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CONTRIBUTIONS TO THE STUDY OF THE LIFE CYCLE OF SPANISH AMPHIBIANS

By

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The reason for the present notes is to contribute to the study of the life cycle, habits and ecological behaviour of some amphibians of the N.E. Spanish and Balearic territory. MERTENS and MULLER have ranged the 35 different forms of amphibians of the Iberian and Balearic fauna in twelve genera, which have been represented by 21 species and divided into 23 subspecies. Sixteen of these species and subspecies are endemic to dry Spain. Fourteen forms are represented in N.E. of Spain (MERTENS, 1925-27) and four cited by BOSCA from Balearic isles. The present study resumes the biological observations of 9 of these species in the field, sometimes completed by laboratory experiments. The methods are explained in foregoing works (BALCELLS, 1954 and 1955).

Salamandra salamandra hispanica, WOLTERSTORFF, 1937 (s. MERTENS and MULLER, 1941), (=*S. s. taeniata,* part. DURINGEN, s. MERTENS, 1925-27 and ANGEL, 1946). Terra typica : Barcelona, Distrib. N.E., E. and S., of Spain. It lives in humid forest. In Santa Fe del Montseny (1,000 m, s/M), it brought forth young in October, 1954 In the laboratory one female produced 50 tadpoles and in her oviduct there were 40 developing specimens. In winter and spring in the shady rills of mountains—Coll Formic 800m. s/M (Montseny), on March 3, 1954; Montnegre 600m. s/M, III, 17, 1952, and Vidrá, 800M. s/M; IV, 17, 1954—there were larvae, between 32 to 40 mm. long, which in laboratory gave adults in June, which were nourished with filamentous algae and ostracods, at an average temperature of 18°C.

Triturus marmoratus marmoratus, LATREILLE.—Spawning females of the marbled newt were in Balanyà (Plana de Vich, Barcelona, 300 m s/M) on April 10, 1954. Their head and body was 53 to 58 mm. long and the length of tail was 61 to 70 mm. The males have the tail-crest little reduced in middle June. The egg laying continued in the laboratory until April 26, at 17°C. average temperature and the 8 females laid 99 eggs. The spawning animals glue the eggs on objects on the ground. Emergence from the egg takes place on the 19th day, at 17°C. of average temperature. The embryo lies straight in the egg and its organic differentiation at the emergence time is less than in the larvae of *Triturus cristatus* (s. BOULENGER, 1910, and SMITH, 1951). In this period there are few gills; the length of the white tail is 2 mm.; the yolk mass is very apparent, light green with two dark lateral bands. The dorsal part is yellow with dark stains. The total length of the young, collected in the rills and pools of Matagalls and Plá de la Calma (Montseny mountains, 700m and 800 m s/M) in August, 1943, is 39 to 43 mm.

Alytes obstetricans boscai. LATASTE.—I must confirm (MERTENS)

that the midwife toad is one of the most abundant species in N.E. of Spain. In the gardens of Barcelona I have observed always the males with the small packet of 120 to 150 eggs in spring: April, 1942, and April 27, 1953, in the University gardens, already very advanced embryos with visible eyes. During the day, this toad lives beneath the stones or in the little caves in the ground clay; however spawning takes place over many months, as in the same pools or rills and at the same time we can observe tadpoles of 14.5 to 42.5 mm. of total length. On September 20, 1953, in Tona (300m. alt, in Plana de Vich, N.W. of Montseny mountains); in the following year the same is observed in Gualba and Campins (S.E. of Montseny, 500m. alt. on May 2), the larvae are 19 to 38 mm. in total length, from eggs of the former year; and in the Pirineos of Barcelona: Montgrony mountain and Castellar d'en Huch, 1,300 m. alt. on September 12 of 1953 (there were also tadpoles of 22 to 40 mm. of total length. MARGALEF collected on July 29, 1951, on Monte Urbía, Aranzazu, (Guipuzcoa, 1,100 m. alt.) the recent residues of an egg packet. In Sant Bartomeu of Vidrá, 1000 m. s/M, I observed new tadpoles in June and July.

