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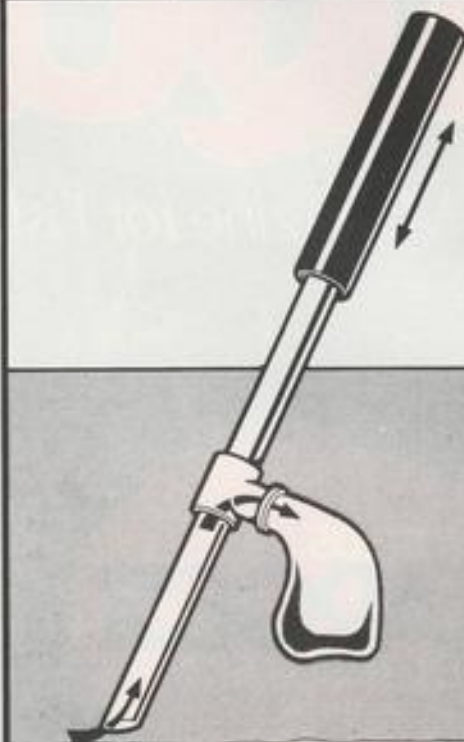
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### COVER STORY *Photo: Laurence E. Perkins*

The Red Cap Oranda is one of the many (over 100) varieties of Common Goldfish, *Carassius auratus auratus* (Linnaeus). The full scientific name is given here to distinguish the Goldfish from its very close relative, the Gibel or Prussian Carp, *C. auratus gibelio* (Bloch), not to be confused with the Crucian Carp, *C. carassius* (Linnaeus).

The Red Cap Oranda is, itself, a colour variety of the "normal" Metallic Oranda which, in many respects, is similar to a Metallic Veiltail. Metallic in this sense refers to the reflective nature of the scales. Usually, the overall colour is reddish-orange, yellow or olive (wild-type). When there is no pigment, the skin will appear silver—as in the Red Cap Oranda.

The Oranda part of the name refers to the "hood" that these fish develop on their head as they mature. This hood is usually regarded as being raspberry-like in appearance. Ideally, it should cover most of the side and top of the head in good Oranda Show specimens.

In the Red Cap Oranda, though, the hood is restricted to the top of the head, as can be seen in our cover photograph. The specimen shown is not yet fully grown. As it matures, both the hood and the caudal fin should develop further.

## CONTENTS

### 22 World's Largest Goldfish Farm

Dr. R. J. Goldstein writes about this huge American fish farming enterprise

### 26 A Pond—Why not?

Frank Orme outlines methods of creating a garden pool

### 28 Basis of Fish Health

Whitespot or the "ich" is described along with some of the complications of controlling it

### 30 Spotlight—The Fantail

Jack Hems describes one of the most popular of goldfish varieties

### 32 Elements of Koi Keeping

Hilda Allen describes the fascination of Koi and gives some fundamental advice to newcomers to koi-keeping

### 34 Meet the Societies

Our coldwater specialist society is the Association of Midland Goldfish Keepers, who share the spotlight with one of Scotland's most active "Show" societies, Muirhouse A.S.

### 38 Press Release

News and information about various items of Equipment and Dry Goods

### 39 The Peculiar Bitterling

Do different species of this intriguing fish employ differing spawning techniques?

### 42 Company Profile

We present a profile of Phillips Yeast Products Ltd., following their "rebirth" from the disastrous fire of June 1982

### 44 Pondside Plants from Seed

In which Roy Pinks advises on how to propagate your own plants for colour around the pond

### 46 Your Questions Answered

Queries received from readers are answered by our experts

### 49 A-Z of the Aquarium

The "first round" of this popular series ends with items on Yawing, Yolk, Zebras and Zooplankton. Watch out for the start of the "second round" next month

### 52 Tomorrow's Aquarist

Here, at last, are the results of our first T.A. competition, Design-a-Fish, sponsored by Tetra

### 54 What is Your Opinion?

Opinions expressed by readers on all aspects of the hobby, with comments by the author

### 57 News from Societies

Past and future events throughout the United Kingdom

Due to lack of space it has been necessary to omit some regular features from this special cold-water issue. We apologise if your favourite item does not appear but don't worry, they will all be back next month!

## AQUARIST



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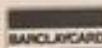
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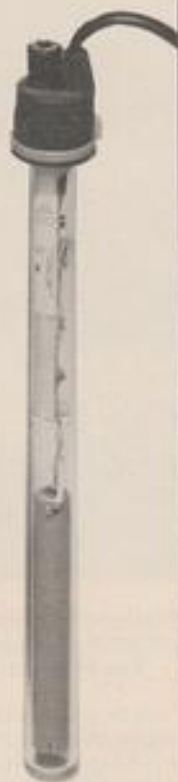
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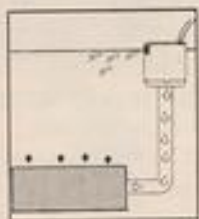
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Illustr. 1



Illustr. 2



Illustr. 3



Illustr. 4



Illustr. 5



Illustr. 6

### Diagnosis of Columnaris Infection Bacterial Skin Disease White Blotch Disease Dropy and Bloat



#### Columnaris Infection—Symptoms:

Cottonlike fluff in the area of the mouth, white-gray pimples on head and fins, restless swimming on bottom of the tank (especially with livebearer species, Illustr. 1 and 2). The symptoms, however, are changeable as the disease is triggered by different bacteria. The disease occurs as local infection of the skin, fins and gills, but also as infection of the inner organs.

#### Bacterial Skin Disease

Caused by *Aeromonas*, *Pseudomonas*.

Symptoms: Bloodshot, chafed areas of the skin, edges of fins and anus inflamed (Illustr. 3).

#### White blotch Disease

Symptoms: With freshwater-fish: Destruction of the skin beginning at fin edges. With marine-fish: White to grey-white blotches on the skin. The mucous membrane breaks open and the skin has a cloudy appearance. (Illustr. 4).

#### Dropy & Bloat

The cause of this disease—complex is to be found in indigestion, also inflammation of stomach and bowels.

Symptoms: Watery areas on the skin up to purulent decay of tissue, bloated belly, protruding eyes and scales abnormally prominent.

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# THE WORLD'S LARGEST GOLDFISH FARM



by  
*Robert J. Goldstein*

THE COMMERCIAL production of aquarium fishes is a matter of business sense as much as science. *Ozark Fisheries*, in the heart of Missouri's Ozark Plateau, is a good example of a successful operation. Expanding from this one Missouri operation to a current total of six fish farms in as many states, *Ozark Fisheries* has become the world's largest producer of goldfish, selling throughout the United States, Canada, Mexico, and much of western Europe. How it began and how it operates seems disarmingly simple now, but that apparent simplicity is the result of judgment, risk, hard work and a continuing firm adherence to aquacultural science. For just as chemistry found its roots in early alchemy, so is

Panorama of a portion of the Sellers Creek unit, one of three sites on 8,000 acres near Stoutland, Missouri. The mixed hardwood forest has been cleared from surrounding slopes and put into grasses, in order to retard runoff and conserve water. A processing unit is visible in the background.

modern aquaculture developing from classical fish farming with an unswerving eye on both livestock and literature, testing one against the other.

It was in the early 1920s when two entrepreneurs, oilman Lawrence Bailliere ("Bally") and dentist C. A. Furrow learned of the novel idea of building a private hatchery for the production of rainbow trout. Trout were being heavily exploited in Missouri, and the state was offering to lease the rich waters of bountiful Bennett Springs to anyone willing to risk capital, and guaranteeing to buy the trout for

stocking in state waters. Bally and Furrow quickly applied everything they knew and could find out about growing rainbow trout, and were remarkably successful. No sooner did they get the hatchery producing, however, than, in true entrepreneurial fashion, they sold it to the state and started up a second hatchery on their own, recently purchased land that was also rich in natural spring water. Today, that first venture at Bennett Springs remains one of the most important trout producing operations in the midwest.

It was shortly after beginning their second hatchery that Dr. Furrow, while traveling in the east, first saw and became familiar with the new craze in fancy Japanese goldfish. Ever curious about these graceful Japanese bowl fish for the consumer market, he quickly learned that the fish were in short supply and could easily be far more profitable than rainbow trout. When he returned to Missouri, he told Bally of his findings, and the two of them decided to switch operations as soon as they could find an expert breeder. Not long thereafter, they found a graduate of the Imperial Japanese College of Fisheries working elsewhere in the United States, and in short order he was an employee of *Ozark Fisheries*. That initial commitment to the best is a theme that runs through the history and operations of *Ozark Fisheries*. Today, the Stoutland, Missouri goldfish farm includes three separate series of ponds covering a total of 350 acres of water on an 8,000 acre property. Why so much land? Primarily, to protect the water. More about how they did that later.

The water of *Ozark Fisheries* is ideal for trout and ideal for goldfish. It's cold and hard with dissolved limestone that is the remains of ancient calcium-bearing animals that once roamed the inland sea now covered by Missouri. That flat sea was uplifted about a million years ago, during the Pleistocene Age, and as it arose water seeped to its lowest levels below ground, finally breaking free wherever erosion allowed it to escape. The rains cut great gaps in the soft limestone, exposing ancient granite outcrops and leaving behind sharp, hard chips of chert that today cover the beds of streams and the great





A typical breeding pond, shown here dried for the winter to kill off aquatic parasites, has its own intake pipe, its own discharge vent (operated by removing boards sequentially until the correct level is reached), and slopes covered with concrete to minimize siltation of the eggs

Ozark rivers. Subterranean seepages become unstable aquifers, breaking free on the sharply eroded hillsides as bountiful springs that pour forth massive volumes of 52° to 62°F hard, underground water, ideal for growing coldwater fish. The five springs on the Ozark Fisheries property produce a flow of 40 million gallons a day, and deep wells provide additional flow for the great acreage of ponds. Much of the land has been purchased for its springs, or to protect springs or wells. The 350 pond facility here is the prototype for additional fish farms in Indiana, Kansas, Alabama, Georgia and Florida. In addition to goldfish for the home aquarium market, the various farms also produce bait goldfish, fat-head minnows and golden shiners for the sportfishing market. Because production and handling of all three species of coldwater Cyprinid is similar, Ozark Fisheries has increased its profitability by diversifying before expanding, using the same facilities and distribution equipment to supply a market located geographically within its older market area and thus inexpensive to reach.

The production ponds are of varying sizes, averaging about an acre in size. Special deep ponds are used to overwinter brood stock, and separate

shallow ponds are used for breeding. Ponds are used on a rotating basis, in order that they be available for drying and cleaning annually. Each pond has an independent inflow and separate discharge to avoid contamination.

The typical breeding pond is a third to one acre in size, with concrete lined sloping walls to prevent siltation of the eggs. Breeding stock is moved into these ponds well in advance of the breeding season to allow for adaptation to the new environs. The brood stock will be encouraged to spawn as soon as the water warms into the low sixties, for the season will be protracted from



The truck unloads its fish into a holding trough until they can be brought indoors to the sorting room

April through July. Different strains of fancy goldfish require differing ratios of males to females for optimal fertilization, and for the comets, fantails, moors, calicoes, shubunkins and red cap ryukins produced at Ozark Fisheries, that ratio will vary from 1:1 to 3:1. Spanish moss is not much used as breeding material these days, as the furniture industry has driven up the price. Modern "nests" are constructed from nylon brush material wrapped onto metal frames. Planted in breeding ponds at a density of about 40 per acre, the nests are removed when covered with eggs and replaced by fresh nests. During the season, a pond might finally use and fill some 100 to 150 nests per acre. Egg-laden nests are removed to rearing ponds for hatching and growth of the fry. By moving nests instead of brood stock, spawning is uninterrupted and the fish are neither handled nor disturbed.

Rearing ponds should have a good population of zooplankton following hard upon a phytoplankton bloom. In traditional aquaculture, that is managed by careful timing and introduction of chemical fertilizers. At Ozark, however, chicken manure provides a rich, cheap and readily controlled supply of nutrients that will not leave a legacy of residual problems in the fish or the effluent. After the fry metamorphose, they are started on a prepared mash diet which, as on every other goldfish farm, is a closely guarded secret. Growth rates must be controlled to provide a year round supply of market-size fish. That is accomplished by a protracted spawning season, and a careful adjustment of rations and stocking density. With good management, perhaps a third of the ponds will produce harvests of 2,000 pounds of goldfish per acre.

The ideal market fish is 120 days old and one-and-a-half to two-and-a-half inches long. It will begin to be available (young of the year) around August, and prior to that time the hatchery will fill orders from stock produced at other farms or held over from the previous year. Larger sizes of fish are usually sold to the European pond fish market, a market not well developed in the United States.

As needed, each pond is seined and



From the indoor holding trough, a netful of fish is moved into a sorting room holding container

the fish brought indoors for culling and sorting. Consistent high quality is more the result of culling than selective breeding. Shape, colour, size and general health all play a role. Cullers lay a netful of fish on a wet table and rapidly flick them into save and discard buckets. Discards may account for a third to half the fish sorted in certain strains. Spread back over the land as fertilizer, the rejected fish play an important role in water management. The spreading of discards on farmland to grow grasses is a management measure that increases the water absorptive and holding capacity of the

thin-soiled land. The replacement of woodlands with grasslands all around the pond management areas was one of the first water conservation measures introduced by the far-sighted Bally and Furrow, and one reason they purchased so much of the surrounding land. That land is used to grow grains and cattle, providing additional income by diversification.

Goldfish are packed in heavy plastic bags with a minimum of water and overlaid with oxygen, medicated, heat-sealed, boxed and strapped with tape. No ammonia-removing clinoptilolite (Zeolite<sup>®</sup>) is used, as goldfish just don't require it. Useful for tropical fish, clinoptilolite will draw ammonia levels down from 80 to 10 parts per million

very quickly, but it is more important to keep antimicrobial agents in the water. Ozark Fisheries puts Clout<sup>®</sup> and Furanace<sup>®</sup> in each shipping bag. Normal shipping time is 12 hours delivery, but enough oxygen is provided to allow a 24 to 36 hour leeway in case of delays en route. Surprisingly, the shipping time to western Europe is often far less than to many areas of the United States not served by major airports.

There are problems in managing any biological product, and they range from predators to parasites and bacterial diseases. Snails are a problem in ponds, as their shells cut the fish during seine operations. Copper sulphate is used to control snails. Modern molluscicides are preferable, but the U.S. Fish & Wildlife Service controls their availability for pond use, and the clearance process is interminably long, involving the Food and Drug Administration and the Environmental Protection Agency. Only recently, in fact, has formalin been cleared for pond culture.

Major predators are fish eating herons, frogs and snakes. Most of these are controlled manually. In the spring, parasitic protozoa can be a problem, and some years it will be *Trichodina* or *Ichthyophthirius*. There



Extensive outdoor holding facilities have fast running water and aerators, and fish can be crowded into a small area

THE AQUARIST



may be an outbreak of *Gyrodactylus* monogenetic trematodes, or perhaps anchor worms, those very resistant parasitic copepods that bury into host fish and render them commercially worthless. Many of these can be controlled by chemicals, if only the chemicals would get clearance. For example, a combination of formalin and malachite green will treat most protozoa and worms, while copepods, worms and other undesirables will respond to insecticides like Baytex<sup>®</sup> or Dylox<sup>®</sup>. In the summer, furunculosis caused by *Aeromonas salmonicida* or other bacterial diseases may become a problem. For them, there is no reliable control. Investigators at the Eastern Fish Disease Laboratory at Leesport, West Virginia are working on a vaccine, but that's a long way off.

Throughout the goldfish industry, a problem is developing of drug resistant disease organisms. This is probably due to excessive prophylactic treatment with old chemicals, to which the creatures are responding with new strains. Some of the favourites which still work are Terramycin<sup>®</sup> and the nitrofurans. But evidence is accumulating that, for example, *Cornia* and certain monogenea are becoming more difficult to eradicate with formalin. Ideally, according to personnel at Ozark, a drug should not be used more than a few years, and then replaced with a substitute to prevent drug resistant strains from developing.

An organisation like Ozark Fisheries could not readily develop today. When this firm was begun in the 1920s, there was a good market and little competition. Today, Ozark's major competitors are a formidable group, including such powerhouses as Mt. Parnell in Pennsylvania, Blue Ridge in North Carolina, Hunting Creek in Maryland, Billy Bland in Arkansas and Marvin Carpenter in California. Land has become prohibitively expensive. Electric power to run water pumps, assuming high quality water was available, is also very much more expensive than in the past. At Ozark Fisheries, much of the high quality spring water is propelled by natural forces, keeping energy costs low; the hard limestone loaded water makes a poor breeding medium for bacteria,

lowering medication requirements and disease losses; the underground water source provides almost constant ideal temperature for goldfish and many kinds of bait minnows; and the labour force is drawn largely from the farming community of surrounding Lebanon, Stoutland, and Richland, Missouri. Here there is a tradition of working at the hatchery, and families are known, trusted and expected to perform the highly specialised work that puts a premium on experience, where everyone knows that one person's lack of care can ruin the harvest and affect the future jobs of many families. The individual intake and discharge pipe system at Ozark would be prohibitively expensive to construct today, but was a wise investment in disease control.

Fish are placed in large plastic bags with Clout and Furex, overlaid with oxygen, the bags heat-sealed and boxed, and taken to the airport

Most of all, perhaps, the key to Ozark Fisheries and its success is its reliance on using the best of everything and everyone to assure efficiency. While some businesses might look to cut corners, do without, build and operate on the margin of what works, Ozark's founders always looked to the future, whether in dealing with people, managing water supplies or planning for future growth. There has always been at least one (and often two or three) trained fishery biologists on the staff year round, people who were well trained to begin with and who constantly update their training and skills by participating in fish health studies with the Eastern Fish Disease Laboratory and other scientific groups. When Bally and Furrow first hired that graduate of the Imperial Japanese College of Fisheries to begin producing high quality goldfish, they began a tradition that has carried through to this day, a tradition of using the best people to provide the best products.



# A POND WHY NOT?

by Frank W. Orme.

