REPTILES by A. d'A. Bellairs.
Hutchinson's University Library. London, 1957. 195 pp. Price 10s. 6d.

This excellent book despite its size, covers a wide field, and deals with the life history, evolution and structure of reptiles. The first half of the book deals with fossil reptiles in some detail and follows their evolution up to creatures of the present day. A chapter is devoted to each order, giving details of classification within the order, and examples of most families are given in more detail. The book concludes with a good bibliography of books, booklets and papers of interest to the herpetologist. It is illustrated by drawings and the lack of photographs is well compensated for by the excellent reading matter and very modest price.

M. G.

## NOTICE

The Jack Lester Memorial Fund is still open and contributions will be gratefully received by the Secretary.



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Contributors of main articles only will be supplied with 25 free copies of the Journal; additional copies may be ordered at cost price.

# THE BREEDING HABITS OF THE FROG *GASTROTHECA MARSUPIATUM*

By

JOHN WALKER

In October, 1955, a pair of this species were obtained through Mr. Robert Bustard, who had just imported them into this country. The frogs come from Ecuador, and average 7 to 8 cms. in length, the male being the smaller. The colour is variable, in shades of green and brown, but with two longitudinal stripes (which may be broken) along the back. These stripes are dark brown, and there are various spots of dark brown scattered on the legs and sides, the underside being generally creamy white. The shape is very similar to the European Treefrog (*Hyla arborea*). The female has a large pouch on her back in which she carries her eggs. This pouch opens to the exterior about 8 mm. in front of the cloaca. The male is smaller, and rather more sombrely coloured.

The frogs are most active during the night, and in the day they spend much of their time amongst the roots of grasses, and under logs and stones. They will eat almost any insects, worms, and even quite large frogs of other species.

The frogs were allowed to hibernate for about 8 weeks, although the temperature was never below freezing. Normally a temperature of about 55°F. is ideal, but during the winter the frogs appeared to be drowsy and not interested in food, so the temperature was allowed to drop. On March 28th the vivarium light was put on again, and the next day the frogs put in an appearance, seeming to be very hungry.

Mating was seen to take place on the morning of the 15th of April, and again on the 16th of September. The account of the breeding which follows is based on these two occurrences. During amplexus, the male is on the back of the female, with its front feet clasping in the armpits of the female. The oviduct of the female is protruded for some 2 cms. and is turned over her back, as has been described for *Pipa pipa* (Bartlett, 1896). This did not occur among the *Gastrotheca* seen to mate by Amoroso, Austin and Frazer* (personal communication) although it definitely took place during the matings described here. In this way, the male is able to fertilize the eggs as he squeezes them out and into the pouches. These eggs are about twice the size of a pin's head, and pure white. Some which had gone astray when the pair were disturbed were seen on the back of the female, just below the opening of the pouch. The time spent in amplexus seems to be variable, since this lasted 30-36 hours during the first mating and only 16-18 hours during the second. After mating, the back of the female appears very swollen, and the outline of the pouch can be more clearly seen.

* A survey of the breeding behaviour of *Gastrotheca* is at present being made by E. C. Amoroso, J. Austin and J. F. D. Frazer at the Royal Veterinary College, London.

On the first of June, small lumps started to appear on the frog's back. These were in gradually increasing numbers and not always in the same places, so it was taken to show that the eggs were hatching. As well as moving, the lumps were noticed to be enlarging. On June 30th, the delivery of the young started : this took 72 hours, and in this case the young were always born at night. 8 to 9 were produced on the first day, 120-130 on the second and lastly 8 to 9 again. Each day the lumps moved down and collected near the pouch opening. After the birth of 163 tadpoles in all, a white piece of membrane was delivered. Amoroso *et al.* (personal obs.) have only noticed this when there was irritation of the pouch. At birth, the tadpoles have a body length equal to that of a small wheat grain, the tail being about 1½ times as long. This ratio of body to tail remains constant. The colour is black or grey, with a darker lining on the lips. At first there are two small white dots on the front of the tadpoles.

