

HUSBANDRY OF CROCODYLIANS, TORTOISES AND TURTLES
IN CAPTIVITY

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(Based on a lecture given to zoo keeper students of the Animal Care Course, Sydney Technical College, N.S.W. Department of Education).

Crocodiles, Tortoises, Turtles and Amphibians.

Keeping aquatic reptiles and amphibians is specialised. This category embraces crocodiles, alligators, tortoises (including land tortoises), turtles and amphibians such as frogs, newts and salamanders.

Crocodiles.

Few amateurs, and very few established zoos, can cope adequately with fully grown members of the crocodile family. The normal procedure is to rear them from hatchlings to a stage where they may become out of hand then donate them to an establishment that can deal properly with larger specimens. To attend adequately to the needs of the young it is necessary to understand something of the life-history of crocodiles.

Accommodation.

Crocodiles kept in the temperate zone need to have conditions as near as possible to the tropical conditions that the crocodiles would find in their natural state.

There are two species of crocodiles in Australia, the Estuarine crocodile and Johnstone's crocodile. In the main the Estuarine crocodiles live in estuaries, creeks and rivers with direct access to the sea, and lay their eggs in debris nests at any time of the year above high tide level. The nest resembles that of a Scrub Turkey's. The incubation period is governed, of course, by the temperature and varies from about three to about five months.

Johnstone's crocodiles live mainly in fresh water lagoons and rivers and occasionally enter the upper extremes of estuaries. They

bury their eggs in sandy loam at the end of the dry season. These hatch before the monsoonal rains raise river levels. They grow to a maximum length of about 12 feet and are no match for Estuarine crocodiles that grow to a length of over 20 feet. Rarely are the two species found naturally together in any great numbers.

It is important to ensure that there are no great differences in sizes of animals kept together. Competition for food takes place, injuries can be sustained or some specimens even eaten by the more aggressive specimens.

At the Australian Reptile Park we have constructed an artificial billabong with some plants, mammals and land birds that would normally be expected to live in an area where crocodiles occupy the water space. This billabong contains Estuarine and Johnstone's crocodiles of similar size, Agile wallabies and cassowaries. Johnstone's crocodiles regularly copulate although no nesting sites have been detected.

Since the construction of the area a sort of ecological situation has developed to suit the circumstances. Wild ducks, cormorants, three species of herons and two species of native pigeons have, of their own accord, chosen to live and breed freely around the billabong. Azure kingfishers, finches, wrens and fly catchers also nest there. Reeds, water lilies, palms and elephant's ears lilies have been established.

During summer periods in the Temperate Zone, Australian crocodiles (which in any case only occur naturally above the Tropic of Capricorn) are able to live in the cheapest of all types of accommodation, and that is a water hole bulldozed out of the earth as a normal clay-bottomed agricultural dam would be built, and surrounded by a fence strong enough to prevent them from escaping and also strong enough to prevent the public from breaking in.

A T-piece across the top will foil climbers of wire mesh. All crocodylians can climb until their body weight becomes excessive. Usually this stage is reached after about 2 metres in length.

Baby crocodiles need a filtered and heated fish tank with sufficient resting area. Care must be taken that green timber is not placed in their water as sap pollution could follow. Sub-sand filtration can be recommended, also systems based on those used in swimming pools. In tanks all uneaten food must be removed to keep the water clear and not offend viewers or the attendants. In open ponds or earth dams the clarity of water is not so important. Large

pieces of uneaten food should be removed while smaller pieces will be dealt with by natural infusoria and harmless bacteria once the pond is established. Faeces are usually deposited on land in a regularly selected place. These can be regularly removed before any offensive smell develops.

Temperature Control.

I have taken tests in the North of water temperatures and not found crocodiles living in any water that sinks below about 17°C.

In this sort of water, naturally the highest temperature is at the top. We know that heat rises, so that when crocodiles find water too cold they keep to the surface where they do have the warmest conditions possible. In captivity casualties occur when water temperatures drop. Crocodiles drown when they become so cold that they have insufficient strength to rise to the surface to breathe. The longest I have observed a crocodile submerged in the wild was one hour. It was a large crocodile we were trying to capture in the Gulf of Carpentaria. It was in extreme distress when it surfaced and blew like a whale.