It is probably true to say that most gardens are suitable for the inclusion of a pond, and that nearly all coldwater fishkeepers plan to have one. However, if the pond is to be an attractive feature it must be well designed; it must be of the right size and in proportion to the garden, sited in the best possible position and fit into the overall design of its surroundings. Of equal importance, consideration must be given to the space requirements of the eventual inhabitants—for instance,

Koi will require a much larger pond than, say, goldfish. Koi grow into large fish and, therefore, must have a greater depth of water and swimming area than is necessary for a similar number of goldfish. A water depth of 2 feet may suit the goldfish, but Koi require a depth of around 5 feet or more. Although a pond with a surface area greater than the fishes actually need would not cause any problems, a surface area which is too small would lead to many problems and may well result in the death of the overcrowded fishes.

Choose a site that is well away from

trees, especially the dangerous-to-fish laburnum, laurel, holly and rhododendron. The site should have the benefit of receiving plenty of sunlight. A pond which is in permanent shade is not in the ideal situation; however, it is always possible to devise shade for a pond which receives too much sunlight.

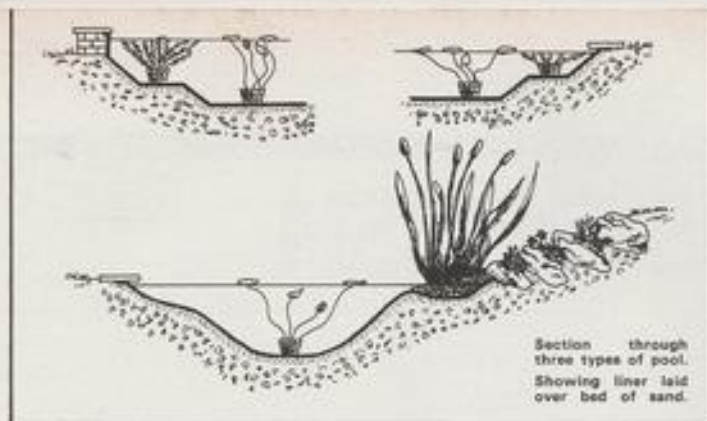
The shape of the pond may be formal or informal in design, but it must blend in with its surroundings to form a unified and harmonious whole. A well planned pond should give pleasure to all who see it, and invite them to linger in contemplation of its charm.

The position, size and shape of the pond can be marked out by laying a clothes line on the ground, or outlined with sand. It is then possible to study the effect, and any alterations that may seem necessary can easily be made before any construction work commences.

Decide where the excavated soil is to be placed, which should be well away from the scene of operations. If it is proposed to create a rockery with the soil, be sure to keep the fertile top







six inches separate from the bulk of the soil—so that it can be placed on top of the rockery-soil mound.

Commence by digging a shallow trench around the marked out outline, thus providing an easily recognised area within which to work. The hole can then be excavated, forming it into the desired shape and depth, from shallow to deep—leaving shelves for the plants not much deeper than 12 inches below the eventual level of the water surface. The slope of the walls should not be too steep, in fact from below the plant shelf the pond can be saucer shaped.

Although concrete is still used for pond building by many, it is hard work and the finished product has to be 'cured' before it can be safely used for fishkeeping. Nowadays most people prefer to employ the easier method of lining the excavation with some form of plastic sheeting. These liners range from the fairly short-lived polythene to the expensive, but very long-lived butyl sheeting. If polythene is to be used it should be of the black 500 gauge type; however, this material has the great disadvantage of deteriorating after a few years; it tends to rot and break-up above the water-line where it is exposed to the action of the sun and air.

Much more suitable are the reasonably tough, nylon mesh reinforced pvc liners. This material wears well and has a much longer life than polythene; it is often available with a pebble design on one side and plain blue on the other.

Best of all are the butyl liners which have an indefinite life and, given reasonable care, are very tough. Butyl has the great advantage that it can be joined by electric welding, or by the

use of a special adhesive and tape, thus allowing various shapes and sizes to be created. Although this is the most expensive type of liner it is well worth the cost in view of its virtually trouble-free long life which, it is said, should be in excess of 50 years. Being flexible, plastic liners are unaffected by ground movement, freezing, or the effects of contraction and expansion caused by temperature fluctuations.

In order to determine the size of liner required the length and width of the excavation should be measured. Measure down the wall, along the base and up the opposing wall at the deepest point. Both measurements, for length and width, should have an extra 24 inches added to each, this will allow a 12 inch overlap all round, to be covered by the surround. Obviously, the measurements should be taken at the longest and widest points of the excavation, and follow the internal contours.

Before placing the liner into the excavation, carefully remove all sharp stones or anything else which might puncture the liner. Next line the hole with a thickish layer of well tamped, sifted sand. Alternatively, several layers of newspaper or old carpeting may be used as a protective cushion for the liner. The liner is then laid over the excavation, allowing it to drape down into the hole, checking that there is an equal overlap all round. Place a few bricks, or other weights around the overlap to hold it in position.

The pond can now be slowly filled with water from a garden hose. As the weight of the water pulls the liner down, and moulds it to the shape of the pond, gently pull and ease the liner into position, trying to disguise

any folds or creases that may appear. Care at this stage will add much to the final look of the finished pond. Ease the weights around the edge as necessary, but do not remove them until a permanent surround can be added.

Although turves can be placed over the liner overlap a more satisfactory method is to lay a paving surround; this will form a firm, dry area for standing on during inclement weather.

When the paving has firmly set, the pond should be emptied to rid it of any impurities or fallen soil, and then the waterlilies and other plants placed into position. The pond can then be refilled with water from the hose pipe. Allow 24 hours to elapse before placing any fish into the pond, taking the usual precaution of allowing the water temperatures to equalise and so avoid chilling the fish.

Many Koi keepers install some form of filtration to preserve the clarity of the pond water—especially as, apart from the waterlilies, few plants survive for long in the company of these large fishes. These filters range from the simple to the complicated; they may be situated either in the pond or outside, or both. Possibly the most simple type of filter is a larger version of the undergravel filter used in aquariums. This is constructed from plastic overflow piping, available from plumbers' merchants, which is made into a grid by means of elbows and 'T' pieces. The piping is drilled with  $\frac{1}{2}$  inch holes to allow an inflow of water. The assembled grid, which should be equal to at least one-third of the surface area of the pond, is then covered by about 3 inches of washed  $\frac{1}{2}$  inch chippings. This depth of gravel should be allowed for during excavations, by increasing the pond depth accordingly. The filter is connected to the suction of a high output pump, which is capable of continuous operation. The filtered water being discharged, often via a waterfall, into the pond at a point farthest from the pump intake. As with most filters, it will take a little time for the filter to become really effective.

If you have contemplated building a pond, but never got around to it, now is the ideal time to make the dream a reality—it really isn't that difficult.

# THE BASIS OF FISH HEALTH

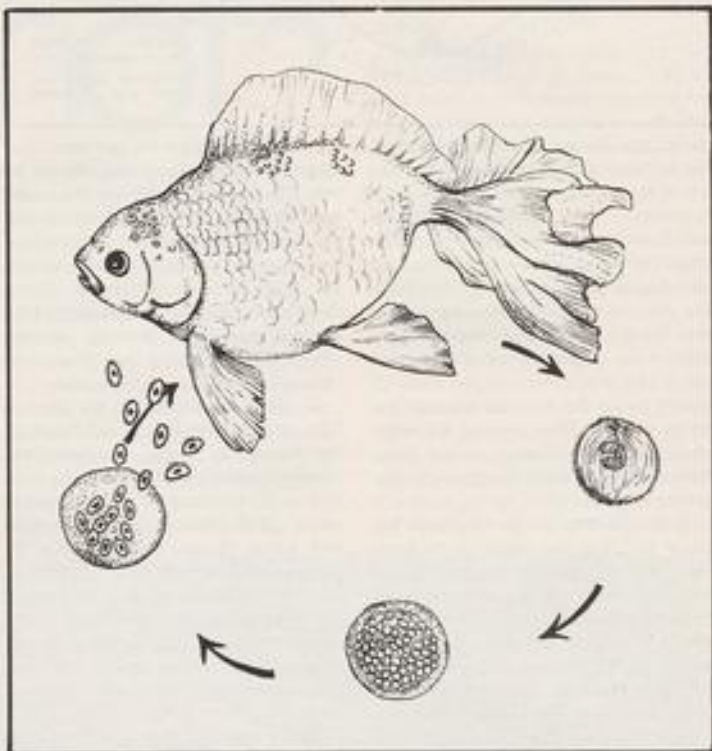
by 'Mayfly'

## Whitespot

—one of the commonest of all fish diseases

*Ichthyophthirius multifiliis* is the causative organism of whitespot disease or 'ich'. It is a single celled organism (protozoan) and is very large for a single cell, up to 40 times the size of the other common skin parasite *Trichodina*, being up to 2mm. in diameter, that is, just visible to the naked eye. In relation to the fish, of course, it is still small—but it does exist in huge numbers during epidemics thereby causing a problem. Each organism normally has a large horseshoe-shaped macro-nucleus and it moves slowly with a rotating motion by the action of many short hair-like processes (cilia) which cover the entire surface of the animal. Sometimes whitespot have bar-shaped nuclei instead of the commoner horseshoe. At one time these were thought to be a different species, but now they are believed to be a physiological variant. It occurs on a wide range of different fish species—there are very few types of fresh water fish that are immune from attack, although some species are more susceptible than others. Catfish, sunfish, carp and goldfish are particularly susceptible.

On the surface of the fish it forms white spots or pustules, pimple-like bodies up to 2 mm. in diameter on the



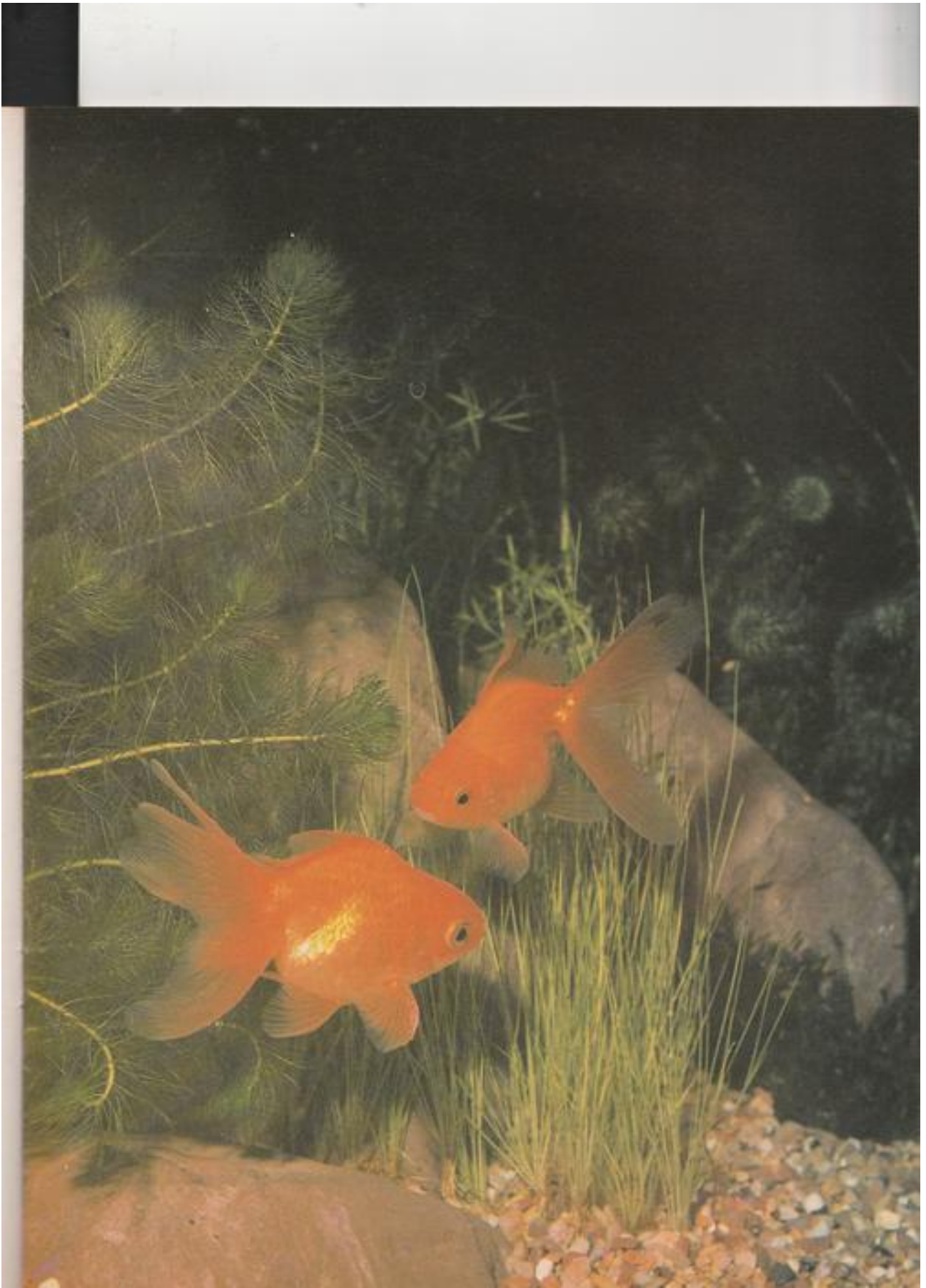
skin, fins and gills. Some species; for example, Golden Shiner Minnows (*Notropis* species) frequently have heavy infections on the gills but seldom show evidence of the disease on other parts of the body. The pustules are usually sharply defined but in heavy infections the spots merge together to form irregular patches.

The mature organism breaks out of the white spot and may swim in the water for 2-6 hours after which it drops to the bottom and attaches to any suitable substrate: plants, the aquarium sides, gravel or detritus, where it encysts. Within the protective cyst the animal divides many times forming up to 2,000 small daughter cells (the number of offspring produced

depends on the size of the parent). Later the cyst wall breaks to liberate small pear-shaped, swimming 'tomites' into the water. If a tomite does not reach a fish within about 48 hours it dies. If it does reach a fish it bores into the outer layer of the skin (epidermis) rotating rapidly and displacing epithelial cells, and gradually working its way into the deeper layers. As a result of the irritation of the parasite there is a rapid proliferation of the skin cells. Once it is embedded in the skin it (now about 0.2 mm.) begins to grow rapidly. The growing phase is known as a trophozoite, and

Continued on page 31





# SPOTLIGHT

## The FANTAIL

by  
Jack Hems

ABOUT the beginning of the seventeenth century goldfish were brought from China to Japan. Among them, it is reasonable to believe, were fish with divided anal or caudal fins or both and a less conventional body shape. For Chinese literature of about the end of the fifteenth century makes mention of goldfish with three tails, five tails, even as many as seven tails (this, of course, in reference to the caudal and anal appendages). Earlier in time, natural mutations in body shape, colour and finnage (wild goldfish, which occur in south-east China, are muddy green to greyish olive in hue) were being developed by keen breeders to provide brightness and amusement for the more exclusive Chinese home.

The Japanese, with their passionate love of the unique or, perhaps, bizarre (to the occidental mind) in animal and plant life (witness bonsai trees, certain flowering plants trained to flow over the side of their containers, and poultry with hugely extended tail feathers) soon improved on rather short and deep-bodied fish, with divided caudal and anal fins, and drew on the Ryukyu Islands for the varietal popular name of Ryukin: a name also applied by the Japanese, of that time, at anyrate, to the Veiltail. Inevitably the most admired characteristics of the Ryukin (to Japanese eyes) as the deep body, etceteras, were enhanced by selective breeding which resulted in the creation of one of the most handsome of aquarium fish: the Japanese Fantail.

Nonetheless, occidental breeders of fancy goldfish had ideas of their own, and wasted no time in moulding a Fantail nearer to their heart's desire. (Decades ago Mr. Arthur Boarder, our much respected coldwater expert,

developed a famous strain of hardy Fantails.) Over here, at the time of writing, the ideal Fantail is almost egg-shaped (viewed from the side) and elongated pear-shaped (viewed from above), with deeply forked caudal fin divided into two almost heart-shaped lobes, not drooping though as in the Veiltail, but held straight out from the body. The anal is short and, like the caudal, divided. The ventrals are well in evidence. So, also the rather spatulate pectorals. The dorsal fin is long based and upstanding anteriorly. The top edge extends downwards in a straight line and terminates just above the base of the caudal fin.

Now for the coloration of the exalted home-bred Fantail. It may be metallic orange or silver (orange is the more desirable colour from the show judge's viewpoint, or nacreous or matt: so-called calico fish. The most admired 'calico type' Fantail displays a large amount of blue, black, orange and yellow among irregular splashes or spots of other colours.

The metallic Fantail is quite hardy if it is from stock bred under cover (in tanks) and reared outdoors. Briefly, then, the metallic Fantail is well suited to life outdoors if the pondwater is at least 2 ft. deep in the middle or one end. Better still, with the health of the fish in mind, is life in a pond situated in a sheltered position or situated in one of the more favoured (climatically speaking) parts of the country.

The pond in which the metallic Fantail may be expected to flourish

the year through should be at least 2 ft. deep in one part. It is hardly necessary to say that, a pond in a sheltered area of a garden, or in a part of the country not given to protracted 'arctic conditions' is well suited to the Fantail.

Feeding the Fantail is easy. Like all goldfish, it is not choosy about its food and will thrive on a mixed diet: thus flake food, crumbled wholemeal bread, shaken in a kitchen sieve to hold back large particles, mosquito larvae netted from a clean rainwater-filled container covered with netting to exclude windblown garden debris or dropped items from the bird-table (birds drop portions of their seized food over a wide area), raw red meat deposited as a gooey mass on the sharp edge of a kitchen knife held in a vertical position as it is drawn across the fat-less flesh, whiteworms (*Euchytusa albidus*), and fresh frozen foods which include brine shrimps, *Daphnia*, and so on. Placed in the freezer—frozen fish foods will do no harm to domestic comestibles—such food will keep until required. To feed, small pieces are broken from the whole and placed in tepid water for a minute or two. Never overload a Fantail's stomach with food. Copious dried food can swell in the stomach and cause bloating and loss of balance. This is very distressing to see; but the fish will recover from its discomfort and regain its balance within the space of a few hours. The best way to feed the Fantail is little, and fairly often. Not too often: say early morning, midday and once or twice at night, that is in the illuminated aquarium or while daylight lasts outdoors. Pond-kept Fantails should be fed up till the time cold weather



## SPOTLIGHT



sets in. To be more precise, up to the time the temperature outdoors falls to the lower 50°F. Then stop feeding and do not resume it until the warmer days of the following spring set in.