Growth is very rapid, and by July 15th the largest tadpoles were ½ inch in body length, with a constriction about junction of head and body proper. By the end of July, the tadpoles were rather like a blunt arrow in shape, and by now the largest bodies were nearly 1 inch long. On 1st August the first back legs were seen : these were very tiny and grew slowly, taking 15-16 days to reach ½ inch long. The front legs appeared on the first ones about August 30th. These appear suddenly, being fully formed before they burst out, in contrast with the slow growth of the hind legs.

On September 4th the first baby frog was found climbing the glass. After this, they kept on appearing almost every day. At first they were about ¾ of an inch long, but grew rapidly and after a week were over one inch long. They are best removed from water as soon as they are climbing the glass, as they are poor swimmers. They leave the water when their tails are about half shrivelled up : as soon as the tail is completely absorbed the frogs are ready to eat solid food. While in the tadpole stage, lettuce and chickweed are readily taken, and tubifex and worms are relished as soon as the legs have developed.

The baby frogs seem capable of changing the colour of their longitudinal stripes from green to brown and vice versa; but in a good light they are generally green.

For breeding, a tank containing an island and about 4 inches of water is needed. The female should be placed in this tank when the lumps have appeared on her back. She should be removed soon after the delivery of the tadpoles, as *Gastrotheca* is a poor swimmer. The female also seems reluctant to eat until taken away from her young. The tank must be covered, as the species are very good climbers.

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Hempton Lodge, Monkshorton, Ashford, Kent.





# A NOTE ON THE USE OF SILVER VITELLIN IN THE TREATMENT OF REPTILIAN DISEASES

By

TIMOTHY J. HUNT

The high mortality rate of reptiles in conditions resulting from diseases of the respiratory system is a well known fact. Conjunctivitis and other infected eye conditions are very frequent, particularly after hibernation (Hunt, 1957).

Holmes (1954) reports on the use of sulphanilamide and its success in the treatment of reptilian respiratory diseases. However, a difficulty exists in many countries in obtaining supplies other than for use in medical therapy, and the complications and toxic effects when used without experience, particularly of the nervous and blood vascular systems, further promotes the use of a substance which can have no toxicity. There are, however, many complicated and chronic diseases in which there is no substitute for sulphonamide therapy.

Silver vitellin has been employed in the treatment of infected eye conditions in some zoological institutions and recent observations seem to merit special mention. It is a stable preparation which has a silver ion concentration which is high enough to be bacteriostatically effective in any dilution but low enough not to cause injury or irritation to the tissues (Andresen, 1928). The latter is a most important feature in its use. In the treatment of tortoises for pneumococcal pneumonia, Silver Vitellin (15%) has been used with some success. A fine pipette is inserted into the mouth, but wherever possible and the size of the external nares allow, it should be instilled as nasal drops. The former task can only be achieved by patience and this usually is only possible during feeding. Clearance was obtained by this treatment usually within six days, and has also been used with several other species of the same genus. In a few specimens of *Testudo graeca ibera* and *Emys orbicularis* which have been treated with sulphanilamide it was noticed that the former suffered from considerable immobility of the hind limbs while in both there was inflammation of the eye. These two probable toxic actions of sulphonamide therapy are considerably reduced if 1 grain per lb. of body weight are administered, this being near the maximum safe tolerance for reptiles.

Pneumonia is common in overcrowded and insufficiently ventilated conditions. Its onset is sudden and acute, and is usually accompanied by shivering or rigor. There is a coarse, moist sound at each respiratory movement and discharge may be visible at the eyes, mouth, nose or even cloaca. A temperature of at least 70°F. with good ventilation should be provided.

Conjunctivitis, whether acute or chronic, purulent or catarrhal, has been treated by Silver Vitellin in many reptiles including *Crocodylus palustris, Vipera aspis,* and *Crotalus adamanteus.* A 10% solution was instilled, the number of drops depending on the size of the animal, every eight hours for the first four days into each eye with a gradual decrease in frequency of

application following. As with all solutions applied directly to the eye, in drops or other form, it should be slightly warmed. Many cases of acute conjunctivitis fail to respond to Boric Acid solution treatment and usually do respond to Silver Vitellin within six days.