The metamorphosis ended the following year, and the tadpoles spent the winter in pools and rills: Sant Bartomeu of Vidrá: March 3. 1951; February 28 of 1953 and March 21 of 1954; between Figaro and Aiguafreda (south to Montseny, 300 m. alt.) on February 9 of 1951.

The end of the metamorphosis takes place between the end of August and October, and it is influenced by the altitude and exposure: S.E. Montseny: Gualba and Campins, 500 m. alt., stage 29 of KOPSCH on August 28 of 1954. N.W. of Montseny: Tona, 300 m. alt, stage 30 of KOPSCH, on September 26 and 28 of 1954. S. of Pirineos mountains: Montgrony, 1300 m. alt., 29 KOPSCH'S stage, on September 12 of 1953

The temperature and nutrition influenced the development, activity and the size of the adult and tadpole; however, the development is very slow, in the last stages of metamorphosis as the 27 to 30 KOPSCH'S stages. Transported into laboratory in February, 1951, and March, 1953, with 17°C. of average temperature, the tadpoles reached the different KOPSCH'S stages in the following times:

TABLE 1

Dates of collection in the field.	February 9, 1951	March 8, 1953
Kopsch's stage of collection date.	20 (1)	20 (1)
Date of 26 Kopsch's stage (2).	March 30, 1951	April 19, 1953
Date of 29 Kopsch's stage (3)	April 19, 1951	April 30, 1953
Date of 30 Kopsch's stage (4)	May 3, 1951	May 15, 1953

(1) The total length in winter is 55 mm.
(2) The anterior legs appear.
(3) The tadpole commences to leave the water.
(4) Young and tail-less adult.

The augmentation of development activity to adult stage takes place up to 30°C. of constant temperature and the accomplishment of the life cycle is

possible at this temperature, but when the temperature exceeds this value, the tadpole resists many days, but before its death, its size decreases and it exhibits abnormal activity; with low temperatures, it also manifests a little reduction of its size. This phenomenon explains the smaller size of the southerly specimens of this subspecies (MERTENS, 1925), which is also influenced by the presence of accessible and organic food. The following table resumes the observations:

TABLE 2

Localities and dates	Temperature	Organic substance abundant in water	Size of Tadpoles Total length	Greatest largeness	Kopsch's stage
Vidrá 1,100m. alt. February 28, 1954	Cold	Very abundant	55mm.	11mm.	20
Urbía, Aranzazu (Guipuzcoa, 1100m. alt.)	Cold	—	44mm.	10mm.	25
Vidrá, 1000m. alt. April-May, 1953	Cold	Very abundant	53mm.	13mm.	26
Gualba and Campins 500m. alt., August 28, of 1954	Cold	Very abundant	(head and body length) 23mm.	12mm.	29
Montgrony and Castellar d'en Huch 1,300m. alt. Sept. 12 of 1953	Warmer in summer (1)	Very slight	16mm.	8mm.	29
Tona, 500m. alt. Sept. 28 of 1954	Warm in summer (2)	Poor	14mm.	7mm.	29
„	„	„	19mm.	9mm.	30
Laboratory	17°C. of average temperature.	—	18mm.	8mm.	30

(1) Sunny position and continental climate.
(2) The climate is also very continental.

Pelodytes punctatus, DAUDIN.—I heard its breeding croaking in Santa Maria de Besora (Barcelona, 866m. alt.) on February 28, 1954. It croaks and spawns, near this place, in Sant Quirse de Besora, 575m. alt. on March 22 of 1954. PUENTE collected one female in spawning time in Nuestra Señora de Estívaliz (Alava, 610m. alt.) on April 26 of 1953.

Its uppermost development temperature is 30°C., but it can develop also at 7°C. constant temperature. At 33°C., the tadpoles resists many days. The emergence from the egg cluster takes place during the 11 little advanced KOPSCH'S stage (=17 POLLISTER'S and MOORE'S stage), and it is earlier than that of the *Rana temporaria.* The tail is reduced to a little pivot, and the larvae fix on the immersed objects, by the secretion of the oral sucker.

