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CONTENTS

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FROG AND TOAD BREEDING RECORDS FOR 1954

Compiled from the phenological records sent in to the British Herpetological Society

By

J. F. D. FRAZER

The weather summary for the months concerned with spawning has been taken from the Monthly Weather Reports of the Meteorological Office published by H.M. Stationery Office.

DECEMBER, 1953. The mean temperature exceeded the average by 4·6°F in England and Wales, and by 2·9°F in Scotland. It was the mildest December in Great Britain since 1934. Extreme temperatures for the month were (England and Wales) 64° at Aber and Llandudno on the 2nd, 23° at Alston on the 31st.

Precipitation : 36% of the average for England and Wales, 95% of the average in Scotland. Under 25% of the average for most of the South of England.

Summary for the Month : Unusually mild, very dry but dull in England and Wales, sunny in Scotland.

JANUARY, 1954. Mean temperature below average by 1·9°F in England and Wales; 0·1° down, in Scotland. The first ten days were mainly cold, especially the 6th and 8th, followed by a mild fortnight (especially the 15th and 20th). It was unusually cold from the 23rd onwards. Extreme temperatures (England and Wales) 59° at Rhyl and Prestatyn on the 14th, Boston, Dartford and Prestatyn on the 15th, and at Stratford-on-Avon on the 20th; 8° at Houghall on the 8th. Scotland, 56° at Aberdeen on the 19th, 9° at Dalwhinnie on the 30th.

Precipitation : 88% of the average for England and Wales, 101% of the average in Scotland. It was below average South of a line from Scarborough to Ilfracombe, and in Wales. Elsewhere, it was above the average.

Summary for the Month : Changeable; very cold from 23rd to 31st; severe gale on the 15th.

FEBRUARY, 1954. Mean temperature 3·1° below average in England and Wales, 2·7° below in Scotland. The first week was intensely cold in England and Wales. At some places in the South, the temperature was 32° or less from January 29th to February 7th. It was mild on the 10th, with a mildish spell from the 21st to the 25th. Extreme temperatures, England

and Wales, 58° at Prestatyn on the 21st, and at Newport, Shropshire and Raunds on the 22nd;—4° at Welshpool on the 2nd. Scotland, 56° at Fort Augustus on the 21st, 0° at Braemar on the 9th.

Precipitation: 131% of normal in England and Wales; 98% in Scotland. In England and Wales, generally above the average except in the central area of the North. Snow early in the month, with some deep drifts in Kent: also in Lancashire and Westmorland at the end of the month.

Summary: Generally cold, notably so in the first week; mainly dull; rather frequent snow.

MARCH, 1954. Mean temperature below average in England and Wales by 0·1°, and by 1·0° in Scotland. The first few days were very cold, especially the 1st and 2nd: another cold spell came from the 13th to the 18th, while it was warm from the 10th to the 12th. The last two weeks were rather mild. Extremes of temperature, England and Wales, 64° in London on the 11th and Aber on the 22nd, 6° at Burnley on the 1st. Scotland, 62° at Prestwick on the 12th, and 4° at Glenlivet on the 2nd.

Precipitation: Snow and sleet on the first five days, and again locally on the 13th and 14th. Precipitation 117% of normal in England and Wales, 89% in Scotland: less than average in the North of England.

Summary: Unsettled and changeable; very cold and wintry at first.

APRIL, 1954. In England and Wales, the mean temperature was 1·3° below average, and in Scotland 0·5° above the average. Nights were very cold, with cool days from 4th to 7th, and 17th to 28th. Extremes of temperature in England and Wales were 67° at Poole and Weymouth on the 15th, 20° at Moor House on the 28th. In Scotland, 66° at Muchalls and Stonehaven on the 11th, 20° at Glenlivet on the 20th and 27th.

Precipitation: 29% of normal in England and Wales, 66% in Scotland. It was the driest April since 1938 in the United Kingdom. There was a large excess of bright sunshine.

Summary: Dry and sunny; mainly cool in England and Wales.

The fact that the weather was alternately mild and severe over the amphibian breeding period has probably been responsible for the variability in the records, and also for the small number of returns sent in. Some 32 spawnings of frogs and 11 of toads were reported, as well as records from the Haifa district of Israel. None of the potential observers on the Continent of Europe returned completed forms.

The frog records (Table 1) show variation in spawn date from early January (Devon) to April-May (Suffolk). It is noticeable that the early

TABLE 1

Main data from frog breeding records

Locality	*Observer*	*Breeding site*	*Spawn date*	*Depth*
DEVON				
South Molton (600 ft.)	M. L. Elliott	Pond	12, 51–54	9 in.
		Stream	40–46	6 in.
Sidbury	P. Hopkins	Lake	54–87	2½ in.
CORNWALL				
Carbis Bay	A. M. Leadley Brown	Flooded field	11–15	6 in.
SOMERSET				
Minehead (100 ft.)	R. Farmer	Pond	45–92	29 in.
,, (700 ft.)	R. Pugsley	Pond	53–59	43 in.
HAMPSHIRE				
Alton (465 ft.)	R. H. Ahrenfeldt	Ditch	72	3–8 in.
,, (300 ft.)		Pond	72	2 in.
,, (465 ft.)		Tank	74–82	5 in.
SURREY				
Burgh Heath	F. C. Brown	Lake	60–66	6 in.
Epsom	F. C. Brown	Pond	73	12–14 in.
Esher	J. L. Cloudsley-Thompson	Pond	73	½ in.
Cheam (150 ft.)	R. C. Hinton	Pond A	69–74	2 in.
		Pond B	84	9 in.
		Pond C	89	9 in.
Woking	M. Smith	Pond	70	10–12 in.
Dorking	J. F. D. Frazer	Large Pond	70	6 in.
SUSSEX				
Newhaven (0 ft.)	E. M. Atkins	Dyke (? salt)	90 (hatching)	24 in.
ESSEX				
Eastwood (500 ft.)	B. James	Pond A	Before 20	12–30 in.
		Pond B	88–89	24 in.
SUFFOLK				
Ipswich (200 ft.)	S. T. Edridge	Pond	April–May	30 in.
WORCESTERSHIRE				
Dudley (600 ft.)	J. V. Tranter	Pond A	82	6 in.
		Pond B		9 in.
STAFFORDSHIRE				
Streetly	L. Bate	Pool	80–84	6–8 in.
YORKSHIRE				
Farnley Tyers	E. Lees	Pond	71–80	36 in.
Kirkburton	E. Lees	Pond	77–85	18 in.
Honley	E. Lees	Pond	80–87	30 in.
Glusburn (450 ft.)	A. Butterfield	Pond	70–71	30 in.
,, (700 ft.)	A. Butterfield	Pool	84	30 in.
		Pond	81	
ARGYLLSHIRE				
Connel (50 ft.)	E. M. Davidson	Bogs	68–70	2–4 in.
INVERNESS-SHIRE				
Kinloch Laggan (800 ft.)	G. W. Harper	Bogs	87	2–3 in.

January spawning in Devon was followed by a gap until the milder weather of mid-February, other Devon frog communities having delayed until nearer the latter date. Similar findings occurred in Essex. The relationship between temperature and spawning is brought out more graphically in Figure 1, though here there were differences between different ponds in