Breeding the Fantail poses no problems. The breeding procedure follows

the usual course of the goldfish tribe. The water needs to be at a temperature in the lower to middle 60°F; the fish brought to the pink of condition by copious feeding on live or flesh foods. Plenty of feathery-leaved plants should be bunched along one side or end of the container, and jars of *infusoria* made ready in preparation for the first food for fry. Alternatively, a culture of micro-worm should be got going.

The male fish, distinguished by white 'pimples' on the gillcovers (and sometimes on the foremost rays

of the pectoral fins) chase after the female fish (denoted by distended sides) in the upper levels of the water. A male drives hard and often—indeed, almost always—swims under the female and struggles to lift her above water level. Just for a second or two. Then down the pair go and scatter sticky eggs in the submerged foliage. The eggs hatch in about five to seven days—the nearer to the 70°F the sooner the eggs incubate. About two days after hatching, the fry swim free in the water, and microscopic food is what they'll be looking for.

# THE BASIS OF FISH HEALTH

*Continued from page 28*

soon appears as the raised white spot which is the characteristic symptom of the disease.

The complete cycle of events described here can take place in as little as four days when the temperatures are optimal i.e. 21-24°C (70-75°F). At lower temperatures the life cycle takes longer e.g. two weeks at 15°C (60°F), and five weeks at 10°C (50°F).

Apart from the white spot, other symptoms include changes in the fish's behaviour. In ponds, infected fish frequently congregate near to a source of incoming water or in plants. In aquaria infected fish may be seen to scrape themselves on the gravel or to exhibit twitching of the fins. Other parasites however, may cause similar symptoms so a thorough check should be carried out before blaming 'ich'.

The control of whitespot is complicated because, although some stages can be killed by certain chemicals (tomites and emerged adults) other stages (the trophozoites and the encysted stages) are difficult to destroy. The normal approach is to employ multiple treatments at regular intervals to eliminate the disease. Various chemicals have been used to treat whitespot, the three commonest being methylene blue, malachite green, and formalin. Success has been claimed for all three compounds, although a combination of malachite green and formalin is the most efficient. However, sensitive fish, particularly tropicals, do not respond well to this mixture, so great care is needed with this type of application. As with many immersion treatments, baths are more efficient than dips and also less stressful on the fish. Malachite green on its own has been used on warm water fish in the United States as a pond treatment when fish removal or draining down was not possible. Complete

control of whitespot was achieved with levels of 0.05 ppm of malachite green.

Common salt (sodium chloride) has also been used as a chemotherapeutic and as a bath for one hour, a 1% solution has met with good results. Concentrations up to 3% are used on larger, hardy fish. Like other baths it is repeated over several days, the exact interval depending on the environmental temperature. Over the last fifty years more than 60 chemicals have been used to control whitespot. Unfortunately the effectiveness of most of these is debatable. Although the tomites and mature cysts are normally shortlived, some observers have noted cysts surviving off the fish for up to five days. How frequently this length of time can be survived is not known, but it casts doubt on the practice of removing fish from an infective tank for 4-5 days and assuming all the infective stages are dead, but suggests that a minimum of one week might be necessary before all the emerged tomites are killed.

Whitespot is sensitive to high temperatures, and tropical fish are often cured by exposing them to temperatures of 32°C (90°F) for part of each day for several days.

*Postscript*—Fuller details of materials, their availability and the best methods for their use in treating fish diseases are given in a later article.

# ELEMENTS OF KOI-KEEPING

by Hilda Allen

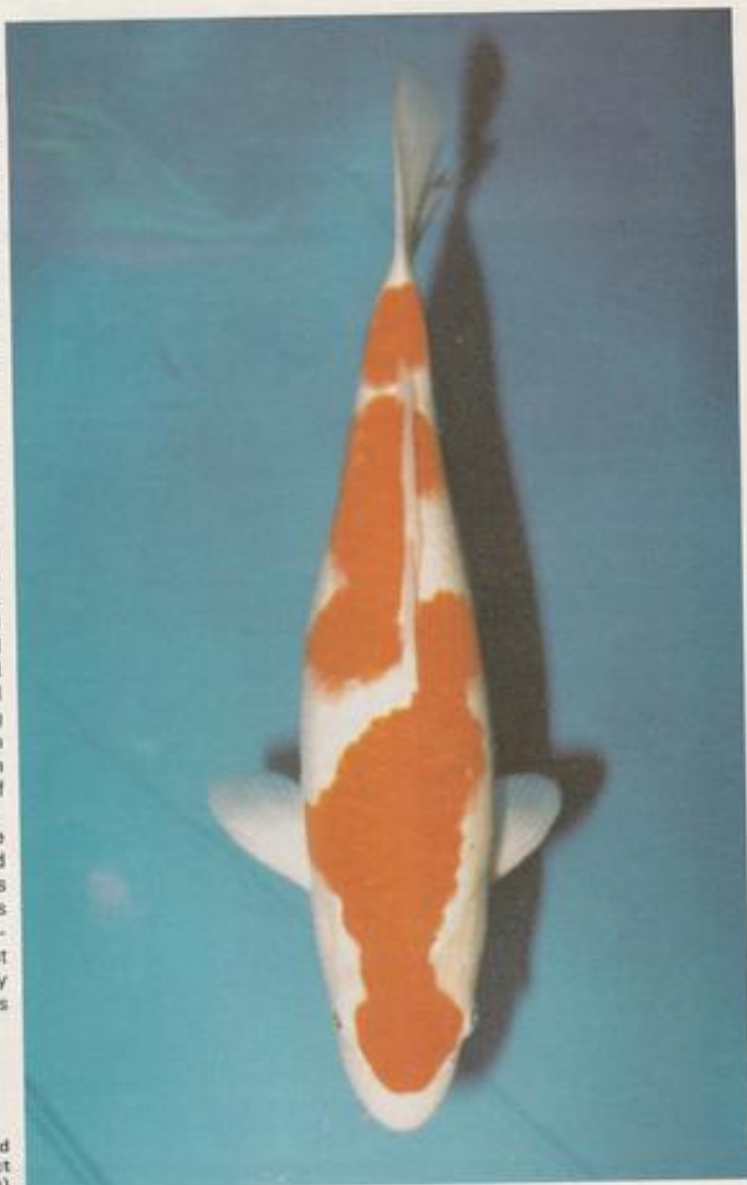
KOI are magic. In a lifetime of pond fish keeping I have seen nothing to compare with these graceful, elegant fish that can cause strong men's eyes to glaze over with longing to possess the spectacular beauties before them. Carp are believed to have originated in Persia and later to be spread to other parts of the world by human migration, trade, etc. They are robust, adaptable, intelligent fish often referred to as the 'king of freshwater fish'.

Coloured varieties of carp were first bred to provide beauty in the garden ponds of Japanese noblemen, and Kyoto was famous as a centre for admiring these magnificent fish. In Japan, the northern district of Niigata became the main region for the production of carp, and many small villages around Yamakoshi were especially regarded as the area for breeding the coloured varieties arising from the careful selection of naturally occurring mutations, as opposed to common carp bred for the table. Both coloured and common carp are of the same species, *Cyprinus carpio*.

All Koi, or their proper name Nishikigoi, were thus developed from the common type known as Magoi, and when viewing today's wondrous selection of colours, patterns and scale forms, the highest tribute must be paid to the early farmers and later specialist breeders

*Continued on page 35*

**KOHAKU**—a white fish with red markings, this specimen has a distinct three-step pattern (SANDAN MOYO)







# Meet the Societies



## ASSOCIATION OF MIDLAND GOLDFISH KEEPERS



The A.M.G.K. Logo



The Lionhead or Bramblehead

THE Association of Midland Goldfish Keepers celebrates its tenth anniversary this month with a young and energetic membership working together for the benefit of goldfish keepers throughout the Midlands, and further afield.

The inaugural meeting was held in April 1974 after a small group of enthusiastic goldfish keepers met to discuss the possibility of forming a regional specialist Society.

Since then, A.M.G.K. has grown in stature and now has members who travel from as far as Bristol and Lincolnshire to attend meetings. These are held approximately bi-monthly on Sundays at the Foleshill Community Centre near Coventry. By having bi-monthly meetings, this allows time in between for members to participate in their other fishkeeping activities at local level.

The most popular meetings are those that include Table Shows. Early in the season, these consist almost exclusively of adult fish while, later on, young fish from the season's spawnings are displayed. In addition to Table Shows, there are guest speakers who tackle subjects from fish biology to photography, commercial breeding and garden ponds.

There is an A.M.G.K. Newsletter which has undergone a recent "face-lift" and will be produced three times a year. In addition, there are plans for an A.M.G.K. tie for members.

Standards are very high within the Association, as their Standards Book on Fancy Goldfish Varieties testifies. It is particularly interesting to note that two varieties which are thought likely to enjoy greater popularity in the future are also included. These are the very distinctive Jikin and Tosakin.

The Association considers itself especially fortunate to have as members two of the best-known names in the world of coldwater fishkeeping. One of these is Frank Orme, who is a regular contributor to *A & P* with long-running series (e.g. *Coldwater Jottings*) and specialist articles, and the author of several books. The other illustrious member is Tommy Sutton who, with his son, owns one of the largest breeding establishments in the country.

Their combined expertise makes A.M.G.K. one of the richest sources of information in the hobby.

Subscription Rates: Single or Family, £4.00.

Apply to: Miss E. J. Edmunds, 71 Booth Lane, Boothville, Northampton NN3 2JH.

## MUIRHOUSE AQUARIUM SOCIETY



The M.A.S. Logo



*Poecilia reticulata*

IN this, the second of our articles on Societies from Scotland (see *Meet the Societies, A & P*, May 1983 for Dunfermline & D.A.S.), we feature a Society which is always active and successful on the Show scene.

Muirhouse Aquarium Society was formed in 1968 in the Muirhouse Housing Estate to cater for the needs of aquarists in the Motherwell area.

As many readers will know, Motherwell Civic Centre has been the venue for the Scottish Aquarist Festival since its inception twelve years ago. This Festival is organised by the Federation of Scottish Aquarist Societies in collaboration with the *Aquarist & Pondkeeper*, and M.A.S. has always played a prominent role in this major event which, this year, will take place on 26th and 27th May. Members of M.A.S. have held many influential positions within the Federation, including those of Treasurer, Minute Secretary and (currently) President. Further, two M.A.S. members have been on the Scottish Aquarist Festival Committee since 1973. At the moment, M.A.S. hold five Committee positions.

The Society has built and shown a Tableau at every S.A.F. held (is this a record?) and has collected several trophies over the years.

Continuity is assured through the loyalty of members, some of whom joined back in 1968. Mrs. Sadie Sinclair, the current Secretary, has held a Committee position without a break since 1970—a monumental feat by any standard.

Meetings are held every third Monday of the month between September and June at the Public Library, Motherwell, starting at 7.30 p.m. Activities include guest speakers, raffles, film shows, general discussions, quizzes and Table Shows. All are welcome. In addition, there has been an Open Show held with the Lanarkshire Aquarium Society for the past eight years.

Six M.A.S. members have attended and passed the highly demanding F.S.A.S. Judges Training Course which can take years to complete. Five members are, in fact, still active on the Judges' Panel. Other members belong to a variety of national Specialist Societies where they also hold influential positions.

Subscription Rates: Single, £2.00; Family, £4.00; Junior, 50p.

Apply to: Mrs. S. Sinclair, 38 Drybrough Road, Wishaw, Lanarkshire.



# ELEMENTS OF KOI-KEEPING

*Continued from page 32*

who have given the world their unique product, the fancy coloured carp of Japan.

There are several thousands of Koi-keepers in Britain who will surely agree that their delightful hobby presents many challenges, most of which can be overcome with knowledge and common-sense.

A wide range of highly-coloured small Koi appear on sale in this country and to the novice they fulfil a need at a moderate cost, but they should not be expected to become champions, although to me, any Koi that grows to the large adult stage is beautiful simply by its grace of movement and friendly nature.

Koi are also imported from other countries, but generally have less colour and definite pattern than the varieties from Japan, and should be cheaper if only by the lesser distances of expensive air-freight and better monetary exchange rates.

It is a fact that the top-quality breeding stock and much of the expertise remains with the Japanese, and their success may also be attributed to the manner in which Koi are reared, the more favourable climatic conditions, and even the nature of the water.

I think that when first seeing Koi, many pond-keepers are captivated by the brilliance of the metallic golden Ohgon types as being something entirely different to the usual pond fish. This is probably a wise choice, as it was my experience over several years that these fish tended to survive and grow more

readily than some of the other small coloured and patterned Koi available at the time.

Beauty is always in the eye of the beholder, although the Kohaku to describe a white bodied fish with red markings, and the Taisho Sanke and Showa Sanke to describe fish with varying amounts of white, red and black markings are still the most popular Koi in Japan. And apart from Koi of one colour, there are about four other easily recognisable types given the basic names of Bekko, Utsuri, Asagi and Shusui. Arising from all those mentioned is a whole host of cross-varieties with an infinite list of names to include the matt, metallic and mirror-scaled Koi. Doitsu, meaning German, is the word sometimes used as a prefix to describe the partly-scaled or scaleless fish.

The Japanese names of Koi should be less important to beginners than the priority of making a suitable pond. All too often the necessary requirements of deep, continuously filtered and aerated water are not discovered until after large sums of money have been wasted on shallow, or otherwise totally unsuitable ponds. There are many variable factors involved in successfully keeping Koi, and it is indeed foolish to attempt to keep any form of livestock without first finding out the bare essentials. Koi most certainly have definite needs and good husbandry begins with a good pond.

Some Koi-keepers, more concerned with the clarity of water than the well-being of the fish go to extreme lengths with filtration and provide what I can only consider to be unnatural, stressful environments for Koi.

As Koi are truly omnivorous they present few problems in feeding and in addition to the wide range of proprietary foods available, will accept almost everything we eat. The list is virtually endless and whereas greasy or fatty foods must be avoided, the delightful activity of feeding is an important part of keeping Koi, but coupled with the inevitable waste products can have a dramatic effect upon the water and appearance of the pond.

Whilst few amateur Koi-keepers have the space, time or facilities necessary to breed Koi in large numbers, it is encouraging to hear of more healthy home-bred fish being produced. Collecting Koi is only a part of the pleasure of Koi-keeping, and most of us are overjoyed when our Koi spawn in Spring and Summer as they will if mature fish of both sexes are present. In a controlled spawning, the presence of two or three male Koi to each female within the confines of a small breeding pond will usually result in a large number of pin-head size eggs. After spawning, the parent Koi are returned to the main pond, and then the problems of dealing with thousands of offspring really begin.

Whether keeping, showing or breeding is your particular interest, then it is all taking place in Britain today.

This year, The British Koi-Keepers' Society of some 3,500 members, will again stage Europe's largest Open Koi Show, KOI '84. The annual national event will be hosted by the Northants Section of the Society on Sunday 24th June, at Billing Aquadrome, near Northampton. Other B.K.K.S. local Section Shows will be held on

Monday 28th May, at Ashton Court, Bristol; on Sunday 15th July, at The Alpha Garden Centre, Wickford, Essex; on Sunday 29th July, at Tatton Park, near Knutsford, Cheshire; on Sunday 26th August, at Badger's Mount, near Orpington, Kent; and with further Shows proposed but details not yet announced.

The Yorkshire Koi Society's annual Open Show will once more be held in the gardens of Harewood House on Monday 27th August.

Queries on Koi-keeping are invited, addressed to *The Aquarist*, but must be accompanied by a S.A.E. for a personal reply.



**TAISHO SANKE**—a white fish with red and black markings, it may have black stripes in the pectoral fins

**SHOWA SANKE**—a present era (SHOWA) version of the SANKE (three colours), predominantly a black fish with varying amounts of red and white markings. The black should extend more round the body and may also appear at the base of the pectorals







**SHIRO BEKKO**—a white fish with black markings. The description of **BEKKO** (tortoise-shell) is also applied to other fish where the main body colour is yellow (KJ), or red (AKA)



**SHUSUI**—derived from **ASAGI** and a cross with the German (**DOITSU**) mirror carp. It should have deep blue mirror scales and is considered more beautiful with red body markings



**KIN-KI-UTSURI**—one of the many reflections of the **BEKKO** varieties, in this case mainly a black fish with yellow (KJ) markings, suffused with gold (KIN) scales

## Press Release



### Koi-keeping with Tetra

Coldwater fishkeeping, particularly Koi-keeping, is enjoying a boom in popularity at the moment, with more and more people installing coldwater aquaria in their homes and fish ponds in their gardens. Coldwater fish are to some extent, easier to keep than their tropical or marine equivalents, although if they are to thrive and be at their best, they must be cared for properly.

Over the past 30 years Tetra has built up a reputation for supplying high quality flaked and other diets for tropical aquarium fish. What many aquarists fail to realise is that during this time, Tetra has also been carrying out intensive research into the nutrition of coldwater (and marine) fish, as well as water quality and fish diseases. Therefore, the Tetra range contains a number of products which are of considerable relevance to Koi-keepers (and other coldwater enthusiasts).

### Correct feeding

*TetraFin* and *DoraFin* have for many years been regarded as the flaked foods for coldwater aquarium and pond fish. However, it became clear that there was a need for a reasonably priced but highly nutritious floating food for Koi and other pond fish, since many of the available floating pellets had a rather low nutritional value. Using a special process called 'extrusion,' *TetraPond Foodsticks* were developed. These one centimetre long sticks absorb water once in the pond and take on the appearance and texture of earthworms, a favourite live food of many pond fish.

The *Tetra* foodsticks float for many hours, thus minimising the risk of pollution since any uneaten sticks can be removed with a long-handled net.

