it. Fishes transferred to fresh water from smoke solutions at an early stage recovered completely.

To determine the effect of smoke on an open aquarium in a living room, Dr. Mann made experiments with mineral water bottles. These were half filled with water and fishes were introduced. Cigarette smoke was then blown into the bottles (not through the water), the stoppers being in position between "puffs." After 70 minutes smoke from three cigarettes had been added. Analysis of the water showed a fall in oxygen content and rise in carbon dioxide and small amounts of phenols and ammonia were detected; the nicotine was at a concentration of over six milligrams a litre, and at this level was rapidly fatal to fishes.

Although it can be imagined that fishes in a can on top of a rush hour bus or in a crowded train compartment would not live long exposed to the "fug," rarely are living rooms filled with smoke to the same extent. Fishes in uncovered tanks in smoky rooms may easily be affected though not killed, and sometimes "off-colour" phases may be ascribed to this cause.



Pond in the Picture—1

Ancient and weathered building-stone and calm waters go together to make a peaceful picture that would be difficult to date. Waterside plants grow in the interstices of rough-hewn bricks forming this large pond's top edges—a good idea for the garden formal pool. Pictured at Barnwell Castle, Northants

Photo: H. & V. Joel

Care and Breeding of *Copeina*

by MARGERY G. ELWIN and L. C. MANDEVILLE

FISHES of the genera *Copeina* and *Pyrrhulina*, which come from the Amazon, are very much the characins which are different. They are different in body form, usage, temperament and mode of breeding, from most other characins that are kept in aquaria. The body is elongated and compressed so as to be rather herring-like but deep like most other characins. The fins are relatively small. Strangely enough, the adipose fin, situated between the dorsal and the caudal which is so characteristic of the family, is absent in these two genera. Most characins are voracious, mid-water fish but these remind one more of the *Pseudorasbora* species in the way they lie up among the floating plants, moving about in a very lazy manner. Unlike *Leuciscus*, however, they are not waiting for some poor mislabeled puppy or other small fish to wander their way and constitute a desirable snack.

Copeina and *Pyrrhulina* species are not cannibalistic, and are quite peaceful. Usually, they do not molest in any way the small fry, which most fish would not hesitate to engulf. The breeding habits are most interesting and again different. In the case of *Copeina arnoldi* they are unique, and these fish are so rare in England the phenomena will be only briefly referred to. The pair swim very close together one another, and then, together, leap out of the water and remain for a few seconds attached to the underside of leaves of overhanging plants or to the aquarium glass, where the eggs are laid in small batches. They then drop into the water. The process is repeated a number of times. After spawning the male swims around immediately above the eggs and regularly splashes them with water by gyrating motions of his fins. The eggs eventually burst open and the youngsters wriggle out and drop into the water.

Air Force Blue

Copeina guttata is not nearly so strange in its breeding phenomena, but it is still extremely interesting. Further, this species is usually obtainable at a relatively low price and is fairly easy to care for and to induce to spawn. It is this species that will be described in more detail. The general characteristics having been given above, the individualities of *C. guttata* follow. The ground colour is rather difficult to describe exactly. In certain lights it appears to shade from a deep plum colour on the back to a whitish blue on the belly, while in other lights it is said by some to be a copper colour. Under normal conditions, the best way to describe the colour is as a varying depth of "Air Force" blue, fading to white on the underside. The sides of the body are marked by longitudinal series of crimson dots, which stand out brightly and conspicuously. This marking on the fish its specific name *guttata*, which means raindrops. The intensity of the colouring depends very much on the temperature and condition of the specimen. The iridescence is usually absent in the female though sometimes a few spots may be present. This characteristic is not so easy. The fins are of a distinct yellow hue. The dorsal is marked by an obvious black fleck, which quite often fades completely away in adult males. The edges of the ventrals, anals, and the greater part of the upper half of the tail are a beautiful bright orange. This iridescence tends to be more spread and of greater intensity in the male.

A strange fact about this species is the deviation between



Photo:

Copeina guttata female

B. & F.

the size of adult wild specimens and adult specimens in captivity. Wild fish exceeding three inches have only been taken on very rare occasions, but in the aquarium the usual adult size is a little over four inches—and the authors have twice seen specimens of five inches. This fact is always brought up when this species is discussed, for it is so curious, as with all our other aquarium fish it is fairly safe to say that the reverse is true. No satisfactory explanation has been offered, because all such suggestions would lead one to believe that it would be possible to grow super-sized specimens of other aquarium species, and this we are not able to do.

C. guttata is a good community fish even though it tends to become rather large for small tanks. In a community of large fish such as barbs and the larger livebearers, *C. guttata* is apt to be left out of things at meal times and will soon begin to look off colour. In spite of its general size it is a heavy feeder and needs particularly large quantities of good meaty food to get into breeding condition. Earthworms, and dried food with a good base of dried shrimp, will be readily eaten, and fish-paste, canned prawn, etc., are eagerly taken as tit-bits. At feeding time this fish readily forsakes the upper part of the aquarium and comes down and grubs about on the bottom for bits and pieces.

Breeding Recommendations

It has been said that it is better to condition these fish in a rather small tank so as to restrict their activity to some extent and so hasten the process of "filling up." As they never swim about in a very active manner this precaution seems rather superfluous, but so many queer things have been said about *C. guttata* that it seems worth while repeating some of them, leaving readers to decide for themselves along what lines they will experiment.

The preparation of the breeding tank is quite simple. It should be of an absolute minimum of ten gallons—twice this capacity if possible. The water should be about eight to ten inches deep and the sand about two to two and a half inches, very clean and fairly fine. Rows of grass-like plants, *Sagittaria* and *Vallisneria*, should be set about. The condition of the water is important. It should be quite freshly matured—not old—well aerated and, if possible, an

airline should be laid on. The pH does not seem to be of very great importance provided it is within normal limits, but it is probably best about 6.8 and certainly should not exceed 7.4. A desirable temperature is about seven degrees higher than the conditioning tank, somewhere between 80° and 85° F. The pair are best introduced into the spawning tank after dark. This is, of course, a precaution which is quite worth while when introducing any spawning fish to the prepared tank. Usually, the pair will not spawn the next day, but they do as a rule in the next two or three days.

The first indication of approaching spawning is the action of the male who will be seen fanning a saucer-shaped depression in the sand, three to four inches in diameter. It is the pectoral fins that are used in this process. Sometimes the female will take part in this process, but not always. If the pair is quite settled and happy, the pit will probably be made well out in the centre of the tank, where it can easily be observed, but if they are subjected to a lot of disturbance and interference either the pit will be prepared hidden away behind the plants or else they will refuse to do anything at all. They are in a state of unusual tension at spawning time, as will be evidenced by the sharpness of their movements, and, being by nature a rather gentle, slow and retiring fish, they are easily put off. The pit prepared, with much fin fluttering and coaxing, the pair hover side by side over it. The female drops down, followed by the male, and a batch of eggs is deposited. The eggs are not thrown about or laid in a solid mass, but are spread over a large space in a single layer with no spaces between succeeding batches. This has led some observers to report that the eggs are laid with geometrical accuracy, and one rather expects to see the spawn arranged in a delicate pattern, but, naturally, this is not so.

Scheming aquarists who have been unsuccessful in getting their fish to spawn in this way—which we assume is fairly natural, since the fish will repeat it often even when opportunities for performing it otherwise are offered—have invented several tricks to hasten or encourage the act. Instead of allowing the fish to fan a pit, a saucer, scallop shell, or piece of slate is provided for the spawn to be deposited upon. The colour of the saucer is said to be of importance; some say white, some yellow, also some aquarists turn it upside down so that it forms the reverse of a pit. In the opinions of the writers, this latter is most unnatural, and, mostly, such an arrangement is ignored by the fish. At any rate, these ideas are worth trying if success does not come your way at once. The essentials, it will have been gathered are clean, fine sand, fresh water and quiet. These provided, no other artificialities will normally be required.

Liberal Spawning

The eggs when laid are very small and match the sand so well that they are rather difficult to detect. A normal spawning will be about five hundred eggs, though spawnings twice this size are not unusual. You now realise the need for a large tank. The female will have hidden herself in a corner and is best removed, as now she serves no useful purpose; the male, however, has a definite and valuable task to perform. He swims in a wide circle round the pit and quite regularly breaks his beat and hovers over the eggs fluttering his fins, so circulating the water around them and washing off any debris that may have settled thereon. After dark he takes up a position quite close to the eggs and remains there resting until it becomes light again, when he recommences his task. Occasionally reports have been made of *C. guttata* spawning in community tanks and successfully hatching the fry in spite of the attempts of other fish to get at the eggs.

In about thirty hours the eggs will be seen to be vibrating vigorously, and in forty hours, at 80° F., the young hatch

and swim up, attaching themselves to the glass and the plants. Having hatched his family the father tends to lose interest: he won't even eat them! To give the fry a maximum amount of room, however, he is best removed. They are very small, but three days feeding with a heavy culture of Infusoria will put sufficient growth on the fry to enable them to take the flour of fine dried food. Growth is very rapid and usually very irregular, and soon the biggest babies begin to eat their underdeveloped brothers and sisters. If it be desired to raise a maximum number, something in the way of grading the fry will have to be attempted, but to raise thirty or forty will probably satisfy most aquarists, in which case they can be left as they are.

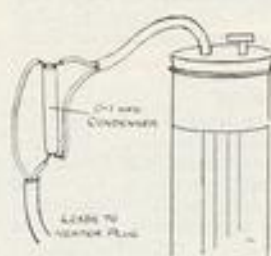
Cannibalistic Youngsters

Give the fry as much good small food as you can so as to keep the largest possible number of them going. However good and tasty the food, it will not cause the bigger ones to cease their cannibalism, and, as it has been very aptly said, "there is no food for *C. guttata* fry like *C. guttata* fry." In about five weeks the orgy of eating and being eaten will have worked itself out, and the result is usually about forty young fish ranging in size from half an inch to an inch. The feeding henceforth is quite straightforward and presents no difficulty.

The young are fairly well coloured at two inches, but it is only in the adult fully-grown fish, particularly the males, that the colour attains its maximum beautiful intensity. When fully grown they really are show pieces, but the fact that large specimens are seldom seen and command high prices, while the youngsters are not so brilliant as other small characins at the same price, probably accounts for their lack of popularity.

How and Why?

My thermostat causes interference with my television set and radio. Can I overcome this?



All that is needed to stop the noise or visual interference with other electrical equipment that is caused by some thermostats as they cut in and cut out is a small condenser, obtainable from any wireless shop. Ask for a 0.1 microfarad tubular condenser. Bare and separate the two wires running into the thermostat for a short distance close to the instrument and solder each wire of the condenser to one of them. Cover the bare wires efficiently with insulating tape. Air pumps giving interference can be treated in the same way.

What precautions can be taken when using electricity near water, as in heating a tropical aquarium?

Modern aquarium equipment is quite safe and accidents are rare. Shocks may be obtained from tank frames and even from the water if thermostats or switches to heaters have been wrongly wired. They must be placed on the live (usually red-covered) wire and not on the neutral return lead. Check which lead from a point is which with a neon tester—it lights only when one wire from it contacts the live wire. For safety earth the aquarium by running earthing wire from a clip secured to the metal frame and in contact with the water to the earth pin of your three-point plug.

J. Francis

THE AQUARIST

Questions and Answers on Breeding

by ————— A. BOARDER

COLDWATER fish-keeping appears to be increasing greatly in popularity once more, and aquarists are tending to look for fishes other than goldfishes with which to work. The first question this month is typical of many I receive:

For the past few seasons I have successfully bred several varieties of goldfishes in my 12 ft. by 6 ft. pond (over 2 ft. deep), and I would like to make a change. Can you recommend any other fishes for breeding in the pond?

There certainly are other fishes for you to try your hand at breeding. Why not have a go with green tench? These are good fish for the pond as they will not interfere with the goldfish you have there. I have bred tench in a pond about the same size as yours. I would advise that you have only one pair, or one female to two males, which is what I use.

The male usually shows a difference from the female in that the pelvic fins are inclined to be spoon-shaped. Green tench are one of the latest British fresh water fishes to spawn and often will not make any attempt until July.

Feed the tench well on earth worms and water snails—they are very fond of these but you will have to crush them first. You can use bunches of water plants as recommended for goldfishes and anchor them at the shallow part of the pond. I find that the tench always prefer shallow water in which to spawn, as do goldfishes. Spawning is most likely to take place in warm weather, and it will probably continue all day long. I have had my tench spawning as late as 8.30 p.m. It is very unusual for goldfish to spawn as late in the day as this. The eggs are very similar to those of the goldfish and can easily be mistaken for them; they are adhesive, and so stick to the water plants.

It is advisable to remove the eggs to a separate container for hatching as otherwise very few fry will be reared, for they are so very small and inactive when very young that many would be eaten if eggs were left in the pond to hatch. Treatment is from then on the same as that which I recommend for rearing goldfish. As the young grow they do prefer live food such as *Daphnia*, but they can be successfully reared with crushed small earthworms. I have sometimes reared tench entirely on dried foods but their growth was not as rapid as when live foods were used. As a matter of interest—my own-reared green tench bred themselves when they were only two years old.

You could also try your hand at breeding golden orfe, but I am afraid that your pond is hardly large enough for this purpose. Orfe like plenty of room and also well-oxygenated water. I have known them to breed in a medium sized pond, but it was at least twice the size of yours. However, nothing ventured nothing gained! It is quite impossible to be able to say definitely what any particular fish may or may not do; only by experimenting can we determine their requirements.

The water level of my breeding pond has been steadily falling since winter and I would like to have advice about stopping the leak.