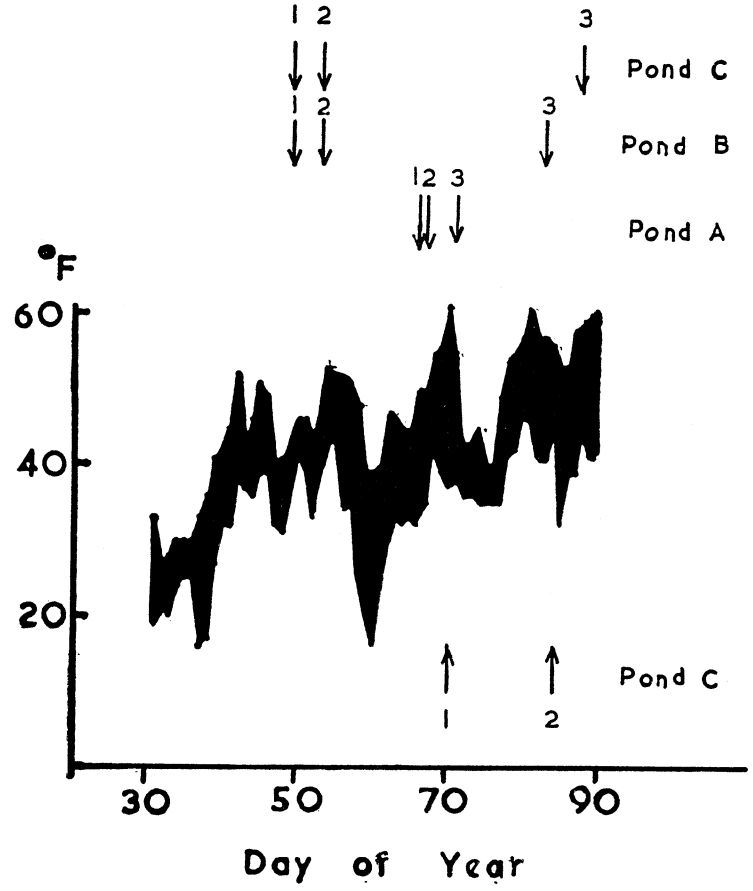


Fig. 1. Maximum and minimum daily temperatures during the frog and toad breeding period at Cheam, Surrey. (R. C. Hinton.) In this figure, the arrows marked 1, 2 and 3 indicate respectively the dates of first arrival of adults at the pond, first deposition of spawn, and the plentiful appearance of spawn.

the same locality. Breeding has been noted as occurring at any depth between two and 30 inches.

Although there have been fewer records of toads spawning, there have been enough (Table 2) to confirm that this normally occurs later than in

TABLE 2

Summary of toad breeding records for 1954.

Locality	*Observer*	*Breeding site*	*Spawn date*	*Depth*
DEVON				
Exmouth	A. M. Leadley-Brown	Pond	42–54	10 in.
Sidbury	P. W. Hopkins	Disused swimming pool	75–90	10 in.
Exe Valley (150 ft.)	Mrs. Parkinson	Lake	76–80	18 in.
CORNWALL				
St. Ives (350 ft.)	L. M. Larking	Pool	71–83	24 in.
SURREY				
Ranmore	F. C. Brown	Pond	73–80	12 in.
Cheam (150 ft.)	R. C. Hinton	Pond	85	9 in.
Dorking	J. F. D. Frazer	Large pond	81	6–9 in.
SUSSEX				
Newhaven (0 ft.)	E. M. Atkins	Dyke (salt)	Adults, 70. No spawn.	36 in.
Hastings	B. Hutchinson	—	About 88	—
KENT				
Swanley	Anon.	Pond	? – 94	6–12 in.
ESSEX				
Thorpe Bay (10 ft.)	B. James	Pond A	84–86	30 in.
,, (25 ft.)		Pond B		6 in.
YORKSHIRE				
Kirkburton	E. Lees	Pond	87–102	36 in.

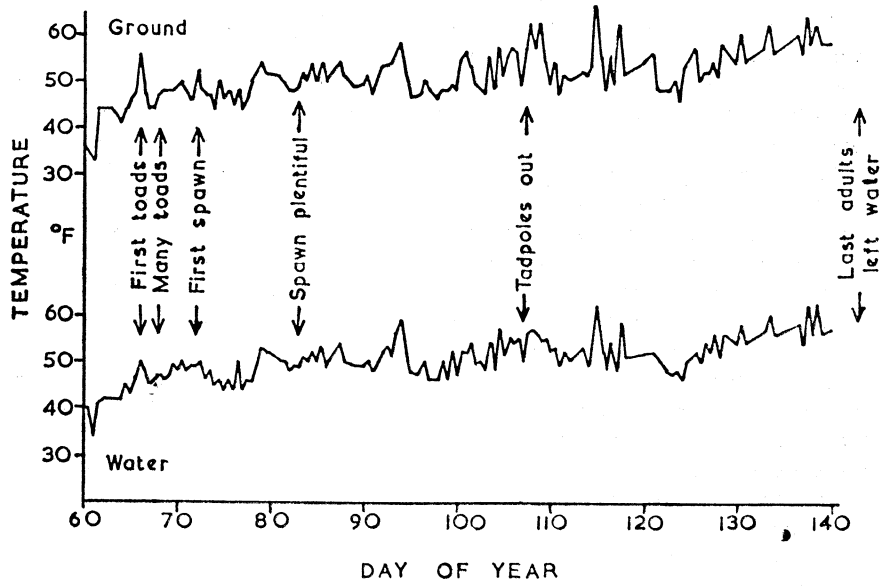


Fig. 2. Morning and evening ground and water temperatures over the toad breeding period at St. Ives, Cornwall. (L. M. Larking.)

the case of the frog; the times having ranged from mid-February in Devon to mid-April in Yorkshire. The Windermere toads (Table 3) have been spawning as late as May 17th, at a depth of 15 feet.

Two records of great interest have been received from Devon. The data of the first have been summarised in Figure 2, where the spawning behaviour is set out against both land and water temperatures, as taken night and morning. It should be noted that although the figure starts on March 1st, the pond had been full of male toads at the previous full moon (February 17th), which had diminished by the next night to eight males and one pair. After this, they were not recorded from the pond until March 6th. It is noticeable that the first spawn was found when the water temperature had reached 49°F. This was followed by three very cold days, with a few pairs and single toads floating motionless in the water. Only a few single males remained for the next three days, followed by a day when no toads were seen. After this it became warmer, and spawning restarted two days later, when the water temperature rose from 46° to 53°F. A second slight rise, following a minor fall in temperature to 48°, was followed by the production of large amounts of spawn. Thus, spawning only occurred with a water temperature over 48°F, and the toads remained quiet in the water at other times. The other interesting point about this spawning community is that the last adults did not leave the water until May 27th, long after the spawn had hatched. Two adults were back in the pond, and croaking, on October 10th.

The other record is shown graphically in Figure 3, where the actual number of toads in the pond is given, as well as the other findings. This pond is a small one with a concrete bottom, so that toads could be easily identified. On occasion, all toads were removed, counted and sexed, and were then replaced in the pond. It is seen that there was a sudden arrival of 20 males on January 21st, when the water temperature was 45°F. With a fall in temperature and ice formation, these had declined to a solitary male by the beginning of February. The weather now was very severe, with three to four inches of ice formed. Once this had melted, the number of males rose with the temperature, spawning occurring when the water reached 46°F. (It will be noted that one aberrant spawning occurred as soon as the ice had melted—water temperature 39°F.) With a second fall in temperature (and ice formation) the numbers dropped again, and rose rapidly once more as the water came from 45° to 50°F. It is interesting that although the maximum number of males present was as high as 46, there were never more than five females seen in the pond on any one night. These figures agree with my own Surrey observations, where a daytime count gave 16 females to 220 males (March 11th).

The Windermere records are summarised in Table 3. With these have been included those from two other local tarns, for the purpose of comparison. In these latter, toads and spawn were found at 10 to 15 feet

depth between April 13th and 23rd. In the Lake itself, spawning in two to three feet of water was taking place by the 22nd (Surface temperature 7·9°C = 45°F), but 12 days later toads were still waiting under stones during a spell of colder weather. About this time, toads were trapped on Beats 20 and 22 (See Frazer, 1953), at 15 to 18 feet, and some spawn was obtained here on May 17th. Special toad traps had been set in Beat 23, but unfortunately only odd single toads (and no spawn) were found in these, the last occurring on May 18th. These findings point to a late