Naturally, *TetraPond Foodsticks* are highly nutritious, with low protein levels to suit the needs of large pond fish like Koi, and they may be used as a staple diet for these fish. Economically priced, the sticks are available in one, three and six litre sealed drums.

### Water quality

Koi are a little more susceptible to water quality than most other coldwater fish. In a garden pond (as a result of incorrectly 'cured' concrete, or as a result of a severe algal problem in sunny weather), the pH of the water may rise to an uncomfortably high level, perhaps even killing the fish. Therefore, in a new pond (and regularly during the summer months in an established pond), it is vital to check the pH of the water using a *Tetra* pH test kit. Values between 6.5 to 8.0 are satisfactory for most fish, but should the pH stray outside this range, advice should be sought.

As a result of overcrowding, over-feeding or a filter which is not yet functioning properly, elevated levels of potentially toxic nitrite may occur in a garden pond. Therefore, as soon as the pond filter is switched on in the spring, the nitrite level should be measured using a *Tetra Nitrite Test Kit* every 5-10 days. Levels above about 0.5 milligrammes per litre (mg/l) (as nitrite-nitrogen) may indicate a possible water quality problem, and a partial water change may be warranted. The pond should also be examined for overcrowding and/or an accumulation of uneaten food.

Pond filters should, of course, be left running for 20-24 hours each day during the spring to autumn months. During the first few weeks that the filter is running, it may be possible to detect the characteristic rise and fall in nitrite, as the helpful bacteria in the filter become established. During this time the fish should be fed carefully

and a partial water change carried out if the fish appear in distress as a result of elevated nitrite levels.

### Water treatments

Many diseases of pond fish are best treated in a separate hospital tank, rather than adding large volumes of chemicals to the pond itself.

With this in mind, *Tetra FungiStop* is an excellent treatment for fungus, and *General Tonic* may be used in a treatment tank when fish are showing signs of fin rot, fin congestion, sliminess of the skin, etc. Furthermore, a combination of *General Tonic* and *Aqua Safe* (the complete tap water conditioner) are ideal for alleviating the problems associated with rough handling, physical damage, and the like.



### Koi in tanks

If you have been lucky enough to spawn your Koi, or if you are simply growing on some small specimens (using *TetraFin*, of course!), you will probably use an aquarium for the first few weeks or months.

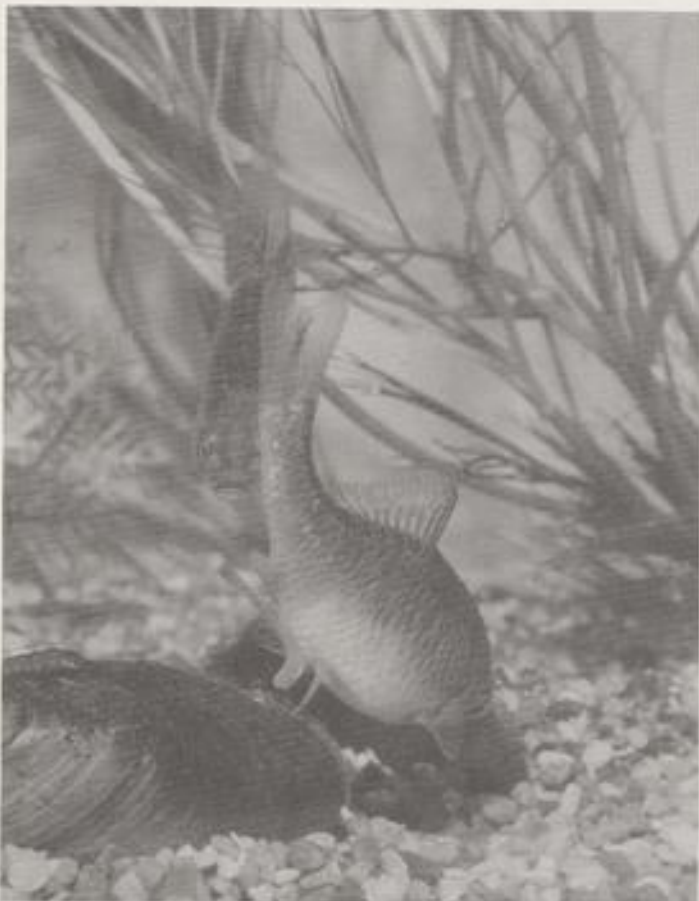
In such situations, the *Tetra* polyfoam filters (i.e. *Billi* or *Brilliant* models) are particularly suitable, since they carry out very efficient mechanical and biological filtration. They are exceptionally easy to maintain—once every 2-4 weeks the unique polyfoam cartridge should be rinsed in luke warm water and slipped back onto the filter tube. The *Billi* filter can be used in tanks up to 10 gallons, whilst the *Brilliant* is suitable for tanks up to 20 gallons. Of course, more than one filter can be used in each tank, and the filtering capacity of each *Brilliant* can be doubled by the addition of a second polyfoam cartridge. Ask your *Tetra*

*Continued on page 51*



## The Peculiar Bitterling

By Laurence E. Perkins



Female Bitterling with ovipositor bent and extending to the left, the sub-tube showing in front (to the right) of the ovipositor, its end level with the bend in the ovipositor. Note that the combination of bent ovipositor and sub-tube are directly over the exhalant siphon immediately before being thrust into it.

PARENTAL care is exemplified in a wide variety of ways throughout the animal kingdom and within the world of fishes there are many examples of unusual ploys utilised for the protection of young. Among the best known are the nest-building stickleback, mouth-brooding cichlids and 'pasupial' seahorses where the male broods the young in a pouch. For ensuring top security in this field of endeavour, however, the accolade must be bestowed upon the Bitterling.

A small cyprinid, the Bitterling relies upon an association with a freshwater mussel (usually *Unio pictorum*), the object being to encapsulate its eggs within the mussel's gill chamber where they will hatch and leave the mussel when free-swimming.

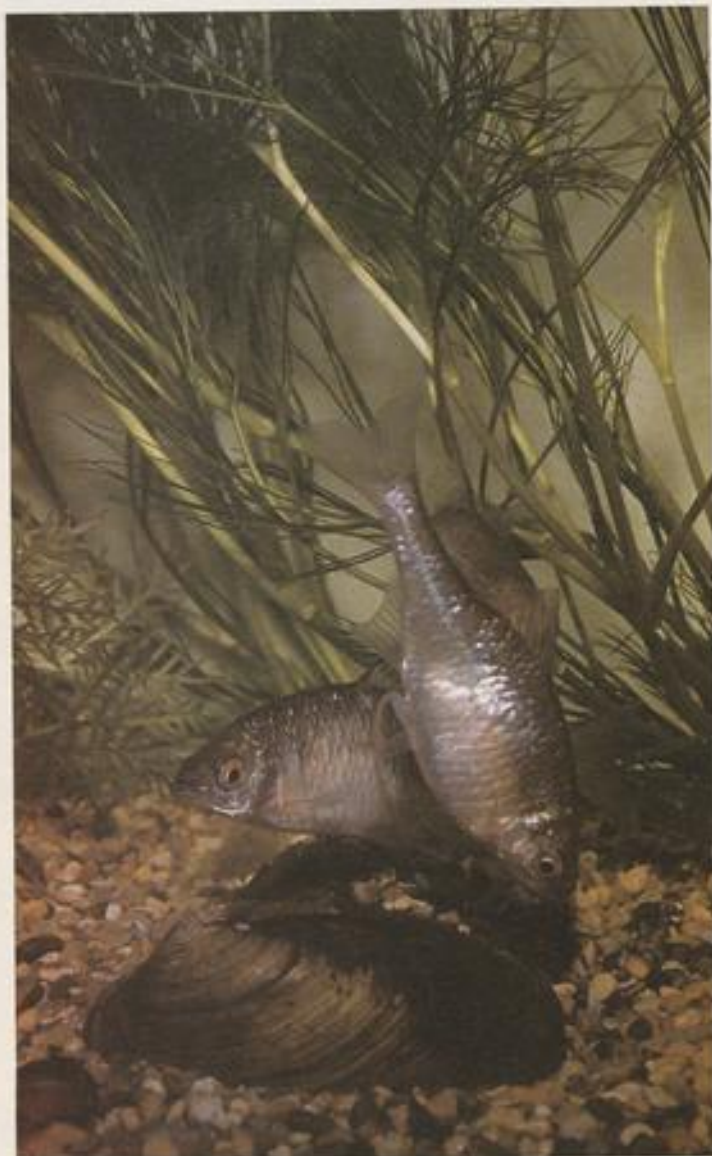
The mussel, a simple bivalve, has an inhalant siphon for obtaining oxygen and food particles from the water, and an exhalant siphon for expelling carbon dioxide and food remains etcetera.

At the onset of the breeding season the male Bitterling's colouration intensifies and the female develops a long flaccid tube from behind her ventral fins—an ovipositor, seemingly, for introducing her eggs to the mussel's interior.

There has been a number of theories expounded as to just how the eggs are transferred to the mussel, one suggesting that the ovipositor is sucked into the inhalant siphon of the mussel and the eggs dropped through it into the gill chamber to be followed by the sucking in of milt expelled by the male fish. Another theory presupposes the stiffening of the ovipositor which is then thrust into the exhalant siphon.

From my own observations the ovipositor is not employed at all, the eggs being extruded via a short sub-tube (situated in front of, and joined to, the longer one) which is thrust into the exhalant siphon, the longer tube being bent right back to facilitate the operation.

When the spawning sequence was observed by the writer the action of both male and female fish was sudden and too rapid for the eye to detect what actually occurred. Both fishes hovered, in turn, above the mussel and dived down along its length making violent contact. In no way was the ovipositor sucked or thrust into either siphon but the camera with highspeed flash recorded the moment before impact between female Bitterling and mussel and this shows the ovipositor bent back into an elbow and this bend, along with the sub-tube, immediately above the exhalant siphon. On subsequent occasions, the odd egg was seen to be expelled from the exhalant siphon, the egg's viscosity having failed,



Female Bitterling above mussel and inspecting siphons

seemingly, to stick it to the wall of the gill chamber.

It is believed that when the successfully sequestered Bitterling eggs have hatched and leave the mussel, many of the fry carry with them larval mussels (Glochidia) attached to them but which will eventually detach themselves thus ensuring dispersal of these semi-

sedentary creatures. This symbiotic aspect of the Bitterling's unique spawning activities is an added bonus to the interesting phenomenon but of more importance and relevance is the actuality of the egg-laying and why it should be that a variety of observers has produced such differing reports. One can conclude only that different species of Bitterling, although all dependant upon the mussel as a crèche, employ different methods of introducing their eggs to the mussel's gill chamber. So how many species of Bitterling are known to science?

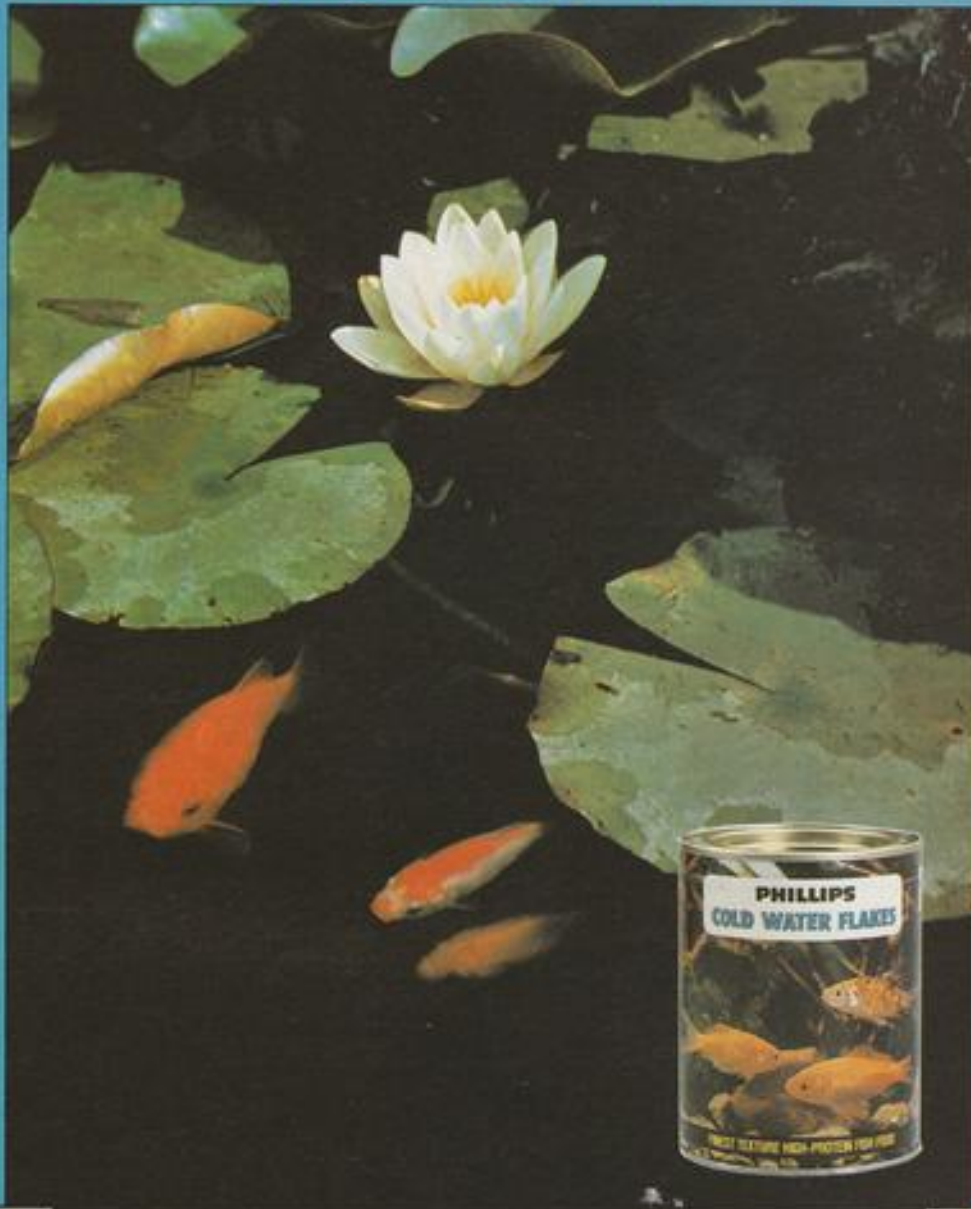
A recent issue of *Aquarama*, a French periodical for the aquarist, contained an article by Yoshimasa Tezuka entitled *Les Boveries*. It included some superb colour photographs of six species of Bitterling as listed below. Regrettably additional black and white photographs of the spawning sequence of *Rhodeus ocellatus* were of poor quality and revealed nothing of interest, one dismissive caption stating that the action is "so rapid that it is difficult to observe the details". However, the Bitterling species illustrated in colour are of more interest.

1. *Rhodeus ocellatus*: Deeper in the body than the fish we have known as *Rhodeus sericeus amarus*, *R. sericeus* or *R. amarus*.
2. *Achillognathus longipinnis*: A deep bodied species.
3. *A. Rhombica*: Very like *R. sericeus amarus*.
4. *A. lanceolata*: Like above but lacking the horizontal blue stripe at the posterior end of the lateral line and with rosy tint to anal fin.
5. *Pseudoperilampus typus*: Like above in shape but with higher dorsal fin.
6. *Tanakaia tanago*: 'Typical' Bitterling shape but with white edge to dorsal and black edge to anal and pelvic fins, both having white inner edging to the black.

It is evident that a wide field for study exists where Bitterling are concerned and aquarium spawnings of the above species, if photographically recorded, could throw a deal of light on what still has an aura of mystery posing a wealth of unanswered questions.



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## Company Profile

### Phillips Yeast Products Limited



Aftermath of the 1982 fire started by vandals

PHILLIPS Fish Food is well-known in the aquarium hobby as a value-for-money flake food in the face of strong competition. This is a claim that the Company is proud to make and can justify by direct weight-for-weight price comparison with other flake foods.

What some aquarists may be unaware of is that Phillips manufacture more than just flake.

The Company was founded in 1932 and pioneered the stabilisation of brewer's yeast for pharmaceutical purposes. In those early years, all Phillips products were just for human consumption. Phillips Tonic Yeast Tablets were developed then, as was Betox, a 'Marmite-like' spread which became very popular before the War.

After the War, the Company diversified and entered the pet trade with products such as Vetzyme, a conditioner for dogs.

In fact, it was not until the 1960's that Phillips expanded into aquatics, producing, at first, a granular fish food. Those were the days when most fish were fed on ants' eggs or biscuit-based foods. However, discerning hobbyists were already seeking superior foods of

higher nutritional quality. The breakthrough came with the development of the (now) ubiquitous flake which, for the first time, provided a balanced diet in a stable form. Phillips claim to be the first British company to produce a flaked food.

Today, the range of foods manufactured by Phillips include Tropical Flake, Coldwater Flake, Maxiflakes,

Aquatabs, Goldfish Granules, Fry Food (for Egglayers and Livebearers), Pond Pellets, Vegetable Diet, Holiday Blocks and High-vitamin Superfood.

The Company has its own factory in Leeds and it is there that all the various flakes are manufactured under the supervision of Dr. Jeffrey Ellison, the Technical Director. From Leeds, the flake is sent to the Company's plant at Park Royal in London for filling, packing and export (22% of the total).

Park Royal is also the base for the other Company Directors, Mr. J. Dew (Chairman), Mr. D. Thurston (Secretary), Mr. Alan Phillips (Sales Director and grandson of the founder), and Mr. Alan Burroughs, the Chief Chemist, who has recently joined the Board.

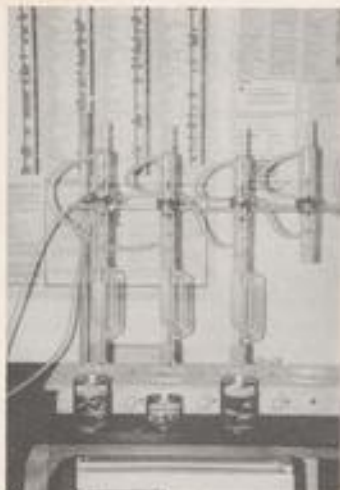
In June 1982 vandals set fire to the Park Royal premises. This resulted in the total destruction of the manufacturing and laboratory facilities. Walking round the rebuilt and redesigned site, one cannot help but feel admiration at the way that the Company has, not only overcome the disaster, but has used it as a springboard into the future.