Such leaks can be troublesome and the repairs which one

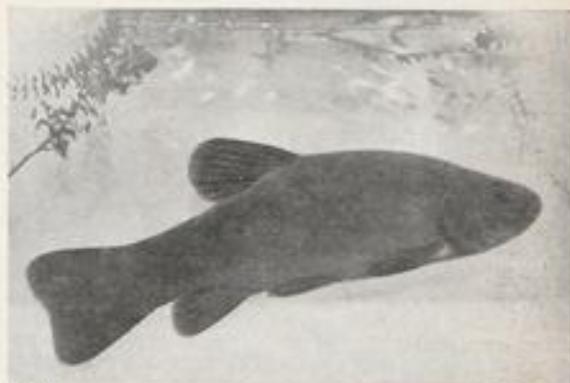


Photo:

W. S. Berridge

Tench—a fish that will breed in the garden pond

can do will often last only until some severe freezing weather causes expansion of the surrounding concrete. There are several methods of dealing with the leaks: if the crack is only a small one it can often be stopped by forcing into it some material such as "Selastic" which is a putty-like substance and being waterproof will often enable the crack to be sealed quite safely. Obviously this would not do for large cracks and repair of these will, I am afraid, necessitate the emptying of the pond. Clean the pond out well and scrub the concrete.

Let the pond dry, and as it dries the cracks will show up more clearly for they remain wet longer than the sound surface. With cracks which are no more than a quarter of an inch across you can try the following method. Cracks that have not dried out must be gone over with a blowlamp. If the pond is well below the surrounding earth then you may find that water will seep back into the pond through the cracks, but they must be dry for this method. Get some bitumastic material (there are several brands on the market) and force this into the cracks with a trowel, making sure that plenty of force is used; it is no use leaving just a thin coating over the crack. The fact that this material is waterproof should indicate to you that it will not stick onto a wet surface. Allow the stuff to dry after application and then you can refill the pond. The bitumastic substance will not harm the fish when they are returned and as the material in the cracks may not dry for a considerable period it will give a little if the concrete expands or contracts with the weather.

If the cracks are large then a more drastic method will have to be used. After cleaning the empty pond thoroughly all the cracks must be chipped with a cold chisel and all the loose concrete removed. Any very small part of a crack can be widened somewhat so that a key for the fresh cement can be made. It is a fact that it is almost impossible to get fresh cement to adhere to old cement; as is said in the trade: "It won't wed." It may appear to do so for a time, but

eventually the fresh application will flake off completely. Still, there are one or two things which you may do to help matters. Having well cleaned the cracks wash them with a neat solution of cement (sometimes if this is applied with a brush it will ensure a better job), then mix up your concrete, one part of fresh cement to two parts sharp, but not too coarse, sand. Then force this well into the cracks and smooth off to the existing level. I do not think that an overlap of a few inches does any good as this soon tends to flake off. Once you have applied the concrete see that it does not harden too quickly. Shade from the sun and if possible keep damp by fine spraying. This method is often successful and trouble may only recur near the top of the pond where the frosts have access to the repair.

Should the concrete of the pond be so badly cracked that neither of the above methods will suffice then I recommend that the whole of the pond be refloated over with at least two inches of fresh concrete—seeing that the whole pond gets a thorough coating. To make up for the loss of space due to the extra thickness the edges of the pond may be raised a little.

I often read of "selective breeding to produce fishes with a characteristic trait." How can I do this with my fancy goldfish strain?

A particular trait can be bred into your strain, but the time it takes to do will depend on how far the trait differs from the normal. Let us take for an example the desirability of breeding into a strain of shubunkins a tendency to carry the upper lobe of the somewhat large tail of the Bristol shubunkin erect. I know that there are some who say that it is not possible to get fishes which carry the tail as is illustrated in the Federation Handbook of Standards, but I say that if it is possible to breed fancy types of goldfishes such as the celestial or lionhead then it is quite possible to breed a strain of shubunkins which will have this upper tail lobe character.

In the first place you will choose for the parent fishes those which have the particular trait in evidence as much as possible. If neither fish has a fairly flowing tail of the type you require then you should choose one of the parents which has a good shaped tail as you can get, and then match up the other—which should carry the upper lobe of the tail very well without droop. Its tail need not have the exact shape required for the strain however. From the resultant youngsters it will be possible to pick out some fish which have a good shaped tail and also the tendency to carry it better; from these fish you can breed better ones. Although this will mean inbreeding, this is not as injurious as is sometimes the case with other animals. Fishes appear to come to little harm through this method.

After a few generations it will be possible by judicious pairings and selections to breed in the trait you desire but it must be realised that it is not as speedy a task as breeding some types into tropical fishes. These last breed, as a rule, at an earlier age. Goldfish types will breed at a year old as long as they have been well fed and have had plenty of space, but it will be seen then that this is a task which will call for plenty of patience. But the results should be well worth the effort.

One of my goldfish has a split tail; will it get well again?

Fins of goldfishes will join up again in a few weeks. In fact, even if the whole tail-fin is eaten away, say by fungus, it can grow again in a few months. A small split will soon mend and may not leave any trace of damage, but if the damage is very extensive there may remain a knot or scar to disfigure the fish. Scales can also grow again and whilst a fish is convalescing it is essential to make sure that its

surroundings are quite healthy; it may be better to separate the fish from others until it is well. Any damaged part of fish is always more liable to be attacked by fungus than healthy part.

My goldfish fry are growing well but some are much larger than the others. Should I separate the larger ones?

If you find that some of the fry are making much more headway than the others it is essential to catch these large ones and put them into a separate container. Apart from the fact that the larger ones may starve out the smaller ones by getting the lion's share of the food, it is quite possible that if at all hungry at any time they may make a meal of their smaller brothers and sisters. I have seen fish of a few weeks of age trying to eat smaller fry of the same hatch. It is very difficult to raise a batch of youngsters at exactly the same rate of growth especially if the fry are at all over crowded.

I have a Bristol shubunkin which I think is good enough to show. How should I go about this?

If you have never exhibited a fish before my advice to you is to join an aquarist club first if possible. There may be one in your area and there would be many members of the club who would be only too pleased to advise you as to the value of your fish as a show specimen. Most clubs hold table shows and by putting your fish against others you would soon see its true worth. There is nothing better than seeing your fish in a show tank alongside another to assess its real value. You could also visit public shows to see how your fish compares with those exhibited, but unless the finer points of judging are pointed out to you it may not be of much benefit to you. It is possible to buy a book—the Federation Standards which will help you a good deal. To assess the true value of a fish it is essential that you exhibit, so that you may obtain an outside opinion of it.

My moor goldfish won a first prize at a show but when I exhibited it at another show it was unplaced. Why should this be?

It is very difficult to say why your fish did not win at particular show as there are so many possible reasons. One is that a different judge may have had a fresh view of the fish; all judges do not always think alike. I had the same thing happen to one of my fish last year. A fish which won first and special was unplaced in another show by a judge who put in front of the special prizewinner two fishes which the same fish had beaten on two previous occasions. This may have been due to the fact that the special fish may have been rather folded up when it was judged and did not show off to advantage. It may have been temporarily off colour through transport, etc., and you see that although a fish may win once it does not signify that it must do so another time.

Sometimes it is possible to have a word with the judge afterwards, when he may be able to give his reasons for placing. Some fishes are very temperamental when placed in a show tank. I know an aquarist who had a very good shubunkin but it would never win a prize as it immediately sulked when it was placed in a show tank. Most judges are far too busy to wait for a fishes convenience to show itself off and pass it by for another. Often a fish may not be showing at its best at the moment of judging. At one show last season one of my fish was awarded first and special but the fish in the show but the judges left word for me that the second prize fish would have been placed in front of it if other had it showed its paces when judged as well as it did an hour later!

Live Foods on the Wing

by W. H. MACEY

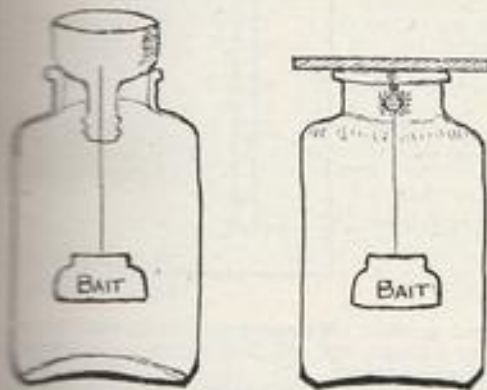
ALTHOUGH the fly is nature's food for the fish, it is seldom used by the fish-keeping public. Yet, if only a few of the vast number of flies that invade our gardens each summer could be easily and conveniently obtained free from poisonous substances, without swatting, and in a wholesome state, they would no doubt become far more popular as fish food.

During long spells of dry summer weather, just when the fish are really hungry, that excellent food the garden worm, becomes very scarce. On the other hand the fly is always available in summer, the water remains clear where it is used as fish food, and the destruction of a few thousand flies is most beneficial to mankind as well as providing our fish with good food.

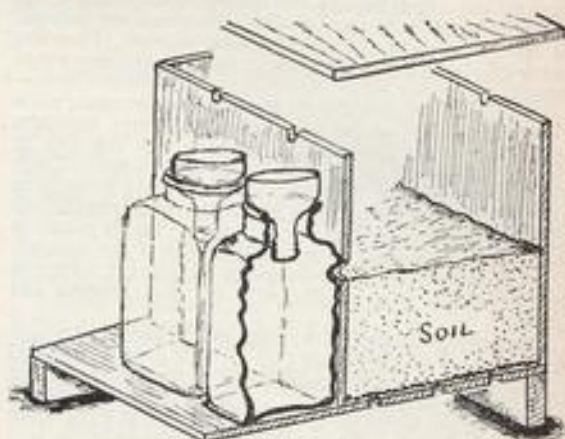
Fly-traps can be used to catch the flies in numbers. They will provide an ample daily supply of living flies for the aquarium by removing them each evening, or a few in the morning or two, or, clean dead or dying flies for the pond fish by removing them each morning, but in this case, as the supply will usually be far in excess of that required, it is suggested that not more than one fly per inch of fish should be given daily. Gentles and pupae can be obtained and fly powder made for both tropical and cold water fish.

Pickle Jar Traps

One of these traps set and left unattended for several days will capture so many flies when they are plentiful, their bodies will reach to a depth of several inches, for the bodies of the flies trapped today automatically become bait for those tomorrow. A large pickle jar used as a trap and filled with equal parts of jam and water to a depth of two inches enticed so many common wasps that fifty were timed to enter in ten minutes, and the average daily catch per trap was 400. More wasps would be ensnared but for the bodies of the number forming a complete raft for the late comers to rest on and eventually escape. Few flies escape from these traps although their bait is solid, but the wasp does



On the left is a diagram of the fly-trap, and on the right the wasp-trap, used by the author



Sectional view of the combined fly-trap and breeder described in the article

much more crawling and often finds its way out, especially when the raft has been completed.

Both large and small flies enter the traps, but the larger species appear to be of most importance as fish food, and they include the flesh flies better known as blow flies. They are most abundant in the garden and they produce young, thus giving them a good 24-hour start over all other species, and their maggot is capable of floating while others sink and drown. The greenbottles are always found in company with the blow fly, so a fairly large number of these enter the traps, while the greatest of all fly pests, the bluebottle, the marauder of our larders and meat safes, is ensnared in smaller number throughout the whole year, even in mid-winter on mild and sunny days. The gentile of this species is also available at all times. The common wasp when plentiful will make a substantial increase to the supply of fly powder.

Rearing Gentles

To obtain gentles and pupae is usually a very messy and smelly affair, whereas the system suggested reduces mess and smell to a minimum, and it ensnares the flies as additional bait. Two large size square pickle jars are used as fly-traps, each having a quarter inch hole made through one side centrally and five inches from the bottom. A strongly made wooden box 8 inches by 8 inches, and 9 inches high, has its bottom boards extended four inches on one side, the front, for the fly-traps to rest on. Two half-inch holes are made in the front of the box five inches from the bottom (inside measurements), and spaced to correspond with the holes in the jars. The bottom of the box has several half-inch holes and at the top edge of each side are three grooves a quarter of an inch deep, spaced for ventilation. The box is raised about three inches with wooden battens on each side and at the back, but not at the front, and a piece of sacking placed in its bottom.

It is then filled level to the holes with garden soil that has been passed through a very fine strainer. A flat board acts as a cover, with a groove made all around on the underside half an inch from the edge to prevent rain water entering the box. The soil must be kept in a fairly dry state. The fly-traps are stood close to the box with their holes in line

and the bait is placed in the bottom of the jar. When the gentles have had their fill (three to four days), although they are apparently blind, they always crawl away from the light, so will find their way into the darkened box through the holes, or out of the trap and through the grooves at the top. They will be found crawling about and just beneath the soil, while the pupae will be a little deeper. They like four inches of soil above and on either side of them where possible.

The bait for the flies may be fresh fish or raw meat, while a few freshly killed garden slugs or snails are very attractive and their smell is quite mild. However, the bait may be renewed frequently to avoid any unpleasant smell. Traps should be protected from the rain, as water coming in contact with the bait makes it ineffective for a considerable time. To ensure the flies being clean, the bait is placed in a container with a screw-top cover having a few quarter-inch holes made in it, and it may be hung to the mouth of the jar with a piece of fine wire for easy removal and renewal.

The fly-trap shown is a large size pickle jar with the neck and shoulders of a "lighter fuel" bottle as a funnel, and incidentally, this type of funnel fits all pickle jars, preserving jars and one pound jam jars. The jar of the wasp-trap has a three-eighths inch hole made in its neck, and a trap-door fitted on the inside—either a piece of perforated zinc, or a small coil of fine wire hung with adhesive tape. A piece of wood acts as a cover, with a hook for holding the bait container full of jam.