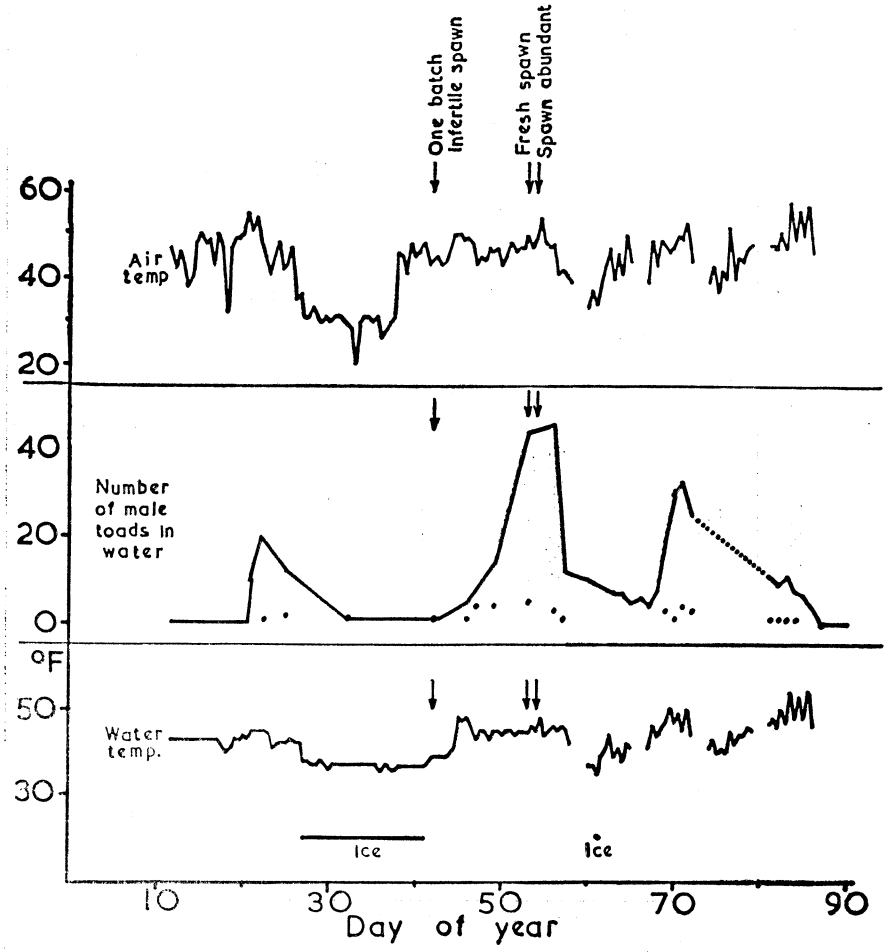


Fig. 3. Air and water temperatures recorded against number of toads in the breeding pond. As far as numbers of toads go, males are shown by the continuous line, while females are represented by the dots. Data from Exmouth, Devon. (A. M. Leadley-Brown.)

TABLE 3

Summary of toad spawning records obtained in the Windermere area by K. Shepherd during 1954.

Date	Surface temperature	Middle Firbank Tarn	Blelham Tarn	Lazy Bay	Beat 20	Beat 22	Beat 23 Toad traps	Beat 26
April 12	7·1°C.			1 toad (seine net, 1–15 ft.)				
,, 13		1 toad, 10 ft.						
,, 14			3 traps, 10–15 ft. Pairs and spawn					
,, 20	7·9°C.			Hundreds at 2–3 ft. Small lot of spawn			Traps set	
,, 22								
,, 23			Several at 15 ft. Some spawn		1 toad, 18 ft.		1 toad, 15–20 ft.	
,, 26	7·35°C.					1 toad, 18 ft.	1 toad, 15–20 ft.	
,, 27				30–40 under stones, 1 ft. No spawn				
May 3	7·15°C.					3 toads, 15 ft.	Blank	
,, 4								1 toad, 15 ft.
,, 10	9·1°C.					2 toads plus spawn, 15 ft.		
,, 11								
,, 17	10·8°C.						1 toad, 15–20 ft.	
,, 18								

spawning in the Lake Windermere area, even in shallow water, which is associated with a surface temperature of 45°F. Spawning at greater depths in the Lake is even later, being associated (Frazer, 1953), with temperatures around 47°F. Lateness in spawning is apparently associated with the lateness of warming of the water at great depths. Why these toads are so late in reaching the water is unknown, but this may perhaps be a result of natural selection, in association with late metamorphosis of the tadpoles from which the toads have developed.

The records for European species, outside the British Isles, are given in

TABLE 4

Amphibian breeding records from the Haifa district, Israel.

Rana ridibunda			
B. Raffaeli	Creek, Asphalte pond	100–125	20 in. or more
F. G. Sulman	Pond	89	24 in.
Hyla arborea			
B. Raffaeli	Creek and pond	59	20 in. or more
F. G. Sulman	Pond	20	—
Bufo viridis			
F. G. Sulman	Pond	–2	13 in.

Table 4. It is considered unwise to comment upon these until further data have been accumulated. It is hoped to extend the range of this part of the investigation during 1955.

To sum up, the data for both frogs and toads in Great Britain show that breeding is associated with warmer weather, the toad records in particular showing an intermission in spawning when there were spells of colder weather. Water temperatures around 47°F were associated with the production of the first toad spawn.

Once again I should like to thank all those who sent in records or supplied other information on which portions of this paper have been based.

REFERENCE

Frazer, J. F. D. (1953). The breeding habits of toads (*Bufo bufo*) in Lake Windermere, *Brit.J.Herpetol,* 1, 153, 159.

POISONOUS SNAKES IN CAPTIVITY

By

NATALIE VINT ROBINSON, B.A., and STANLEY F. WOODWARD, C.M.Z.S.

A chance to study the deadly Russell's Viper, Daboia, or Tic Polonga (*Viper russellii*), at close range is an event of great interest. A specimen of this snake, "The Speckled Band" of Conan Doyle's famous story, was found in the foothills of the Himalayas at an altitude of 6,000 feet on 26 October, 1945 (temperature 70°F) and captured by a noose secured behind its head. It was placed in a cage with grass, stones, and water. At the time of capture it was about 18 inches in length.

The Russell's Viper, being a tropical denizen of India, Malaysia, the Dutch East Indies, and the Islands of Flores and Komodo, is not seen in comparatively large numbers in the temperate climate of the Simla Hills, where this one was taken. It is, however, extremely prolific in the Orient, one reason being due to the generous litters brought forth alive by the females. Another captive Russell's Viper, under observation at the same time as the young snake under review, produced 23 young, the whole process taking over 30 hours. The average length of the young was 9½ inches; the average weight, ten grams. The whole litter weighed half a pound.

The Tic Polonga (as the viper is called in India) is one of the deadliest snakes in the world, and together with the kraits and cobras, combine to produce a large number of fatalities from snake bite in India and other parts of the East. The young are equipped with fangs and venom and able to fend for themselves from birth. The fangs have two functions—to kill the prey, and, by using each alternatively, to assist in swallowing. On being alarmed, the snake hisses loudly on both inhalation and exhalation of breath. The full-grown snake may reach a length of nearly five feet. Its principal food is rodents.

Once in captivity, the young viper went into a period of hibernation or stupor lasting 161 days. The temperature at this time ranged between 43°F and 65°F. During this period the snake was offered four mice, two frogs, and two young bush rats. All of the mice were killed but not taken. The frogs remained untouched. The first bush rat was killed but not eaten; the second, offered 4 April, was killed and eaten. Water, however, was drunk freely throughout the period. In killing its prey, the snake does not hold it as do many reptiles, but strikes at its victim with a lightning flash; the victim takes one jump, drops, and dies within a few seconds, for the venom of the viper is very powerful and can kill a young rat in less than a minute.

After the period of hibernation ending 4 April, the snake's life may be divided into periods between the sloughings. Before sloughing, the viper's

skin loses its colour and lustre, and the eyes become misted. The snake is particularly vicious at this time, when the snake begins to slough, and skin first becomes loose about the jaws; then the snake wriggles out of its old skin, turning it inside out in the process. The shedding takes about one hour. Russell's Viper, freshly sloughed, is a handsome creature, very beautifully coloured. The background is pale brown, and extending down the entire length of its body are three large black chains of rings. The head is distinct from the body and wedge-shaped.

During the first period, lasting from 4 April to 17 May, with temperatures ranging between 74°F and 83°F, two moderate sized field mice were eaten. It is interesting to note that a white mouse put into the cage was utterly ignored for 24 hours (after which it was moved), the snake preferring its customary neutral-coloured prey.

The snake sloughed again on 17 June. In the period before the second shedding, it consumed two small field rats. Another small proffered field rat was killed immediately but not eaten. The temperatures in this period were between 51°F and 85°F.

During the third period, the viper ate three moderate-sized field rats and one mouse. Another mouse was killed but not eaten. The third sloughing occurred on 1 August. Between the second and third sloughings the snake grew from 20 to 26 inches—six inches in 43 days!—and the temperatures were between 57°F and 83°F.

From 1 August to 27 August, the viper ate six small field rats. On 1 September another field rat was offered. This rat lived in captivity with the snake until 23 September, when it ate its way into the adjoining cage of a krait (*Bungarus caeruleus*), from which it subsequently escaped.