The laboratory alone has cost £100,000 to build. It covers an area of 1,100 square feet and houses sophisticated apparatus, such as a Mass Spectrophotometer, plus a small bacteriological laboratory, both of which



The new warehouse built on the site of the fire





All products undergo stringent analysis in the Phillips laboratories play an important part in quality control and new product development. The laboratory also undertakes other technical services for the Company and deals with customer queries.

All of the Fish Food products sold by Phillips are tested at all stages of manufacture and packing. Samples of packed products are also retained and tested periodically to check their quality throughout their 'usage life'. Legislation and labelling claims on Fish Foods are such, nowadays, that the nutritional value of products must be carefully monitored and controlled. Therefore, analyses of Protein, Fat, Fibre and Ash content are carried out on a daily basis on the whole Phillips range.

The Fish Food industry is a highly competitive one. Phillips are, obviously, fully aware of this and seem to be facing the challenge in a scientific, orderly fashion, without cutting corners. This was quite evident during our visit, particularly in their high levels of hygiene which included specially designed (pressurised) ventilation systems to prevent the accidental flow of air between those areas concerned with products destined for human consumption and all the other departments.

Phillips still believe that, despite the horrendous fire of 1982, they will

continue to offer aquarists good value for their money for many years to come. Phillips Yeast Products Ltd. may be contacted at Park Royal Road, Park Royal, London NW10 7JX. Tel. No.: (01) 965 7533.



Spot-check being carried out on Aquatab production

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## COLDWATER FISHKEEPING

by Arthur Boarder

More than 100 pages containing invaluable advice on every aspect of coldwater fishkeeping from one of the world's leading authorities.

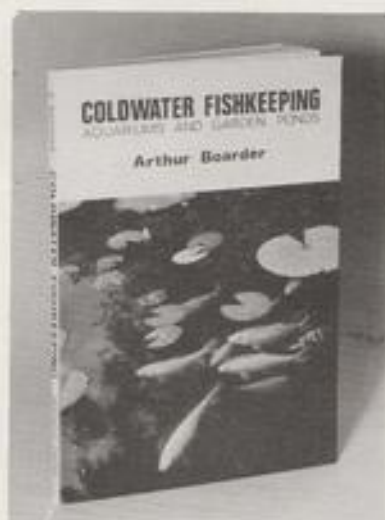
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# POOLSIDE PLANTS from SEED

DURING THE WINTER there are wonderful opportunities for examining the prospects of improving the look of your poolside plantings at a minimum of cost. As the price of smallish snippets of plants sold commercially range from about 60p to over a pound, the financial appeal in growing your own increases by a pretty horrifying factor every year. Most of the seeds I have been ticking off in the seed catalogues can be raised simply enough in either John Innes No 1 seed compost or a mixture of your own comprising  $\frac{1}{3}$  peat,  $\frac{1}{3}$  silver sand and  $\frac{1}{3}$  finely sifted garden soil. The seeds should be covered if they are on the large side, but the smaller ones do as well by being scattered on top of the compost. The boxes or pans in which you sow them must always be moist—never allowed to dry out—

## Part 1 by Roy Pinks

Primroses will provide colour for a long period if the soil is kept moist







though waterlogging will nearly always result in failure. They are best placed in cold frames or under cloches in about April, and protected from hard frosts which lift the soil and play havoc with the emergent plantlets. Most of the small plants may be moved on to nursery beds when about as round as a 10p piece, and again they must be kept well watered during the summer.

#### Seeds

Last autumn I browsed through the very fine catalogues produced by Suttons, Dobies and Thompson & Morgan. All are a great credit to the seed industry, and one may order by post from these firms with complete confidence. On receipt, the seed packets should be stored in a cool dry place until you decide to sow them.

Taking Suttons first, I earmarked three useful springtime species. The first was *Anemone pulsatilla*, the Pasque Flower, which produces foliage resembling that of a carrot, from which its wonderful cup shaped flowers of pink, maroon and mauve emerge, always somewhat surprisingly. The furry buds are long and attractive, welcome sights after cheerless winters. This is a plant which can be tucked away beside other more prominent subjects which flower later: it never gets in the way and is quite undemanding. You get a lot of seeds for your money and they germinate well, so the yield is usually very high. Height is about 9 in. Plant them in the foreground, marking their places with labels so that you will know where they are when the foliage has died away. (No 218-40p). Much better known are the Cowslips (1362-30p) and Mixed Primulas (2334-35p), both of which have been tremendously improved in recent years, and which give an astonishing display from early spring onwards. The latter packet will provide you with some nice surprises and may whet your appetite for some of the more specialised forms in later seasons. The thing to remem-

ber with primulas is that they must always have moist quarters, but given this they will provide both colour and form for many months of the year. They are best in the foreground or slightly further back. If you want to achieve a splash of colour right into the winter it is worth investing in some of the Polyanthus Triumph strains. The Blues (2957-70p) which I raised a year or so ago have provided startling spring colour, and then after resting for a time in the summer put up a really brave show in the autumn until decimated by severe frost.

For later flowering I suggest a little known miniature creeping or carpeting plant known as *Arenaria* or Sandwort. It has thinnish foliage and the purest of white flowers. My own packet provided dozens of plantlets which took kindly to their nursery bed and transplanted quite well to their final places, the only losses being due to under-watering. This is something for the foreground, again, or for interplanting with taller subjects. Though the flower resembles the popular Snow in Summer, it has none of its bad habit of smothering everything else within reach. It is most useful in setting off other colours to best effect. (489-30p). Almost in the same breath comes that old favourite Thrift (*Armeria*), but the dwarf types are so improved that they seem to come from a stable all of their own. The white varieties are particularly useful, but whatever the colour of the flower, the attractive closely matted tufted bases are wonderful for filling in odd patches of open soil almost anywhere. Here is ground cover *par excellence*, as no weed will ever grow through this sort of thicket. (497-35p).

Every year I include a packet of *Lobelia cardinalis* (2277-50p). This is a half hardy subject, producing a long red leaf and a scintillating, quite startling red flower. Happy either in water or on land, this will usually flower from seed sown the same season, but if given some winter

protection it will go on from year to year. Heaven knows what mine will have done last winter after a record -36F, but if any pieces do survive I think I shall submit them for a medal of some kind. Even so, this is a plant of the highest merit. It will grow to about 2ft, so situate it in the middle of your planting beside the pool, otherwise put a dozen or so together in the pool itself, let them flop over one another for a few weeks, then they will sort themselves out and throw up high their amazing flowers to delight you beyond measure, then you will be hooked on them, like me, for all time.

#### Perfume

In the midst of such colour as you can conjure from the poolside from this recipe, do try also to introduce some perfume. Whilst there are many other candidates, the glorious Night Scented Stock (*Matthiola bicornis*) must reign over all. A miserably thin flower by day, this opens up near evening to lay its fragrance far and wide, and when this hovers near water it seems to improve in quality and mystery. Only an annual plant (2416-28p) it is not untidy nor does it drop its leaves. When its job has been done at the turn of the season it is easily pulled up and composted with a prayer of thanks. It will be noted that most of the plants in these two articles are unlikely to cause trouble with falling leaves or over-production of foliage, such traits being a nuisance in terms of pool cleanliness. It is most unfortunate that many people plant deciduous subjects or annual plants near pools, often attended by heavy petal fall. The resultant herbage regrettably finds its way into the pond by the most devious and unexpected means, and can cause a lot of trouble during winter periods when the surface is laden with ice. In the second of these articles I will discuss some of the species at present in the lists of Dobies and Thompson & Morgan.



# Your questions answered...

Having problems? Send your queries to our panel of experts who will be pleased to be of service. Every query receives a personal answer and, in addition, we will publish a selection of the most interesting questions and responses each month. Please indicate clearly on the top left hand corner of your envelope which department you wish your query to go to. All letters must be accompanied by a S.A.E. and addressed to:

**Your Questions Answered, The Aquarist & Pondkeeper,  
The Butts, Brentford, Middlesex TW8 8BN.**

## TROPICAL



Dr. C. Andrews

## Tropical



### rams . . .

Can you provide some information on Ramirez's dwarf cichlid?



This fish, affectionately known to aquarists as the 'ram' is a marvellous aquarium fish—although a little delicate. It should be provided with well filtered water, which is soft and slightly acid, and maintained at a constant 25-26°C. You should offer a range of good quality flaked foods and some 'safe' live foods. There should be plenty of hiding places in the aquarium, and every 2-4 weeks 25% of the tank water should be removed and replaced with fresh. Please note that rams do not like unconditioned tap water or dirty tanks!

### cloudy water . . .

Although my fish do not seem to be unduly worried by it, the water in my aquarium has suddenly gone very cloudy. What could have caused this and how can I put it right?

In an aquarium, cloudy water can be caused by a number of factors, including overfeeding, the use of

unwashed gravel or rocks or even an algal 'bloom'.

Assuming your tank water does not smell unpleasant, you are probably not causing the problem by over-feeding. (You should, by the way, feed your fish 2-4 times a day on a good quality flaked food, offering only as much food as is consumed in a few minutes.) All new gravel and rocks should be well rinsed in running water before they are used in the aquarium (as they may be quite 'dusty'), and algal blooms are often caused by a combination of too much light, too few plants and (perhaps) overfeeding.

I have enclosed a copy of the "Complete Aquarists Guide", a booklet which was given away in instalments in last year's *Aquarist and Pondkeeper*. I think that you will find it helpful in getting your problem sorted out. I must admit that if the fish do not seem too upset, I would be inclined to reduce the feeding, ensure the filters are working properly (for at least 20 out of each 24 hours), and sit back and let the tank settle down itself. I would not advocate a 'total clean out'!

### tank volume . . .

I am at a loss with the various units of measurement used by aquarists. What is the easiest way to calculate the actual amount of water in my tank?

This may be achieved quite easily by multiplying the internal length by the depth of water by the internal width (all in centimetres). The resulting volume is expressed in cubic centi-

metres (cm<sup>3</sup>). To convert this to litres, it should be divided by 1,000. If required, litres may be converted to Imperial gallons by multiplying by 0.22.

Thus an aquarium measuring 60cm x 30cm x 30cm has a volume of 54,000cm<sup>3</sup>, which is equivalent to 54 litres (or approximately 11.7 Imperial gallons). In a set-up tank, about 10 per cent should be subtracted from the total (apparent) volume to allow for gravel, rock, etc., is present.

Further information on 'unit conversions' is summarised in the Table.

To convert	Into	Multiply by
cm	inches	0.39
metres	yards	1.09
metres	feet	3.28
litres	US Gallons	0.26
litres	Imperial Gallons	0.22
°C	°F	(°C x 1.8) + 32

\*pH (water hardness) ppm Ca CO<sub>3</sub> 17.9  
A pocket calculator is useful!

### 'pop-eye' . . .

What causes 'pop-eye' in fish, and how may it be treated?



A Snakeskin gourami with 'pop-eye'



**COLDWATER**

Arthur Boarder

**PLANTS**

Vivian De Thabrew

**KOI**

Hilda Allen

**MARINE**

Graham Cox

**DISCUS**

Eberhard Schulze

'Pop-eye' (or exophthalmos) may be caused by a number of factors and fish like oscars seem particularly prone to the condition. It may be caused by a bacterial infection, poor diet, poor water quality, internal (physiological) problems, etc. Treatment is difficult since the problem may be caused by such a variety of factors! So long as the pop-eye is confined to one fish (and is not spreading to others), and so long as the affected fish is feeding well and behaving normally, I would not worry. However, if you wish you may separate the affected fish into an isolation tank to observe how the condition progresses. A local vet may be able to help.

C.A.

**Coldwater****old wives' tale . . .**

I have heard that when new fish are introduced to a tank they have to be treated to stop them from being eaten by the other fishes. Is this true and what is used?

This is something new to me; I have heard some queer old wives' tales in my time but this one beats the lot. Goldfish and their varieties do not eat each other although they will eat very small fry. However, it is not likely that such small fishes would be added to a tank of adult fishes. The only point to consider when adding fresh fishes is to quarantine them for a week or so to make sure that they have no disease or pests. Small fishes should not be added to a tank which has much larger occupants as they may be deprived of getting enough food.

**missing eye . . .**

I have found that one of my shubunkins in the pond has lost an eye. The fish is otherwise quite healthy and as it is a good specimen, I would like to keep it but wonder if it should be destroyed to save it from suffering?

Do not think of destroying the fish. It could lead an almost normal life. It would soon learn to feed all right and as there is no sign of disease you could keep it for breeding as its potential would not be impaired in any way. I have known several fishes with one eye which have appeared little the worse for the loss.

**water-proofing . . .**

I wish to breed coldwater fishes and intend to convert old dog kennels to rearing tanks. I can make five tanks, each 15 ft. x 7 ft. and 3 ft. deep. They have sloping bases and drainage. The walls are painted with Snowcem over breeze block walling. Will they be water proof or shall I have to improve this feature. Can I fill the tanks from a near-by stream by the aid of a pump?

The Snowcem will not make the tanks water-proof. You will have to line them with a strong plastic liner, as long as the walls are strong enough to withstand the weight of the water they will hold. The alternative is to float over all the insides with at least an inch thickness of three parts sharp sand to one part fresh cement. This mixture should not be used too wet.

I do not like the idea of using water from the stream as it could contain

harmful minerals or chemicals washed from the land surrounding it. Also various pests and diseases could also be in the water. Use tap water and you will be safer. If a concrete lining is used the tanks must be well washed and left to soak for a few days to remove lime.

**water-lilies . . .**

How long will I have to wait for my water lilies to flower?



If the plants were seedlings it could take two years or more. If off-shoots from a mature plant, they could flower late the same year if planted in early April. You cannot divide until side shoots have formed. Off-shoots can show tiny buds when separated.

**change of colour . . .**

I have a number of goldfish in my pond and a few of them change colour to paler shades as they grow; some even becoming silver. Why is this please?

This change of colour is usually through goldfish being allowed to breed in a garden pond indiscriminately. In consequence if there are many fishes with a tendency to lose colour as they age, this trait can be passed on to their



Good red/orange goldfish come from controlled spawnings

progeny. To keep a good red or orange colour in the stock it is imperative that spawnings are controlled carefully and no fishes are allowed to go back into the pond which show any signs of white or silver patches. It can take a few years to get a pure strain but it is worth it in the long run. Once a goldfish shows any white or silver on it, it is certain that it will not lose it but is more likely that the expanse of white will increase each year. If you wish to keep a good coloured stock you must remove all badly coloured fishes from the pond before the breeding season.

A.B.

## Plants



### planting medium for ponds . . .

During the past few weeks I have completed the construction of a garden pond, which has a surface area of approximately 80 sq. ft. A butyl liner has been used in the rectangular construction, with provision for marginal shelves at both ends and total of one length. I am now looking forward and in fact planning for 1984 spring planting, with all the (I hope) hard work behind me.

My main concern is the type of soil which I have to offer from my garden to use in the plastic container; the soil is not good, and personally I would rather not use it. For the sake of a few pounds at this stage I would prefer to obtain a suitable (i.e. compatible with fish) compost from a garden centre, if you can recommend its use. I am aware of John Innes

potting compost 1, 2 and 3, and also aware each one contains a certain amount of fertiliser, which may harm fish.

The best thing for you to do would be to ask your garden centre to supply you with a basic compost without any fertiliser. There are some on the market which contain loam, sand and peat. Ideally, if you can, put a good layer of clay in the baskets along with your compost. This will be very beneficial for your plants, without harming your fish.

V.T.

## Koi



### home-bred koi . . .

Recently I have heard about and become interested in obtaining some British-bred Koi if possible.

I have had many losses with imported fish and would like to try, and hopefully later breed from some healthy home-bred stock; can you supply names and addresses?

It is always pleasing to hear from those readers who intend to establish themselves as Koi-keepers and breeders.

For too long there has been almost a sole reliance on imported fish which can and do suffer severe stress in transit and the fate of many small Koi is sealed before being sold.

I am enclosing the name and address of probably the most successful Koi-breeding farm in this country, and being situated in Essex it is not too far for you to travel. In fact, any potential Koi-keeper would be encouraged by the sight of thousands of home-bred Koi of all sizes showing what has been accomplished through many years.

### algae . . .

Since starting with Koi I have an increasing problem with the growth of algae and in particular blanket-weed.

Apart from the algae the pond filtration appears self-maintaining even after three years and quite able to cope with my stock. Any advice would be welcome.

This is a perennial query which is regularly answered to individual readers but with springtime it is opportune to publish your letter as by April the pond can best be treated with an aquatic herbicide before the growth becomes a real nuisance.



Crystal clear water in summer following spring herbicide treatment

The difficulty is that this product is only sold in expensive 10kg sacks, more than enough to treat 350,000 gallons of water at the prescribed rate. Obviously it is an advantage to belong to a Society where local members can purchase to economically share out the large quantity.

Any chemical that will inhibit the growth of algae must also retard or inhibit other plant life, so it is advisable to remove water lilies etc for two weeks or so.

The herbicide gives the impression of being slow-acting and it may be 2-3 weeks before any sign of "die-back" is seen, but it is long-lasting and very effective against blanket-weed which can grow several feet in length every day in summer if left untreated in the spring.

Photosynthesis by strong sunlight is a contributory factor to the proliferation of algae and some shading of the pond will be a deterrent, as well as protecting the Koi from the potentially damaging effects of ultra-violet radiation.

H.A.





## A-Z of the Aquarium

### Yawing

First use three techniques in swimming forward through the water. The first involves the rhythmic, sequential contraction and relaxation of the myomeres (blocks of muscle tissue) situated along the sides of the body. The second (which, in some species, plays an even more significant role than the first) involves movement of the fins themselves. The third makes use of the jets of water that are expelled through the gill covers as a natural consequence of respiration.