Making Holes in Jars

To make the holes in the necks of the jars, a short straight length of brass or copper tubing is used as a bit. A narrow strip of leather with a hole made in it—a square hole will do—just large enough for the bit to rest in is secured around the neck. A little carborundum powder and a few drops of water are placed in the hole, the bit inserted and the grinding started, using a fast-running drill with little or no pressure on it. Occasionally add fresh powder and water and it will take about five minutes to make the hole. To make the

hole in the side of the jar, first make a hole in a piece of wood for the bit to rest in. The wood is held in the correct position by an assistant until a depression is made deep enough to prevent the bit from slipping. Then the wood can be removed and the grinding continued until through. It will take a little longer to make a small hole than a large one in glass, and the hardness and thickness of the glass has to be considered.

How to Cut Bottles

To cut the neck and shoulders off a bottle, first dry it inside and out. Stand the bottle on a smooth surface alongside a block of wood high enough for the glass cutter or diamond to rest on and be in the correct position for cutting. The glass cutter is held firmly on the block while the bottle is pressed against the edge of the cutter and turned one complete turn. The bottle is then held horizontally over a candle and turned slowly with the cut in the flame. In a minute or two it will crack and part, usually with a perfectly clean cut, and the sharp edges are smoothed down with any kind of sharpening stone or an old smooth file. Sometimes the bottle will crack all around without parting, but usually parts when allowed to cool. If not, it is placed in the flame again.

About a quarter of the wasps escape from these fly-traps while the raft of dead bodies is forming, and a much larger number when it has been completed. Observing that the wasp, unlike the fly, will force its way through a passage, or push open a light trap-door, the wasp-trap illustrated was used during the summer of 1950. Wasps were very scarce in my locality during that summer, but a few entered the traps and not one was known to escape.

Fly powder is made by collecting the trapped flies and wasps until there are enough for drying. Then they are spread out on a sheet of paper placed in a shallow box, such as the drawer of an old kitchen table. The box is raised off the ground, covered with a sheet of glass and placed in a position where it will receive plenty of sunshine. In a few days both flies and wasps will be dry enough for crushing into a fine powder, using a bottle as a rolling pin.

Automatic Siphon

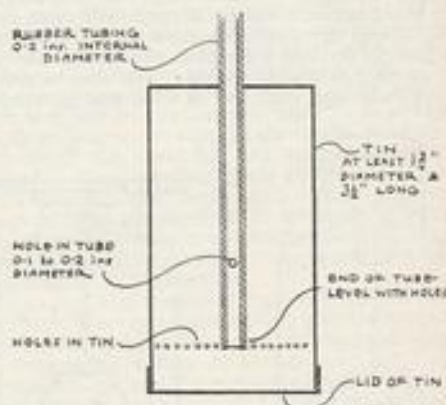
by L. R. FORD

AN automatic siphon can be easily made, using only rubber tubing and a tin of convenient size.

The rubber tubing should be approximately 0.2 in. internal diameter, preferably thin-walled, and the tin at least 1½ in. diameter and 3½ in. long; if thick-walled tubing is used, a larger tin will be required (I have found that a tin 2½ in. diameter by 6 in. long is suitable).

A small hole (about 0.1 in. to 0.2 in. diameter) is cut in the wall of the rubber tube, about 1 in. from one end—use sharp-pointed scissors to do this. A hole is made in the bottom of the tin so that the rubber tube can just be pushed through and fits *tightly*; holes are then made round the tin, just below where the lid fits, and the end of the tube inside the tin should be at the level of these holes.

The siphon may be used with or without the lid on the tin, which should be pushed smartly into the water in an



inverted position. When the siphon is working the tin may be released, and will float on top of the water, still functioning normally.

When there are small fish in the water being siphoned, it is an advantage to have the lid on, to avoid the fish being sucked through, and in this case the holes round the tin should be smaller and more numerous.



Mr. Robert Helpmann, well-known ballet star, photographed at the opening ceremony of the B.A.F. last month

British Aquarists' Festival Belle Vue, 1951

Over a Thousand Entries Displayed

MANY people have said that the British Aquarists' Festival, held last month at Manchester, marks an important point in the history of British aquarium keeping. It was the largest exhibition ever put on in these islands, chiefly for aquarists. It was the first time a show of this magnitude has been held away from London. The support it received indicates that there is a true desire for such events to take place on a national scale, and the interest manifested that our hobby is in the most active phase of its growth. Over 17,000 people visited the show during 2nd to 5th May, and now that it has been announced that aquarists living some distance from an aquarium venue can make entries without personally transporting their stocks it appears likely that future shows of this kind will need to be on an increasingly large scale.

Organised by the Federation of Northern Aquarium Clubs and sponsored by *The Aquarist*, the B.A.F. was formally opened at the Exhibition Hall, Belle Vue, by Mr. Robert Helpmann. In introducing this leading British exponent of ballet, Dr. J. F. Wilkinson, President of the B.A.F., said at the opening ceremony that the main aim of the Festival was to publicise the extent and scope of the hobby and scientific study of fish-keeping and aquatic gardens in this country and specially in the north of England. Particularly, he stressed, was it hoped to give to schools and school children, and Dr. Wilkinson stressed the valuable addition that an aquarium can be in children's wards of hospitals. It was also an aim of the Festival to give help to *The Aquarist's* Hospital Aquarium.

When opening the Festival, Mr. Robert Helpmann stressed that although not an aquarist himself he had witnessed adequate proof of the interest of the hobby and the soothing and restful nature of aquaria for patients. He recalled that his friend, Miss Margot Fontaine, had come to the festival to soothe her nerves, and that whilst in New York and having occasion to visit a dentist his trepidation subsided on looking for a while at an aquarium in the waiting room. He said that he was glad, therefore, to have taken "from that large tank, the Opera House" to open the show for aquarists.

Before the Opening

Setting up and receiving entries commenced on the day before the opening day, and as so often seems to be the case on these occasions, operations were hampered at times by a most unseasonal fall in temperature accompanied by some snow. Heating facilities were soon arranged by stewards, however, and by the following

morning, and, in fact, for the remaining period the fishes were staged, one of the main problems was to keep temperatures in the tanks down, rather than up! The railway arrivals of fishes at Manchester on Sunday and Monday were according to plan and as several aquarists experienced at fish-showing remarked, the preparations were singularly free from the bustle and confusion that is often taken as an insurmountable preliminary to these events.

Judging commenced on the day before opening to the public and was completed the following morning. Over a thousand entries in the 86 classes were made, and the variety of species shown in the tropical section surprised many visitors. The fishes exhibited by breeders revealed the good work that a number of aquarists in the north have been carrying out, unbeknown to their southern brothers!

New Standard of Staging

The impressive row of furnished tropical aquaria was an exhibit of special delight for the public; these, one thought, were what these visitors wanted to see—how an aquarium can be made to look really decorative in the home. Some novel ideas were tried out, but did not tempt the judges on this occasion. The tanks were all hooded and screened, and placed at eye-level, as was all other staging.

Traders who had stands at the B.A.F. combined to put on a display that was quite the equal of any trade exhibition to be seen at leading exhibition halls and the variety of their stocks was indicative of the thought and care that is put to supplying the needs of aquarists these days. Together with the special displays of water gardens, biological exhibits, cacti, reptiles and amphibia and the regularly given film shows and talks, all this added up to a show of which the F.N.A.S. can be justly proud. *The Aquarist* shares in this pride, and can look forward to the future with the certain knowledge that the valuable experience of this Festival can lead to bigger and better things.



Presentation of a corner bow-fronted tropical aquarium to Mr. Robert Helpmann by Mr. W. W. Charman (left), Festival Director, and Dr. J. F. Wilkinson, F.N.A.S. President

Festival Message from HERMANN MEINKEN

*Distinguished German aquarist visitor
to the B.A.F.*

I AM very glad that I was able to see the wonderful British Aquarists' Festival, and I must express my great thanks to all my friends in England, especially to Dr. J. F. Wilkinson, President of the Federation of Northern Aquarium Societies, to my old friend Mr. A. Fraser-Brunner, and to *The Aquarist* which made it possible for me to attend this event.

I was asked to convey the most kind wishes of the President of the Federation of German Aquarium Societies, Dr. K. Kramer, for a successful Festival and to offer also the best regards of the President and members of the Bremen Aquarium Societies. In Germany our opinion is that the success of an exhibition is measured by the numbers of new members of societies and new readers of aquarium journals obtained, rather than by the monetary profits.

I know that this view is also that of British aquarists and it is our hope that this Festival will be followed by an effort to bring about a close international co-operation between European Federations. In writing of co-operation I think of an exchange of monthly news bulletins, aquarium journals articles concerning original research work, perhaps of fishes and plants too, and of exchange visits by aquarists to exhibitions in different countries.

With regard to the British Aquarists' Festival I can but repeat what I have already said—it was the best show I



Mr. Fraser-Brunner (left) showing the Fraser-Brunner Trophy to Herr Hermann Meinken and his wife at the B.A.F.

have ever seen in Europe. Especially was I struck by the idea of showing fishes in small individual tanks apart from beautiful furnished aquaria, so that each visitor may easily choose the species he most wants to keep, and then see and obtain advice from the catalogue on how they may be kept; these were quite new features to me.

I regret very much that other German aquarists were not able to see this really grand Festival and that I was forced to return to Germany before the final day of the F.N.A.S. Assembly.

London Water taken to Manchester



Members of the Hendon A.S. unloading their exhibits after their arrival at Manchester in the placarded van

HIGHLIGHT of the Sunday before the opening of the B.A.F. was the arrival of a party of Hendon Aquatic Society members with their entries. They unloaded these from a conspicuously labelled large van, revealing fish cans bearing the legend "Hendon is Here," and complimentary to Manchester's Water Board, large carboys with labels "Mature London Water." Prominently displaying their club badge on white jackets these enthusi-

astic aquarists set up their furnished aquarium and distributed their individual fish and plant entries. Several awards went back to Hendon with them on their return journey the following week-end and their happy co-operation in the Festival will long be remembered.

Thanks to advance planning and efficient reception the arrangement by which fishes were forwarded to Belle Vue by rail from various parts of the country proved highly successful. Insulated cans and large thermos flasks were used as travelling fish containers and one aquarist, Mr. H. S. White, of East London, sent a specially made large wooden box, double-walled for heat conservation, containing his entries in carefully packed glass jars.

A popular exhibit that was unfortunately short-lived was a young octopus, obtained by Mr. Gerald T. Iles from Plymouth for the B.A.F. In the living state, in his aquarium, and later as a preserved exhibit "Oswald" was eagerly sought out by the 5,000 school children who visited the Festival in parties organised by their schools. Their visits were often planned to provide a little extra-mural natural history study, such as the biology class of the Castle Hill County Secondary Boys' School, who has been issued with typewritten questionnaires to fill in during their tour of the exhibition. This practical idea ensured that the boys made observations for themselves and also that they asked questions of the stewards who acted as their guides.

The fishes that travelled the longest distance to Manchester were some cichlids that accompanied Mr. J. Alexander from B.A.O.R., Germany. Mr. Alexander made the B.A.F. his first stopping place to set up a furnished aquarium entry on his way home to Scotland on his first leave for two years. The thirty-hour journey was not made without difficulties. Before the trip was made Ministry of Agriculture and Fisheries permission had been secured to bring in the fish and water plants; fishes that normally lived together quite peaceably nibbled one another's fins in the close confines of cans; unheated trains added to temperature maintenance troubles and the long spell in darkness did not improve the plants. Mr. Alexander was awarded a special prize in token of his meritorious entry.

Farthest travelled visitor to the B.A.F. was an *Aquarist* reader from Nairobi—Mr. S. McKnight, who was greatly impressed by what he saw. He told us of the delights of keeping tropicals at home in garden ponds and of freedom from worries about tank heating. Two of our oldest readers also made themselves known to us—Mr. C. E. Duce of Preston and Mr. L. Portway of Sheffield (who also successfully entered some fine fishes), friends of our founder Editor. We were pleased to meet Mr. and Mrs. V. Collier, who flew over from Ulster to see the show, and to renew friendship with Mr. Strachan Kerr from Glasgow and aquarists from Torquay and Cardiff.

Plenty of time was available before the opening day for judging to take place and thanks are due to the F.B.A.S. judges who travelled up from the south—Messrs. J. Cansell, C. W. G. Creed, H. P. Lynn, R. G. Mealand, W. G. Phillips and M. Welch. Together with the F.N.A.S. judges, Messrs. H. Loder and G. T. Iles, their decisions were speedily yet unhurriedly made. Mr. Phillips, the noted guppy specialist, who has been an aquarist for fifty-six years, thought the B.A.F. to be the finest fish show he had seen anywhere; he praised the eye-level staging of hooded tanks and the organisers' provision that judges could withhold awards when standards were not considered to be reached.

A first-class display of biological interest—water animal and plant life of all forms—was made on the stand of the Manchester Microscopical Society, and members of the Society on the stand were kept very busy answering questions and giving demonstrations to visitors. Mr. C. Burwell had arranged a named collection of nearly twenty native water plants and a fine display of mosses and lichens

A competitor in the furnished aquarium section who travelled from Germany to set up his tank—Mr. J. Alexander



Photo: News Chronicle

suitable for vivarium use. The northern section of the British Herpetological Society also staged a comprehensive exhibition of reptiles and amphibia, also some African lung fishes. A non-competitive row of aquaria showing British fishes including trout, pike, carp, bream, perch, tench, chub and orfe by Mr. E. Chapman of Sheffield Aquarists' Society drew much appreciative comment.

Film shows of aquatic and herpetological interest, six a day, were very popular, as were talks given by Messrs. G. T. Iles, A. Boarder, A. Fraser-Brunner and R. O. B. List. The Exhibition Hall's broadcasting system, in the capable charge of Mr. Chadwick, was an invaluable administrative help, and announcements of new arrivals at the show, of "happy events" in the livebearers' tanks and of spawnings were made regularly. Several species spawned in their exhibition tanks during the B.A.F., indicating that conditions were quite satisfactory for the fishes!