I have observed a number of crocodiles on aerial surveys that I have taken of northern rivers in winter, and noted that when the air temperature exceeds the water temperature, crocodiles lay out on the banks and absorb the greater warmth. Giant crocodiles do not often leave the water entirely as their immense body bulk requires water support.

I have been able to set my watch on particular areas where I knew a number of crocodiles lived, watching the thermometer and regularly flying over just in time to see them crawl slowly out of the water.

In captivity in the temperate zone, water temperatures may drop below frost level, as it does in the Gosford district.

Because of this our crocodiles must be shifted into heated quarters during the winter. I will illustrate a workable design of their winter terrarium.

In the case of young crocodiles temperatures must be kept constant in their tanks, but if they are held in mud pools then they must be put into warmed tanks over winter. Most electrical aquarium elements are suitable heaters. Care must be taken that crocodylians do not bite through electrical elements. If the elements are in

glass tubes a suitable length of galvanised pipe will protect them.

Crocodiles require a certain amount of solids, such as rocks, to assist the maintenance of their specific gravity. Newly hatched crocodylians swallow gravel and the adults larger stones. If these materials are not available bottles, cans and other dangerous or objectionable materials will be engorged.

Feeding.

If the water hole is large enough carp can be introduced. Most elude the crocodiles, but some provide additional food and the incentive to hunt that keeps crocodiles moving. If sufficient water vegetation is maintained frogs will also breed.

The main food, of course, is given to them by the attendant and this consists of any kind of flesh; chicken, beef, mutton, fish, pork or carrion. In American reptile farms, all snake casualties are fed to the alligators after poisonous heads have been removed.

Crocodiles of any size need only be fed at the most once weekly. We, at the Australian Reptile Park, feed weekly as a special exhibition, but once monthly would not deteriorate reasonably mature crocodiles. The young require much more frequent feeding.

Young crocodiles should be kept in small isolated pools with a muddy bottom or in aquarium tanks. In order to start them feeding they need to be kept at a high temperature between 27° and 32° C.

In their wild state for the first few days they are shepherded by their mother and protected from all enemies. After these few days even the adult crocodiles will eat their young.

Hatchling crocodiles, if kept in shallow water, can be fed with live tadpoles, live fish, such as readily available Gambusia, or live insects. Grasshoppers, cicadas, beetles, or even spiders are usually acceptable. Once the base of the tail thickens and the neck thickens, and it is obvious that the reptile is in good enough condition, it can then be fed on small pieces of flesh. Day old chicken legs can be recommended as the reptiles will at this stage need the calcium in some form, pieces of fish, especially with some bone content are a standard requirement.

Crocodiles in captivity should be fed lightly. There should be no attempt to try to reproduce full summer conditions year round as nowhere do summer conditions in their wild state exist for twelve

months of the year.

The result of overfeeding, on the assumption that summer conditions are required constantly, causes bone distortions and heavy build-ups of fatty tissues which reduce life expectancy. Water may become polluted when overfeeding occurs and the faint 'fishy' smell can be rectified by starving them until it disappears.

Even the wildest newly captured crocodiles soon learn to recognise their keepers and within a few weeks will feed from the attendant's hand if he exercises sufficient discretion.

Safety.

There has only been one case in Australia, that I have ever known, where the keeper has been killed by a crocodile. Minor injuries are rare. A crocodile called 'Tarzan' killed a native keeper at Wirth's Zoo in Townsville. (Incidentally, I have reason to believe it was not 'Tarzan' that killed its keeper but the crocodile we captured outside Wirth's Zoo and brought back to the Australian Reptile Park in 1964. This animal was eventually shot by a vandal one night.) Crocodiles are essentially creatures of habit. They are wary of new situations but once they have become accustomed to a regular procedure they will fit in with it. The taking of humans and animals by crocodiles can be attributed to this trait. Natives and livestock usually take water at a particular time of the day. Crocodiles remember this and lay in wait. This is where the tragedy occurs. Any zoo attendant can easily make the same mistake on his feeding round.

Safety in animal care is largely a matter of prior consideration to reduce potential hazards.

Handling.

Small crocodylians, which include crocodiles, alligators, caimans and gavials, can be handled best by grasping with one hand around the neck and by the other hand around the base of the tail, the thick part behind the hind legs.

Larger ones can be moved with a specially made 'giant ferret net'. That is a net that can be thrown over them and closed as a bag by a pull string. Nylon type nets can hold the largest and most powerful animals but need to be shifted by a crane.

