The ever-resourceful Dr. David Ford didn't let a little thing like a one-in-four slope hold back his pond building activities. Here he presents a DIY guide for anyone else whose garden goes up and down as well as along...

GOING UP IN THE WORLD

When the 'Aquarian' Research Laboratories were moved to Thomas's in Yorkshire, I bought a bungalow near the factory in Halifax and moved all my worldly goods. Installing the home aquarium was easy — but to rebuild a pond in the garden was a problem, since I was up against a slope of over one in four!

Various ideas were discussed in a family conference. These ranged from a glass-fronted pond to a rock stream connecting a high pond to a low one. The glass-front pond sounds attractive. You can really see the fish, but in practice it is difficult to build and render waterproof. Still — this is the magazine with everything, so see how another fishkeeper managed it! (*Page 42*).

A rocky stream is attractive, but leads to massive evaporation in summer and freezing problems in winter (especially in Yorkshire).

THREE FOR THE PRICE OF ONE

So it was decided to build a series of ponds with waterfall connections. These would be viewed from the windows of the bungalow — particularly the kitchen. Times when one can sit beside the garden pool admiring the fish are few and far between in the Pennines!

Calculations showed that three reasonable sized ponds could be dug into the slope, so they were graded into a bottom large one (which could be looked into from the window), a medium sized one about six feet higher (to be used for marginals) and a small top pond, about eight feet up from the house foundations, which could serve as the filter.

Gardening on a steep slope is difficult — even dangerous — but when that slope faces the windows every weed shouts at you. So the opportunity was taken to extend the pond design the complete length of the garden, to give flat beds for easier gardening and maintenance. The sides of the ponds and extensions were also designed to be strong enough to carry 2′ × 1′ coping stones. These doubled as walkways from which the next garden patch up could be tended without even bending down!

FORMAL OR INFORMAL?

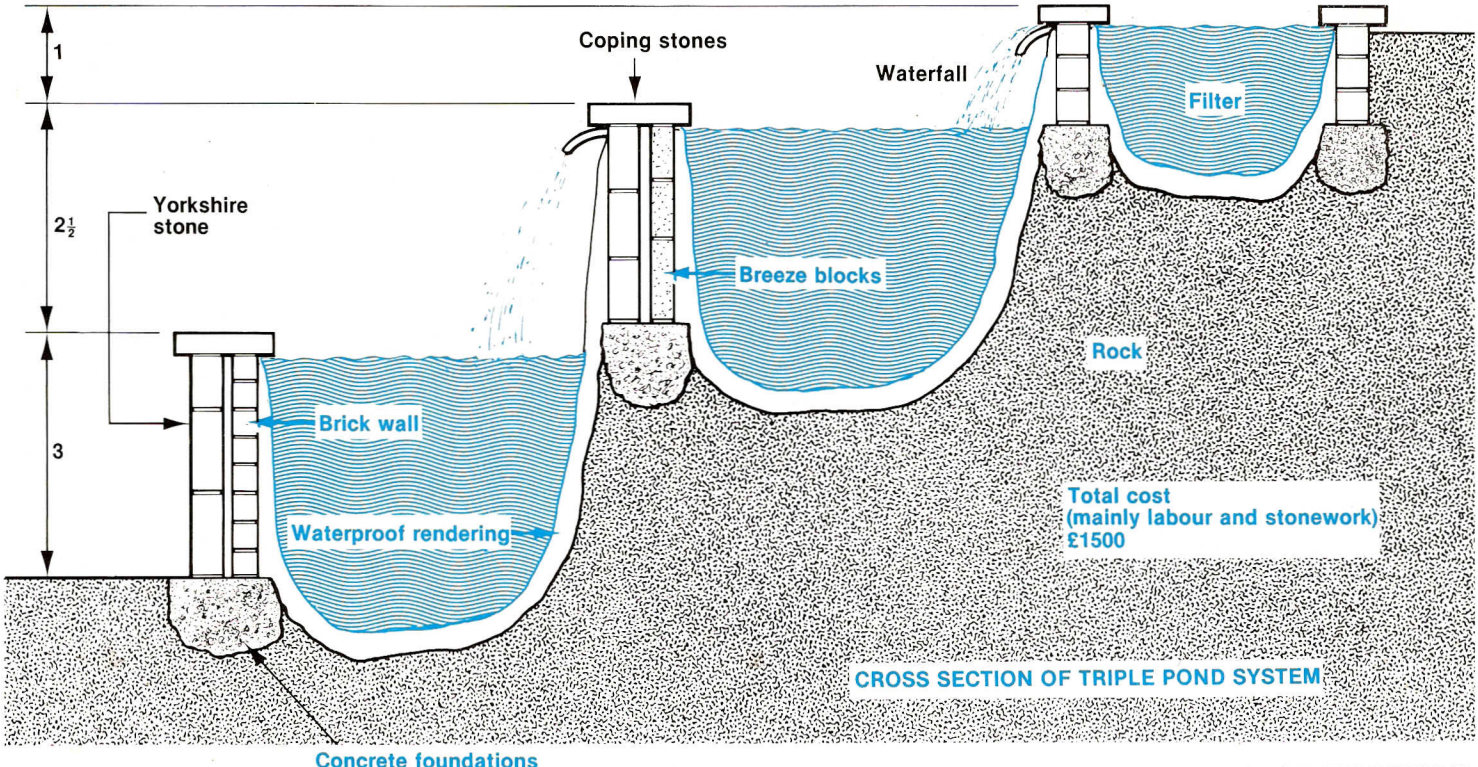
It was felt that square formality would be obtrusive, so few square corners were designed. The bottom pond was given a lop-sided, cross-section of a barrel design and the second pond was truncated with rising sides to lift the waterfall into view from that kitchen window. The third pond, however, was disguised. It was made square and flat with a large slab covering the lot — the ideal filter bed, big and buried!