All three techniques are interrelated and may be used in various combinations, depending on a number of factors, such as the way of life, shape and size of the species in question.

Forward movement, unless deflected, will proceed in a straight line. When

a deflection occurs in the direction of movement of a swimming fish, instability results which, if not corrected, will have disastrous effects.

Any deflection can be resolved into three components: rolling (in which the dorsal/ventral axis is displaced), pitching (in which the longitudinal axis is displaced in an upward/downward direction) and yawing (in which the longitudinal axis is displaced in a side-to-side direction).



All the fins play a part in rectifying or discouraging rolling. Pitching is tackled, largely, by means of the paired fins, i.e. the pelvics and the pectorals.

Yawing seems to be the most difficult of the deflections to correct because it is a natural extension of the side-to-side contraction/relaxation produced by the action of the myomeres in locomotion.

Clearly, one way of minimising the amount of yaw movement is to develop some form of resistance to the lateral forces that cause this type of deflection.

In most cases, fish which exhibit relatively little yaw have sail-like dorsal and/or anal fins, laterally compressed bodies, or a combination of both. Good examples are Angelfish (*Pterophyllus* spp). In other cases, yaw is avoided by delegating responsibility for forward movement to the dorsal and/or anal fins, as in some Knifefishes, eg, *Notopterus chitala* and *Papyrocranus afer*.

Conversely, dorso-ventrally compressed fish tend to exhibit a relatively high degree of yaw. Many of these, however, like the Banjo Catfishes, eg, *Banoccephalus* spp, are sedentary species and are, therefore, not influenced greatly by yaw.

### Zebbras

WITHOUT a doubt, the most common of the Zebbras is *Brachydanio zebra*, the Zebrafish or Zebra Danio, which belongs to the largest Family of fish, the Cyprinidae. For fuller details of this species (and other Danios), see A-Z of the Aquarium, May 1983.

At the other extreme, perhaps the least-known of the Zebbras is the Zebra Blenny, *Meiacanthus grammistes*, one of the tropical representatives of the Family Blenniidae, also known as the Combtooth Blennies. *M. grammistes* is an attractive fish which tends to be more 'outgoing' than other Blennies but has hardly (if ever) been seen in UK.

The Zebra Moray, *Echidna zebra*, belongs to the Muraenidae, the same Family as the 'Common' Moray, *Muraena helena*, and the beautiful Blue Ribbon Eel, *Rhinomuraena ambonensis*. *E. zebra* can grow to 1.2 metres in length (approx. 4 ft) and is, therefore, only suitable for the aquarium when young.

Among the Cichlidae, the label 'Zebra' is carried by the Zebra Cichlid, *Cichlasoma nigrofasciatum*, otherwise known as the Convict Cichlid. Although this fish carries zebra-like lines on its body, it is one of the few (probably the only) of the 'Zebbras' not to have this term (or a similar one) as part of its scientific name. Instead, the black stripes are indicated in the name by the Latin equivalent, *nigrofasciatum*.



*S. nigrofasciatum*

The Zebra Cichlid is one of the smaller Central American species, growing to a length of about 10 cm (approx

3½ in). It is a great digger, a voracious feeder, and a rather aggressive fish which, nevertheless, can be kept in a shoal, as long as the tank is roomy enough and provides adequate shelter.

Surprisingly, the 'original' *Pseudotropheus zebra*, despite its scientific name, is not generally known as a 'Zebra'. Instead, it has often been called the Blue Cichlid, although some of its numerous colour morphs have (with greater or lesser appropriateness) been so labelled, eg, the Cobalt, Pink, Red, Tangarine, Powder Blue and Orange Blossom Zebbras.

Among the Gobies (Family Gobiidae), *Zeburus zeburus* is known as the Zebra Goby. It is a small, 4.5 cm (1½ in), inshore fish which has not yet made an appearance in the UK marine hobby. In the wild, it is found along Mediterranean coasts.



*Zeburus zeburus*

## Yolk



16-hr-old Gourami eggs

ALL fish start life as a fertilized egg with a certain amount of yolk.

In some, the amount present is just sufficient to allow for partial development of the embryos which are then born in an 'incomplete' or larval state. This is usually the case in species that produce very large numbers of small eggs. Good examples may be found among the Cods (*Gadidae*) and Plaice (*Pleuronectidae*) in which females can lay several million eggs (*Gadus*), or over 100,000 (*Pleuronectes* and *Hippoglossus*), in a single spawning.

At the other end of the scale, some species produce fewer, but larger, eggs which are sufficiently rich in yolk to allow more or less complete develop-

ment of embryos. Suitable examples may be found among those Sharks and Skates which produce hard egg cases, such as Mermaids' Purses, and among many of the common Live-bearers.

Irrespective of the type of egg produced, the yolk inside performs the same function, i.e., it is the embryo's main, initial food supply.

By definition, development involves growth, and growth cannot take place without protein. Chemical analysis of yolk reveals it to be predominantly made up of proteins and fats. Of these, the proteins are generally utilized first, with fat metabolism being delayed until the late pre-hatching or early post-hatching stages.

The proteins in the yolk are first broken down into their component amino acids by enzymes (themselves proteins) and then re-assembled by different enzymes into the complete range of 'new' proteins required by the developing embryo.

Fish eggs are categorised as being Telolecithal. This means that the yolk is more or less concentrated towards one of the 'ends', the Vegetal

Pole (the opposite one being the Animal Pole).

In some types of fish, notably some Sturgeons (*Acipenseridae*) and Lungfishes (? *Lepidosirenidae*), the whole egg, including the yolk, divides during the early stages following fertilization.



This is the egg of a livebearer, *Ameo splendens* showing Meroblastic Cleavage

This is known as Holoblastic Cleavage. In most fish, though, the yolk remains undivided and cleavage is restricted to the cytoplasm which is either concentrated at the Animal Pole or else is thinly distributed around the yolk. This type of division is known as Meroblastic Cleavage and results in an embryo which floats on the surface of the yolk.

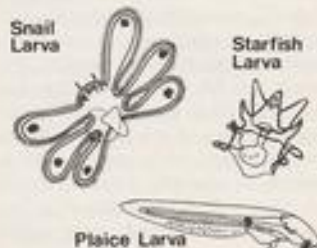
## Zooplankton

The term Plankton is given to those organisms (plant and animal) which spend part, or all, of their lives drifting freely in water currents (both fresh-water and marine). Those organisms whose whole life is spent in this way are referred to as the Holoplankton. The Meroplankton is made up of immature stages in the life cycle of organisms which will later live in a completely different environment.

These terms do not, however, distinguish between the plant and animal components of the Plankton. In order to do this, there are two biological categories:

- the Phytoplankton—made up of plants and,
- the Zooplankton—made up of animals.

Other terms, such as Mega-, Macro-, Micro-, Nano- and Ultraplankton are used to refer to the size of the organisms, irrespective of their nature.



Almost every major group of animals has, at least, one representative which spends part, or all, of its life as a member of the Zooplankton. These include species of Coral, Echinoderms (Urchins and Stars), Molluscs (Bivalves, Snails and Nudibranchs), Jellyfishes, Crustacea (Crabs, Shrimps, Prawns and Lobsters), Worms and Fish. Added to this are countless numbers of Protozoa and other 'lower' microscopic animals.

So many of the species that are available to marine aquarists have meroplanktonic larval stages that the successful captive breeding and rearing

of these is likely to constitute a major hurdle for years to come.

An idea of the size of the problem can be gleaned from the following list made up (just) of British fishes which have planktonic eggs or fry: Sprat, Herring, Pilchard, Mackerel, Cod, Pout, Whiting, Hake, Pollack, Haddock, Three- and Five-bearded Rockling, Plaice, Lemon Sole, Turbot, Brill, Flounder, Dab, Grey Gurnard and Dragonet.

Notable among the common 'tropical' marine fishes are the Wrasses (*Labridae*), the Parrotfishes (*Scaridae*) and the Surgefishes (*Acanthuridae*), the last of these having a transparent planktonic larval stage known as the Aconurus stage.

The planktonic stages of many animals are so different to the adults that correct identification is often extremely difficult. As a result, relationships within the Zooplankton, between it and the Phytoplankton, and between both and adult stages are, often, little understood.



Continued from page 38

stockist for details. Do not forget that the Tetra filters (like most other filters) must be left running for at least 20 hours per day for maximum efficiency.

The need to monitor the nitrite content in ponds has been mentioned. The same applies in aquaria, especially as small fish begin to grow. Koi kept in dirty, poorly filtered tanks with unsatisfactory water quality will exhibit poor growth and become more susceptible to a range of diseases—so be warned!

In addition to good filtration and sensible feeding, regular partial water changes (25% every 7-14 days) are a good idea as the small Koi grow into larger Koi. For a variety of reasons (e.g. chlorine, copper ions, etc.) fresh tap water can have adverse effect on fish, and the use of AquaSafe to condition all tap water for aquarium use is recommended.

The Tetra water treatments also include *FungiStop* and *General Tonic* (as already mentioned), along with *ContraIck 80* (a really safe treatment for the white-spot parasite, *Ichthyophthirius*). All these are suitable for use in the Koi rearing tank to combat specific problems.

For further information on the Tetra range (or advice on fish-keeping problems) contact Dr. C. Andrews at the Tetra Information Centre, P.O. Box 27, York YO2 2ZZ. Trade enquiries concerning the Tetra range should be directed to Tetra, Mitchell House, Southampton Road, Eastleigh, Hampshire SO5 5RY.

#### Koi in distress?

1. Check the pH.
2. Check the nitrite content.

#### Profile on Cyprio

CYPRIO LIMITED may be a new name in the aquatics industry but they can lay claim to considerable expertise in the field through their Managing Director, Malcolm Goodson, who is a recognised authority on wastewater treatment and fish farming technology.

Over the last 12 years they have developed several purification systems for maintaining water quality on fish farms which are now in wide use in

3. Check the water temperature.
4. Note any abnormal symptoms.
5. Contact a local Koi group, a vet or the Tetra Information Centre.

#### SPECIALIST KOI GROUPS

**British Koi-Keepers Society,**  
c/o Mrs. E. Liddicoat,  
4 Hilltop Avenue,  
Blackley,  
Manchester,  
M9 2PF

Many local meetings too.

**Yorkshire Koi Society,**  
c/o Mr. J. Morris,  
4 Orchard Way,  
Hensall,

**North Humberside**

With members across the country.

Please enclose a S.A.E. when writing for details.

#### SOME COMMON KOI PROBLEMS

Symptoms	Disease	Treatment
White-grey cotton wool-like growths on skin, fins	Fungus ( <i>Saprolegnia</i> , etc.)	Aquaria: add recommended doses of a proprietary fungus treatment Ponds: isolate affected fish into a treatment tank, and treat as above
White pimples on skin and fins	White-spot ( <i>Ichthyophthirius</i> parasite)	Add the recommended dose of a proprietary white-spot treatment to the tank or pond
Fin rot, tail rot	Often a localised bacterial infection	Aquaria: add recommended dose of a general fish tonic Ponds: isolate affected fish into a treatment tank, and treat as above
White-pink waxy coating to skin and fins	Fish pox (a viral infection)	Not usually dangerous to the fish and will often disappear with time. Treatment not possible
Ulcers, red vent, reddening at base of fins, etc.	Generalised bacterial septicemia	Isolate affected fish, contact a local vet and attempt antibiotic therapy
Folded fins, shimmying rapid gill movements, reddened areas on body	Various bacterial or parasite infections	Aquaria: add recommended dose of a general fish tonic Ponds: isolate affected fish into a treatment tank and treat as above
Slimy grey coating to skin, rapid gill movements, scratching against rocks	External parasite infestation	Aquaria: add recommended dose of general fish tonic Ponds: isolate affected fish into a treatment tank, and treat as above

the UK and abroad, and are also employed on their own fish farm in the cultivation of ornamental fish species.

In response to a recognised demand from the ornamental pondkeeper for a simple and economic biological pond filtration system, in 1983 they launched a range of pond filters under the trade name Cyprio Biofilters. These subsequently received enthusiastic acclaim both from the public and

aquatic press; over 2,000 units being sold in the first year of production.

As in all good ideas the concept is basically very simple. In place of gravel which is inefficient and blocks quickly, Cyprio use a special non-toxic open-cell foam material as the filtration media, over 98% of which is holes. Unlike other plastic foams this material is totally perforated.

Continued on page 53

# Tomorrow's AQUARIST



## DESIGN-A-FISH COMPETITION RESULTS

(Sponsored by Tetra)

First of all, thank you very much for your fantastic response. We had entries coming in right up to the closing date itself. Some were even block entries from schools. As you can well imagine, judging has been extremely difficult—your ingenuity knows no bounds! In the end, the following were judged to be the winners. To all those of you who entered but did not win, we say, "Watch this space in the coming months for details of new, exciting competitions. You may well be lucky next time round." To those who won—sincere congratulations. We look forward to hearing from you again.

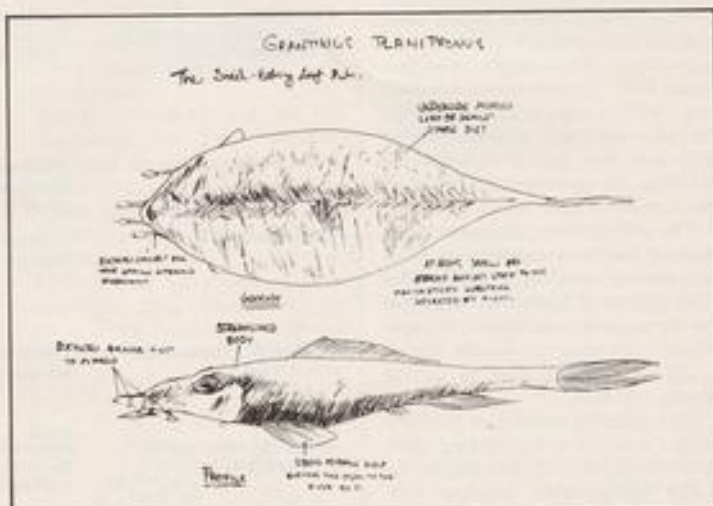
**First Prize:** £20 worth of Tetra products, including Tetra Min Staple Food, Doro Min Food Sticks, Tetra Conditioning Food, Tetra F.D. Tips (Freeze-dried Food), Tetra Aqualife and a copy of Tetra's "Tropical Aquarium Fish" by Dr. Ulrich Baensch plus free subscription to the *Aquarist* and *Pondkeeper* for a whole year.

### UNDER 15 WINNER

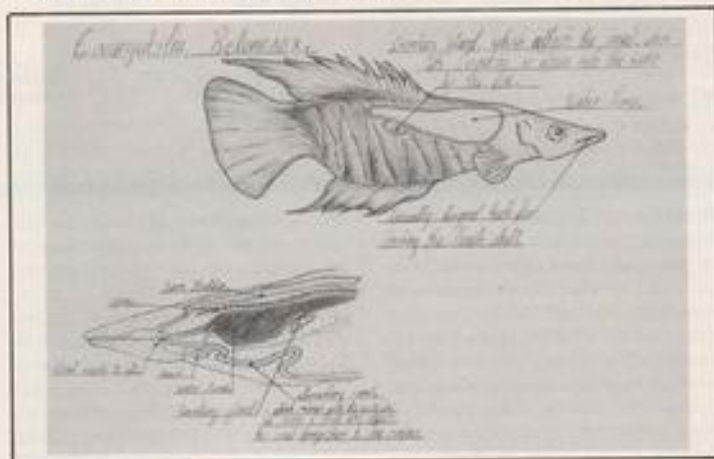
Andrew Grant, (age 14 years)  
45 Cameron Street,  
Dunfermline,  
Fife,  
Scotland, KY12 8DP.

### OVER 15 WINNER

Robin Tanner, (age 16 years)  
"Shaw's End",  
Rochester Way,  
Crowborough,  
East Sussex, TN6 2DR.



Andrew Grant's intelligent winning entry in the under-15 age group



Robin Tanner's brilliant *Escargotilla*—winner of the over-15 section



**Second Prize:** Tetra Starter Kit which includes Tetra Min Staple Food, Tetra Tabi Min (Tablet Food), Aqua-safe, Tetra Bills-Filter, Nitrite Test Kit, a copy of *Beginner's Aquarium Digest*, Tetra Pisces Thermometer and one issue of *Aquarium Digest International*.  
Plus free subscription to the *Aquarist* and *Pondkeeper* for six months.

**UNDER 15 WINNER**

Nell Barnes, (age 13 years)  
4 Southwinds,  
Deepdene Drive,  
Dorking,  
Surrey, RH5 4AD.

**OVER 15 WINNER**

Nicola Gill, (age 16 years)  
Headlands School,  
Cricklade Road,  
Swindon,  
Wiltshire, SN2 6BQ.

★ ★ ★ ★ ★ ★ ★ ★

**Third Prize:** A copy of Tetra's "Tropical Aquarium Fish" by Dr. Ulrich Baensch.

Plus free subscription to the *Aquarist* and *Pondkeeper* for six months.

**UNDER 15 WINNER**

James Hollingsworth,  
(age 13 years)  
29 Parkfield,  
Horsham,  
West Sussex, RH12 2BG.

**OVER 15 WINNER**

Simon Needham,  
(age 16 years)  
28 Oakwood Drive,  
Leeds,  
West Yorkshire, LS8 2JB.

★ ★ ★ ★ ★ ★ ★ ★



*Continued from page 51*

The small pore size and large surface area of the filter foam, provide excellent filtration of solids, but in addition the voids provide homes for millions of biological organisms which break down the chemical pollutants produced by the fish, and filter out harmful bacteria,

thereby maintaining the pond in a clear and healthy state. The Cyprio Biofilter is over 10 times more efficient than gravel filters. Cleaning is simply achieved by removing the foam from the filter and washing in tapwater. With reasonable care the filter material will last several years.

Six Biofilter models are now available for ponds from 100-10,000 gallons capacity at prices starting at £13.90.

Consistent with their policy of providing a professional service to the public and to the trade they are pleased to offer a free advisory service on all aspects of pond filtration.