Thanks of *The Aquarist* and publishers, sponsors of the B.A.F., are due to many individuals and clubs for their interest and work in making the event a success. The following are among those who bore the brunt of the hard work of stewarding a busy show and of keeping a night watch on exhibits:—Mr. C. Graham (Chief steward); Belle Vue Aquarist Society, Messrs. A. Westbrook, H. Hall, C. J. Westbrook, W. S. Tracey, E. Ratcliffe, D. Ratcliffe, H. J. Paynting, A. Pella, B. Dickinson, C. K. Wilson, J. Crassly, T. Bentley, Mrs. Bentley, Mr. and Mrs. G. Thompson, Messrs. W. Pearson, R. Broughton, J. L. Traynor, A. P. Elton; Salford Aquarist Society, Messrs. E. McDowell, K. Iwill, G. Rankin, D. D. Pendlebury, T. Bowden, A. Spencer, G. Poyser, L. Gregory, R. Kershaw; Mrs. C. Hammond, Mrs. E. Chapman, Mrs. Ledger. To these and to officials of the F.N.A.S. and all the other members who gave their enthusiastic support, our grateful thanks.



Setting up night—a problem is solved by Mr. E. Chapman, Dr. J. F. Wilkinson and Mr. H. Hall, B.A.F. officials





Display stand of "The Aquarist" (picture above) on which the B.A.F. trophies were exhibited, was placed centrally and formed a break between tropical and coldwater sections of the Exhibition. Souvenir catalogues, magazines, books and booklets were on sale.

Members of a young audience deeply absorbed in one of the film shows provided free for visitors in the cinema adjacent to the show's tropical section are shown on the left.

Pictures of the Exhibition Hall on these pages, were taken immediately prior to the official opening before crowds made it impossible to do so. Part of the coldwater section is shown below. Shubunkin breeder, Mr. G. Handley of Hartlepool A.S., in the picture was given a post-judging view of the entries.



General view main bank of Aquarist's level display



British Aquarists' Festival 1951 *in pictures*



Herpetological section and
reptiles seen from "The
Daily Dispatch" and eye-

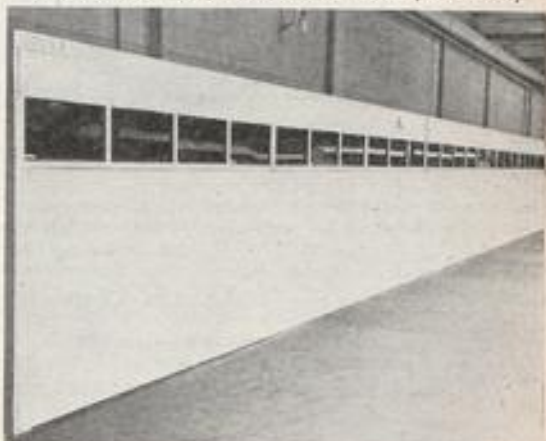


Mr. R. Skipper of Hendon A.S. (right, above picture) is seen receiving "The Aquarist" trophy from the Editor of "The Aquarist" for the best exhibit in the water plants section.

The coldwater section was brightened by a colourful pond and water-garden arranged by members of the Southport A.S. (pictured left). Part of the run of tropical furnished aquaria is seen on the right.



Photo: Daily Dispatch
Mrs. W. Charman, representing the Buckley Press Ltd., publishers of "The Aquarist," handing the "Daily Dispatch" trophy for the best fish in the show to its winner, Mr. R. R. Brough, during the presentation ceremony at the F.N.A.S. Assembly on 6th May



Judging Results and Awards



F.B.A.S. judges at "The Aquarist's" stand. Left to right: Messrs. M. Welch, J. Carnell, C. W. Creed, H. P. Lymn, W. G. Phillips and R. G. Mealand

Awards

Section A.—Furnished Aquaria

Class 1. Club Tropical Aquaria: 1st—Blackpool and Fylde Aquatic Society; 2nd—Bradford and District A.S.; 3rd—Hendon and District A.S.; V.H.C.—Sheffield and District A.S.; H.C.—Leeds and District A.S.; C.—Preston Scientific S.

Class 2. Club Coldwater Aquaria: 1st—Nottingham and District A.S.; 2nd—Hendon and District A.S.; 3rd—Nelson and District A.S. Classes 3 and 4. Individual Furnished Aquaria: 1st—D. McC. Pallen; 2nd—(Mrs.) M. Thompson; 3rd—R. E. Legge; V.H.C.—R. Borrowdale; H.C.—H. Charles; C.—(Mrs.) B. Robertshaw.

Classes 5 and 6. Junior Furnished Aquaria: 1st—N. S. Young (Hands Trophy Winner); 2nd—B. Pengilly; 3rd—W. Parker; V.H.C.—D. Townsend; H.C.—R. K. Pawson; C.—A. R. Edgar.

Best Furnished Aquarium, Section A: Blackpool and Fylde Aquatic Society's entry; awarded Cousins Trophy. The aquarium displayed a small shoal of *Hypessobrycon serpa*.

Section B.—Coldwater Fishes

Classes 7 and 8. Common Goldfishes: 1st—M. R. Price; 2nd—R. F. Singleton; 3rd—S. G. Wingrove; V.H.C.—S. Coldbeck; H.C.—T. S. Pick; C.—P. R. Chapman.

Class 9. Shubunkins: 1st and 2nd—A. R. Sutton (Leeds Aquarists' Society Trophy Winner); 3rd—H. W. Pollard; V.H.C.—H. North; H.C.—R. Hyatt; C.—H. Troman.

Classes 10 and 11. Fantail Goldfishes: 1st—W. Butler; 2nd—H. W. Pollard.

Classes 12 and 13. Veiltail Goldfishes: 1st—Z. Webb (Goldfish Society of Great Britain Trophy Winner); 2nd and 3rd—N. L. Smith; V.H.C.—W. Butler; H.C.—Z. Webb; C.—W. Butler.

Class 14. Moores: 1st—Z. Webb; 2nd—W. Butler; 3rd—R. P. Singleton.

Class 15. Oranda, lionhead, celestial, etc. No awards.

Class 18. American sunfishes and bass: 1st and 2nd—J. Stott; 3rd—R. Hyatt.

Class 19. Perch, pike and A.O.V.: 1st—No award; 2nd—J. A. Holloway; 3rd—G. H. Winder.

Best Coldwater Fish, Section B: Veiltail goldfish (Z. Webb), awarded Belle Vue Ltd. Trophy.

Section C.—Guppies

Class 20. Cofertail (male): 1st—G. M. Challans; 2nd—B. Jowett; 3rd—D. Cannon.

Class 21. Pintail (male): 1st—No award; 2nd—H. S. White.

Class 23. Bottomsword (male): 1st—D. Johnson; 2nd and 3rd—H. S. White.

Class 24. Doublesword (male): 1st, 2nd and 3rd—J. P. Keene.

Classes 25 and 26. Lyretail and roundtail (male): 1st, 2nd and 3rd—H. S. White.

Class 27. Robson (male): 1st—No award; 2nd—H. S. White.

Class 29. Female (coloured): 1st—No award; 2nd and 3rd—G. M. Challans.

Class 30. Female (plain): 1st—no award; 2nd—D. Cannon; 3rd—No award.

Most outstanding guppy, Section C: Doublesword male (J. P. Keene) awarded Guppy Breeders' Society Trophy.

Section D.—Livebearers (pairs of fishes other than guppies)

Classes 31 and 32. Shortfinned molly: 1st—W. L. Mandeville; 2nd—R. Metcalfe.

Classes 33 and 34. Broadfinned molly: 1st, 2nd and 3rd—W. R. Smith; V.H.C.—A. H. Bond.

Classes 35, 36, 37 and 38. Platy: 1st—A. J. Rashley; 2nd—C. Graham; 3rd—S. Talbot; V.H.C.—W. L. Mandeville.

Classes 39, 40, 41 and 42. Swordtail: 1st—R. R. Brough (Daily Dispatch Trophy for Best Fish Winner); 2nd—H. Welch; 3rd—D. Collinwood; V.H.C.—J. Southworth.

Class 43. Platy varians: 1st—J. H. East; 2nd—M. C. McAfee; 3rd—R. P. Singleton.

Class 44. Other livebearers: 1st—R. Skipper (*Phallops caudomaculatus*); 2nd—A. Sunderland; 3rd—D. Cannon (*Girardinus metallicus*); V.H.C.—B. Pengilly (American guppy).

Best livebearers, Section D: Tuxedo swordtails (R. R. Brough), awarded Fraser-Brunner Trophy.

Section E.—Small Egglayers (pairs)

Class 45. Rosy barb (*Barbus conchomias*): 1st—H. Charles; 2nd—E. W. Eadon; 3rd—P. Bentley; V.H.C.—G. N. Hadley; H.C.—B. Jowett; C.—C. H. Westbrook.

Class 46. Tiger and ruby barbs (*B. tetrazona*, *partipentazona*, *microfasciatus*): 1st—W. Sharp (*B. microfasciatus*); 2nd—J. H. East (tiger barb); 3rd—G. Mollard (tiger barb); V.H.C.—M. Hipperson (*B. microfasciatus*); H.C.—W. Tait (*B. microfasciatus*); C.—J. Wilde (tiger barb).



An attractive rock garden and pool designed by Mr. C. Graham of the F.N.A.S., in the coldwater section

Class 47. Other barbs: 1st—L. Portway (clown barb); 2nd—S. Davies (*B. fasciatus (schuberti)*); 3rd—(Mrs.) M. Thompson (cherry barb); V.H.C. & C.—W. Sharp (cherry and checkered barbs).

Class 48. *Rasbora* species: 1st—G. Mollard (scissor-tail); 2nd—(Mrs.) B. Robertshaw (*Rasbora* sp.); 3rd—L. Portway (*R. sordidula*).

Class 50. *Hyphessobrycon* species: 1st—G. W. Cooke (rosy tetra); 2nd—R. Borrowdale (serpa tetra); 3rd—L. Portway (*H. pulchripinnis*); V.H.C.—A. Grant (neon fish); H.C.—S. Rice (Belgian flag tetra); C.—E. L. Calver (glowlight tetra).

Class 51. *Hemigrammus* species: 1st—L. Portway (beautiful tetra); 2nd—D. Rogers; 3rd—T. S. Hobday (beacon fish); V.H.C.—S. Talbot; H.C.—A. J. Rashley (beacon fish); C.—W. L. Mandeville (beacon fish).

Class 52. *Nannostomus* species: 1st—N. Bell (margined prim fish); 2nd—M. C. McAfee (pencil fish); 3rd—E. Shaw (margined prim fish); V.H.C.—J. H. East (*Nannostomus* sp.); H.C.—L. Portway (prim fish); C.—(Mrs.) K. Anness (prim fish).

Class 53. Other characins: 1st—W. L. Mandeville (black widow); 2nd—R. Skipper; 3rd—A. Jackson (black widow); V.H.C.—J. L. Traynor (Congo characin); H.C.—R. Skipper; C.—W. Smith (hatchet fish).

Class 54. Zebra fish: 1st—H. Loder; 2nd—D. Cannon (*Danio rerio*); 3rd—H. Loder; V.H.C.—E. Watson; H.C.—L. Heeson; C.—G. Bennett (giant danio).

Class 55. White cloud minnows: 1st—H. Hall; 2nd—L. Heeson; 3rd—F. Bickerdike.

Class 56. Loach: 1st—L. Sunburg; 2nd—J. Bond.

Class 57 and 58. Catfishes: 1st—H. Hall (*Corydoras*); 2nd—A. J. Bland; 3rd—R. Skipper (*Corydoras*); V.H.C.—H. W. Pollard (*Corydoras*); H.C.—R. F. W. Bowman (*Corydoras*); C.—(Mrs.) K. Annes (*Corydoras paleatus*).

Class 59 and 60. Toothed-carps: 1st—B. Calrow (striped parachea); 2nd—J. H. East (*Apocheilichthys*); 3rd—L. Heeson (Cuban ribubus); V.H.C.—H. S. White (Cuban ribubus); H.C.—H. Loder (striped parachea).

Class 61. Glass fish, etc.: 1st—N. Bell (rainbow fish); 2nd—J. Bland (rainbow fish); 3rd—W. Tait (rainbow fish).

Best egglayers. Section B: Ruby barbs (W. Sharp), awarded *The Aquarist and Pondkeeper Trophy*.

Section F.—Labyrinth Fishes

Class 62. Paradise fish: 1st—A. J. Bland; 2nd—B. Greenwood; 3rd—H. Loder; V.H.C.—E. Ryan.

Classes 63, 64 and 65. Gouramis: 1st—R. Borrowdale (pearl gourami); 2nd—C. B. Higginson (blue gourami); 3rd and V.H.C.—W. R. Burwell; H.C.—H. Loder.

Classes 66, 67 and 68. Gouramis: 1st—A. Allison (dwarf gourami); 2nd—S. Streets (thick-lipped gourami); 3rd—W. L. Mandeville; V.H.C.—R. F. Singleton (dwarf gourami); H.C.—E. W. Haddon (dwarf gourami); C.—W. L. Mandeville.

Class 69. Fighting fish: 1st and 2nd—A. Beay (Bland Trophy Winner); 3rd—G. M. Hadley; V.H.C.—H. S. White.

Class 70. Fighting fish, cambodia variety: 1st—H. Hall; 2nd—W. Tait.

Best labyrinth fish. Section F: Pearl gourami (R. Borrowdale), awarded *Federation of Northern Aquarium Societies Trophy*.

Section G.—Cichlid Fishes

Class 71. Acaras, etc.: 1st—G. H. Phillips (blue acara); 2nd—E. R. Burwell (brown acara); 3rd—W. L. Mandeville (blue acara); V.H.C.—G. H. Phillips (blue acara); H.C.—A. J. Bland (marbled cichlid); C.—(Mrs.) B. R. Mills (marbled cichlid).