Calculations showed the total volume would be 1000 gallons, which is a lot of water to be towering over the side of one's home. Hence the walls were double thickness — brick for the bottom large pond and breeze block for the upper, smaller ponds. The viewable face of every wall needed to be of traditional Yorkshire stone to match the house.

ENOUGH'S ENOUGH!

Now I am a keen DIY fan and a great believer that anyone can do anything. All you need is enthusiasm. But to dig out some 20 tons of Yorkshire rock made even my enthusiasm wane. Besides, I am the first to admit that my bricklaying leaves a bit to be desired. So I engaged a couple of likely lads to do the excavating. The rocks they moved (and a pneumatic drill had to be hired) were turned into a rockery (in several local gardens, too).

A professional bricklayer was contracted to lay the Yorkshire stone walls. A very good job he made of this too, as can be seen from the photographs.



CROSS SECTION OF TRIPLE POND SYSTEM

Once the holes were dug out, foundations laid and the bricklayer paid off, the three ponds were lined with cement rendering — I used Ness Synthasil, but any compound to BS 3826 Class A and B will suffice. When thoroughly dry, two coats of Plasticall's "Aquaseal" (a rubber based paint-on sealer in a blue colour) were painted on to ensure each pond was watertight.

To give the waterfalls, and effect filtration, the water needed to be pumped from the bottom pond to the top. The lift is about eight feet so a powerful pump was required. My choice was a Nova 300 automatic "Cellar Pump", which gives 8000 litres/hour.

This flow rate is too high, but the pump needs to deliver that pressure. A T-piece was therefore fitted, with a sealed bypass with small saw cuts added to bleed off some of the water. Experiments soon showed how many V-cuts were necessary to give a steady waterfall effect from the top to the middle and middle to bottom pond (five actually).

SAFETY FIRST

The pump has a float valve which cuts off the electricity if the pond empties. This means the pond can never be pumped dry (important for saving the fish in an emergency) nor will the pump burn out. Since this is a mains electricity pump, the supply was tapped from the garage using armoured cable buried under the slabs of the patio. Protection was via a "Centaur" ELCB 240 volt, 25 amp, Dipole, circuit breaker, also sited in the garage.