On 26 September, the Russell's Viper squeezed through the rat hole into the krait's cage. Viper and krait proceeded to live in apparent harmony. On the evening of 1 October, a shrew (*Crocidura caerules*), known in India as the common musk shrew or musk rat, was put into the communal cage as food for the krait. Next morning the Russell's Viper was found dead, with terrible injuries to its snout; one fang with its premaxillary bone was completely missing, although the other fang was intact. Obviously the snake had been killed in a terrific fight, although neither the krait nor shrew showed signs of injury.

At the time of its death, the viper was 28¼ inches long. It was on the verge of sloughing and might have sloughed the night of its death, for the skin was easily peeled off. The viper, on examination, was found to be a female. During the last period of its life, the temperature ranged between 70°F and 80°F. No food was taken by the viper from 27 August until its death on 2 October, although food was in its cage during that period. The reason for the viper's refusing food between 27 August and its death is not understandable; it was in good condition and took water readily, but it is well known that snakes can be very fastidious in their diet. Efforts

made to catch a different species of rat proved unsuccessful.

The morning of 3 October found the krait dying, with terrible injuries to its snout, and the lower part of its body badly gnawed. (The krait, a female, was four feet long, a very fine specimen rarely found in the Simla Hills.) Culprit? The shrew. The small, agile shrew had proved itself victor over two of the deadliest snakes in India.

Since study of the viper's growth and development was put to an end by its untimely death, it was decided to experiment on the shrew to see what effect the venom of the Russell's Viper had on it, for if the animal had been bitten in the battle, as seemed possible, no effects were evident, and the viper venom is so strong that even when used therapeutically—to control minor haemorrhage, such as nosebleeding and oozing from tonsil beds after the removal of tonsils — it is diluted to 1/10,000 and even 1/100,000. The shrew, a male specimen weighing 45 grams, was prepared for injection with Russell's Viper venom. Unfortunately, too much chloroform was given, and it died before receiving the injection.

A second male shrew, also weighing 45 grams, was caught and injected subcutaneously with 5 mg of Russell's Viper venom at 2.15 p.m. Though only 5 mg were injected by actual bite, a snake could inject 50 to 100 times this amount. Like other secretory organs of the body, the poison gland of a snake is constantly secreting; it follows, therefore, that if the snake has not used its fangs for a period, the first victim will probably receive a heavy dose. The injected shrew showed first symptoms of poisoning at 3.30 p.m. and it died at 5.55 p.m. (3 hours 40 minutes after being injected). The shrew was therefore not immune to the snake's poison, and its survival of the battles with the two snakes can be explained best by its exceeding agility. It must also be remembered that all three animals were in a state of captivity and that such battles never occur in natural life.

However, the shrew, a terrestrial insectivora, has been known to eat meat, and instances have been reported of its eating frogs and scorpions. In captivity, the shrew which killed the snakes ate bread, chippaties, and cheese, all unnatural foods for it. It is assumed that in both battles it was the aggressor.

The Viper's untimely death, so close to the end of the planned observations period, denied the completion of full data on a year of its life. The subsequent experiments, however, not only compensated the tragedy but also proved absorbingly interesting.

NOTES

THE INTRODUCTION OF AN AUSTRALIAN FROG INTO ENGLAND

In the spring of 1951 I paid a short visit to Melbourne, my native town. On the voyage out the idea occurred to me that some of the Australian frogs would be a welcome addition to our garden in England, and soon after my arrival I began to make enquiries on the subject. Several different kinds of frog were suggested, and the one finally decided on was a small species known locally as the Rain Frog—so called on account of its habit of croaking when rain is about to come. It has since been identified as Ewing's Frog, *Hyla ewingi*. It is evidently a common frog in Melbourne for it can be heard frequently in many of the gardens. Those brought back by me were collected in the Botanical Gardens. They were presumably young ones born the year before, for the largest was not much over half an inch in length of head and body. I selected a dozen. They were packed in an old billy can, lined inside with several layers of blotting paper and a supply of leaf mould, all well damped. Ventilation was provided by a piece of wire gauze over the top of the can and once a day on the journey they were given a sprinkle of water.

On 8 June I returned to England by air, travelling via the Pacific. We arrived on 13 June, and on the following day I reached my home at St. Ives in Cornwall. The frogs had stood the journey well and leapt from the can as soon as it was opened. They were set free at once beside the pond in the garden and disappeared into the undergrowth. For three and a half months nothing was seen or heard of them.

The pond by which they live is about nine and a half feet long by six wide and at its deepest is about two feet. It has concrete on three sides, the fourth being formed by a large slab of rock. In it grow aquatic plants, and on two sides are shrubs and bushes which grow down close to the water. In this herbage the frogs spend most of their time; they are hardly ever seen. On the night of 1 October several frogs were heard croaking; after that they were silent and were not heard again until 19 February, 1952. The first spawn was seen on 11 April.

The call of this frog is a soft bird-like note, but there is considerable variation in their voices, some being deeper in tone than others; there is also some variation in the actual note produced. They call only at night, but when several are in song together it can be continuous almost all night long. When croaking the throat is blown out two or three times the size of the head. They are most noisy during March and April, but calling continues throughout the summer, and they have been heard in the winter months—December and January—when the temperature was quite cold,

sometimes freezing. Spawning has taken place every year and has been observed in February, March, April and May. The earliest date is 22 February. The spawn is laid in small clumps and is attached to the vegetation in the pond. In about three months the tadpoles metamorphose.

The tolerance of this frog for cold is considerable, as the following remarks taken from a diary kept at the time will show.

1954.

Jan. 3. Very cold. One frog heard early in the evening.
„ 4. Very cold. Two frogs heard.
„ 9-20. Warm and wet. Frogs heard every night.
Then followed two weeks of bitter cold weather with hard frost.

Feb. 9. Warm and wet.
„ 11. One frog heard early a.m.
„ 17-18. Several frogs heard calling loudly.
„ 19. Very cold and wet. A northerly gale. Frogs singing gaily.
„ 22. Spawn in pond on beech twigs. Last night and to-night frogs very noisy. Four heard.
„ 23. More spawn in pond. Frogs shouting.
„ 25. Frogs heard every night. Very cold with hail. One seen swimming in the water.
„ 27. More spawn laid. Weather very cold.

Mar. 1. Very cold. Temperature in pond 40°F.
„ 2. Very cold night. Ice on the edge of the pond. Two frogs heard.

Spawning continued until 7 March, by which date seven clumps had been laid.

The coloration of this frog is very variable, partly owing to its ability to change colour, which it can do very rapidly. A complete change from light to dark can be accomplished in about 15 minutes. The back may vary from light brown, grey, or yellowish-green to dark brown. There is a black streak on the side of the head passing through the eye, over the shoulder and down each side of the body. The belly is whitish and the under surfaces of the limbs may be red, flame or pink, but this colour is not constant. The male when fully grown is about two inches in length of head and body, the female grows larger.

On 21 May, 1954, Dr. Malcolm Smith paid us a visit and took back with him to his home some 20 tadpoles. The vibration of the car on the journey was too much for many of them, but some survived, and five ultimately metamorphosed. On 17 August they were taken over by Mrs. Derek Green, of Colindale, in whose care they still are. They have done well. They were fed at first mainly on flies, as these were the most easily procured food, but they were prepared to take other insects when offered

them. Their supply was curtailed during the winter, but they have not hibernated. They now measure between 30 and 35 mm. in length of head and body and eat flies, mealworms and spiders. At the end of November the male—there is only one—was heard croaking. After that he was silent but commenced again on 19 February, and now croaks every day. The description just given of their coloration has been taken from these frogs, which are under constant observation, and not from those at St. Ives.

I am indebted to Dr. Smith for the following information concerning this frog. *Hyla ewingi* was originally described from Tasmania. It has since been found in S.E. Australia and New Zealand, and wherever it occurs it seems to be fairly abundant. Four geographical races have been described, but owing to the amount of individual variation in any one locality their status is not very clearly defined. English* writing of its habits in Tasmania, remarks: "This frog seems to be abundant in most parts of Tasmania. It is on the whole aquatic, seldom going far from water and living generally under stones and logs on the bank of some pond or stream. When disturbed it dives in with all speed. It does not seem to be really arboreal, though it may climb up 10 feet from the ground. Where plants are kept in pots on a verandah a colony of these frogs usually settles, and its members seem to appreciate watering as much as the plants do, generally greeting it with song. Except when breeding *Hyla ewingi* is inactive during the day. Its regular concerts begin towards sunset, though as is the case with many other frogs, its voice is heard when rain is approaching or at times when certain loud noises excite it—rapid hammering, for instance. It does not seem to hibernate, but is sluggish in cold weather. Its colour is almost invariably some shade of brown, closely resembling that of its immediate surroundings.