It is essential to remember that the eye should be protected from bright sun or artificial light, and that it is not kept in any dust-encouraging medium which could further irritate the eye.

In the case of hordeolum and suppurative inflammation (Styes), Silver Vitellin drops should be applied every 3-4 hours.

It may be necessary on completion of the treatment to swab with a piece of damp cloth or other suitable material the area around the eye where Silver Vitellin may spread, as repeated applications tend to form a residue which discolour the scales. This, however, is superficial and removable. Cotton wool should not be used as it tends to adhere to the facial scales and may recommence irritation of the eye.

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5 Acol Road, London, N.W.6.

## THE HATCHING AND REARING OF GREEN LIZARDS (*LACERTA VIRIDIS*)

By

MARY E. WHITE

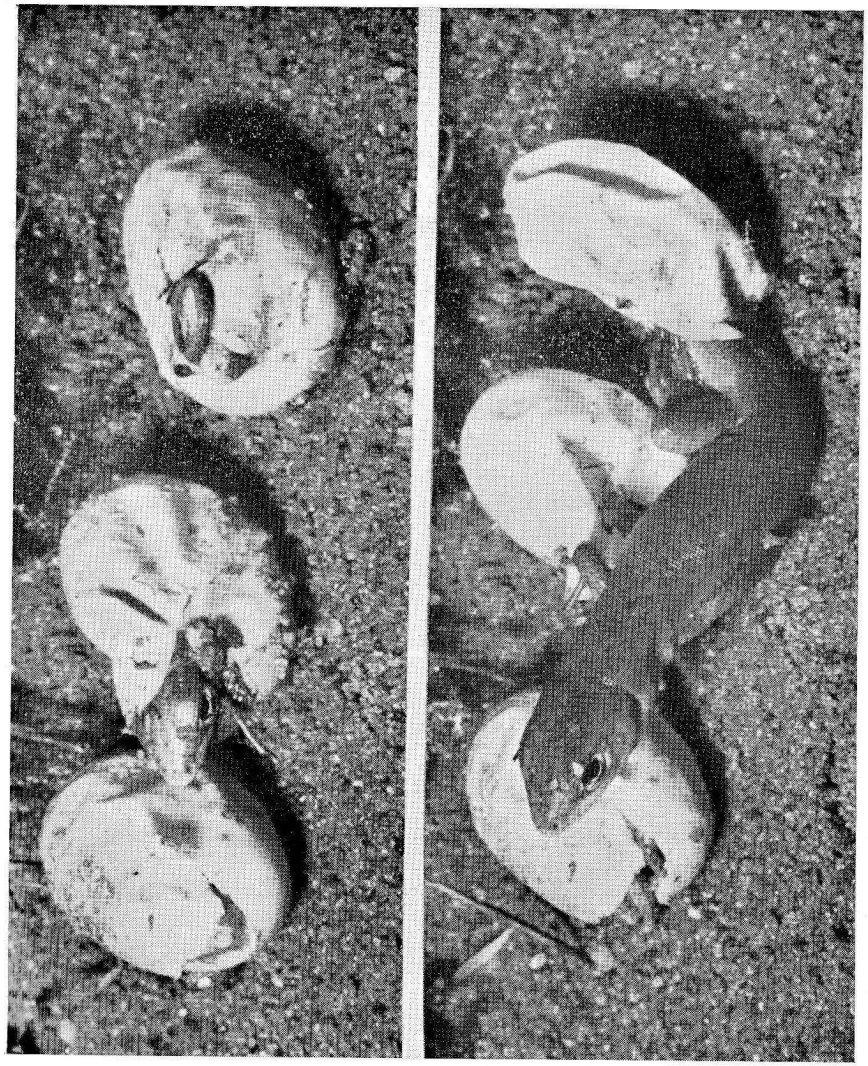
Since 1948 I have made several attempts at breeding Green Lizards in an outdoor vivarium and have at least reached a measure of success. The vivarium is a taller version of a cold frame, about four feet square with glass front and top which can be opened to admit direct sunlight.