The pipework is "Polypipe" 32mm ($1\frac{1}{4}$") diameter with push-fit joints (any builders' merchants or DIY store). This ran under the soil (for frost protection) from a cemented hole in the wall of the lower pond. The pipe then ran up the slope left near the garden boundary fence and back to the top pond.

Another hole in the wall let the water flow on to the surface of the upper pond. This pond was divided into two with redbrick, the inlet side being filled with 'Atlantis' Ceramic Filter pieces and the outlet side with bulk nylon filter floss.

The whole pond was covered with a heavy stone. This made the filter unit disappear, held down the floss and prevented odours escaping (a "busy" filter unit can become quite smelly in summer).

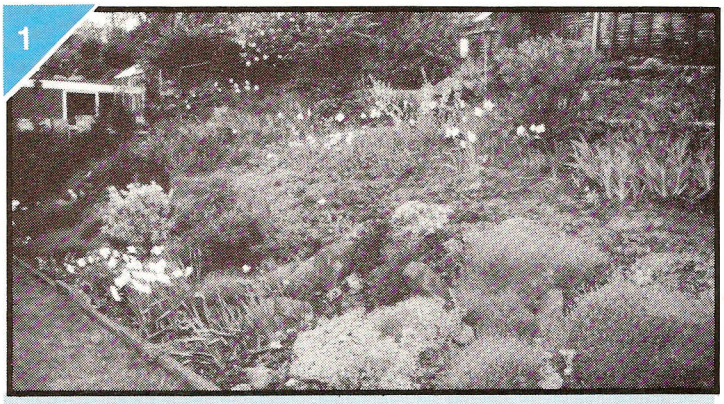
After flowing through the Ceramic Pieces (biological filtration) the water passed through the floss (mechanical filtration) and then overflowed via a slate buried in the pond wall. It then cascaded into the middle pond, with consequent oxygenation, and then via a similar waterfall route to the bottom pond.

Ten tonnes of topsoil were delivered (one rainy day and left on the pavement . . .) which were used to infill the walled areas each side of the pond.

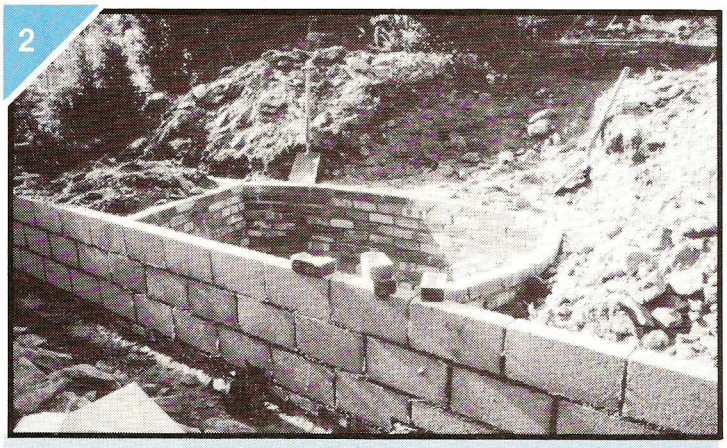
Paths were laid using 2′ × 2′ slabs and the usual bulbs and bedding plants were installed.

The ponds were filled and drained at weekly intervals to ensure any lime from the cement or mortar was flushed away. This is most important — cement ponds can leak alkali sufficient to kill fish even after many days of maturing.