Class 72. Chacchito, Jack Dempsey, etc.: 1st—W. Butler (Jack Dempsey fish); 2nd—L. Heeson (*Gichlanus festinus*); 3rd—A. J. Bland (Bremouth cichlid); V.H.C.—D. Cannon (*Gichlanus nigrostriatus*); H.C.—J. Beaumont (*G. nigrostriatus*); C.—R. K. Parson (Jack Dempsey fish).

Class 73. Mouthbreeders: 1st—B. Cheshire (African sp.); 2nd—L. Partway (Egyptian sp.).

Class 74. Angel fish: 1st—D. Collinswood (Whitwell & Smykala Trophy Winner); 2nd—G. Mollard; 3rd—F. Bentley; V.H.C.—D. Rogers; H.C.—Messrs. Bates and East; C.—T. C. Farrell.

Class 75. Other cichlids: 1st—L. Heeson (dwarf cichlid); 2nd—E. R. Burwell (dwarf cichlid); 3rd—B. Cheshire (*Geophagus brasiliensis*); V.H.C.—(Mrs.) M. Beaumont (*Hemichromis fasciata*); H.C.—A. J. Bland (pike cichlid); C.—B. Pengilly.

Best cichlid fish. Section G: Dwarf cichlid (L. Heeson), awarded *National Aquarists' Society Trophy*.

Section H.—Breeders' Classes (teams of six fishes)

Class 76. Goldfish: 1st—E. S. Walker; 2nd—W. Butler; 3rd—B. North; V.H.C.—R. F. Singleton; H.C.—E. S. Walker; C.—No award.

Class 77. Other coldwater fish: 1st—H. North (golden orfe, bred 26th April, 1950); 2nd—No award.

Class 78. Small egglayers: 1st—G. W. Cooke (glass fish, bred 25th September, 1950), (East Lancs. Society Trophy Winner); 2nd—Messrs. Bates and East (lyretails, bred 3rd January, 1951); 3rd—J. H. East; V.H.C.—J. Alred (harlequins, bred September, 1950, and rosy tetra, bred November, 1950); H.C.—(Mrs.) B. Robertshaw (glowlight tetra); H.C.—G. W. Cooke (harlequins, bred 6th September, 1950); C.—Messrs. Bates and East (lyretails, bred 2nd February, 1951); C.—Z. Pic (neon fishes, bred 25th October, 1950).

Class 79. Livebearers: 1st—J. Walsh (red-eyed swordtails, bred August, 1950); 2nd—H. S. White (bottomsword guppies, bred January, 1951); 3rd—V. Flecher (lemon wagtail platys, bred 24th December, 1950); V.H.C.—L. Heeson (guppies); H.C.—No award.

Class 80. Labyrinth fishes: 1st—W. R. Burwell (pearl gouramis, bred August, 1950); 2nd—(Mrs.) M. Thompson (dwarf gouramis, bred 20th November, 1950); 3rd—No award.

Class 81. Cichlid fishes: 1st—H. Loder (angel fishes, bred December, 1950); 2nd—J. Alred (angel fishes, bred 12th February, 1951); 3rd—(Mrs.) K. Annes (angel fishes, bred 9th February, 1951).

Best breeder's effort. Section H: Glass fishes, bred 25th September, 1950 (G. W. Cooke), awarded *Federation of British Aquatic Societies Shield*.

Section J.—Plants

Class 83. Coldwater plants: 1st and 2nd—A. Stow (*Myriophyllum* and *Sagittaria*); 3rd—R. Hyatt.

Class 84. Tropical plants: 1st—R. Skipper (red *Myriophyllum*); 2nd—R. Skipper (*Cubomba*); 3rd—L. Heeson (*Cryptocoryna*); V.H.C.—E. Chapman; C.—R. F. W. Bowman (*Ambulia*).

Class 85. 1st—G. Mollard (Amazon sword plant). Best water plant. Section J: Red *Myriophyllum* (R. Skipper) awarded *The Aquarist and Pondkeeper Trophy*.

Special Prizes

GOOD support was given to the B.A.F. by traders and others who kindly donated the following special prizes: One cash prize of five guineas, two of two guineas and one of one guinea (Federation of Northern Aquarium Societies); 24 ins. by 12 ins. by 12 ins. aquarium (Urmston and District Aquarium Society); "Hyflo" single piston air pump (Mr. and Mrs. C. Hammond, Doncaster); six "A-1" thermostats (Angel Electrical Industries, London); cash prize of two guineas (Baldry's, Accrington); copper oil-heating lamp (P. J. Bryant, Bristol); three "Elephant" thermostats (Evans Electronic Developments Ltd., Birmingham); six copies *Right Way to Keep Pet Fish* (Fish Tanks Ltd., London); ten vouchers, each valued 10/- (W. T. Jefferies, London); fish-house jar and cartons "Mero" fish food (K. T. Aquaria, London); cartons "Coral" fish food (Liverine Ltd., Grimsby); "Jaynor" de luxe air pump (James North, London); voucher, value 7/6 (Wm. Owen & Sons, St. Helens); four vouchers, each valued one guinea (St. Martins Aquaria, London); "Reliable" thermostat (Joseph Sanley Ltd., Birmingham); "Little Wizard" thermostat (The Little Aquarium, Derby); two thermostats, one heater (Sharrowood Pet Stores, Salscup); two "Ea-Ea" thermostats, two "Ea-Ea" heaters, two "Ea-Ea" thermometers, two "Ea-Ea" aerators (Singleton Bros. Instruments Ltd., London); two "Constat" thermostats (South Western Aquarists, London); two "Angel" heaters, one copy *Essential Aquarium Fishes* (Waddington's Pet Stores, Brighouse).



Stewards and other B.A.F. helpers at the F.N.A.S. stand, which served as an information bureau at the B.A.F. Mr. C. Graham, chief steward, is on the left.

Show Secretary's Report

ALTHOUGH the B.A.F. was held in the north, I was pleased to see that not all the awards remained there. London aquarists were well represented and have been rewarded for their pains. The general opinion was that most of the fishes were not quite up to southern standards, but those that were good were indeed good. This was evidenced by requests from best known breeders in London for some of the progeny of the very fine pair of Wiesbaden swordtails which took the *Daily Dispatch* Trophy for the best fish in the show.

The spade work of preparation and stewarding was done with boundless enthusiasm and helped considerably, and for the organisers was one of the great features of the show. Rail despatch exhibits were dealt with in a fine manner and no fishes were lost, either in transit or by neglect. This opens up an entirely new vista for show secretaries in general. A good point to use as an illustration is the fact that fishes from Torquay went back to their owner together with the awards won by him; excuses by aquarists that they haven't the time to bring their fishes to a show can no longer be valid.

Our distinguished visitors returned home full of admiration for the aquarists who were represented at the B.A.F. I take this opportunity of thanking all those who so ably supported me in my work as show secretary.

R. O. B. List

Over 1,000 Aquarists at F.N.A.S. Assembly

AT the Spring Assembly of the Federation of Northern Aquarium Societies the largest attendance of society members yet recorded at one meeting in this country gathered together, on Sunday 6th May. The Festival was open only to the Assembly on this day, and from 10 a.m. to 4.30 p.m., with a break for lunch, members toured the Exhibition Hall. After tea they assembled in the Belle Vue Ballroom to hear an address from the F.N.A.S. President, Dr. J. F. Wilkinson, reports by the treasurer and secretary, and a lecture by Mr. A. Fraser-Brunner. Official presentation of trophies took place before these proceedings.

In his address Dr. Wilkinson thanked donors of trophies and prizes on behalf of the Federation. He recalled how the Federation had arisen from the Belle Vue Society, which before the last war had staged an exhibition in Manchester that had proved extremely popular. The B.A.F. was an undoubted success from the hobby publicity point of view, he said, and he expressed the hope that it would be the forerunner of other co-operative efforts between *The Aquarist* and the Federation. Dr. Wilkinson foresaw the growth of similar ventures on an international scale, with aquarists from all countries meeting at various large centres in turn.



B.A.F. Trade Exhibits

USEFUL tip for aquarists was demonstrated on the stand of the manufacturers of "Black Magic" Aquarium Cement at the B.A.F., where a tank that defied the rust encouraging action of water condensation was shown. Strips of glass had been cemented under the top edge of the frame to project about half an inch beyond it. On the junction of these strips with the edge of the top frame were cemented lengths of glass tubing; these formed a retaining ledge for the glass cover and prevented water from reaching the metal.

The extent of the increasing interest in the hobby was shown by the presence of a large stand erected by Spratts Patent Foods Ltd.—the first time that this well known firm have patronised a show devoted solely to aquarium exhibits. A small pond with water garden and fountain decorated the front of their stand.

Wartime equipment of all kinds has found various peacetime uses, and one unexpected adaptation of the frogman's diving gear was disclosed by Mr. Jordan of Aquafern, who exhibited at the B.A.F. Men equipped with this apparatus are used to collect the marine animal *Sertularia*, the skeleton of which is sold as a spawning medium and aquarium decoration.

Fishy newcomers to the tropical aquarium on the stand of Pets and Aquaria Ltd., puzzled many aquarists at the B.A.F. These were the freshwater soles (*Trinectes maculatus*), one-inch long flat fishes looking, as one aquarist put it, "all the world like an enlarged *Argulus*."

Brosiam Ltd.'s stand, where a full range of this firm's products was on show, was shared by kind permission of the exhibitors with an information table for the National Aquarists' Society. Good publicity for this month's National Aquarium Exhibition was secured in this way.

Largest display of furnished and stocked aquaria among traders at the B.A.F. was that on the stand of Walter Smith of Manchester. Helping Mr. Smith on this stand, throughout the show, was Mr. R. R. Brough, winner of the *Daily Dispatch* (Kemsley) Trophy for the best fish exhibited.

Ulster Aquatic Co. attracted interest to their stand with a

display of neons and head and tail lights in one of their new attractive tubular type aquaria on a modern type stand.

Included in a recent importation of S. American fishes from the Orinoco region to Tom C. Saville Ltd. of Nottingham were several new species, including *Leporinus striatus* and *L. friderici*. These, together with some unidentified newcomers of the catfish, characin and barb groups were displayed on this trader's stand at the B.A.F.

Exhibition tanks at the B.A.F. were aerated by "Prockter" aerators, kindly loaned by the Scottish Fisheries. Two of the aerators mounted in special glass casings formed working demonstrations of their power when connected to glass columns of blue fluid on this firm's B.A.F. display. The stand was manned by Mr. and Mrs. Keene who were attired in Scottish national costumes.

A very large collection of coldwater fishes, in addition to tropical aquaria displays, formed the main attraction of the "Letty Kremmer" Aquarium stand at the B.A.F.

Arrival of a consignment of iguanas for Robert Jackson by air at Manchester's Ringway Airport was announced on the second day of the B.A.F., and they were delivered to the stand of this trader in the presence of a large crowd of visitors. An oak aquarium, shown on Mr. Jackson's stand, labelled "Sold to Winston Churchill," attracted attention of visitors—an order received the day before the B.A.F. opening.

B.A.F. visitors to the stand of Little Wizard Products Ltd. were able to see the working parts of this firm's thermostat in a "dissected" instrument and receive advice on setting and adjusting from experts who have recently installed specially designed apparatus in the aquaria at the new Southsea Public Aquarium.

A group of "scats" (*Scatophagus argus*), believed to be the only ones in the country at present, were shown on the stand of D. and H. Loder of Burnley, Lancs., who also included in their display some attractive cage birds. Mr. Loder supplied live foods for the fishes shown at the B.A.F.

Interference-proof thermostat ("The Elephant") wired to an electric light bulb mounted in a prominent position on the stand of Stuart Erskine of Birmingham, provided a flashing beacon attraction. The instrument has a rubber bung protecting an aperture into which a key is inserted for setting purposes.



A page for
the beginner
contributed
by

J. P. VOLRATH

Most budding aquarists, when they see a large tropical fish-house or the tropical hall of the London Zoo Aquarium for the first time, are slightly intoxicated by the brilliant colours and strange shapes of the tropicals. They can't be wondered at, for which of us didn't catch a fish when seeing a male fighter in full colour for the first time? But it has its dangers. Too many people, led by the initial enthusiasm, rush to buy some tropical fish without due thought for their welfare.

Setting up a Tropical Aquarium

The first essential for tropicals is, of course, warm water. "What temperature do my fish require?" is the first question asked by most beginners. Fortunately most tropicals are very tolerant of gradual fluctuations of a few degrees in the temperature of their water, but the changes must be gradual. 86° to 78° F. is a safe range; 73° F. is a good temperature to keep your aquarium at until you have had a little more experience of the requirements of individual species.

Too low a temperature will make the fish sluggish and may kill them; too high a temperature will make the fish too active and will shorten their lives. Also the higher the temperature of the tank, the more heat is being lost through its surfaces. A physicist will tell you that the rate of cooling of an object, or the speed at which heat is lost, is proportional to its excess temperature above that of the atmosphere around it. This means that in a room at 68° F. an aquarium with a temperature of 86° F. is losing heat as much heat as one at 73° F. and therefore using twice as much current.

The best method to heat a single tank is with an electric immersion heater and a thermostat. Put them a fair distance apart in the aquarium, but do not put the heater right up in one corner or the heat won't spread properly; do not bury it in the sand or the plant roots may rot. A 100-watt heater is usually sufficient for a 24 ins. by 12 ins. by 12 ins. aquarium in a warm living room. A reliable thermometer is essential; the mercury-in-glass type is best. The electrical circuit is shown in the accompanying diagram; the switch controls the light which should be above the tank. The heater is controlled by the thermostat. It is important that the joints are well insulated—remember that electricity can be lethal. Our American friends make practical use of this fact, but try not to follow their example in this respect.