# WHAT IS YOUR OPINION?



by B. Whiteside,

B.A., A.C.P.

'Photographs by the Author'

DR. CARRINGTON writes to say that he has recently become very interested in problems of water quality, since he is convinced that it has a great effect upon the success in growing plants—possibly even more so than its effect upon fish, in many cases. Some considerable time ago I sent Neville a few plants of Java fern—a plant that at that time was taking over several of my tanks. He tells me that the Java fern I sent him is still alive but that it has not taken over his tank as it did mine. When he tried it in tap water, it died; but by using soft water and peat in the tank he has at last managed to maintain a stable situation with the plant. Neville says that as soon as he has finished his experiments he will give me more details. I've just sent him a few more pieces of Java fern—and some Java moss.

It interests and intrigues me to note that two apparently identical tanks may not support the growth of identical plants; and the fact that at one particular time a specific plant may flourish in a given tank, while that plant may not do at all well in the same tank, say, a year later. I feel that shade plays an important part in the growth of some plants. Java fern is growing quite well in a couple of my tanks, but is not taking over any of them. In another tank,

where the whole of the base is covered with the plant, it is making very little growth—although it is not dying or fading away. The tank in question houses eight medium-sized angels which eat any floating plants of Indian fern that I place in the tank to shade the Java fern. The Java fern seems to grow well in tanks where the surface is shaded by Indian fern.

The irony is that in other tanks, Indian fern has been growing like wild weeds. Five of my tanks had become almost smothered by floating plants of Indian fern (water sprite)—and when I cleared out the excess plants I managed to fill a standard, black, polythene dustbin liner about one third full of plants. I presented the plants to Mr. Billy Coats, the groundsman at the school where I teach. I'll be able to give pupils some additional plants of Indian fern. Photographs 1 and 2 show Indian fern and Java fern, and other plants. My couple of plants of *Bolbitis heudelotii*, which I call African fern, are now growing quite well, if still rather slowly. I suspect that the heavy covering of Indian fern on the water surface encouraged the growth of both African and Java fern plants.

Mr. Tam Cunningham lives at



Indian fern—*Ceratopteris thalictroides*—with baby plantlets on leaves



*Microsorium* (Java fern)—adult plant with young plantlets on mature leaves

27 Shielhill Place, Stanley, Perth, Scotland, and he wrote: "I have been keeping Oscars (photograph 3) for nearly a year now. I bought two 3½ in. Oscars in January 1983, at £4.50 each, which I thought was quite a bargain. My two children, Thomas (7) and Paula (2½) immediately christened them Ossie and Ollie. What first surprised me about them was that a fortnight after I bought them they started eating Tabi-Min tablets out of my hand. One morning I got a big shock when preparing to feed them. Ollie couldn't wait and leaped right out onto the carpet. Well, I also have a cat and I didn't know what to do first: catch Ollie, or dispose of the cat. As it turned out, the cat was terrified of this big fish flapping around on the carpet. I grabbed the fish and stuck it back in the tank. Apart from a few missing scales, and Ollie sulking in the corner for hours, he was none the worse for his high jump escapade.

"Shortly after this I got two severums from a friend. Each was about 5 in. in length. A few fights followed but after a week or so relative peace reigned. I then got a 6 in. Apollo shark for £4.50—the shop wanted £6.00, but after three weeks' haggling I got it for £4.50. The shark was petrified for the first week; but now, at 8 in., he just makes sure that he's



at the opposite end of the 53 in. x 15 in. x 12 in. tank. Eventually I lost Ollie through a terrible case of pop-eye. The family was in mourning all day! Well, now Ossie is 8 in. long and living in relative harmony with the two severums, the shark, a firemouth and a big sucking loach."

Mr. Melvin Cooper resides at 5 Union Street, Trecynon, Aberdare, Mid-Glamorgan, and writes: "After a lapse of six years I have again started keeping tropical fish. After selling off my 2 ft., 3 ft., 4 ft. and 2 ft. 6 in. tanks, along with 125 fish, many of them show size, so that I could pursue other interests, I have now bought my own house, which gives me a great chance to start again.

"I have started off with a 3 ft. tank, which to keep my new wife happy, was stocked with the usual variety of community fish. My wife loved them and has virtually taken over feeding them. I have noticed a few changes since I last kept fish, the main one for me being the introduction of the internal power filter. When I was advised to install one of these I was a little bit dubious, but I went ahead and bought a Rena 305. I was amazed at how quiet it was—no bubbles driving me mad at nights: a far cry from the noise of pumps and under-gravel filters. Also, the water remains crystal clear, and the fish and plants healthier.

"In the January issue you asked about lighting. I use a 3 ft. Gro-Lux tube kept on for 14 hours daily. The plants thrive under these conditions and regular thinning out has to be done to keep the plants tidy. My stock of 10 *Vallisneria*, for instance, has increased to over 40 plants, slowly taking over one half of the tank. I will be buying a 4 ft. tank soon, along with a breeding tank, and I will write again to let you know what fish I stock it with, and my fish breeding successes."

Master Marcus Denne is 12 years old and his address is 10a Church Street, Great Shelford, Cambridge. He says he has "a keen interest in cichlids, piranha, coldwater fish, lizards, toads, newts and snakes. All

of these are rightfully becoming more popular. The piranha is one of the most timid fish of all; mine won't touch meat or fish and has to be content with flake food. I also have two wall lizards, one of which blows up its throat and opens its jaws, then bites the other one in the middle. Is this a courtship display? If anyone knows what is happening, please tell me—as I have no idea.

"I first started keeping cichlids when my community fish died after I bought a new batch of fish. At the moment I have one Oscar, two Jack Dempseys, two firemouths, one jewel, one blue acara, one rainbow cichlid, one opaline gourami and one 1 in. red-tailed black shark—which hasn't grown



Oscar — *Astronotus ocellatus*

in one-and-a-half years. Remarkably, it is also untouched by the other fish. As for plants, I have *Vallisneria*, Amazon swords and *Egeria densa*. The fish just ignore the plants—which proved that the experts can be wrong, occasionally.

"My convict cichlids, of which I have two, seem to have paired off and have taken over a flower-pot; but I do not know if they are a pair. Would they breed in my aquarium? How do you sex convict cichlids? The rainbow cichlid is a very pretty yellow and black fish growing to about 7 in. I was surprised to find that they cost around £4 each; I bought mine, at a ½ in., for 15p.

"For anyone who has a community

aquarium, here is a warning: don't buy any gouramies! They are the most aggressive fish I know. All my experience with them has led to disaster—particularly when kept with smaller fish; but they are hardy and certainly attractive. Has anyone else had problems with gouramies—in particular, keeping two of them together?

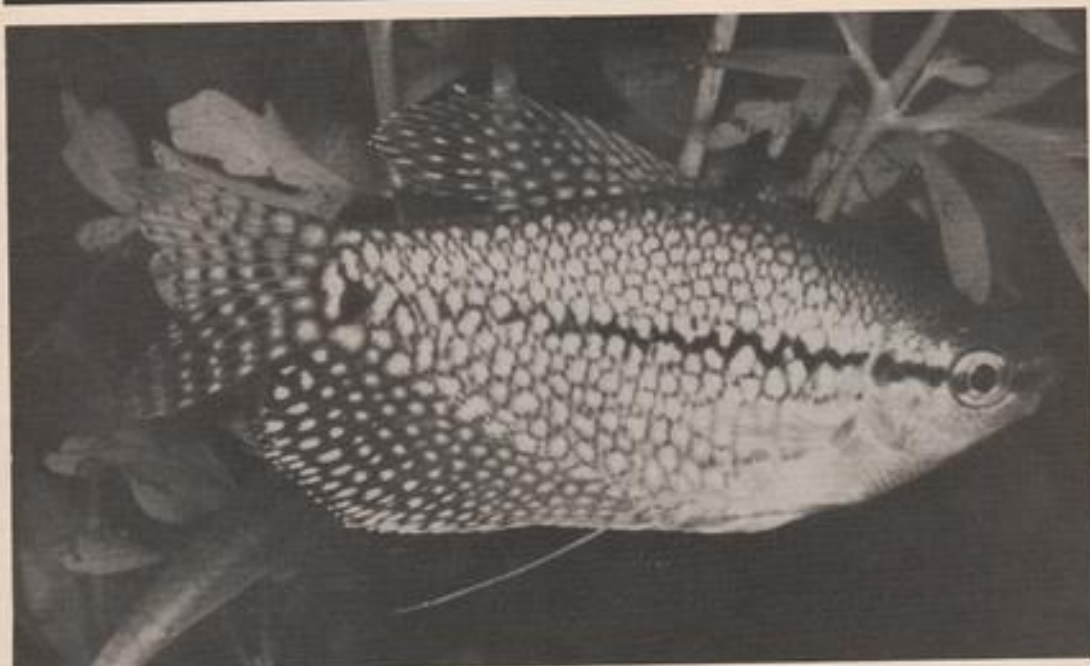
"My favourite fish of all must be the Jack Dempsey, another very beautiful and hardy fish. It is also very aggressive. The last pair I had, though they were quite young, killed each other within two weeks of purchase. One of the beauties of cichlids is not only their low price, their being colourful or their being interesting, but also their being intelligent

and remarkably tame. If anyone else has had experience of cichlids, please contact me because I don't know of any clubs here.

"The moral of this letter is that if you are thinking of specialising, or buying your first aquarium, take a look into the cichlid community. You might get hooked—as I was!"

Photograph 4 shows a pearl gourami. Please send me details of your experiences with this species.

My thanks to the two main koi organisations for copies of their latest magazines; and to the Anabantoid Association of Great Britain, for the latest issue of *Labyrinth*. Newsletter No. 12 contains 14 pages of interesting



Pearl gourami

information. In an article called *The importance of biologically conditioned water*, Hilde B. Fraser, of Welwyn, Herts., expands the idea that new fish should do better in a new tank if at least some of the water in the new tank is taken from an established aquarium—as long as the established aquarium is disease-free. Numbers of aquarists have been mixing old water with new water for many years. It's also useful to mix some 'old' aquarium gravel with new gravel when setting up a new aquarium, to 'seed' it with useful bacteria. An 'old' filter, i.e., used but clean, may also usefully be fitted to a new tank to 'seed' it. An examination of in-use filters and filter tubes will usually show gelatine-like collections of bacteria. Bottles of 'patent' water treatments, for new aquarium water, contain substances intended to protect the mucosal covering of fishes.

Mr. George F. Yallop's home is at 2 Colmans Cottages, Colmans Cross, Launceston, Cornwall. He writes:

"... Since I started keeping fish again about a year ago, I have bought *The Aquarist* and (a competitor) every month to compare them. I have had *The Aquarist* since the 40s. When the *Petfish* magazine started, back in the 60s, I used to take that as well—plus *T.F.H.*, and old William Innes' *Aquarium*. As you may have gathered, I was what could be termed 'A right tankomaniac!' I still prefer *The Aquarist* and notice that many of the old writers still contribute. Although I spent a couple of years in Malaya and kept many locally-obtainable marine fishes in home-made tanks back in 1952, I have never been keen enough to bother with them in England. If a few fish succumbed to some weird lergy, or excess of chemicals, I simply used to set off to sea in my old aeroplane fuel tank, complete with a mossy net, and get some more. I was more addicted to creeping around the swamps and catching a great variety of fish—which I could not only keep but also breed, among thriving plants.

"The average person wishing to set up a tank from scratch these days must find the gear required to keep a long-term marine aquarium really thriving positively mind-boggling! I was approached by a local 24 carat Wurzel recently. He wanted to know how much it would cost to have 'One o' they sea fish tanks' installed. I gave him a rough idea of tank size, filters, salt requirements and heaters, etc., and he was amazed. I didn't mention anything like protein skimmers, ozonizers, nitrites, or other undesirable chemicals. If I had, he would probably have thought that he would need a qualified chemist to set it up, and a full steamer ticket to drive it!" (I hope to include more of Mr. Yallop's interesting letter in a future column.)

For a future feature kindly send me your opinions on: (a) breeding uncommon livebearers; (b) home-made fish foods; (c) cultivating *Cryptocoryne* species and species of aquatic ferns; and (d) breeding small cichlids. I look forward to hearing from you. Goodbye until next month.



# NEWS...

## SOUTH WEST



AT the A.G.M. of the Dorchester Tropical Fish Society held on 25 January, the following officers were elected: Chairman, Gerry Fitzgerald; Vice-Chairman, Peter Keeve; General Secretary, Don Young; Treasurer and Show Secretary, Barry Symes. The club also elected a new President, Mr. Colin Ansey, who has been Chairman since January 1981, replaces Ron Christopher who retired as President last year. Our thanks to Ron for his generous help and support in the past and best wishes to Colin for the future in his new post.

A programme of activities were planned for the whole year including monthly table shows, inter-club contests, trips to Aquatic centres, guest speakers and slide shows. The main event in the club's calendar of course is our 4th Open Show on Sunday, 23rd September; please make a note in your diaries. Finally, clubs are reminded that at this year's Show the new 'Grassley Trophy' will be presented to the Highest Pointed Visiting Society.

THE Torbay A.S. held its 26th A.G.M. in the St. Andrew's Church Hall, Shipway, Torquay, on 14th February. The following officers were elected: Chairman: Mr. G. Luffhouse; Vice Chairman and Publicity Officer: Mr. B. Smith; Hon. Secretary: Mr. R. C. Fletcher; Treasurer: Mrs. G. Luffhouse; Show Secretary: Mr. D. MacManus; Assistant Show Secretary: Mr. M. Matthews; Trophy Secretary: Mrs. R. Matthews. Four other committee members were also elected.

It has been noticed that attendance at meetings is far better in Winter than in Summer and for this reason it was decided that this year, meetings would be held twice monthly for nine months of the year but only once a month during June, July and August.

The society offers 4 warm welcome to any aquarists in the Torbay area, also anyone from other clubs who may be on holiday in the area.

As a change of venue is likely in the near future, anyone interested should write to the Secretary, Mr. R. C. Fletcher, 115a Winner Street, Paignton, Devon, or telephone the Publicity Officer on Torquay 314130 (evenings), before attending.

The club may be holding its first Open Show for quite a few years this year if a suitable venue can be found, so please watch this column for further news.

AT the A.G.M. of Portsmouth A.S. the following people were nominated for the committee: Chairman: Mr. C. Foster; Secretary: Mrs. J. Meredith; Treasurer: Miss W. Ryder; Vice-Chairman: Mr. S. Dooley; Assistant Secretary: Mrs. T. Lister; Librarian: Mr. J. Sykes; Shop: Mr. and Mrs. J. Stillwell; Raffle: Mrs. R. Frost; Table Show: Mr. W. Ryder; Publicity: Mrs. J. Meredith; Hosts: Mr. and Mrs. J. Stillwell; Registrar: Mr. T. Lister; Social Secretary: Mr. D. Forse.

Old members, new members and visitors are always welcome on the first and third Wednesday of the month, at Portsmouth Community Centre, Maline Road, Buckland, Portsmouth.

The Society wish to thank their former Chairman and Secretary, Mr. and Mrs. J. Stillwell for all their hard work and efforts over the last few years. Any communications to Mrs. J. Meredith, 13 Cranleigh Road, Portchester, Hants. PO16 5DH.

# From Aquarists' Societies

North Avon A.S. were privileged in February, to be addressed by Mr. Peter Cook, who delivered a fascinating talk on Rainbow Fish. Peter, clearly a dedicated specialist, vividly enlightened us in many aspects of these fish, including origins, habitats, and breeding. During the refreshment break, he very kindly judged a table show in the category of A. V. Livebearers, which resulted in 1st, 2nd and 3rd places going to Mr. G. Tanner, Mr. B. Hunt, and Master Matthew Round respectively.

More new faces were evident again this month, why not come along yourself and join our increasing numbers, we meet on the third Monday in each month at Harham Folk Centre, High Street, Harham, Bristol, commencing at 7.30 p.m. If you find our meeting dates awkward for you to attend, don't be deterred, contact the Secretary, R. W. Cummins, 1 St. Annes Close, Cadbury Heath, Warmley, Bristol BS15 5EH, and request a membership application form. On taking a membership you will be kept informed of the activities of the Society with our regular monthly Newsletter. Be assured that you will not be alone, we've a number holding membership in this way.

CLIFF and David Spence entertained members of Bristol A.S. with a selection of films from their library. These varied from the gardens and ponds at Compton Acres to developing Anolis eggs in Doug Paul's fishbowl.

Details and schedules of Bristol A.S. Show for Coldwater Fish on 15th September from Show Secretary, V. Caspali, 7a Walsingham Road, Bristol BS6 5JU (0272-426323).

## SOUTH EAST



F.B.A.S. OFFERS OVERSEAS SERVICE FOLLOWING a number of enquiries from overseas, the Federation of British Aquatic Societies has examined the possibilities of offering a service to overseas societies.

It is appreciated that not all of the Federation's many services enjoyed by societies in the U.K. can be practically extended to societies hundreds (or even thousands) of miles away. However, distant societies have expressed an interest in the Federation's work and published material. It is therefore with no little pride that the F.B.A.S. now opens its membership wider than the United Kingdom and Ireland.

Associate Membership of the F.B.A.S. is available to any overseas Aquarist Society that meets on a regular basis.

An Associate Member Society will be entitled to receive news of all F.B.A.S. activities, minutes of meetings, details of merchandising, complementary copies of Federation Books Nos. 5 (Constitution and Show Rules), 6 (Show Fish Sizes) and 7 (the new Yearbook), the quarterly Bulletin and the option to purchase copies of other publications for its own members' use at very advantageous discount rates.

Associate Members can be distinguished by their own badge and it is hoped that by this expansion of the Federation's services visiting aquarists from all over the world can be made to feel 'at home' whenever they visit the U.K.

The fee for Associate Membership of the F.B.A.S. (payable in Sterling please) will be £15.00 per year, plus appropriate postage on

Monthly reports from Secretaries of aquarist societies for inclusion on this page should reach the Editor by 3rd of the month preceding the month of publication.

publications or merchandising ordered (members can choose air or surface mail rates).