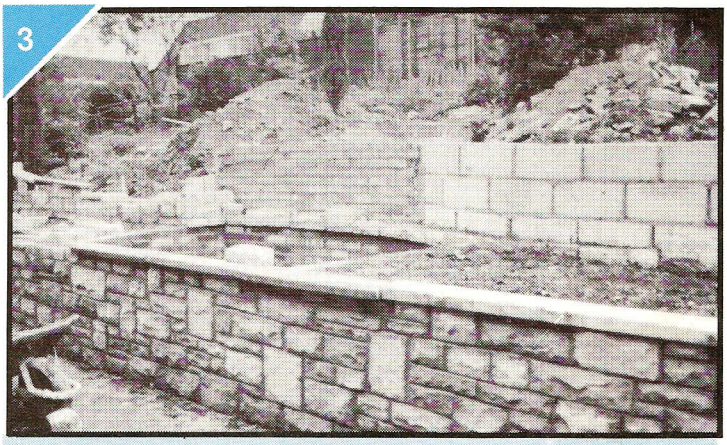
This period of flushing through was also used to test the system and trouble-shoot any problems. It is always better to do this *before* any fish are added.



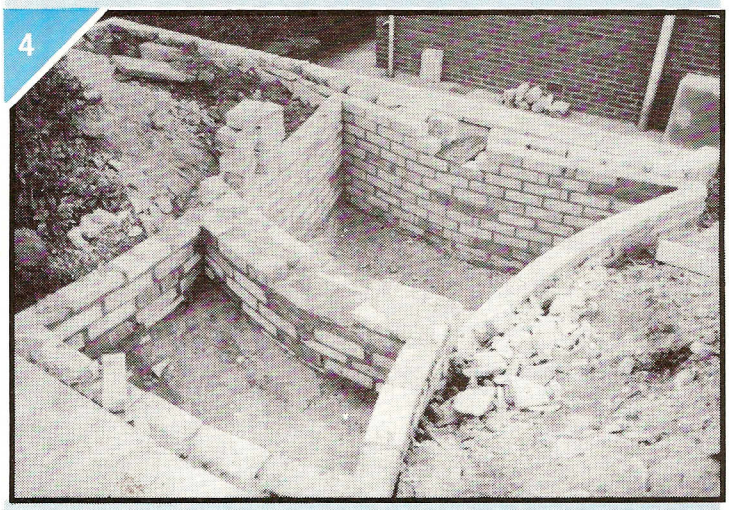
The original garden, with a few inches of soil on a one-in-four slope of Yorkshire rock.



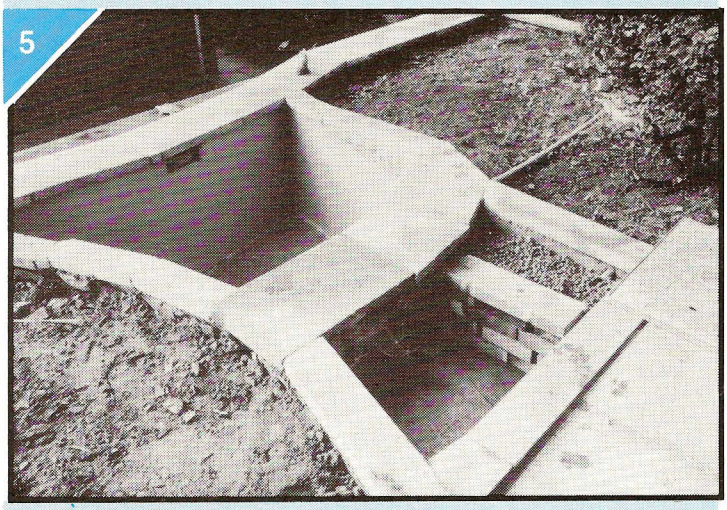
The rock is blasted out, and a wall built to contain the first (lowest) pond.



The second wall is built and the bottom wall faced with Yorkshire stonework.



Top view of the ponds, to show the third (filter) pool under construction.



Top two ponds with divider and filtering material being added.

The first problem was that the noise of the waterfall kept us awake all night, and probably the neighbours too. Various schemes were tried to silence the waterfall, from a plastic bag "tube" to a series of sideways, mini waterfalls. The most effective was a 12" wide acrylic sheet supported within the outlet hole (wooden pegs) and bowed down to a support under the water in the pond. Experiment gave a bend in the sheet that caused the water to slide, rather than cascade down into the lower pond. The Niagara Falls noise then became a gentle babbling brook.