Nylon nets are expensive and should be properly serviced.

They should be washed after use, cleaned of litter, and shade-dried. They deteriorate in sunlight. The mesh of a 'handling net' should be small enough not to entangle the snout or limb of the animal being transferred. A 'capture' net is different and needs to 'gill', or entangle the crocodile. It may have to be cut to remove the captive, but this is part of the cost of the venture.

Where only a short distance is involved in the transfer of a large crocodylian to other premises it can be moved by three keepers. Two soft strong lassos, thrown over the head and operated by a keeper on either side can control the fore part of the body. Another keeper on the tail can steer the reptile.

If it becomes necessary to hold the jaws closed it should be done by an experienced handler who understands the positions of certain teeth that may protrude beyond the jaw-line. A twisting crocodile or alligator can inflict serious lacerations with protruding teeth even when the jaws are closed. There is a fable that seven years after the bite of a crocodile the victim contracts leprosy. I was first bitten by a crocodile in 1943. I have not yet started ringing bells.

I have been injured in this way by crocodiles, less than a metre in length. There should be no attempt to handle these reptiles by the tail without the head being secured.

The claws are not used in defence or for offensive reasons at all. They are virtually spikes, as in running shoes, to enable them to climb slippery river banks. The hind legs do most of this work and also entirely construct their nests.

There are times when an unwary animal attendant may be confronted by one of his charges. Large crocodylians can be dangerous if the keeper has no land space in which to dodge. They lunge suddenly, clamp their jaws on part of their victim and twist with enough power to tear off a limb.

Often crocodiles will swing their tails to knock their prey into the water where it can be grabbed and drowned. In the same manner monitor lizards use their tails. For this reason large crocodiles should be kept in water depths only sufficient to comfortably cover their backs as a safety precaution for the keeper.

The swinging tail is easy to dodge once the attendant becomes familiar with the actions of his charges. Crocodiles that do fell their keepers usually do little harm as they are relatively

slow-moving. They cannot out-run a man and a reasonably agile attendant can regain his feet as long as there is space.

Keepers, in any case, would not be employed in these positions if they did not first demonstrate that they had the agility, interest and experience to deal adequately with such a situation.

It is nonsense to believe that legs can be broken with a sweeping tail. The tail is clumsy and soft, and it is a gentle way to be knocked over.

As with snakes, the danger lies in the head. Crocodiles have no venom but they have very powerful jaws and long, efficient grasping teeth, and they have a head. The skull of a crocodile, along with its flesh tissues, may be a third of the reptile's weight.

A 5 tonne crocodylian suddenly swinging its head, could easily smash its keeper's legs. This does not necessarily mean that the reptile intends to eat its keeper. Most reptiles react violently when food is expected. Therefore accidents can occur.

With a group of any kind of animal; mammals, birds, fish or reptiles, what is called a 'frenzy' can occur.

The term 'frenzy', in the world of animal handlers simply means that a situation can exist, as in human society, that does not endanger any member of the society until a 'stirrer appears'.

The 'stirrer' in animal societies can be a crocodile or shark or a snake. Once the 'frenzy' occurs all animals, including humans are in danger of their lives.

I was once confronted and cornered on land by a large captive crocodile and had to resort to slapping it on the top of the snout with the soft sole of my shoe. The snouts of most animals are very sensitive but whereas even a light tap on the snout of a savage kangaroo could break some delicate bones with fatal results a sharp rap on a crocodylian's nose is unlikely to cause damage.

It is a good idea to carry a long light cane in the event of these circumstances, or even a bamboo rake. Mops, brooms and other relatively harmless tools can confuse any dangerous animal.

Small crocodylians can inflict nasty lacerations with their tiny pointed teeth due to their inclination to twist when they obtain

a hold. Suddenly withdrawing a hand when the teeth sink in only causes more severe wounds. It is better to allow the reptile to release its grip of its own accord. It will not do so if the body is held. It appears that it needs the incentive of escape before it can be convinced that defence is no longer necessary for its safety.

Transport.

Large crocodylians, which may weigh .5 tonne or more, can be easily injured due to their own body weight. Over short distances they can be walked with a three-man-double-lassoo technique into a prepared container.