Application for Membership, or more details, can be obtained from: Mrs. Sylvia M. Brown, General Secretary of the F.B.A.S., c/o Arthur Road, Goodmayes, Eford, Essex IG3 9QU, England.

AT a recent meeting of the East Sussex Herpetological Society, Mr. Donald Wise spoke about the Hastings Country Park where, until last year, he had been 10 years the warden.

In February Dr. Trevor Beeber, a member of the British Herpetological Society's Conservation Committee, spoke to a packed meeting on "Amphibian Conservation in Sussex".

Dr. Beeber spoke of the decrease in numbers of frogs, toads and newts in recent years and what the Conservation Committee, formed in 1969, are doing to reverse this sad trend. He also spoke of the excellent opportunity for the promotion of amphibian conservation given by garden ponds where many of our frogs, toads and newts thrive.

Both these talks were illustrated with the speakers' excellent slides.

New members are welcome at the Society's meetings held on the first Tuesday of each month at Chelmsford Hall School, 71 Carlisle Road, Eastbourne, 7.30 p.m.

Further information can be obtained from the Secretary, Peter Martin, 20 Silverlands Road, St. Leonards on Sea, East Sussex TN37 7DE. Tel: Hastings 460995.

THE Guest Speaker at the February meeting of the East Kent Aquatic Study Group was Mr. Terry Walter. His demonstration of how to set up a miniature furnished aquarium, started with a small empty tank and ended up as a beautiful underwater picture, complete with fish, plants, rocks and gravel. The tank was much enjoyed by the members who attended the meeting.

Following a break for refreshments, there was an auction of secondhand fishkeeping equipment.

This month's table show was judged by Mrs. Walter and resulted: Cichlids: 1, J. Edwards; 2, T. Webber; 3 and 4, M. Martin, Dennis; 1, E. Webby; 2, T. Webber; 3, K. Webby; 4, D. Webby. Swordtails: 1 and 2, P. Edwards; 3, T. Webber; 4, D. Bridgeman.

Meetings held on second Tuesday of each month at the Memorial Hall, Belling, Herne Bay when guests will always be welcomed.

## NORTH



### CHANGE OF SECRETARY

Change of Secretary: Leicestershire A.S. New Secretary, Mrs. C. Wainwright, 45 Haringworth Road, Leicestershire LE5 6TL.

AT the A.G.M. of Preston & District A.S. the officers elected were: Chairman, Mr. S. Spencer; Vice-Chairman, Mr. P. Kelly; Secretary, Mrs. J. Crosswell; Treasurer, Mr. P. Kay; Show Secretary, Mr. W. Rawlinson; Librarian, Mrs. A. Kelly; Brooders Award Committee, Mr. P. Holden; Lay Members, A. Milligan, D. Pouch and E. Oates.

Meetings are held at Preston North End Supporters Club on the first Tuesday of every month. New members are always made welcome. All enquiries to be made to the Secretary, Mrs. Joyce Crosswell, Chorley 69312.

**British Killifish Association (North West Group)** show results. Class 1 Aploposomion and Retolia: 1, Mr. K. Wiltshire, Aploposomion lusitanum (Gombosi); 2, Mr. E. Brown, Aploposomion cognatum; 3, Mr. and Mrs. S. Clark, Aploposomion bivittatum (Fänge). Class 2, Notobrachius: 1, Mr. M. Agnew, Notobrachius foresti; 2, Mr. R. Brown, Notobrachius rufocaudatus; 3, Mr. S. B. Marshall, Notobrachius guntheri (Zanclus). Class 3, South American Anabantids: 1, Mr. and Mrs. E. Eyre, Pseudorasbora parvius; 2, Mr. R. Scott, Cynolebias indigenus; 3, Mr. M. Price, Cynolebias alexanderi. Class 4, Epilplatys and A.O.V.: 1, Mr. and Mrs. E. Eyre, Pseudoplatys amulianus (Monrovia); 2, Mr. and Mrs. S. Clark, Epilplatys dagiri (Monrovia); 3, Mr. R. Brown, Funduloscopus thierrii. Class 5, Rerodora Top and Bottom (Spawners): 1, Mr. and Mrs. E. Eyre, Aploposomion walkeri. Class 6, A.O.V. Pairs: 1, Mr. K. Wiltshire, Aploposomion ragnabachi (Nobben); 2, Mr. M. Price, Cynolebias alexanderi; 3, Mr. and Mrs. E. Eyre, Pseudoplatys aculeatus (Monrovia). Best Fish in Show: Mr. K. Wiltshire with Aploposomion lusitanum (Fombani).

## SCOTLAND



**Paisley & District A.S.** held its last meeting on 7th February, when the tableshow on the night was All Catfish, Loaches and Sharks. The results were as follows: Catfish—Seniors: 1, Bill Dunbar, Whiptail; 2, Ian Lindsay, Pseudorasbora; 3, Sandy Helman, Corydoras; 4, Bill Dunbar, Synodontis Docum. Juniors: 1, George Armstrong, Peppercorn Catfish; 2, Steven Robertson, Corydoras; 3, Andrew Irvine, Pseudorasbora; 4, D. Anderson, Peppercorn Catfish. Loaches—Seniors: 1, Bill Dunbar, Clown Loach; 2, Graham Harold, Clown Loach; 3, Ian Lindsay, Coolie Loach; 4, Andrew Johnson, Clown Loach. Juniors: 1, Robert Davidson, Coolie Loach; 2, George Armstrong, Coolie Loach. Sharks—Seniors: 1, Ian Lindsay, Black Shark; 2, Graham Harold, Red Tail Black Shark; 3, Ian Lindsay, Silver Shark; 4, Bill Dunbar, Red Tail Black Shark. Juniors: 1, Robert Davidson, Red Fin Shark; 2, Robert Davidson, Flying Fox; 3, George Armstrong, Red Fin Shark. The club meets on the first Tuesday of every month at 7.15 p.m. in the Museum & Art Galleries, High Street, Paisley. Everyone welcome, further details can be obtained from the club secretary, Mrs. E. Lindsay, 71 Wright Street, Renfrew. Phone: 041-689 5772.

## Dates for the diary

A monthly information column to keep you up to date on forthcoming events.

### APRIL

**1st April: HUNGORN A.S.** open show will be held at the R.I.C.C. Cannon, Helby, Nr. Ramcor, Cheshire (new venue). Plaques for all class winners, annual trophies, etc. Further information, schedules, etc., Ruth Mackle, 23 Adela Road, Ramcor WA1 4TL. Tel: 78999. (N.B.—New venue easily accessible from motorway. Maps will be sent with schedules if requested).

**1st April: SUDBURY A.S.** open show, to be held at Nenden High School, Quanton Street, Nenden NW10. Further details and schedules from: B. Wiltshire, 142 Joel Street, Northwood, Middlesex. Tel: Northwood 24450.

**1st April: ROTHWELL A.S.** joint open show with the WAKEFIELD A.S.

**8th April: CENTRAL MIDLANDS CICHLID GROUP** for "Cichlid Only" open show. To be held at the Parkside Middle School, Toddlerdy Road, Foston. Details and show schedules available from either Maureen Hall, 71 Saxon Road, Foston, Staffs; or Mick Kirkham, 10 Brackley Way, Rugeley, Staffs. 23 classes plus auction and other attractions.

**8th April: TAUNTON & DISTRICT A.S.** Annual open show at Youth and Community Centre, Tangier, Taunton. F.R.A.S. Championship Trophy, Class G, Tropical cichlids. Schedules and more information available from: T. W. Cole, Wildwater Cottage, Seacoch Owl, Hantsworth, Bridgewater. Tel: North Petherton 662505.

**8th April: LANARSHIRE A.S.** open show, to be held at Cranmer Community Centre, Willow Drive, Airdrie, Lanarkshire. Further details and schedules from: W. Bennett, 15 Couler Avenue, Wishaw, Lanarkshire.

**15th April: KIRKCALDY A.S.** annual open show at Hibernian High School, Bilsborrow Gardens, Kirkcaldy. Fish auction, tombola and canteen facilities. Schedules from A. Little, 104 Elgin Drive, Glenrothes, Fife.

**15th April: THE CROYDON A.S.** open show at The Endeavour Hall, Meffert Road, Thornton Heath SW16. Schedules are available from: L. S. Derrick, Secretary, 5 Glen-thorne Avenue, Shirley, Croydon, Surrey CR9 7ET.

**15th April: BISHOP AUCKLAND A.S.** open show will not be held at place previously advertised, for details of new venue contact: R. Brogden, 44 Ridgeway, North Gosw, Spennymoor, Co. Durham. Tel: 0381 516666.

**22nd April: OLDHAM & DISTRICT A.S.** annual open show to be held at Werneth Park, Oldham. Further information and show schedules can be obtained from: 9 Bronville Close, Chadderton, Oldham OL1 2RH; telephone 061-602 8200.

**22nd April: MALVERN & DISTRICT A.S.** 11th open show which is being held at St. Joseph's School Hall, Newtown Road, Malvern. Details and show schedules from: S. K. Yallop, 3 Moorfields, Yarkhill, Leobury, Herefordshire HR9 2TK. Tel: Trueman 562.

**22nd April: EAST KENT AQUATIC STUDY GROUP** 1st open show, at Catholic Social Club Hall, Clarence Road, Herne Bay. Show schedule from: J. Edwards, 14 Upper Lane Road, Margate, Kent.

**29th April: ASHBY FISHKEEPERS' SOCIETY'S** mini open show. Benching 1200-1400 hrs. Venue: Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe.

**29th April: HULL A.S.** open show.

**29th April: YEOVIL A.S.** open show at St. Michaels Hall, Yeovil. Schedules (s.a.p. please), from: T. C. Perry, 216 St. Michaels Avenue, Yeovil BA22 4NL.

**29th April: MERSEYSIDE A.S.** annual open show will be held at the Rainhill Village Hall, Rainhill, Lancashire.

### MAY

**5th May: SOUTHWEND, LUGH AND DISTRICT** open show, St. Clements Hall, Leigh-on-Sea, Essex. Schedules available upon the date.

**5th May: BRITISH MARINE AQUARISTS ASSOCIATION** Marine Seminar to be held at Dewsbury Club and Institute, Oates Street, Dewsbury, commencing 10.30 a.m. Guest speakers include Dr. David Ford and Richard Sykes. Members free, non-members 75p. For further details contact Mr. S. Preston, 16 Fountain Drive, Liveredge, West Yorkshire WF15 7PX or phone Heckmondwike 405367.

**6th May: WHITBY & DISTRICT A.S.** 10th open show to be held at The Spa Pavilion, West Cliff, Whitby, N. Yorkshire, judging 2 p.m. Further details from Mr. T. Wilson, Helehead Gardens, Whitby, N. Yorkshire.

**6th May: PAISLEY & DISTRICT A.S.** open show, Gallowhill Community Centre, Paisley. For further information, please contact the Secretary: Mrs. E. Lindsay, 71 Wright Street, Renfrew. Phone: 041-689 5772.

**6th May: I. & E. A.S.** open show at Monk's Dyke High School, South Lincs.

**6th May: PAISLEY & DISTRICT A.S.** open show to be held in Gallowhill Community Centre, Paisley. For further information, please contact the Secretary, Mrs. E. Lindsay, 71 Wright Street, Renfrew. Phone: 041-689 5772.

**6th May: STRETFORD & DISTRICT A.S.** open show at Hartford Community Centre, Canterbury Road, Davyhulme, Manchester. Secretary: D. Brightmore, 4 Malvern Grove, Salford 6, Manchester. Tel: 061-707-4300. Show Secretary: G. Cummins, 16 Royal Avenue, Urmston, Manchester. Tel: 061-746-0973.

**12th May: BOURNEMOUTH A.S.** annual open show will take place at Kinross Community Centre, Pelhams Park, Kinross, Bournemouth. Show schedules will be available after 1st April, from Show Secretary, Jack Jeffery, 13a Woodland Avenue, Bournemouth Dorset BH5 2DJ. S.a.p. will be appreciated.

**13th May: WILLENHALL AQUARIST GROUP** 1st open show will be held at the Frank F. Harrison Community Centre in Walsall. Details and schedules will be available from Alan W. Davis, 5 Star Close, Beeley, Walsall WS2 0LU, West Mids.

**13th May: KING'S LYNN A.S.** open show, Corn Exchange, King's Lynn. Further details from Dave Rye, Field End Close, King's Lynn, Norfolk.

**13th May: MACCLESFIELD A.S.** open show at Ryles Park County High School, Ryles Park Road, Macclesfield, Cheshire. For further information contact: Mr. J. Merriman, 10 Grange Road, Macclesfield, Cheshire. Tel: (0625) 22911.

**13th May: YORK & DISTRICT A.S.** open show at the Livestock Centre, Marston, York. Show Secretary, Mr. M. Fewell, 16 Seacroft Road, York.

**13th May: THROCKLEY A.S.** open show will be held in the Grange Centre, Newburn Road, Throckley, Newcastle on Tyne. Children's video show. Good prizes. S.A.E. please for schedules to Mrs. D. Lakay, 51 Herby Green, Throckley, Newcastle on Tyne NE15 9PX. Tel: 0631-677236.

**19th May: BRITISH MARINE AQUARISTS ASSOCIATION** Marine Seminar to be held at Uxbridge Scout H.Q., Rockingham Road, Uxbridge, commencing at 10.30 a.m. Guest speakers include Mr. Graham Cox, Mr. Andrew Stagg and Mr. Jerry Gawdor. Members free, non-members 75p. For further details contact Mr. T. Condra, 15 Turnpike Lane, Uxbridge, Middlesex UB8 0AH or phone Uxbridge 54427.

**20th May: ABERDARE A.S.** second open show at Aberaman YMCA. Schedules from Mr. R. Williams, 298 Cardiff Road, Aberaman, Aberdare, Mid-Glam. CF44 6LU.

**20th May: BRADWELL & DISTRICT A.S.** first annual show, will be held at Bradwell County Primary School. For further details contact the Show Secretary, Mr. J. Blakemore, 17 Cedar Road, Chesterton, Newcastle-under-Lyme, Staffs.

**20th May: BRIGHTON & SOUTHERN A.S.** open show at the Queenside Youth Centre, County Primary School. The show secretary is Bob Smith. Tel: Bix (0273) 433703.

**20th May: CRAMLINGTON A.S.** first open show at Cramlington High School, Dudley Lane, Cramlington. Benching 10.30 a.m.-1 p.m. Judging 1.10 p.m. prompt. N.E.P.A.S. rules apply. Enquiries to: Show Secretary, Dave Murray, 30 Wharfedale Place, Southfield Lea, Cramlington. Tel: 715993.

**20th, 27th May: SCOTTISH AQUARIST FESTIVAL** Motherwell Civic Centre, Scotland. Details and schedules from W. Bennett, 15 Couler Avenue, Cottbus, Wishaw, Lanarkshire ML2 8SZ.

**27th May: PORTSMOUTH AQUARIST SOCIETY'S** Inter-Club show at St. Simon's Rooms, Albert Road, Portsmouth.

**27th May: CORBY & DISTRICT A.S.** open show, Corby Civic Centre. Schedules from A. Henderson, 5 The Nook, Corby, Northants. Tel: 05366 68269.

**27th May: BRIDLINGTON & D.A.S.** 11th annual open show, to be held at the Holderness Junior School, Shaftesbury Road, off Knapgate, Bridlington, E. Yorkshire. Schedules from the Show Manager, Mr. M. Jordan, 12 Greenfield Road, West Hill Estate, Bridlington, E. Yorks. Tel: 0262-74109.



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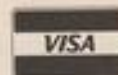
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The firms listed are wholesalers or retailers or both in fishes, tanks, plants, appliances and accessories, reptiles and amphibians. Abbreviations: W.—Wholesale only. R.—Retail only. WR.—Wholesale and Retail. C.—Coldwater. T.—Tropical. M.—Marines. P.—Plants. AA.—Appliances and accessories. B.—Books. R. & A.—Reptiles and Amphibia. E.C.D.—Early closing day.

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**The Aquarium Centre**  
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Telephone: Bedford 44163  
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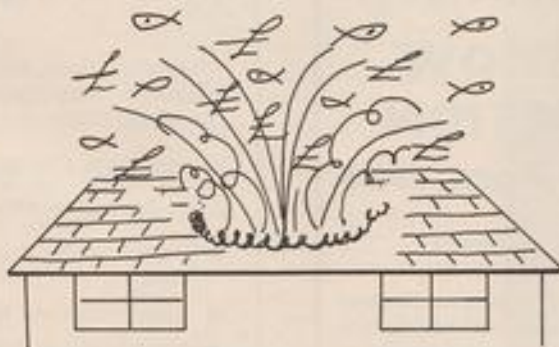


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K.A.A.S.



SUNDAY 22nd APRIL 1984

THE CATHOLIC SOCIAL CLUB HALL  
CLARENCE ROAD,  
HERNE BAY

**THE FEDERATION OF SCOTTISH AQUARIST SOCIETIES**

*Members of the Confederation of Aquarists*

**12<sup>TH</sup>**  
**SCOTTISH**  
**AQUARIST**  
**FESTIVAL**



at  
**Motherwell Civic Centre, Near Glasgow**  
(Motherwell is 1 mile from the M74 the main motorway from the South)

Organised by  
**THE FEDERATION OF SCOTTISH AQUARIST SOCIETIES**  
in collaboration with  
**THE AQUARIST AND PONDKEEPER**

**SAT. 26th MAY '84**  
**10.00 a.m. - 6.00 p.m.**

**SUN. 27th MAY '84**  
**10.00 a.m. - 6.00 p.m.**

(Societies from outside the Scottish area are also invited to participate and are assured of a warm welcome)

**SOCIETY TABLEAUX**      **TRADE STANDS**  
**RESTAURANT**              **SNACK BAR**  
**AMPLE CAR PARKING ACCOMMODATION**  
**ADMISSION - ADULTS 70p      CHILDREN 30p**

The classes will be judged under the auspices of F.S.A.S.

*Further particulars and schedules from :-*

**Mr. W. Bennett, 15 Coulter Avenue, Coltness, Wishaw, Lanarkshire ML2 8SZ. (Please enclose S.A.E.)**