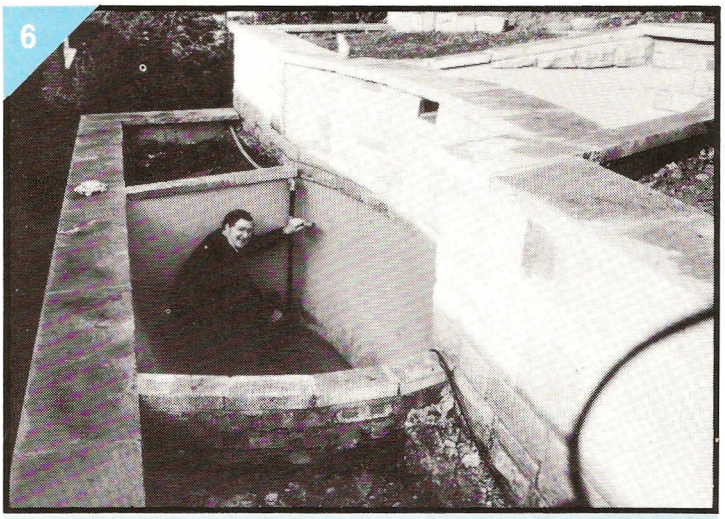
The second problem was that support for the waterfall chute, and the logistics of positioning any planted pots. They are deep ponds (lower is 43 inches and middle is 27 inches) and no ledge was made for marginals. The depth was to take the pond below the level ground to prevent winter freezing. A raised pond can freeze solid.

Plastic buckets were used for supporting the chute and plants. These were lidded buckets (with metal handles cut off) filled with stones to prevent buoyancy. One bucket (the 'Aquarian' 20 litre size was used) was sufficient for the middle pond, one bucket standing on another sufficed for the lower one. The bucket system was also used to support an Ekto Water Fountain by Sicce of Italy — this gives a small (silent) fountain using a safe 24-volt transformer system.

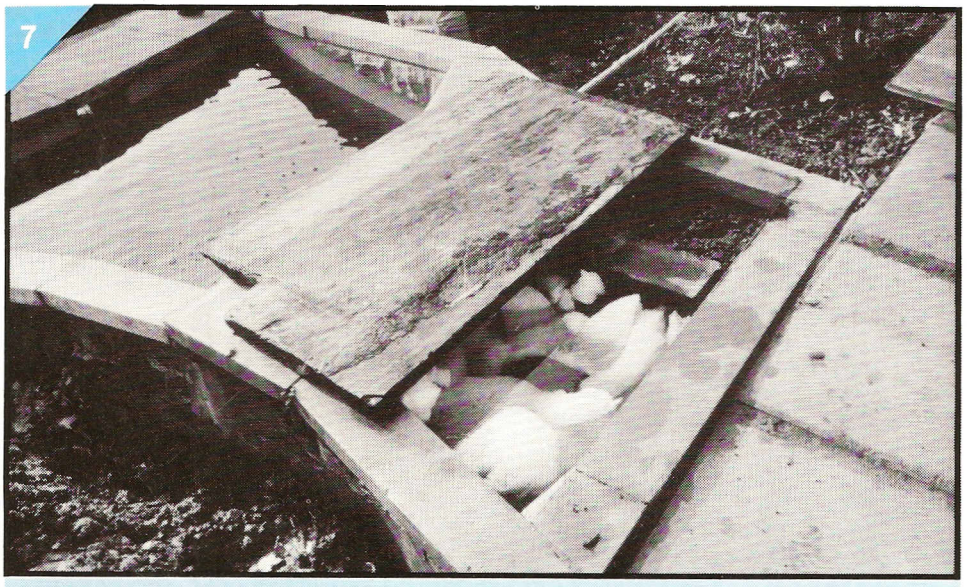
VANISHING WATER

The third, and final problem, was that the water began to disappear! It did not happen when the pump was off, and all pipework was found to be sound. This indicated that the waterfall was the source of the leak, probably between the double wall system. The ponds were drained and dried and the waterfall holes well coated with Araldite liquid epoxy resin and hardener (CY 1301 GB/HY 1300 GB pack by Ciba-Geigy).