"*Hyla ewingi* has its regular breeding season in winter. In July, 1902, it was spawning at Launceston and Devonport, in pools and ditches such as would be chosen by *Rana temporaria*. Its spawn is in masses. The first tadpoles appeared at the end of July. They are quite black, becoming paler and silvery underneath as they develop. During November the pools they frequent are fast drying up and the water which remains is packed with tadpoles. Early in December these pools are mostly dry and the tadpoles have either become frogs or have perished."

The climate of Melbourne is not unlike that of the South of England, but the summers are hotter and the winters are not so cold. Snow and ice are seldom seen. There is less humidity.

ELSA LARKING.

Pelican Hill, St. Ives.
1 March, 1955.

*English, T. M. S. Notes on some Tasmanian frogs. Proc. Zool. Soc. London, 1910, pp. 627-634, col. pl.

THE USE OF PENICILLIN IN THE TREATMENT OF REPTILES AND AMPHIBIA

Having had my share of troubles in the reptile house from time to time, it is not surprising that Penicillin has found its way into my medicine chest. I had always placed my faith in Sulphanilamide, particularly as Mr. Lester, who is known to us all, was kind enough to prescribe it in the treatment of an Indian Monitor. The specimen in question suffered from copious discharge of blood-covered mucus whenever it attempted to swallow food—a condition which got persistently worse as time went on. At last the inevitable refusal to feed resulted, and it was then found on attempting forcible feeding, that all the teeth were loose. The teeth having been swabbed away, as well as part of the gum having been displaced, everything which would come away easily was removed. The resultant "mess" and only this would describe it, was plugged with Sulphanilamide impregnated cotton wool and left for a couple of days. When next examined the flesh seemed clean and the plugs had vanished. Swabbing having brought no blood and no discharge to light, the area was dusted over with Sulphanilamide powder again—this was repeated daily for several days. About the 12th day the opposite side of the gum came away along with much blood. The whole procedure was repeated, but, unlike the other side, appeared to get worse. It was during the treatment for this side that Penicillin was dusted on by mistake. From then on progress was phenomenal. The flesh healed as it had done with the other side, but quicker, and in two weeks the mouth had healed—no more patches of flesh came away and there was no more blood or discharge. The reptile recovered fully, but did not regain teeth. Unfortunately, during the coldest part of last Winter, a heating failure put him in a position where no drug would save him from death.

I am not putting my case for Penicillin on this instance alone—both Penicillin and Sulphanilamide played their parts. Such is not the case, however, with the Tuberculated Iguana which arrived with a bad patch due to faulty sloughing. This patch, on the chest, was about the size of a matchbox top; it consisted of several layers of old skin in a hard, black, and solidly packed mass. Efforts to remove it showed matter beneath and by disturbing the "scab" oozed forth with bubbling and frothing. The mass was so formed that it was obvious damage would be done by pulling it off at that stage. Peroxide swabbing and cottonwool soaked in penicillin cream were forced under where it was loose. In a few days the whole mass came away, leaving an ugly red and green patch bursting with pus beneath. This pus was released; swabbing and penicillin dressing followed. In a few days of this treatment the wound was beautifully clear and healing rapidly. The creature set itself back by running up a branch in its case and tearing the new-formed skin. All efforts to prevent a scab forming

failed. Later the scab was removed and the above proceedure repeated. This time, however, a jacket fixed by Cellotape was fitted round the specimen's body. It could then rush about if it desired, branches being removed, however, just to be on the safe side. The reptile is now doing nicely and hardly shows a mark.

The next patient is a Green Toad (*Bufo viridis*) which through a large stone being accidentally dropped on his "hand" sustained a nasty injury which swelled to resemble a miniature boxing glove. Penicillin cream but no dressing was applied about three times a day for a week. The hand shows very little damage except two digits are missing. A cut head (cause unknown) on a common frog, a body injury to a Salamander, a wounded head on a tree frog have all been nicely cured using penicillin cream.

Snakes also have figured, the first being a Grass Snake, *Natrix natrix*, which was suffering from slight canker. All the hard pus was removed, the gums scraped and swabbed by Peroxide, Penicillin powder dusted on and cure effected in short order. This reptile had ceased to feed, but resumed the next day after the first part of the treatment. Swabbings and dustings were given every day for about ten days. No healthy specimen is better than this as regards condition now.

NIGEL EDMONDSON, Curator.
Morecambe Children's Zoo.

JUVENILE BEHAVIOUR OF DENISONIA SIGNATA

As the observations recorded in these notes were enacted under abnormal conditions their scientific value is possibly suspect; but they will, I trust, offer some interesting observations on juvenile snake behaviour, and evidence that sunshine, traditionally associated with reptilian existence, is, in fact, not of paramount importance.

According to Kinghorn's 1929 list of 17 species, two sub-species and a variety of *Denisonia* this is a fairly large genus with a wide distribution on the Australian mainland. Tasmania can claim at least one species, and Dunk Island, on the Barrier Reef (immortalised in the writings of E. J. Banfield—"The Beachcomber"), is the only known locality of *Denisonia signata* var. *vagrans*. The genus us also represented in the Solomon Island group.

Only one species—the Copperhead or Superb Snake (*D.superba*)—is of any great size, and is one of the deadly snakes of Australia. The rest of the genus are of small size and are not considered dangerous. Probably the most widely distributed and best known of the group is the Marsh or Black-bellied Snake (*Denisonia signata*), which rarely would exceed three feet, but such a specimen has, I believe, been recorded by Mr. George Cann, Curator of Reptiles at Taronga Park Zoological Gardens.

Because of its docility and ready acceptance of captivity, the Marsh

Snake, or "Sig," to give it is most popular name, is an ideal subject for the herpetologist. It usually settles down and starts to feed on small skinks and frogs without any fuss. These notes will bear witness that it will readily turn to cannibalism.

On 1 January, 1953, on the northern slopes of Bondi Beach (Sydney), I obtained two good specimens of *D.signata*. One measured 18 inches and the other 24 inches; the larger of the two had every indication of approaching motherhood.

Most of my specimens are kept in glass-fronted cases on a verandah which has plenty of natural light, but never gets any direct sunlight. It was here that the two *signata* were housed in cases about two feet long by ten inches wide and deep, with glass front and top. They were furnished with freshly cut turves of grass, dry leaves, small rocks and earthern water dish.

Some time between 22 and 25 January the birth of young began from the larger "sig." On the evening of the 25th I found one young snake on the top of the case. Others may have escaped, but were never discovered. On 26 January two more were found in the case (which I had made escape-proof) during the morning, and a fourth at 8.30 in the evening. This was much more slender than the previous three. There appeared to be no more births until the morning of 27 January when, at 10.30 a.m., I found a further seven. These had been born since 6 a.m. that morning when I had last inspected the case. Four of these young were still in the foetal membrane, but broke out in a few moments.

I was able to observe the complete birth of the 12th youngster. Delivery began at 10.50 and was complete by 10.52, the young enclosed in a blood-veined sac. By 10.55—five minutes after birth had commenced—it was free of the membrane and moving about. Delivery was immediately preceded by slight but rapid convulsions, and I noticed that the mother drank very copiously. During the whole of the time she was very nervous and alert.

Sometime during the afternoon of 27 January the 13th and last youngster was born, but later had disappeared. As escape from the case was impossible, it is almost certain that the mother ate it. (I omitted to mention that all the young snakes had been removed to a separate case as soon as they were mobile to prevent this very thing happening.)

Although accurate measurement of live snakes is very difficult, these averaged approximately five and one-half inches at birth. The young are considerably lighter than the adults, but have the typical colour pattern. A sooty-black dorsal area, with quite a noticeable dense black stripe down the centre of the back. The belly lead-grey. The head, very distinct from the neck, is a velvety jet black with white upper lip, and a white temporal stripe from the rear of the eye to the angle of the mouth.

The baby snakes assumed an aggressive attitude as soon as they were

able to move when handled, but none actually attempted to bite. All had achieved their first slough within a couple of hours of birth.

At about 7 p.m. on the day of birth of the last snakling I placed one of them in a glass jar with a small garden skink (*Leilopisma* sp). Later it had disappeared, and as it could not have got out of the jar it must have been eaten. Another young snake in a jar with a three-inch skink must have struck at it and caused it to drop its tail. The snake seized the tail, but seemed uncertain which end to start swallowing. It worked the tail through its jaws twice from one end to the other. Finally it swallowed it thick end first.