Feeding your Coldwater Fish

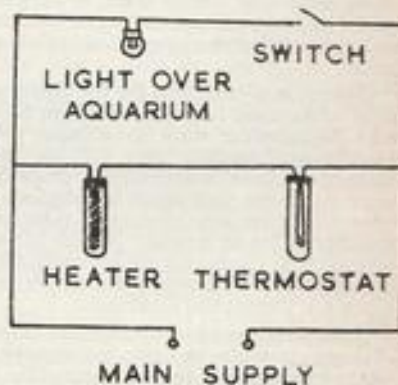
Fish foods can be divided into two classes; dried foods and fresh foods. The dried foods include all the proprietary fish foods, bread, biscuit meal and Bemax. Fresh foods include raw meat and fish and various live foods such as water fleas (*Daphnia*), earthworms, mosquito larvae and frog tadpoles.

In their natural state fish eat only fresh foods. The majority of species eat some vegetable matter. Dried foods are very much more convenient to use than fresh foods, but

they are inclined to be fattening and constipating. You need not worry so much about this in an established pond as the fish are always browsing around the sides and bottom for small aquatic creatures and plants to eat. In an aquarium your fishes will need some fresh food.

Earthworms are highly thought of as a food for goldfish. Large ones must be chopped up, but smaller ones may be fed whole. They are a nuisance to dig up and messy to cut up so I do not bother with them. My fish seem to thrive on a little fresh or cooked horse flesh purloined from my dogs; don't feed tinned or prepared dog meat to your fish. Raw fish is an excellent food for your fish. *Daphnia* are good but too expensive to feed in any quantity unless you can collect them from natural waters. *Cyclops*, a minute creature which may be amongst the *Daphnia*, will not harm your fish. Mosquito larvae and frog tadpoles are useful if you can get a good number of them.

Bemax is a good dried food but the dust must be sieved from it for large fish. Unfortunately some proprietary foods consist largely of biscuit meal and should therefore not be used often. Above all, remember in feeding your fish that variety is the spice of life.



Simple electrical circuit diagram for wiring heater, thermostat and overhead light of the aquarium

Definitions

THERMOSTAT: an instrument to control the temperature of an aquarium. Making use of different coefficients of expansion of two metals it switches the heater off at a predetermined temperature and on again when it has dropped a few degrees.

AERATION is the forcing of small bubbles of air through the water of an aquarium. It helps circulation and increases the air/water surface area slightly. It may cause distress to fish if they are moved from an aerated tank to an unaerated one.

Next month we will talk about some tropical fish and plants that are easy to keep.

How to Make a Rock Garden



by W. E. SHEWELL-COOPER

THERE'S many a pool that would be improved by having a rock garden planned somewhere near it so as to make, perhaps, a reason for the pool itself. Of course, if there should happen to be any undulation in the garden, the higher spot is ideal for the rocks and the lower part excellent for the water-garden. Thus, one gets height and depth attained without any artificiality. When the garden is small and there are no definite depressions, it may be necessary to make a mound with varying contours, say to the south side. Here, it can be a regular feature and one might be lucky enough to be able to make a little trickling stream tumble down over the rocks so as to feed the pool below.

Now, it is all very well for the purist to insist that really good rocks must be purchased from long distances. One man insists on the water and weather worn limestone from Derbyshire. Another asks for the special stone from Somerset or from Westmorland. I always think it is much nicer to use the rock which is indigenous to the particular county. I have seen gardens in Kent where the good old Kentish rag has been used. Folk in Sussex have made some very attractive little rock gardens with the typical sandstone of that county. Friends in Wales have used granite, as have experts in Devon and Cornwall.

If the garden can be made with stone found in the district, of course, it will be cheaper, but remember that it is always better for such stone to be dug out of the hillside and not be quarried out of the bowels of the earth. It's the weathered stone which has the natural appearance. Quarried stone somehow always looks too neat. Make it a rule that you are going to bury about three quarters of the stone in the soil; that will give you an idea as to how big rocks you will have to buy. The best side of the rock should always be visible and the quarried edges may be hidden beneath the earth.

For small rock gardens, I always insist that the two main stones should weigh at least five cwt. each, while the others used in the build up should weigh about one cwt. a piece. You will see by this, that I am appealing for *rocks* to be used and not just stones. We must get away from those so-called rockeries which used to be the vogue in the Edwardian era.

You know the kind of mound I mean—with stones just sticking out of it like almonds out of a trifle.

People are horrified when I say that it is possible to make one's own rocks by means of concrete. A large irregular hole in the earth of the shape and size required is prepared and the bottom of this hole is sprinkled well with sand to give the surface of the artificial rock the texture desired. Once the outline of the hole is lined with cement, it is possible to use old tins and jam pots as a centre, of course, making sure that these are well covered. The "rock" will then be lighter to handle. It must be left to harden in its hole and this usually takes about three days.

The main drawback of course, to the concrete rocks is that they take a very long time to weather and they tend always to look what they are. I merely mention them because there are some who just can't afford to buy the proper rocks and they may like to try their hand at producing something as near nature as possible. Incidentally the growth of lichen on these "rocks" will be encouraged if, when dry, they are painted with a mixture of flour, milk and water. One man bought one or two real rocks and used them as the basis for the earth moulds to make others of a similar size and shape.

Having shocked some readers by this suggestion, I must now pass on to the actual making of the garden—that is the placing of the rocks in the right position. One gets the right idea by studying the small outcrops one sees on hill-sides. These rocky outcrops will demonstrate the meaning of the word *stratum*: for when planning a rock garden, there must be some effort at what is called stratification. There must be some primary line which tries to show where the original material was deposited and then there will be the secondary lines caused by what geologists may call the earth's upheaval.

Thus, when building the rock garden, we usually start at the lowest point and having bedded the lower rocks in their right strata or as some people call it, at their proper angle, the other rocks can then be placed in position, the general slope of the strata being followed right the way through. The rocks should be put in sufficiently deeply, as advised previously, and they should have a backward slope so as to help to get the rain down to the roots of the plants and not to take it away from them.

When placing the rocks in position, look at them carefully and see whether there are any particular markings. Look at the graining because this may well determine where the big stones are to be placed. It is always a good thing to keep the same types of stone together. A big group of rocks is often better than little groups of small ones. Choose for the top of the rock garden the more rounded stones only, for these give the right appearance of gradual weathering. As the stones go into position, place suitable soil behind and roundabout them and ram this in tightly. The "pockets" or planting areas should appear quite naturally and sometimes these will be quite large.

A Day in the Life of a Curator

by L. R. BRIGHTWELL

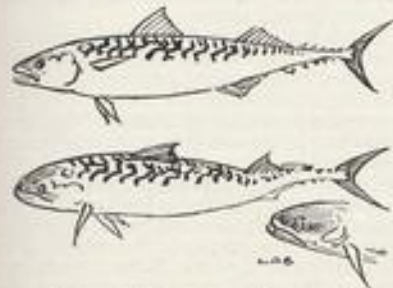
A LITTLE while ago I quite inadvertently overheard this scrap of conversation in the darkness of the London Zoo Aquarium: "Well, you see dear, Harold's tried art criticism but there doesn't seem to be any real opening, and who can understand it anyway? I thought perhaps you, being an F.Z.S. . . ."

"As a matter of fact I've only been one a week, so of course I haven't a frightful lot of influence as yet. I suppose you wouldn't like him to look after elephants or monkeys? Something like this perhaps . . . as its curator of course . . . not a common keepah . . ." Then the ladies drifted out of ear-shot and Harold's future as a celebrity in the aquarium world remained undetermined. But one from the general conception of curating a big public Aquarium is much as pictured by those ladies; a nice clean, gentlemanly task, one of the few really restful jobs in a working world. It has been my privilege to know with some intimacy a number of aquarium curators, and so can safely present the following as a fair picture of the real thing—not what it is imagined to be like.

Early Starters

The Aquarium staff, anything from five to fifteen men with the engineers, arrives at 8 or even 7 a.m. No. 1, the head keeper, makes a detailed survey of anything up to a hundred tanks, with capacities of from thirty to four or even seven thousand gallons. Dead animals are removed and if likely to be of museum or laboratory value suitably handled. Various museum and other people must be notified. Ailing beasts are removed to isolation and reserve tanks; every tank floor is siphoned and the observation windows cleaned, inside and out. Then comes the checking of temperatures, testing for salinity, and especially, pH, with a colour comparator. And No. 1, by the way, has not walked into his job with a string of academic letters after his name. He started years ago, right at the bottom, as a floor sweeper and washer of sand—a fine job for developing the biceps.

Nine a.m. sees the arrival of the great man himself. He has almost certainly made some business calls on the way, and having digested No. 1's detailed report, embarks on a survey of the whole place from show tanks to reservoirs and sand filters. "Take nothing for granted" is the motto of every successful Aquarium as well as the Royal Society's. A



The strange "club-head" appearance of mackerel seen after some months of aquarium life however natural the water



An Aquarium Curator's nightmare—a tank burst

curator's holiday, just a few weeks each year, is more often than not of the busman's variety; responsibility is ever at his elbow, and gets into bed with him at night.

"Not much worse than my job so far, allowing for the bigger scale," says the private fish-house owner. But the difference becomes manifest when the curator, on his way back to the office to deal with a mountain of correspondence, pauses for a few moment's purely aesthetic enjoyment before some favourite exhibit. Immediately the phone rings and keeps on ringing between opening envelopes and dictating letters. The phone calls vary from intelligent business enquiries to cooing, seductive voices asking him if he knows of a fish with five—or else thirteen letters—in its name, and the first letter is Z and the last G, or perhaps W, but the print's so bad the enquirer can't be certain which!

In the middle of considering a particularly knotty letter there enters by one door a clerk desiring his immediate attendance upon some wealthy patron no Aquarium can afford to snub, whilst from another door comes No. 1, who silently lays upon his chief's desk what appears to be a fossil sausage very heavily encrusted with iron filings. He mentions that there are plenty more such exhibits available.

Pipes and Pressures

This object on the desk represents what was a year ago a section of the aquarium's mile or more of feed pipes; it has now given up the fight. Ironically enough the big scale marine aquarists' life is one long fight against the very fluid which is the life blood of his always difficult to keep, and often costly, exhibits. Only when tank and service fittings can be made of solid gold is this struggle likely to end. The perfect, sea-water-proof insulating medium is yet to come. Sea water too has a way of "pitting" the steam cocks in the engine room, with the result that salt water is sucked into the boiler, so jeopardising the temperatures of the tropical tanks, when of course anything may happen.

Few visitors, even if home aquarists, realise that the glass fronts of big exhibition tanks are held in place simply by the enormous pressure of the water behind them. The curator's nightmare is a tank burst. It was found in the London Zoo Aquarium's early days that the observation windows of the 4,500 gallon tanks were just six inches too tall. This, however, was not appreciated until one morning, luckily before opening time, a tank burst and some giant congers were swept into the stoke hole. Glass fragments

(Continued at the foot of next page)

Book Review

A "New Innes"

Exotic Aquarium Fishes, by Wm. T. Innes. Twelfth edition. 521 pages; numerous photographs, many in colour; line drawings. Innes Publishing Company, Twelfth Street at Cherry, Philadelphia 7, Pa., U.S.A. \$7.50. Obtainable from advertisers in *The Aquarist*, price about £3 10s.

NEW editions of the book about which it is most certainly true to stay that no serious tropical fish-keeper is ever without, have come to be accepted and anticipated events by aquarists. The twelfth "new Innes" does not disappoint and retains its premier position in English aquarium literature. The growing appendix of earlier editions has been removed and its contents dispersed to their proper positions in the book; new photographs and new fishes have been added; name changes have been incorporated.

This is the only book that can be offered in response to the query from the hopeful beginner who wants to buy a book "with all the information." *Exotic Aquarium Fishes* does not contain it "all" (no single volume ever will), but it goes further in this direction than others, and it is the unpretentious manner with which it does so, together with the beauty of its illustrations, that have made it so popular.

Fishes as Pets

The Right Way to Keep Pet Fish, by R. Dutta. 156 pages. Illustrations in line. Right Way Books, Glade House, Kingswood, Surrey. 6/- net.

THE author of this new book is an experienced aquarium trader and he brings to the task of presenting information for the beginner several new aspects. Thus, chapters with advice on choosing a dealer and dealer-customer relations are included, and the author has clearly intended that where possible his book shall answer the questions most frequently put by his customers.

It is a pity though, that a book that has much of value for beginners has been so loosely written. Its aquarium chemistry is very muddled (e.g., page 17); "smells" are accused of causing water troubles; "flukes is an irritant disease" (page 81); mis-spelt names and mis-used terms (e.g., "oxygenation") occur. Such faults mar an otherwise useful little book.

Water in the Garden

The Garden Pool, by Frances Perry. 128 pages. 26 photographs. W. H. & L. Collingridge Ltd., 2-10, Tavistock Street, London, W.C.2. 8/6 net.

A LITTLE brother to the author's well-known *Water Gardening*, this book will be read with pleasure by pondkeepers and those planning to make decorative garden pools. Greatest emphasis, and rightly so in a book by an authority in this sphere, is placed on plant life, both aquatic and sub-aquatic; the would-be water-gardener is helped to select, plant, maintain and propagate his stocks and told how to make a home for them. The book is attractively laid out and its illustrations are specially fine.

Pond Life

Pond Life, by R. L. E. Ford. Young Naturalist Series. 96 pages. 22 illustrations (six in colour). A. and C. Black Ltd., Soho Square, London, W.1. 6/6 net.

FOR the naturalist the natural pond is the most rewarding site for observation that can be chosen. Nowhere else does animal and plant life occur in such profusion and diversity of type, except at the seashore. Mr. Ford's

book sets out to show the young naturalist what he can hope to find in and at the pondside, and details for him the interesting habits of many of the animals. With such wealth of material a small introductory book such as this one, planned to cover all interests—trees, plants, water mammals, fishes, aquatic insects and other invertebrates, as well as microscopic water life—cannot give other than a superficial treatment of the subjects, but the choice has been well made and will stimulate further reading. Directions for making a garden pond are given in the final chapter. The photographs in the book are by Lionel E. Day and they greatly increase its value.