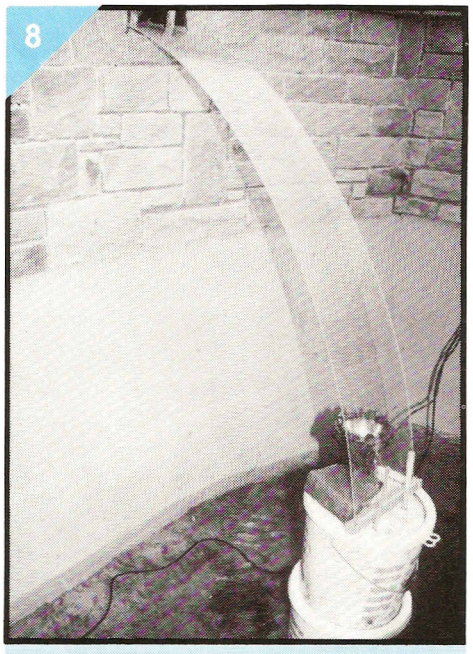
Finally, the whole edifice was floodlit via 24-volt lighting units operated by a time-switch. The fish were Koi (not show specimens!) and large goldfish, quarantined in paddling pools for a week. At the time of writing, all the ponds were coated with six inches of ice and six inches of snow, so the Koi and Goldfish had to remain in their temporary quarters. However, by the time you read this article, they should be swimming in their "Ponds on a Slope". ■



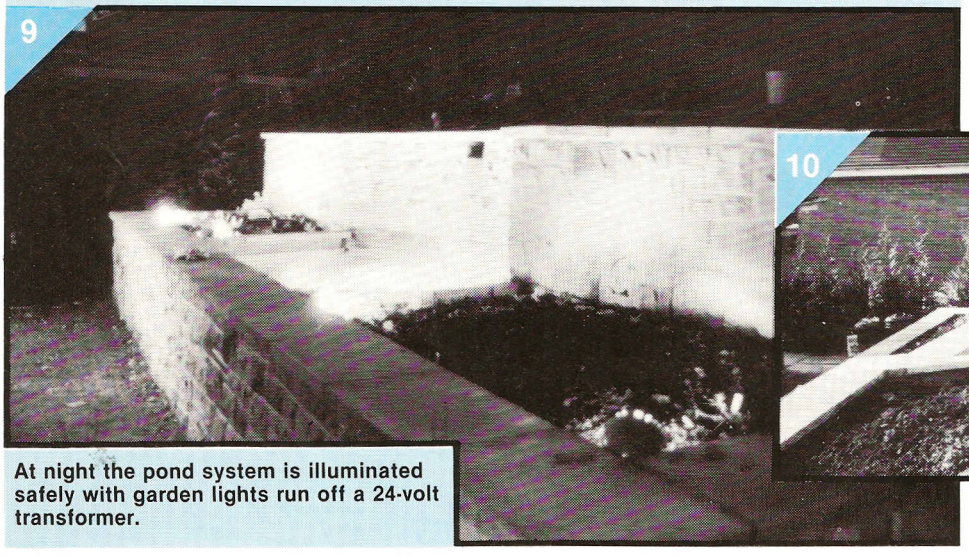
Getting down to it — the author installs water pump and pipework.



The filter system now contains wool as well as ceramic material. The slab holds everything down, preventing smell and disguising the unit.



The silent waterfall system. Plastic sheet is pegged top and bottom, while plastic buckets support the sheet and an underwater light.



At night the pond system is illuminated safely with garden lights run off a 24-volt transformer.

It's all done bar the cosmetics. Dr. Ford proudly adds topsoil to the new garden beds surrounding his 'pool on a slope'.