On 30 January I found the opportunity to try some experiment in food preference, and, dividing the young into twos, I placed them in jars with a variety of different possible food. In No. 1 were eggs of *Leilopisma* and some small caterpillars. No. 2 had earthworms. No. 3, garden slaters. No. 4 had an adult skink (Leilopisma).

Here I should explain that all the young *signata* had, up to this moment, been confined to a case 18 inches square and three inches deep, glass-topped and with a tray of leaf-mould and dry earth. So far as I know there had been no attempt at cannibalism.

At the end of a quarter of an hour none of the snakes in Jars 1, 2, and 3 had shown any interest in the various items of food offered to them. In Jar 4 I witnessed one of the most amazing events I have ever even dreamed of. To make the description easier to follow I shall call the two young snakes A and B. They were of equal size (about 5½ inches), and it will be recalled that I had offered them a garden skink.

Action started when A struck at the skink, which it missed, and, because of the confined space in the small jar, it fastened into B about mid-body. After a brief struggle A released its hold, although B showed no violent resistance, and made no attempt to retaliate. A few moments later A again struck at the skink, missed, and once more fastened into B. Again, after a brief struggle, they separated. A few moments later A, completely disregarding the skink, made a deliberate attack on B, and started to swallow its brother head first. In ten minutes it had gulped down more than half the length of B, when it suddenly disgorged its victim.

B showed no evident distress at having been more than half swallowed by its brood-mate, and was at once alert and flickering its tongue. It lay quiet for a very brief moment and then started to move vigorously about. Noticing the skink B now made its own attack and seized the lizard. This caused it to drop its tail, which, was still wrigging, was the subject of a half-hearted attack by A. In the meantime the lizard had struggled out of the grip of B.

Now, after missing the wriggling tail, A again made a deliberate attack on B. This time the victim struggled most violently, but was soon apparently subdued and was more than half swallowed. It seemed, how-

ever, that he was just too large a meal, and for the second time in half an hour B was disgorged seemingly none the worse for his repeat journey to the stomach of A.

B lost little time in launching an attack on the still-wriggling tail of the skink and disposed of it. It then grabbed the lizard itself and, in spite of an attempt by A to take the food from its mouth, it finally succeeded in swallowing the *Leilopisma*.

After this astonishing train of events I thought it time to separate them.

By 6 March, 1953, I had, unfortunately, disposed of all except one of the young *signata*. Some went to a friend in New York, and are still with him. The single young was overlooked among the debris in its case, and at the time of his discovery, almost two months after birth, it had never been out of its original case. It was now that I decided to experiment in keeping it completely inside away from the sunshine. It is now within a few weeks of its second birthday, and I have never seen a more healthy snake. It has been fed exclusively on small skinks. It has survived two very cold winters without heat, and two infestations by red mite. These latter can prove very fatal to snakes if they become established, and are something of a bugbear to herpetologists in Australia. I have not had them identified, but suspect that they are identical with, or very closely related, to the tropical fowl mite, *Dermanysus gallinae*. They may be successfully combated with an emulsified solution of nicotine sulphate.

The following brief notes and dates may show the development of the young *D.signata*.

Some time during the first week of March it completed its second slough. On 19 March a third slough and now measuring about seven inches. 5 May, fourth slough, now about 8½ inches. 12 December, 1953, measures 11¼ inches after a winter spent buried in dry leaf mould. 15 February, 1954, another perfect slough and in wonderful condition, 13 inches. 22 March, 1954, completed a perfect slough. The cast skin was complete in every detail from rostral and mentum to the last tiny tail scale, measuring 15¾ inches. The snake measures 14 inches. It it now one year and two months old. 29 March, 1954, the coldest day we have had this year and the young snake is coiled up deep in the dry leaf mould. In the last couple of days its diet has been six skinks. 8 September, 1954, the young *signata* has come through the winter in superb condition. A rough measurement shows that he is still about 14 inches, but he appears to have gained appreciably in bulk. 3 November, 1954, another complete slough, which measured 16 inches. 27 November, 1954, to-day the *signata* got rid of another perfect slough, although only a week ago it was rather ill from an infestation of mite. Have cleared these up with Black Leaf 40 spray.

At the present date, 27 December, 1954, the snake measures 15¼—15½ inches, or slightly less than three times its birth-day length. Judging from its size, I would say that it is still far from mature, but this may not be

an accurate guide to maturity, as it had been deprived of almost every advantage of food and movement that would be found in the natural state. I rather fancy that frogs, and not lizards, would be its normal staple diet. Captive specimens have been known to enter water after tadpoles. But it is, in every other respect, a very healthy and active snake.

I hope to rear this snake to maturity, mate it, and if possible rear another generation under the same conditions.

From the foregoing it is evident that snakes can like and prosper in the complete absence of sunshine. It is regrettable that only after I had disposed of all other young of the brood that I decided on this experiment. Otherwise its value would have been greatly enhanced in the use of control specimens reared under nearly natural conditions.

ALEX. HOLMES, *President*.
Australian Reptile Club.

TELESCOPUS FALLAX FEEDING UPON *ANGUIS FRAGILIS* LIZARD BEING APPARENTLY IMMUNE TO THE POISON

During the month of July a number of European snakes were received, among which was a specimen of the European Cat snake, *Telescopus fallax*. This snake, in its wild state, feeds almost exclusively upon lizards, very occasionally taking small mammals and the nestlings of ground nesting birds. To comply with the reptile's specialised feeding habits I placed a number of lizards in the cage. *Lacerta viridis* (juvenile); *Lacerta vivipara;* a number of *Anguis fragilis*. The lacertae were caught by the snake in the manner usual to the opisthoglypha, that is, the snake quickly grasped the lizard with its mouth, at the same time throwing a coil around the prey to hold it further. The snake then chewed until the prey was well into the mouth and obviously in contact with the fangs. The prey was thus held until the poison had taken effect, usually around four minutes, depending on size of prey. The swallowing of the prey followed. After killing and swallowing the lacertae, the snake then proceeded to stalk and catch a specimen of *Anguis;* the usual procedure was followed until the *Anguis* was well into the snake's mouth. Four minutes elapsed, and after a further four the *Anguis* was still alive and now biting the snake in the region of its head. The fangs either did not penetrate the hard scales of the *Anguis* or the lizard was immune to the poison. I am inclined to accept the former as being the case. Finally the snake began to swallow the *Anguis,* tail first. At this point I was called away, returning ten minutes later to find the *Anguis* had completely disappeared, and the snake's head was being held in a very odd manner, so that the back of the neck formed an acute angle to the body. Thinking that the snake had sustained an injury, I gently opened its mouth, to find the head of the *Anguis* lying to the rear of the

snake's mouth, and firmly holding the tongue-sheath of the snake. The snake was obviously choking, being unable to swallow or regurgitate the lizard. I released the snake's tongue with a pair of fine forceps, after which the *Anguis* was quickly swallowed. On examination the tongue-sheath was found to be badly bruised.

KENNETH BLACKWELL.

OBSERVATIONS ON SNAKE CHARMERS

To the majority of people the word "Snake Charmer" has a strange and intriguing sound. While in the Orient I had the opportunity to get information on this odd profession.

The technique used by the fakirs to nullify the danger from the venomous snakes is nothing more than taming them. It is just like getting a common bull snake accustomed to being handled. This technique causes poisonous snakes to give up attempting to defend themselves by biting. I have seen snake charmers with wild specimens, and their handling of such is caution carried to the extreme. That is, caution to me, but to one unaccustomed to these sights, their actions were apparently foolhardy. There are many tricks of the trade which look dangerous, but are not. The weaving back and forth is just the snake trying to stay in striking position, aimed at the charmer or a portion of his body. This occurs only in freshly captured specimens. Most persons who have seen the snake charmers exhibit their wares have been acquainted with the organised strike of the rattlesnake or some other viper. Thus when the snake hits the exhibitor's hand or arm it is viewed as a bite. But it is really a faint or bluff with the mouth closed. I saw snake charmers deliberately fondle the edge of the mat on which the snake was reposing, causing the snake to strike his hand, *but not to bite* it. I have often observed cobras biting, and I have never seen one just touch the skin and be able to bite, or to inject any venom. To my knowledge when injecting the venom they always hold on and chew, re-imbedding the fangs many times.