There seems to be no difficulty in the mating of these lizards in such surroundings, but the hatching and rearing presents greater problems. My first attempts at hatching, which consisted of placing the eggs in a bowl of damp sand at a temperature of 75° to 80°F., was only partially successful. The trouble here was getting the right degree of humidity.

The few lizards that hatched lived for not more than three months, developing deformities of the front feet and jaws. The toes were closed together and were not able to grip.

In the Spring of 1956 I purchased fresh stock with the determination to succeed. On July 8th a female was seen to be digging holes. This usually takes place in the evening when no other lizards are out. The female is very secretive about egg laying, and if disturbed will not lay in that par-





Green Lizards hatching

ticular hole. A number of trial holes are made before she is actually satisfied, and all are carefully filled in again once the eggs are laid.

The eggs were found next day by careful digging and placed in a plastic box half filled with moist sand, evenly spaced and only half covered with the sand. My reason for this semi-exposure was that with this method a watch could be kept on the eggs during incubation. Over them was placed damp moss. The box was then stood in an aquarium with the water half way up the side. Temperature was maintained at 75° to 80°F. In the case of this batch of sixteen eggs the actual hatching process was completed in about three days, the incubation period being 46 days.

Using this method it is found that the eggs seldom need attention as the humidity within the tank keeps the sand in the right condition. Any dryness can be overcome by damping the moss a little. The eggs increase in size and may or may not darken as the embryo develops, depending on the thickness of the shell. The hatching of these eggs was photographed (see plate), and this is what happens.

The embryo makes a slit $\frac{1}{4}$ inch long with the egg tooth which appears as a small dark projection through the shell, and a quantity of fluid pours out. This causes the egg to collapse into a shapeless mass. The lizard then pushes its snout outside blowing bubbles as it gulps in air. Much peering out, pulsating and twisting round inside the shell goes on before the young lizard finally dashes out. If the egg is fully exposed as was necessary for photography purposes, several hours may pass before this happens. It is done at such speed that even with flashlight it is difficult to photograph.

Some of the young still have the umbilical cord attached, but others are quite clean with just a small slit on the abdomen. The only egg failing to hatch was one which grew to an abnormally large size. This did eventually rupture and was found to contain a fully developed dead embryo with a large quantity of yolk and blood still attached.

Until April, 1957, the babies were kept at room temperature but having about two hours daily under an Infra Red bulb. All possible variety of food was given, including orange juice instead of plain water. Whether this is beneficial or not I cannot say, but the youngsters seem to like the sweet taste and drink a great deal of it. Not one death has occurred in the two batches which I have now succeeded in hatching, twenty-seven young in all. Although making good progress, the foot and jaw trouble in the young has been a problem again; a large percentage of them have it in some degree.

I have noted in particular the following :—

1. The critical period for the young is after the third month. Up till then no malformation occurs. It is during the winter months when very little food variety is available that the trouble starts, so I put it down to diet deficiency and lack of sunlight. The young are now kept in an outdoor run and I am hoping that the exercise and climbing facilities they now have, may improve the condition of the feet.
2. The adult females lay two batches of eggs, the laying of the second coinciding with the hatching of the first. Eggs will be laid by a healthy female whether fertile or not.

3. The earlier the eggs are laid the more chance of success there is during the warmer months. Grow the young as quickly as possible before the winter sets in and food becomes monotonous.

4. The adult Green Lizards are in better condition when hibernated in a frost-proof outdoor frame than those hibernated indoors. They always emerge fat and in good colour as no loss of body moisture occurs.

It is interesting to note that Wall Lizards (*Lacerta muralis*) which I have also hatched and reared to maturity do not suffer with the foot trouble, but some specimens develop a similar abnormality of the lower jaw.

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## ADDITIONS TO THE LITERATURE ON DEVONSHIRE AMPHIBIANS AND REPTILES

By

Peter W. Hopkins

While writing a paper on the amphibians and reptiles of Devonshire for the Devonshire Association (Hopkins, 1957 : in press), it was apparent that I had found further references to the literature of the county which were not mentioned by Taylor (1948). It is the purpose of this note to submit further additions from the literature available in various public libraries in Devon. A fuller account of this material will appear in my paper noted above.