The most suitable transport box for large crocodiles and alligators is one of marine ply where the sides are hinged and the top fixed with long bolts stabilizing from the bottom to the top. Foam plastic about 15 centimetres in depth will reduce the effects of vibration and shock during transport. Also the foam plastic can be kept soaked to establish a moisture content.

Dehydration during transportation is a great hazard. Young crocodylians cannot survive long distances travelling if their transport box is well ventilated. They need an enclosed situation that restricts evaporation. A small enclosed container that can be opened daily for aeration is, strangely enough, safer than a large, well ventilated box.

A container built of timber retains more moisture than one of metal. Metal boxes that can contain water are used for transportation but transport companies are reluctant to handle water containers and the added shipping cost can be astronomical.

The insulating value of a timber container must also be considered when there is a possibility of it being left in extreme weather conditions at a changeover depot.

Alligators.

Other exotic crocodylians can be kept and fed under similar conditions. The same safety and transport precautions should be observed. Great care must be exercised in ensuring that there is not too much difference in the sizes of the animals kept together.

The United States of America, in their wisdom, now prohibit the export of alligators. Alligators exist naturally in the

southern part of North America. Skin trade reduced the animals to a stage of being an endangered species. Africa, Australia, New Guinea, China, Cuba and other countries are also protecting their rapidly declining species of crocodylians.

Alligators differ from crocodiles in that they will survive at a little below freezing conditions for brief periods during winter and require no special attention excepting during summer. The exception is that with the oncome of winter they will burrow for insulated shelter. In this way, unless their actions are anticipated they can undermine buildings or escape from their enclosures.

They are an anomaly in their class in that they are not entirely carnivorous and will feed on certain vegetation including any available fruit. In captivity they will even take bread.

The Australian Reptile Park imported a number of hatchlings from the U.S.A. and reared them partially on grapes. These hatchlings are the first alligators to be bred in captivity out of their native country.

In nature their basic food has a high protein content, and in captivity this need must be closely considered.

Care must be taken with alligators, as with other crocodylians, in that they are not overfed. They can accumulate an enormous fat build-up. This can be suddenly fatal.

Apart from reducing the quantity of food, when crocodiles and their kind appear to be overweight, it is a good idea to basically feed on fish which has such a high water content that the nutriment of the bulk is reduced.

To control overfeeding, crocodiles, alligators and their kind can safely be fed monthly. Where a public exhibition of feeding must be held regularly, fish with its lower nutriment value, can be offered. The advantage of feeding monthly is that their faeces, which are deposited regularly on a particular spot on land, need only be removed monthly.

Sedentary reptiles can be given exercise by providing them with a large portion of flesh, which may even be a skin of a cow, which they cannot swallow easily. This provides a great deal of public interest in showing how crocodylians would normally obtain food in their wild state from carrion.

Usually they do not fight each other, but a number will grab hold of the flesh or skin and roll to try to tear off the portion they require. It may take hours for them to acquire their share, but the exercise, and exhibition as far as the public is concerned is part of animal husbandry, and satisfying the public who pay the costs. The original intent of a zoo is to provide something that will please the public.

Once it was thought that a menagerie, or more simply, an exhibition of animals did the job. Modern thinking does not agree. Rightly, thinkers are objecting against cruel and tyrannous attempts to dominate helpless animals, but also zoos should show something of how animals exist in their natural state. It is impossible to re-establish a complete ecological situation, but it is important to try.

During the winter alligators outside the tropics are not on public view as they do undergo a form of partial hibernation in cool areas, and dig burrows where they lay underground until spring.

In the tropics, Australian crocodiles have similar habits, but their burrows are usually refuges where they lay only for a few days at a time. Alligators may lay underground for three months at a time in winter.

Tortoises.

Accommodation.

Tortoises as we know them in Australia are amphibious, spending some time on land and most of the time in water. They live in freshwater creeks and rivers throughout most parts of Australia, even the Centre. In other parts of the World tortoises are purely land animals and although they enjoy a mud bath they do not normally swim. The care of Australian tortoises is much the same as the care of crocodiles and alligators, and in fact if the tortoises are large, crocodiles and alligators can be kept in community terrariums.

The ideal way of keeping Australian freshwater tortoises is in a low outdoor pit, dimensions according to the number required to be kept, with as large a mud pond as can be satisfactorily fitted towards the front of the viewing side. If there is more than one viewing side, each aspect can be different. A log can protrude from the middle of the pond to encourage them to sunbake.