The snakes used by most snake charmers are the Indian cobras (*Naja Naja*) and their closely related sub-species, of which I have observed many specimens in captivity. I have not seen any of the snake charmers use the King Cobra (*Naja hannah*), although it is possible, for they tame just as well as other snakes.

It is most uncommon for snake charmers to keep any of the true vipers in their baskets and allow the vipers to strike at them. But when the vipers are kept their fangs are usually pulled out. After prolonged investigation into the subject, I have knowledge of just one snake charmer with a pit viper which had its fangs intact. This snake was wild and would strike at

the least provocation. In handling it, the snake charmer would always lay a cloth on it, or put part of the basket or some other object over the snake's head. Then he would pick it up. The covering of the snake's head was always made to appear accidental. Of course, since snakes usually only bite moving objects, the snake charmer was careful not to move much, thus there was little danger of being bitten.

The few kraits noted in the snake charmer's basket were so tame and gentle that they could not be induced to bite. They were touched on the nose and in general every measure was used to induce them to bite, to no avail. Little or no precaution has been taken in cleaning krait cages, and at no time have they ever tried to strike. The kraits must almost certainly be injured before they will try to defend themselves.

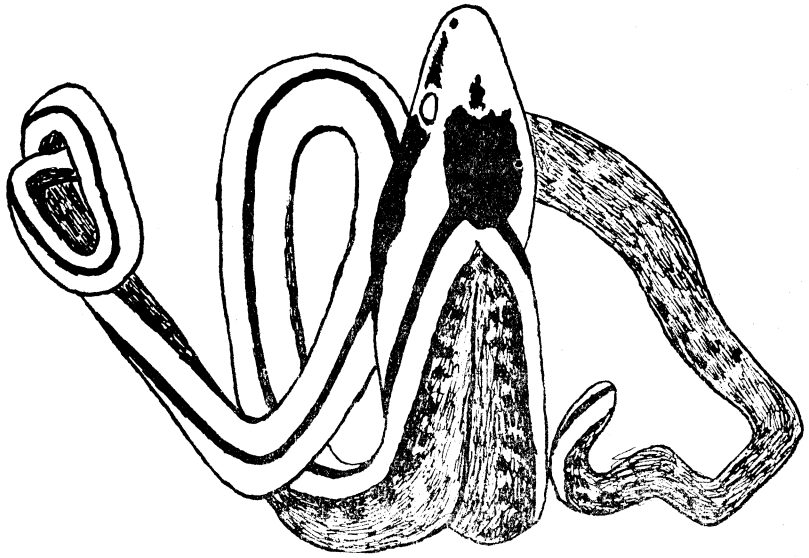
The snake charmers sometimes have an assortment of harmless snakes, which they do allow to bite them. To the layman it is possible that these could be mistaken for a dangerous species and the charmer will thus be accredited with having lived through a poisonous snake bite. Sometimes a bright, shiny stone is placed over the bite. The snake charmer wants you to think that a small stone has done more than all medical science has been able to do. The stone is something he would never part with. That is unless you offered him enough money. He will sell it to you, pick up another from the ground and wait for the next tourist to buy a miraculous "mad stone." One must remember that snake charmers are willing to do anything that will heighten their prestige in the eyes of foreigners.

The musical instrument the snake charmer plays has no effect on any snake. Snakes have no ears and they have no means of hearing anything. Snakes can feel. They feel vibrations such as you and I. The vibrations of an instrument cannot be carried to the snake in sufficient force to affect the animal. The show usually goes on by the side of a crowded thoroughfare with cars, trucks, camel wagons, etc., going by all the time, and the vibrations set up by these are sufficient to disturb any music. The flute used by snake charmers has no mystic powers. It is a symbol or sign of the snake charmer. In crowded bazaars you just listen for the sound, look in the direction from which it comes and there will be the snake charmer. The reed instrument played by snake charmers serves the same purpose of the hurdy-gurdy of the organ grinder and his monkey.

SHELDON PARKS.

UNUSUAL DEFORMITY IN *ANGUIS FRAGILIS*

Several gravid female Slow-worms were received by me on the 3 September, 1953, these specimens having been collected by Mr. Clive Pearce of Birmingham during the previous week in the Cornwall area. The last of the females to produce young did so on the 10 September; three being deposited by 7.30 a.m., and four more at five minute intervals after that time. The young were enclosed in the transparent membranes and all except one had freed themselves and were quite active within ten minutes or so. The remaining "egg" was somewhat larger than the others and the young Slow-worm inside was not making much effort to break out. Upon examination I discovered that it had a very wide head from which emerged two bodies, coiled up one on either side of the head. The struggles of the Slow-worm in its attempts to emerge were rather feeble and there seemed very little chance of them being effective.



I was unable to examine this Slow-worm until almost twelve hours later, when I found that it had died without rupturing the membrane, which was considerably wrinkled due to the shrivelling of the "egg." I broke this and removed the Slow-worm for closer examination. The bodies ran side by side from the head and were joined at the umbilical slits, but from that point were entirely separate and formed a coil each side of the head. The tails did not taper gradually but were uneven and coiled by a series of "kinks" (see diagram), the ends also being very blunt and rounded.

This lizard was preserved in formalin and is still in my possession.

"Berkeley," 54 Nevil Road, Bishopston, Bristol, 7. ROBERT J. RICHES.

CORRESPONDENCE

Sir,

I have read with interest your report of the lecture given by Dr. F. R. Irvine on the subject of "Reptiles as Food for Man." You include a comment upon the popularity of various "terrapins" in the United States.

The information included in Dr. Irvine's speech was concerned largely, of course, with the situation as it existed some years ago, but the complexion of the turtle industry in this country has changed considerably. I thought that perhaps you, Dr. Irvine, and some of the other members of the British Herpetological Society might be interested in certain data on the subject—hence this letter. My facts are concerned chiefly with Philadelphia which, I believe, is today the largest market for snapping turtles (*Chelydra serpentina*) and which, in the heyday of the terrapin (*Malaclemys*), was at least on a par with Baltimore and Washington where large quantities of terrapins also were sold.

First-class diamond-back terrapins may be bought here today for $2.50 each. This is just half the price charged twenty-five years ago when there was still a demand for them. Nowadays there are few buyers, and prepared terrapin can be purchased only in a few of the better clubs and highest class restaurants. Few terrapins find their way into private homes anymore. One large dealer in fish here in Philadelphia used to handle large numbers of these reptiles every year; now the same firm seldom has more than two or three dozen at a time, and they may be held for weeks before they are sold.

The marked change largely reflects increased labour costs and alterations in social patterns. Frankly, I do not believe there is any lessening of popularity from the standpoint of the gustatory value of the finished product. It is largely a matter of economics. The costs of labour have now risen so high that the average restaurant no longer can afford to assign its help to the time-consuming and tedious process of preparing terrapin. In years gone by, kitchen help worked on such tasks during the morning and afternoon lulls. Now that union hours are in vogue, there is no spare time. Also the cost and availability of domestic servants is a large factor, this being one of the main reasons why less terrapin is served in private homes. Undoubtedly many housewives of yesteryear, who prided themselves on their culinary abilities, expended the necessary time and effort to prepare terrapin for their families and guests. Nowadays such other activities as clubs, bridge, and watching television cut deeply into Madame's time. Until terrapin is available in tin cans or frozen food packages, at a very moderate price, there is little chance of the demand increasing. Even at that, the gourmet will tell you that such modern methods will not bring out the flavour and delicacy that resulted from the proper old-time preparation of the dish.

The net result of all this is that the terrapins have made a great comeback. They are once again common in the brackish coastal marshes which are their natural habitat. They are seen frequently, and a friend of mine recently counted a hundred heads in view at one time in a brackish canal in Delaware, the State that lies to the south of us.

When the terrapin market was at its height, many turtles of the genus *Pseudemys* were used to make a terrapin dinner stretch farther. These turtles are inferior in flavour, according to the experts, but their eggs and livers could be added to the genuine product, thus making it possible to serve more guests. The demand for *Pseudemys* is now very slight.

Snapping turtles are still sold here in large quantities, and snapper soup is a famous Philadelphia delicacy, much in demand. Snappers can be bought alive for about thirty-five cents to forty cents per pound. One of our large food processing companies is now offering frozen snapper soup.

To the best of my knowledge no turtles are reared today on farms, in the sense of being raised like chickens or pigs. Many professional turtle collectors hold their catch, mostly snappers, in special pens until they have a sufficient quantity to send to market. Sometimes they call these "farms," but that is not the proper term for them.