*Distribution Lists.*

The earliest reference is probably that of Ho(o)ker (1584 [?1561]). The only copy, of which there are 170 folios, has not been seen by me; it being in the British Museum. Five species are referred to. Polwhele (1797), who quotes the previous author's entry, also writes of a long-lived toad, over 36 years of age, in a lengthy footnote. Pennant (1776), from whose work this observation was taken, actually devotes nine pages to this same amphibian.

Turton and Kingston (1830) for the Teignmouth, Dawlish and Torquay area, list nine species, but include the edible frog. Bellamy (1839), for South Devon, lists eight species and also includes *Rana esculenta*. Brooking Rowe (1865), was the first to classify systematically the county's herpetological fauna; he gives twelve species including the sand lizard, edible frog and the natterjack toad. D'Urban (1871 circ., 1875?), lists ten and eleven species respectively for Exeter and South Devon. He includes the sand lizard and natterjack toad.

Since Taylor's work (1948), Harvey (1953) lists seven species, for the Dartmoor area specifically.





*General References.*

Cummings (1912) has contributed a paper on the comparative ethology of newts, North Devon. This is mainly concerned with homing experiments. Doe (1915) referred to a two-headed grass snake caught at Great Torrington and which is still in the Museum collection at Exeter. He has also written of a young adder swallowing a viviparous lizard of the same size (1936); and more recently, an article on Devonshire snakes (1938). Chope (1934) lists local Devonshire dialect names for the reptiles and amphibians; the term "Long-cripple" being used in various localities for both the viper and the grass snake. Harris (1936) writes of an albino adder seen in 1934 at Hembury Fort, South-East Devon.

Hendy (1933, 1936) has entered into the controversy as to whether female adders swallow their young. Gordon (1931) and Gooch (1939 [1948]) have written books concerned with the county's reptiles and amphibians. Stidson (1954), from an old note (1868) has described the grass snake taking fish as prey.

*Introduced Species.*

Perry (1940) refers to European tree-frogs kept in captivity on Lundy Island (which has no indigenous reptiles or amphibians) in 1933. Owing to an accident they escaped, but, six years later, a solitary specimen was found; one of the previous female's progeny.

Malcolm Smith (1951 a, b) refers to the release of *Hyla arborea, Lacerta muralis* and *L.viridis* at Paignton by the late Mr. Jack Lester.

Frazer (1953-56, continuing) lists frog and toad breeding records in Devonshire by various observers.

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(The designatory letters T.D.A. signify abbreviation for: Reports and Transactions of the Devonshire Association.)

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## EDITORIAL POSTSCRIPT

Bruce F. Cummings, referred to in the previous paper, was a figure of considerable scientific and literary interest. He was born in 1889 at Barnstaple, N. Devon, and was the brother of the late Mr. A. J. Cummings, who was for many years associated with the *News Chronicle.* B. F. Cummings wrote three books, *The Journal of a disappointed man* (first edition 1919), *A Last Diary* (1920), and *Enjoying Life and other literary remains* (1919). All of these were written under the pseudonym W. N. P. Barbellion, and were originally published by Chatto and Windus. The *Journal* is by far the best known and has been reprinted since the war by Penguin books. It gives a moving account of the author's early struggles as a provincial journalist, of his life in London after he had gained an appointment at the Natural History Museum, and of his protracted illness (disseminated sclerosis) which finally killed him while he was still a young man. *Enjoying life* is a collection of literary and scientific essays and includes one article on the distribution of British newts. He wrote at least one other paper on amphibians; this was called "The formation of useless habits in two British newts (*Molge cristata,* Laur., and *M. palmata,* Schneid.), with observations on their general behaviour". It appeared in the *Zoologist* (1910), 14, pp. 161-175, 211-222, 272. He also wrote a note on the "Occurrence of the small red viper in North Devon (*Zoologist,* 1912, 16, p. 38). His other scientific works included a pamphlet on the bed-bug and papers on the parasites of birds. A biography of him (*W. N. P. Barbellion;* 1926; pub. Parsons, London), has been written by R. H. Hellyar, but deals primarily with his literary rather than with his scientific work.