While it is ideal that the pit should be in a sunny position, there should also be plenty of shade bushes around the edges of the

pond. Bottlebrushes and Teatree shrubs are usually suitable.

If the pond has indeed been dug into the earth, and no over-feeding takes place, natural infusoria, which can be added in the beginning, will keep the water clean if not clear. The deeper the pond the cleaner it will remain. It is then only necessary to top up with fresh water to allow for evaporation and earth absorption. Now and then the pond can be flushed out if necessary.

About one metre is a reasonable depth provided some of the shade bushes overhang the water to filter some of the sunlight. The shallower the water and the more exposed to sunlight it is, the more green algae will form.

The pit may be constructed from formed concrete, rendered bricks, asbestos sheets or galvanised iron. It must be smooth inside as, although a wall a third of a metre high can contain any Australian tortoise, they have sharp claws and can easily climb wire netting, chainwire and most rough surfaces. They have little difficulty in climbing an unrendered brick corner.

Some keepers may prefer a concrete pond. The sides must be very smooth, to prevent wear on the claws and plastrons of the tortoises, and slope well enough to allow them easy access to land. Unless a mechanical filtration system is installed, the concrete pool requires more frequent cleaning than an earthen one.

If the concrete pond can be raised above the ground to a suitable eye level it can be glass-fronted to give an underwater view of the animals feeding and swimming.

There should still be a planted earthen bank on which they can rest, and it is usually essential to filter the water for viewing.

Glass sizes are regulated by water depths, so professional glaziers need to be consulted before the thickness can be considered safe.

Under the same conditions small tortoises can be held in indoor tanks, but when sunlight is not available a specially developed artificial light for indoor plant-growing should be used. Otherwise growth is slow, shell distortion and diseases occur and the tortoises usually die.

Water plants are shortlived in a tank with a tortoise, what they do not eat they scratch out by the roots.

Interesting exhibits can be arranged in the indoor tanks. Apart from the essential landing rock, specially selected rocks and gravels can be tastfully arranged. Pieces of well seasoned driftwood can be added.

Some crayfish and larger fish can be introduced as tankmates, but there must be plenty of room to allow them to chose their own territories.

If no fish are added to the tank, some experimentation in lighting and infusoria can control algae. It may be difficult at first. Small tortoises will feed on a small number of the microscopic creatures but this is insignificant. Certainly fish will clean them out altogether in a short time.

Lighting should be switched on daily for no longer than natural light would be expected and infusoria should be placed in the tanks before algae growth becomes too strong. They will disappear when the algae disappears but fresh lots can be added when the growth appears again.

Naturally excess food should be syphoned out. If no infusoria are used a filter is beneficial. Algae then needs to be regularly scraped from the glass. *(Editor's Comments: Algae growth (or the lack of it) is directly dependent upon solar radiation (i.e. light) and various chemical constituents in the water - NOT infusoria. Various micro organisms (in large aggregations) may well influence aquatic environmental conditions, and thus indirectly influence algae growth. Therefore, actually advocating the use of micro-organisms to control algae seems to be a rather haphazard approach to a rather simple problem - U.E.F.)

Feeding.

If crocodiles and alligators are larger in size, they will feed on the tortoises as these are one of their natural foods.

Although Australian freshwater tortoises are mainly flesh eaters, most will eat water plants and even the roots of water lilies.

Unless specially trained they normally do not eat out of the water. They will eat floating snails, but they are unlikely to eat snails crawling along the earth. Tortoises, like crocodylians, will soon learn to recognise their keeper and can be trained to come out of the water to take the food from the hand of their keeper or even eat their food out of water.

Tortoises are not very good hunters and can be easily kept successfully with fish. They may catch an occasional fish but it has been our experience in ponds that most fish can breed faster than tortoises can catch them. There is a mistaken idea with many of the inland fishermen that tortoises kill the fish and for this reason fishermen destroy tortoises when they can.

Temperature.

Tortoises can be roughly divided into the ones from the tropics and temperate zones. Those from the tropics will require water to be raised in temperature during the winter, and most species from the temperate zones will undergo some form of hibernation. They bury themselves in some loose vegetation on banks near their waterholes during the colder months of the year. In both temperate and tropic zones it is usual for tortoises to bury themselves in mud when waterholes dry up.