If you or any of your associates should ever come to Philadelphia, have them look me up, and I will see to it that they have a try at snapper soup which is one of our more important gustatory triumphs.

28 August, 1954.

ROGER CONANT.

Zoological Society of Philadelphia,
34th Street, Zone 4.

Sir,

We, the undersigned, testify that at a Frog-jumping Contest held on Green Point Track, Cape Town, on Saturday 16 January, 1954, a male *Rana oxyrhynchus*, measuring 55 mm, popularly known as "Leaping Lena," attained a total distance of twenty-four feet three inches in three successive jumps, shortly afterwards eclipsing this record by attaining a distance of thirty-two feet three inches, also in three successive jumps. We personally witnessed this record which was achieved in the presence of approximately five thousand people under strictly observed conditions. The ground surface was absolutely level short grass and there was no wind. The competitor was placed with his rump against a starting peg, no mechanical impetus was applied and the frog was left to his own devices. Another peg was placed exactly to his rear on the completion of the third jump and the distance from the first peg was immediately measured with a steel tape.

The two runners-up, in the competition, both *Rana fuscigula,* achieved nine feet five inches and nine feet four inches respectively.

ERIC J. LEVER.
Bristowe, Boyes Drive, Muizenberg, C.P.
(Honorary Chairman, S.A.N.T.A. Fund-Raising Committee).
NATHAN JACOBSOHN.
Anne's Aquarium, Long Street, Cape Town.
Official Starter and Measurer.
WALTER ROSE.
"Oaknook," Protea Road, Newlands, Cape Town.
Author of "Reptiles & Amphibians of Southern Africa."
(Judge and Technical Adviser).

Subscribed and sworn to before me this 8th day of October, 1954.

JOHN F. STONE.
(Consul General of the United States of America).

FOOTNOTE: Sporting items are not usually admitted to the columns of the journal but to every rule there may be an exception. This, from a South African member, Mr. Walter Rose, is it.—Editor.

REVIEW

A coloured Atlas of some of the vertebrates of Ceylon. Vol. II with thirty-five plates in colour, fifty-five plates and text figures in black and white and 104 pages of text. By P. E. P. Deraniyagala. Ceylon Government Press. Published July, 1953. No price given.

Volume I of this series deals with the Fishes. The present one covers the Crocodiles, Chelonians and Lizards. It is the culmination of some twenty-five years close study of the reptiles of the island during which the author has shewn that many of the Ceylon species, although closely related to those on the mainland of India differ from them in a number of small points. As Director of the National Museum he is in a particularly favourable position for collecting material and he has made full use of his opportunities. Considerable attention in this work has been paid to general anatomy and our knowledge in that field is greatly enlarged. Much of this work has already been published as separate papers; it is now gathered together and conveniently arranged in a single volume. The descriptions of the species are full and adequate but throughout the volume, except where new names are concerned, no mention is made of any previous worker on the subject. In what purports to be a standard text book such an omission is a serious one.

The volume is lavishly illustrated both in colour and in black and white, and if the execution of the plates in colour is somewhat crude, they fulfil

their main purpose of giving a good impression of the animal. The book is written chiefly for the systematist. Considerably more attention is paid to anatomy than is usual in text books and this is to the good. Not all herpetologists, however, will welcome or will agree with the changes in nomenclature, particularly in the names of the higher groups, for they do not advance our knowledge of the subject. What is gained for instance by creating new names for the two main divisions of the Squamata when adequate and generally accepted ones are already in existence. Many of the well-known genera are now raised to sub-family rank but without giving fresh evidence as to why this has been done. As examples can be quoted *Gymnodactylus, Cnemaspis* and *Gehyra* among the geckos and *Mabuya* and *Lygosoma* (*sensu latu*) among the skinks. Others could be quoted. Nevertheless in spite of these criticisms this book is a valuable contribution to the herpetology of Ceylon and no student of the Indian fauna can afford to be without it.

M. A. S.

AUS DEM LEBEN DER REPTILIEN by Zdenek Vogel.
Artia Prag, 1954, pp. 1-84, and approx. 50 pages of photographs.

Since 1949 the zoological garden in Prague has had a "Herpetological Station" for the study of imported reptiles. This book is an account of various species which the author has kept there. His charges have come from all over the world but it is especially interesting to us in Western Europe that of the sixty-four species he mentions half are from the Middle East and Soviet Asia. These are species rarely seen here.

"Aus Dem Leben" does not presume to be a comprehensive account of the reptiles and the chapters are arranged in no special order. They are merely a series of observations on various reptiles or groups of reptiles in which the author has been interested. Nor does it profess to be a scientific book. The "wenig Wissenschaft" which the author deems necessary to accompany his observations is put, quite rightly, at the end.

The book is profusely illustrated. Indeed, there are so many photographs that there is no room for them in the text; they, too, are regulated to the end. This is a pity; most of the photos are good and should be in the appropriate places in the text. Others are not so good and could have been omitted.

J. I. M.

LIST OF MEMBERS

CORRECTIONS

see page 227 *"Corrections"*
line 3. *For* Tolwarth *read* Tolworth.
line 9. *Should read* 3 Derwent Road, Whitton.
"Additions"
line 2. *For* Crayford *read* Brayford.

CHANGES OF ADDRESS

BUNTING, Wm., *now at* 72 Kirton Lane, Thorne.
COOK, L. M., *now at* Principal's House, University College of the S.W., Exeter, Devon.
COPPING, R. H., *now at* Apartado 1239, Quito, Ecuador.
CROFT, D., *now at* 4 Wordsworth Road, Clevedon, Som.
DAVIES, P. M. C., *now at* Elmhurst, High Road, E.18.
FRAZER, J. F. D., *now at* Stone House, Boxley, Maidstone, Kent.
GOUGH, M. J., *now at* 28 Avebury Road, Tonbridge, Kent.
HALL, R. C., *now at* 20 Hartshill Road, Stoke-on-Trent.
LAWSON, R., *now at* District Laboratory, Military Hospital, Fulford Road, York.
LOWE, P. W., *now at* The Vicarage, Coln St. Aldwyns, Cirencester, Glos.
MASH, Capt. P., *now* c/o Manufacturers' Life Insurance Co. of Canada, P.O. Box 455, Nicosia, Cyprus.
MORRIS, G. F., *now with* R.A.F., Kenley, Whyteleafe, Surrey.
OLIVER, D., *now at* 6 Russell Street, Rochdale.
SINCLAIR, *now at* Torquay Aquarium, Beacon Quay, Torquay.
WEBSTER, R. L., *now at* 73 The Crescent, West Wickham, Kent.
WERNER, Y., *now* c/o Zahavi, Bornstein House, Routtenberg Street, Qiriat Shmuel, Jerusalem, Israel.
WOOLFORD, Mrs. D., *now at* 55 Camberley House, Redhill Street, N.W.1.
UZZELL, T. M., *now with* USS Benham (DD796), Fleet Post Office, San Francisco, Cal., U.S.A.

ADDITIONS

BELTZ, Ronald E., 416 South Birch Street, Santa Ana, Cal., U.S.A.
CONSTANTINE, R. R., 331 Marston Road, Oxford.
EVANS, G. D., 10A Watford Road, Wembley, Middx.
FITTER, R. S. R., Drifts, Chinnor Hill, Oxford.
HAYS, Richard, 11 Ranch Road, Orinda, Cal., U.S.A.
HAYWOOD, N. J. R., 124 Dartmouth Road, Ruislip, Middx.
JEFFS, R. W., 61 Tubbs Road, N.W.10.
LEVITON, Alan E., Natural History Museum, Stanford University, Cal., U.S.A.
MUSITANO, J. P., The Buttery, Newquay, Cornwall.
NEAL, E. G., Foxcombe, Greenway Road, Taunton, Som.
PHILIPPE, Ludovic, 13 Rue Shakespeare, Palais Ophelia 501, Nice, France.
PORTER-COX, E. C., 31 Devonshire Road, Bathampton, Bath, Som.
RICHARDSON, D., 1 Hatton Street, Macclesfield, Cheshire.
SCHOLEFIELD, A. J., 9 Ilminster Gardens, S.W.11.
SCOTT, D. R., 110 Forest Edge, Buckhurst Hill, Essex.
SKINNER, A. T., 10 Green Lane, W.7.

The Secretary would be grateful if members would call his attention to any errors in this list.

LIST OF CONTRIBUTORS

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