# NOTES

## LARGE SIZE OF A DEVON VIPER

Peter W. Hopkins

On June 20th, 1957 (7.30 p.m.), two very large *Vipera b. berus* were found under a long piece of galvanized corrugated iron in a local allotments; of these, one was caught. The other has not since been seen, though frequent visits have been made to this spot. They both appeared to be of much the same size.

Captured specimen : Total length, 2ft. 2in.; girth at mid-centre 7/10ths in. Weight, just under 1 lb. Gravid female. Since presented to Paignton Zoo.

In so far as Devonshire is concerned this appears to be an unusually large specimen, although Leighton (1901, p. 241, 255) refers to adult females of 27in. for this county. However, in eleven years, this is the largest adder I have seen and corresponds most favourably to the measurements of other large specimens. It may well be a present day record for Devon.

This specimen was, admittedly, stretched to record this length, though not unduly so. When measuring overall length there is considerable tension, an expansion-contraction force, exerted by the muscles which has to be counteracted at the exact time when the snake momentarily relaxes. At this precise moment the measurement can be taken.

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41, York Street, Sidmouth, S.E. Devon.

## ACARINE PARASITE ON SAND LIZARD (*Lacerta agilis*)

By

Robert V. Skinner

On a stretch of heathland near Studland in Dorset, a male adult Sand lizard was caught with a large parasite adhering to its body, just above the left foreleg.

The parasite was later removed, and found to be 3 mm. in diameter. The abdomen was hard and smooth, nearly spherical, and of a dark grey colour.

As records of this type of parasite occurring on lizards in the wild state are rare (see Smith, M. (1951) *The British Amphibians and Reptiles,* London : p. 284), it was preserved, and later identified at the British Museum as the nymph of a tick, *Ixodes reduvius.* This species is the common tick of sheep, but it will also parasitise most kinds of warm-blooded animals. The lizard was caught in September 1956, and as far as could be ascertained, there were no sheep within three miles.

# OBSERVATIONS ON THE SMOOTH SNAKE (*Coronella austriaca*) IN EAST DORSET DURING THE THREE YEARS 1954-56

By

ROBERT V. SKINNER

In order to study the habits of the Smooth Snake a reptiliary was constructed three years ago, and during the two years 1954 and 1955, much time was spent hunting for specimens, but without success.

Last year (1956), however, 42 Smooth Snakes were caught or identified, within about 10 miles of Poole, Dorset. Many were found lying beneath sheets of metal on small strips of heath left between new housing estates. Others were caught either moving across heathland, or basking with that peculiar habit of this snake to lie with its head tucked under its coils. Two specimens were killed in ignorance of the fact that they were harmless, and the charred remains of two more were found after heath fires, which are common in this area.

Many of the snakes caught were released again, sometimes in what was considered a more suitable place for their existence. Seven were kept for observation in the reptiliary, two of these being gravid females. One of these females was the largest Smooth Snake caught measuring 647 mm. (25½in.).

On 24th September, and at about the same time, these two females produced 16 young between them.

As the Smooth Snake is so rare in this country, this apparent increase in their numbers may be of interest. The amount of time spent in searching was not very great, and the area of heathland covered was comparatively small, indicating that in all probability, many more exist here.

A number of smooth snakes have been kept together in an outdoor reptiliary. During the month of September a large male (22 inches) was observed to be very interested in a smaller female (18 inches). If the female spent the morning basking, the male would always be coiled by her side. When she moved to another position, the male would follow, using his tongue to pick up the female's scent. Any other males coming too close were driven off with a few sharp bites.

One day the pair were found to be in a tangled mass, and upon closer examination it was discovered that the male had the female's head down his throat. Fearing the female would be killed, the two were separated.

However, a few days later the two were found entwined again, and this time the male had swallowed the head and about four inches of the female. She did not move except for a slight twitch of the tail, and her body was held by four extremely tight coils of the male. Twenty minutes later the male disgorged his unfortunate mate, and then tried to effect union. The female lay still whilst the body of the male became very active, especially near the vent. Union did not however, take place, and the female soon recovered and glided away, closely followed by the male.