If tortoises, as crocodiles, are required to be constantly on exhibition, then water temperature must not drop much below about 20 C.

Foreign land tortoises, rare in Australian collections, can be held in grazing paddocks, their natural food supplemented with vegetables, fruit and a small amount of minced meat, or other protein substance.

They must be protected from frosts, damp conditions, dehydration and other weather extremes.

Turtles.

Australian marine turtles do reasonably well in captivity, providing there is a turnover of salt water. Most only come to land when they are laying eggs and they spend almost all of their lives in the ocean. Unless there is continuous filtration, water would be naturally fouled by their own faeces. Faeces can, by the filtration system illustrated, be completely cleared (illustration not supplied - U.E.F.)

The Australian Reptile Park has kept a Loggerhead turtle under these conditions since 1969, when it arrived as a hatchling.

On a grander scale this design is a practical way to keep marine animals such as turtles and sea snakes and fishes where fresh

supplies of clean sea water are not readily available. Evaporation can be made up with fresh water as the salt content remains.

Marine turtles feed principally on fish, squid and certain sea weeds, including what is commonly known as sea lettuce.

As marine turtles follow warm currents, it is necessary in the temperate zone to raise the temperature of the water in which they are kept to about 24°C.

Breeding.

Crocodiles.

It is unusual to breed crocodiles in captivity in Australia, and excepting in the tropics in their most natural conditions, have we ever expected them to breed. Eggs have been laid, mating has taken place, but to date there has never been any success until 1972 in breeding alligators in Australia in zoos. For the first time outside of their home country, the Australian Reptile Park at Gosford hatched three alligators, one of which still survives and thrives.

Tortoises.

Tortoises can be bred in captivity if kept under natural conditions. To induce tortoises to lay eggs it is necessary to have a hill on the bank of their natural pond. A hill consisting of not too hard earth, preferably broken down with a mixture of sand with a northerly aspect to provide the greatest natural radiation that can be obtained. If the tortoises lay their eggs on flat surfaces the earth will usually be compacted by the traffic of animals.

It is sometimes advisable when it is known that eggs have been laid to remove them. Place them in a sandy loam in an enclosed area where soil is not allowed to dry out and they are able to be kept at a constant temperature as with snakes and lizards, at about 26.7°C.

The newly hatched tortoises can be fed on mosquito larvae, small infusoria and then to tadpoles, chopped earth worms and tubifex worms until they are able to take small pieces of fish. It must be remembered with young animals that are going to be constantly fed, that the water temperature must be kept at a higher level than normal.

Medication.

Crocodylians, tortoises and turtles.

Crocodylians, tortoises and turtles kept under proper conditions should need no medication. If fungal conditions appear, common salt can be added to the water and the temperature raised.

Lacerations usually heal themselves. If they are severe they can be washed with antiseptic, stitched and veterinary aureomycin applied. The reptile must then be kept in a humid atmosphere until the wounds have reasonably healed before returning to its water tank. Saltwater turtles cannot be taken from the water for long as it affects respiration.

Amphibians.

Those kept in Australia will be native frogs. Some European, American or Asiatic newts and salamanders, are cultivated, the most common being axolotls or Japanese fire bellied newts.

These can be kept in aquariums with land areas and preferably with growing water plants. They do not require sunlight but can be lit artificially. However, it has been our experience that a little sunlight is beneficial. Their food should consist of small pieces of chopped beef, or tadpoles or worms. Tubifex worms are also a very good food.

Breeding.

Axolotls are a larval form of the Mexican tiger salamander and will breed in this larval form as also they will breed in their completely metamorphosed form. (Editor's comments: In the light of a recent review of pertinent taxonomic papers the axolotl and the Mexican tiger salamander are NOT identical).

It is rare to see a completely metamorphosed form of the Axolotl but we have successfully carried out this change at the Australian Reptile Park by gradually reducing the water in the exhibit over a period of several months, where the amphibians lose their gills and legs and use their lungs.

Frogs will breed in natural ponds with live food such as slaters, which can be bred in adjacent compost heaps. If serious attempts are made to breed frogs the young should be separated from the adults, otherwise they will certainly be eaten.

Some amphibians can be induced to breed if taken from their normal quarters and placed in a luxuriantly planted tank. This applied especially to axolotls.

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Cover Photo: Tawny Frogmouth, Podargus strigoides

(Photo. H. Millen)