Reptiles of North America

Zwischen Atlantik und Pazifik, by Robert Mertens. German text. 160 pages. 60 photographs. Alfred Kern Verlag, Stuttgart, Germany. DM 9.50.

HERPETOLOGISTS able to read German will find plenty to delight and interest them in this new book by Professor Dr. Robert Mertens, director of the Senckenberg Museum and professor in Frankfurt University. It is largely an account of his own observations of reptiles and amphibia that he made at museums, zoos and scientific institutions in N. America during his visit there in 1949. The photographs, some very fine studies of American reptiles among them, include pictures taken at the Florida Oceanarium and the San Diego Zoo reptileries.

New Aquarist Booklet

Exotic Egg-laying Fishes, by Jack Hems. An Aquarist booklet. Photographs and colour drawings. *The Aquarist*, Brentford, Middlesex. 2/8 post free.

THIS latest booklet in our series is designed to provide an introduction to the most usually kept egg-laying tropical fishes and to give the beginner guidance in breeding them. The fishes are grouped in natural families with handy reference lists of popular and scientific names and countries of origin; useful advice on special breeding aids for particular species is given as well as directions for feeding and general care. One section deals briefly with treatments for some common ailments of tropical fishes.

A Day in the Life of a Curator

(Continued from previous page)

were hurled twenty yards distant, one transfixing a turbot—the only casualty. It may be mentioned that aquarium fishes, however well nourished, eat with a certain "wooliness," and that even in well aerated and plankton-rich water aquaria mackerel and herring develop "clubbed heads" and queer kinks in their spines.

Spring brings the curator the richest harvest of 'phone calls—the pond owners, not yet roped into and educated by aquatic societies, being chiefly responsible: "There are a lot of dead frogs floating on my pond. Ought I to take them out or will the goldfish eat them?" No, that it is not a journalistic invention, and it is mild beside some of the enquiries received.

Finance is a peculiarly delicate, even distressing subject nowadays, so I do not propose to wind up this article with even a hint at the salary of a big scale aquarium curator. But it is safe to say this: an Aquarium reflects its curator as mercilessly as a dog its master. If the Aquarium is a good one, the man at the wheel more than deserves whatever it is the inland revenue leaves for his private uses and lawful enjoyment.

EASY TO MAKE—

Fish-house Heater

AN inexpensive convector-type heater, useful to the aquarist with a fish house or conservatory, etc., can be made for a few shillings.

Materials required are:—Empty 5-gallon drum (approx. diameter 14 ins.); boiling ring, 700-watt; two pieces of 1 in. mild steel strip, each 22 ins. long; six nuts and bolts, 3/16 in. Whit.; twelve washers, 3/16 in.; sufficient 3-core cable to connect to mains.

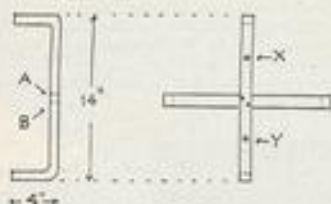


Fig. 1

First cut off the top of the drum, clean and dry it. Perforate bottom (which will now become the top) and sides with fair sized holes. Take the steel strips, bend at right angles 4 ins. from each end, and drill two holes (A and B) in each piece (Fig. 1), and bolt together in the form of a cross. Then drill two more holes (X and Y) the same distance apart as the holes in the boiling ring (Fig. 2). Using six washers each side, fix the boiling ring in position as in sketch.

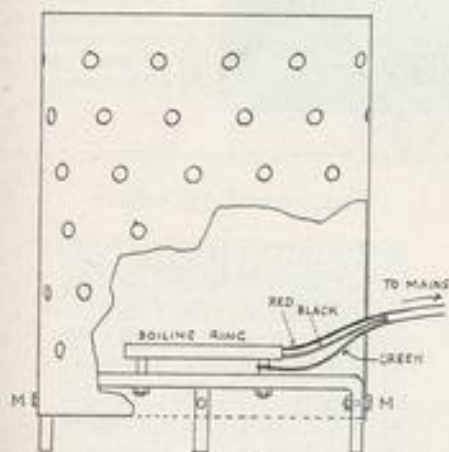


Fig. 2

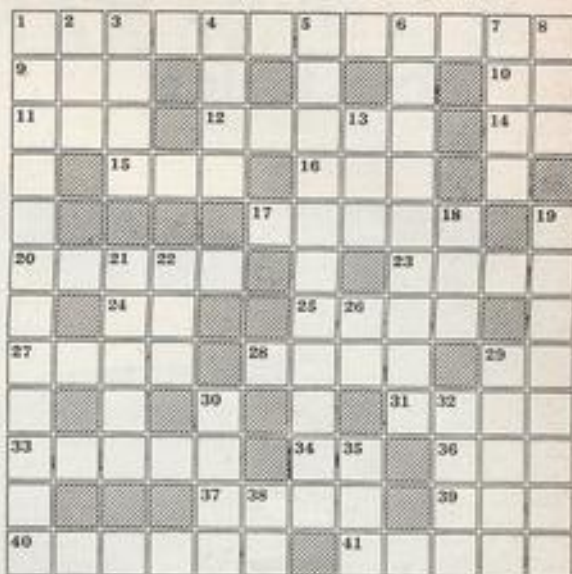
Drill four more holes in legs (M), and four to match at open end of drum. Fix the three-core cable to the heater, the red and black as mains, and the green wire to the fixing bolt holding down the boiling ring. Lower the drum into position, bringing the cable through one of the ventilating holes, bolt into position, and the heater is complete, as sketch.

The whole costs about six shillings, and is really efficient.

A. L. Myatt

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

- 1 Pertaining to propagation (12)
- 9 — wife, U.S.A. Shad. (3)
- 10 This is that is (1, 1)
- 11 Idea cut for 4 (5)
- 12 This shrimp is a freshwater type (5)
- 14 Half 23 returns to Capone (2)
- 15 Half a mollie is untrue (3)
- 16 British river. Blue water? (3)
- 17 Broken plate (5)
- 20 Source of roe (5)
- 23 *Ambona* — (4)
- 24 Penniless cod promoted (1, 1)
- 25 Buy from the lily tub with a song (4)
- 27 Adult tadpole (4)
- 28 South African (4)
- 29 Leader of shrimps (1, 1)
- 31 Cicatrice (4)
- 33 Not fish-egg shaped (5)
- 34 A hundred from the can (2)
- 36 Wine from alevin (3)
- 37 These fish are scarce (4)
- 39 Form of quay (3)
- 40 Large game fish of warmer Atlantic waters (6)
- 41 Clump of hair-grass? (5)

CLUES DOWN

- 1 *Saboo irideus* (7, 5)
- 2 Antiquity (3)
- 3 Skin of Jap eel (4)
- 4 Ide (4)
- 5 One celled, as *Amoeba* (11)
- 6 Grayling (9)
- 7 Small glass vessel (4)
- 8 Fish from the Sargasso (3)
- 13 Water this is really a mole (3)
- 18 Earth-embracing abbreviation (3)
- 19 These fish killed a British King (8)
- 21 Vehicle in A.A. (5)
- 22 Perch (3)
- 26 The Italian (2)
- 29 Usually brightest and smallest fishes (5)
- 30 One end of Centigrade—and of your fish (4)
- 32 You can't have it and eat it (4)
- 35 Comes back with ten—on paper! (3)
- 38 Mid-tank (2)

PICK YOUR ANSWER

(1 mark each. No cheating, if you please)

1. The pericardial cavity of a fish houses: (a) The heart. (b) The brain. (c) The stomach. (d) The liver.
2. The popular name of *Anolis* is: (a) Bladderwort. (b) Crystalwort. (c) Fairy Moss. (d) Frog-bit.
3. The disease known as costiasis is caused by: (a) A protozoan parasite. (b) A fungoid growth. (c) A bacterium. (d) A free-swimming crustacean.
4. The *Victoria Regia* was first flowered in England at: (a) Chatsworth (b) Blenheim. (c) Kew. (d) Wisley.
5. *Corynopoma rissii* is native to: (a) Ecuador and Colombia. (b) Peru and Chile. (c) Uruguay and Paraguay. (d) Venezuela and Trinidad.
6. The scientific name of the Cuban live-bearer is: (a) *Limia heterandria* (b) *Gambusia punctata*. (c) *Quintana atriscua*. (d) *Alfaro cultratus*.

G. F. H.

(Solutions overpage)

News from Aquarium Societies

Aquarist's Calendar

9th June: **Federation of British Aquatic Societies** Assembly, 2.30 p.m. at Friends House, Euston Road, London

14th-16th June: **National Aquarists' Society** Annual Meeting at the Royal Horticultural Hall, Vincent Square, Westminster

29th-30th June: **Wembley and District Aquarium Association** First Annual Open Show at St. John's Hall, Avenue, Wembley, Middlesex.

6th-8th July: **Kodak Aquarist Section's** Second Annual Show at Kodak Hall, Wealdstone, Middlesex.

7th-14th July: **Leicester Aquarist Society** Exhibition Y.M.C.A. Hall, Granby Street (near London Road Station), Leicester

28th July: **Federation of British Aquatic Societies** Assembly, 2.30 p.m. at Friends House, Euston Road, London

28th July: **Romford Aquarist Society** Open Show at La Hall, Western Road, Romford, Essex.



Photo: Valerie Lilley

Mayor and Mayoress of Kingston admired the exhibition of aquaria staged by the Kingston and District Aquarists' Society at a public Hobbies Exhibition at Kingston in April



Club Secretaries

are invited to advance notices, exhibitions, and other features for announcements on this page. Help help you—letter inclusion in an particular issue received by the the preceding. New societies minded that no is made for announcements

New Societies

INAUGURAL meeting of the **Dublin Society of Aquarists** was attended by thirty-six aquarists. Meetings are to be held at 8 p.m. on the third Friday of each month. Full details may be obtained from the Secretary, Mrs. W. H. Godden, 6, Conyngham Road, Parkgate, Dublin.

NEW society in Buckinghamshire is the **High Wycombe and District Aquarist Club** formed in April. Secretary is Mrs. D. Brown, 150, Desborough Road, High Wycombe, Bucks, who will welcome enquiries from other aquarists in the locality.

MEETING place of the newly formed **Lambeth Aquarists' Society** is to be the Kings Head Hotel, Norwood High Street, S.E.27 where members will assemble every other Wednesday commencing 9th May.

SECRETARY of the **Leigh and District Aquarists' Society** is Mr. K. Ratcliffe, 28, Cook Street, Leigh, Lancs, who will be pleased to hear from aquarists in the district.

Entries Invited

Wembley and District Aquarium and Pool Association's First Annual Open Show: 21 classes for tropical and coldwater fishes. Schedules available from Show Secretary, Mr. W. Peplar, 10, Turton Road, Wembley, Middlesex. Date: 28th-30th June.

Hendon and District Aquatic Society Open Festival Show. Schedules from D. Cannon, 7, Courtleigh, Bridge Lane, Golders Green, N.W.11. Date: 6th August.

Romford Aquarist Society Open Show: 21 classes in over 250 aquaria. Schedules and entry forms from Mr. H. Mace, 78, Belgrave Avenue, Gidea Park, Romford, Essex. Date: 28th July.

Crossword Solution

R	E	P	R	O	D	U	C	T	I	V	E
A	L	E	R	N	H	I	E				
I	D	E	F	A	I	R	I	A	L		
N	L	I	E	C	A	M	L				
B				P	E	T	A	L	L		
O	V	A	R	Y	L	L	A	L	A		
W	C	O	L	L	I	L	T	M			
T	O	A	Z	L	U	M	P				
R	R	Z	L	S	C	A	R				
O	V	A	T	E	A	N	A	L	E		
U				R	A	R	E	K	E		
T	A	R	P	O	N	T	R	E	S	S	

PICK YOUR ANSWER (Solution)

1 (a), 2 (c), 3 (a), 4 (a), 5 (d), 6 (c).
6 marks—Congratulations; 5 marks—Excellent; 4 marks—
3 marks—Good; 2 marks—Fair; 1 mark—Poor; 0 marks—

WHERE TO DRAW THE LINE?

TO US THERE IS NO DOUBT ABOUT IT—

Quality must come first; if we sacrificed this for quantity, production would go up and our reputation would go down. This is a course we would never pursue.

In 30, 40, 50 years we still want to be makers of the finest aquaria equipment obtainable.

ELEPHANT (REGD.) THERMOSTATS

STANDARD (External Control) as illustrated **25/6**



KEYSET (Prov. Pat. 1595/50) **25/6**
External Control by means of removable key

HEATERS

Refractory wound, coiled coil, wattages 25-150 **16/3** (Including Purchase Tax)

ILLUSTRATED LEAFLET ON REQUEST

Evans Electronic Developments Ltd.

EVONIC WORKS, BIRCHFIELD ROAD, BIRMINGHAM, 19

Tel.: NORthern 0792

YOUR FISH EAT BUT LITTLE —make sure they have the best!

● SPRATT'S AQUARIUM FISH FOOD

A properly balanced food for general use, suitable for Goldfish of all varieties up to four inches. In 3d. and 1/- packets, 3½-lb. bags 5/-, 7-lb. bags 9/10. For larger fishes, feed Spratt's Pond Fish Food.

● SPRATT'S TROPICAL FISH FOOD

In two grades, fine and coarse, contains Dried Liver-Meal, Yeast, Dried Shrimp, etc. In 1/- Drums.

● SPRATT'S AQUARIUM COMPOST

Consists of a selection of multi-coloured grits, thoroughly washed and ready for layering the aquarium. In 1/3 bags and 11-lb. bags 3/6.