69, MELLSTOCK ROAD, POOLE, DORSET.





# NOTES ON SLOW-WORMS

By

F. C. BROWN

The following observations may be of interest. In July, 1950, a captive slow-worm 17 inches long was seen in the act of eating a viviparous lizard 5 inches in length, which had been placed in the same vivarium. The lizard had apparently been taken head first, and when first noticed, it had been half swallowed. It was eventually completely swallowed after some twenty-five minutes.

In May of the same year I found two blue spotted slow-worms, one on Leith Hill, Surrey, and another, less conspicuously spotted, in Duke's Warren nearby.

6 OSMOND GARDENS, WALLINGTON, SURREY.

# DISTRIBUTION OF THE ADDER (*Vipera berus*) IN THE COUNTY OF NORTHAMPTONSHIRE

VICE COUNTY 32

By

KENNETH BLACKWELL

In the year 1948 the first Journal of the B.H.S. was published. This contained a series of maps showing the distribution of the reptiles and amphibians indigenous to the British Isles. It is with the map showing the distribution of *Vipera berus* that this paper is concerned. Vice County 32 is completely "blacked-out" denoting that the adder is found throughout the county. The writer was aware that the adder did not occur in the western portion of the county, where he lives, and was therefore interested in discovering the origin of this information. In seeking the information it was realised that the reptile probably did not occur elsewhere in the county at the present time, for the reference given in the Journal dated back to 1902. This on further investigation proved not to be an original survey, but to refer back to a work of the year 1712. It would appear that no records for the distribution of the adder in this region have appeared for some 250 years, and it therefore seemed desirable that the status of this snake be investigated as soon as possible.

During the last eight years the writer has been investigating localities which should be suitable for the reptile to inhabit, having both an abundant supply of food (lizards and small mammals) and being reasonably free from predators. He has in addition contacted local naturalists, schools, museums, and has checked a large number of local records.

The conclusions drawn from the field investigations together with information from other sources indicate that the adder only occurs in the northern-most tip of Northamptonshire and is probably diminishing gradually from its last habitat there. It is said to have been common in a wood in the north of the county about 1860-70 (Leighton, *British Serpents*; 1901).

REFERENCES

1902 Victoria County History.
1712 John Morton's Natural History and Antiquities of Northamptonshire.

The writer wishes to express his thanks to the following for their response when approached for records relating to *Vipera berus*:—

M. Urwick Smith, Curator, Museum and Art Gallery, Peterborough.
John Gilbert of Wansford.
Ian Hepburn of Oundle School.

LOWER WEEDON, NORTHANTS.

## REQUESTS

Dr. E. Elkan (62 Woodhall Gate, Pinner, Middlesex), would be very grateful for any amphibians which die in members' collections and are not wanted. If possible, preservation in the following way would be much appreciated. Immerse animals in formalin (10%) as soon as possible after death. If large, hypodermic injection of formalin into the body prior to immersion gives better results. They should be sent packed in cotton wool soaked with the same fluid after about a week's immersion. Large frogs, toads and salamanders are particularly wanted.

Mr. M. J. Tyler (175 Waldegrave Road, Teddington, Middlesex), would be very grateful if any persons who have recent distribution records for the edible frog (*Rana esculenta*) in this country would communicate with him. He is preparing a survey of the food habits of this species.

## ZOOLOGICAL NOMENCLATURE

### Notice of proposed use of the Plenary Powers in certain cases for the avoidance of confusion and the validation of current nomenclatorial practice (A. (n.s.) 39).

Notice is hereby given that the possible use by the International Commission on Zoological Nomenclature of its Plenary Powers is involved in an application relating to the under-mentioned name included in Part 9 of Volume 13 of the *Bulletin of Zoological Nomenclature*.

(1) *Phrynosoma* Wiegmann, 1828, validation of (Class Reptilia, Order Squamata). (Z.N. (S) 399.)

Any specialist who may desire to comment on this application is invited to do so in writing to Francis Hemming, Esq., Secretary to the International Commission on Zoological Nomenclature, 28 Park Village East, London, N.W.1, as soon as possible. Every such comment should be marked with the file number given above and sent in duplicate.