● SPRATT'S "RECTO"

A scientifically prepared mineral, most beneficial to the fish, cures fungus, etc. In 1/4 packets

SPRATT'S FISH FOODS AND AIDS

SPRATT'S PATENT LTD., 41-47 BOW ROAD, LONDON, E.3



Write for SPRATT'S 36-page book, "MODERN FISHKEEPING." Covers every aspect of fishkeeping, and includes special chapters on pond construction and layout of typical garden pond. Price 6d. from Spratt's stockists, or if any difficulty, 8d. post paid from the address below. Price Lists of Foods, Plants and Accessories free from Dept. A.

SPRATT'S Regd. Trade Mark
"Builds-up"
fish for you!

WALTER R. SMITH

For Complete Tropical and Coldwater Aquaria
39 TIB STREET, MANCHESTER, 4

Telephone: Deansgate 2961

We specialise in Angle Iron aquariums and frames, also stands. Nine standard sizes always in stock, despatched in crates chargeable at 30/- (returnable) half carriage paid, any odd size made to order and painted any colour, guaranteed square and free from welds, satisfaction or money refunded.

FIFTY VARIETIES OF TROPICAL AND COLDWATER FISH USUALLY
IN STOCK. FORTY-FIVE LARGE TANKS OF FISH ON VIEW

Distributor of Brosiam Products, Angel Equipment, Es Es Equipment, Prockter Aerators, Water Life and Aquarist booklets, Tropico Fish Food, Limpet and Compass thermometers, Reliable thermostats, Hy-Flo Products, Aquatic Developments, Ditchfields Fish Booklets, The Scottish Fisheries, Black Magic Leak Proof Aquarium Cement, Aquafern Products, Little Wizard and Kingfisher heaters, Ozonia Pumps, Aquatrop Glazing Compound, Hykro Products, and all leading makes of Aquatic Equipment.

PRICE LISTS FREE ON APPLICATION

AQUARIUM MANCHESTER Offers—

PLANTS FOR POND AND AQUARIUM. VALLISNERIA SP. 10/- 100 OR 2/- DOZEN; MYRIO., TORTA, LUDWIGIA 6d. EACH; HYGROPHYLLA, AMBULIA 8d. EACH; WATER SPRITE 2/- EACH; AMAZON SWORDS 5/- EACH; CRYPTOCORYNE 2/6 AND 3/6 EACH; FLOATING WATER SOLDIER 2/- EACH; WATER FERN 1/- EACH; SALVINIA 1/- PORTION; HORNWORT, VIOLET, CROWFOOT, MINT 4d. EACH; WILLOW MOSS 9d. BUNCH; CREAM, PINK, WHITE LILIES 6/- EACH. POST 1/-. MINIMUM ORDERS 5/-.

WE WOULD APPRECIATE ALTERNATIVE CHOICE TO AVOID DELAY

S.A.E. FOR NEW LIST, 12 PAGES OF HINTS AND ALL ACCESSORIES FOR THE HOBBY

LETTY KREMNER, Aquarium

66 CHEETHAM HILL ROAD, MANCHESTER, 4

5 MINS. FROM VIC. STATION

Telephone: BLAckfriars 2163

THE PRESTON AQUARIUM Offer the following TROPICAL FISH

NEONS (Large), NAN. MARGINATUS, NAN. ANOMALUS, RASBORA MACULATA, SERPAE, GLOWLIGHTS, CUBENSIS, APISTOGRAMA RAMIRIZI, EGYPTIAN MOUTH-BREEDERS, PIGMY SUNFISH, BADIS BADIS, ANGELS, ULREY, HARLEQUINS, BARBUS LINEATUS, CATFISH (four varieties)

- NEW VARIETIES OF FISH ARRIVING WEEKLY
- 120 TROPICAL TANKS FULLY STOCKED
- BLACK MOORS ARRIVING IN A FEW WEEKS
- BARINANA, CELLOPHANE, AND MADAGASCAR LACE PLANTS IN STOCK

ALSO ALL THE POPULAR VARIETIES. PLANTS, LILIES, SNAILS, AQUARIUMS, PUMPS, HEATERS, THERMOSTATS ETC.

RETAIL . WHOLESAL . EXPORT . IMPORT

The Finest Show on the South Coast. Include a Visit to Brighton in your Festival Programme

S.A.E. FOR LISTS **44 Beaconsfield Road, Brighton** BRIGHTON 29620

SOUTH

WESTERN

AQUARIA, STANDS, ACCESSORIES,
FOODS AND PLANTS



AQUARISTS

TROPICAL FISH, COLDWATER FISH
REPTILES AND BATRACHIANS

TROPICAL FISH

Despite the acute shortage of specimens, we are still able to offer
the following at competitive prices

NEONS 10/-	HARLEQUINS 12/6	NANN. MARGINATUS 10/-
YELLOW WAGS. 4/-	SWORDTAILS 2/6	CUBANICHTHYS 12/-
RED WAGS. 7/6	NAN. UNITAENIATUS 10/-	APHYOSEMION. trio 25/-
APPIST. PERTENSE 15/-	BARBUS LINEATUS 6/-	TETRAZONA 7/6

SUPPLIES OF COLDWATER FISH ALWAYS IN STOCK

REPTILES

The following are now available at very reasonable prices. Spiny-Tailed Mastigure (*Uromatryx Ornatus*); Crocodiles (*Crocodylus Porosus*); Chameleons; Tortoises; Terrapins; Reticulated Pythons; Blood Pythons.
All prices for above on application

TRADE SUPPLIED

2, GLENBURNIE RD., TRINITY RD., LONDON, S.W.17 Telephone: BALHAM 7334

TOM NORTH

AQUARIST ——— ORNITHOLOGIST

Grand selection of breeding pairs of Goldfish at 20/-, 30/-, 40/-, 50/-, 60/- pair
Breeding pairs of good coloured, quality Shubunkins at 30/-, 40/-, 60/-, 80/- per pair

Yearling Goldfish, Shubunkins, Carp, Orfe, Tench, Bitterling, Bass, etc.

Nice range of tropical fishes. (Tropicals are for personal shoppers only)

AQUARIUMS — FISH FOODS — APPLIANCES

Breeder of high class pedigree Budgerigars. Call and see them or send S.A.E. for Lists
217 ILFORD LANE, ILFORD, ESSEX

"RELIABLE" THERMOSTATS

BUY THE BEST

It's cheaper in the end

Ask for a

"RELIABLE" THERMOSTAT

and enjoy

RELIABLE

SERVICE

Price 29/6

Robust Bi-metal strip, finest large contact points, positive screw action, the whole mounted on strong plastic base.

(Wholesale only)



"That is the best and SAFEST Thermostat we have seen so far" were the words of a Factory Inspector (one of two who visit our Works from time to time) after examining a batch we were making.

"A PRODUCT OF LIGGINS"

167 WICKERSLEY ROAD, ROTHERHAM

ARTHUR DERHAM—55 Years in the Fancy 23 QUEEN'S AVENUE, WATFORD Telephone: WATFORD 2708

IN ANY FANCY THERE IS ALWAYS SOMETHING
OUTSTANDING. IN OUR CASE IT IS MY

"ELITE" FISH FOOD

FIRST CHOICE OF BOTH FANCIER AND FISH
and both are well advised. Here is something unique,
the result of 55 years of experiment and practical
trial. Something that can't be reproduced by any
other, even if they knew what was in it. The sole
wholesale distributor of this remarkable food is

BARRY M. AUSTIN
230, Staines Road, Twickenham

Small tin, retail from here 1/6, post paid. Large tin
(Breeders pack) containing four times the amount 4/6
post paid. A real save. Try it!

S.A.E. ALWAYS FOR ENQUIRIES, PLEASE.

I AM OFFERING THIS MONTH, THE FOLLOWING
PLANTS ONLY. IN PERFECT SHOW CONDITION.
A GOOD STOCK, BUT SUBJECT UNSOLD, SO
GREAT IS THE DEMAND.

Myriophyllum Floridan 5/6 doz. Genuine Rich Red
Georgian Myriophyllum 16/- doz. Under-water
phase—very attractive—of Proserpinacoides 5/- doz.
Floating Fern 3/6 doz. Ambulia, s. 8/- doz., Hygrophila
8/- doz., Elodea Grandiflora 2/6 doz.
From May on should have the usual 20 varieties.

If you are thinking of building a pond, save yourself
future trouble by sending for my "Garden Pools, their
construction, stocking, and maintenance," 2/- post
paid from here.

If your son is worrying you to go into the fancy for
a livelihood, buy "Derham's Luck." Let him read it, and
break his heart!! This will cost you 2/6 post paid from
here, a cheap heartbreak!

BUSINESS BY POST ONLY

THE LIVERPOOL AQUARIA CO.

(Proprietor: W. BAILEY) (Member of A.T.A.)
BUSINESS HOURS: Telephone: ROYAL 7426
Mon., Wed., Fri. and Sat. 9 a.m. to 5.30 p.m.
Tues. and Thurs. 9 a.m. to 1 p.m.

— RETAIL ONLY —

INVITES YOUR ENQUIRIES FOR TROPICAL
AND COLDWATER FISH, PLANTS, SNAKES
AND LIZARDS, AND ALL
AQUARIA ACCESSORIES

WATER LILIES. Hardy varieties of these
beautiful plants are now available to suit your
pool (and pocket) in the following colours:

RED, WHITE, PINK and YELLOW

Send for list.

Have you tried

BREMOND BIOLOGICAL FISH FOODS?

A leaflet giving details of these remarkable
products available upon request.

REPTILES. Grass snakes, Dark Green snakes,
Green and Wall Lizards, and Pond Turtles
are now in stock.

At your service at
1 Dawson St., Whitechapel, Liverpool, 1



Padbourn Aquariums (PADBOURN LIMITED)

Telephone No.: AMBASSADOR 7130

Hours: 9 a.m.—6 p.m. Mon. to Sat. S.A.E.

We specialise in healthy tropical fish and
plants, tanks, frames, stands and all the
necessary equipment and accessories for
the aquarist. We have a small selection of
fancy goldfish and plants.

Live foods always in stock

**8 CHAPEL ST., MARYLEBONE,
LONDON, N.W.1**





The well-known Continental Fishfood which everyone is talking about. Why? Because even Fishes have their likes and dislikes! If you give them SLUIS you will soon discover what they like best of all. If your local dealer does not yet stock this popular Fishfood, send 1/9 for a sprinkler-top tub to-day.

WHOLESALE AND RETAIL ENQUIRIES INVITED.

COOMBS & CREWES

The Woodlands, Walderslade Road, Chatham.

Phone: BLUEBELL HILL 268

Sole Importers & Trade Distributors for the U.K.



DENSON

AVIARIES and AQUARISTS

557 BATTERSEA PARK ROAD,
BATTERSEA, LONDON, S.W.11

Buses 19, 29, 44, 45, 49 and
170 stop outside our door.

Telephone
BAT 4616

Hours of Business:
Monday to Saturday, 9 a.m.—6 p.m. Early closing Wednesday, 1 p.m.



We extend a hearty welcome to all our customers who are visiting the Festival Gardens at Battersea Park.



ARBOLITE Q.S.

Aquarium Glazing
Compound

Available in the following shades: Grey, Cream, Red, Green and Blue. Packed in 1¼-lb., 2½-lb., 4-lb., 7-lb. and 14-lb. tins; also in ¼-cwt., ½-cwt. and 1-cwt. kegs.

**ADSHEAD RATCLIFFE
& CO LTD**

ADSHEAD RATCLIFFE & CO LTD BELPER DERBY

Tel. BEL 351-2

TO THE TRADE Mr. E. A. Bowler and Mr. J. van der Kolk
have pleasure in announcing their commencing

"SOUTH COAST AQUATIC NURSERIES"

12 HARBOUR VIEW ROAD, PARKSTONE, DORSET

Telephone: PARKSTONE 3429 (Night) 3521

**FOR TRADE SUPPLIES OF TROPICAL
AND COLDWATER FISH AND PLANTS**

WE INTEND TO SUPPLY FIRST CLASS FISH AND PLANTS BRED AND GROWN
IN THE NURSERIES BY ARRANGEMENT WITH THE LARGEST BREEDERS ON THE
CONTINENT. LARGE NUMBERS OF RARER FISH ARE BEING IMPORTED. THESE
ARE GIVEN EVERY ATTENTION, FOOD AND REST FOR AT LEAST 7 DAYS BEFORE
BEING SOLD, THUS ENSURING THEY ARRIVE AT YOUR PREMISES IN GOOD
CONDITION. OUR PRICES WILL COMPARE FAVOURABLY WITH DIRECT IMPORTS
WITHOUT THE RISKS

PLANTS ON OFFER—APONOGETON, ULVACEOUS AND UNDULATUM

PLEASE APPLY FOR REGULAR LISTS

**HILLWARDS
OF BIRMINGHAM**

IMPORTERS, BREEDERS & GROWERS

WANTED

SURPLUS FISH AND PLANTS

—
FORTY VARIETIES OF TROPICAL
FISH IN STOCK. AGENTS FOR ALL
MAKES OF EQUIPMENT, AND
TANKS, STANDS ETC.

WHOLESALE, RETAIL.

Overseas Suppliers Please Note

—
**343 COVENTRY ROAD,
SMALL HEATH, 10**

**DON'T LET THE
POOR FISH SUFFER**

A VERY slight change in the pH value
of the water in your aquarium makes
a great deal of difference to the comfort
and well-being of its inhabitants. The
pH measurement is easily checked to
within 0.3 pH by the JOHNSON COM-
PARATOR TEST PAPERS. Books of
twenty leaves 2½ in. by ¾ in. are sold in
boxes of one dozen. The most useful
COMPARATOR books for the aquarist are

No. 5267 for pH 5.2 to 6.7
(faintly acid to neutral)
No. 6883 for pH 6.8 to 8.3
(neutral to faintly alkaline)

Enquiries and orders can be sent to
PHILIP CASTANG, 91, Haverstock Hill,
Hampstead, London, N.W.3

PHONE: PRI 1842

MANUFACTURED BY

JOHNSONS OF HENDON LTD.

Established 1743