With 8°C. of constant temperature, the development time until 20 POLLISTER'S and MOORE'S stage is more than 20 days. The difference in time of development between 8° and 17°C. of average temperature is one month, when the tadpoles are in the 19 KOPSCH'S stage. When the eggs were transported into the laboratory with 18°C. of average temperature, emergence took place on March 22 of 1954. The 20 KOPSCH'S stage (presence of the posterior legs) took place on April 12. The 27 KOPSCH'S stage (anterior leg) took place on May 31; the 30 stage on June 3. The total time between emergence from the egg cluster and water emergence in adult form, is 73 days with 18°C. of temperature average.

The tadpoles avoid living animals as food; they prefer macerated lettuce. The greatest total length of a tadpole in the laboratory was 30mm. and 8mm. the greatest diameter; that of the young adult 13.5mm. and 4.5mm. These laboratory speciments are very short (s. ANGEL), they seem to be influenced also by abnormal or unnatural conditions.

Hyla arborea meriodionalis, BOETTGER.—I observed the last period of breeding males on April 15 of 1954, in Prat del Llobregat (near Barcelona). The tadpoles at this date were 9mm. in total length. The spawn was in Barcelona city gardens 20 or 30 days before.

Bufo bufo spinosus, DAUDIN.—In the E. parts of Montseny mountain (Gorg Negre and Breda, 300m. to 500m. alt.) breeding animals were observed between April 11 and May 2 of 1954; but in January, 1955, on the 23rd, the breeding animals could be observed also, because the temperature and the very nice weather of this year belong normally to April month. These localities have 12°C. of average April temperature. In Santa Fé del Montseny (1000m. alt.) the breeding time is in May. In Banyolas (prov. of Gerona), with a climate like that of Breda, eggs are collected the first days of May and tadpoles in 24 KOPSCH'S stage, which have 22.5mm. of total length and 6.5 mm. of greatest largeness.

Bufo viridis viridis. LAURENTI (=*B. v. balearica,* BOTTGER).—It is very abundant in Alcudia and Pollensa (N.E. of Mallorca), but I have specimens of Ciutadella (Menorca) and it is also very frequently in the isle of Ibiza (Pitiusas). In the latter place it croaks until the last days of May and at this time it lays in the pools. During the summer it spends its life in the dry ground and generally it emerges at night. In May, 1950, I collected them in marshes of Ibiza, in the pools of San Antonio, Santa Gertrudis and Salinas. In San Antonio there were also tadpoles in 19 KOPSCH'S stage, between 10 and 13mm. of total length.

Rana temporaria temporaria, L.—This frog lives in Spain only in Pirineos and Prepirineous mountains, and in foregoing works (BALCELLS, 1954 and 1955) there is described minutely the places where it is cited in our territory

The dates of emergence from hibernation varies with the temperature, place and year. In the high mountains it takes place after the thaw; but in Vidrá (Spanish Prepirineo) the emergence and spawn take place when the average winter temperature comes up to 4° or 5°C., and the spawn is interrupted when the temperature drops. The eggs laid by each female are few in those specimens which are subjected to a very short winter and their

behaviour in egg and larval stages is somewhat different: it is like the behaviour of *Rana dalmatina.* In the laboratory, the metamorphosis may be completed in 54 and 56 days at 18° and 17°C. respectively of average temperature. The temperature influences also the size of the tadpoles and young adults.

The application and calculation of parameters of the BODENHEIMER hyperbola and the value of the sum of the effective average temperature of the months, accounts for the possibilities of the accomplishment of the annual cycle in one determined place. This product: D(T-2) may be greater than K=845.2. This conclusion explains also the possibilities of the life cycle in the far North. The conclusions of BARTHELEMY and the study of the behaviour of the "common frog", permit us to give the 4° or 5°C. January isotherm as the south limit of its distribution in the plains of France.

Rana ridibunda perezi, SOANE.—The Spanish marsh-frog spawns in May. In the high parts of Mallorca it spawns up to May 21. Santuary de Lluch, 550m. alt.; near the Puig Major mountain 850m. alt.; but the spawning must have been earlier in order that in the pools there should exist tadpoles up to 15 or 16 KOPSCH'S stages at the same time. In Ibiza isle, the spawn is earlier; there were only tadpoles in the salty marshes at 12 KOPSCH'S stage (=20 of POLLISTER and MOORE), but the most advanced were 22 stage of KOPSCH and they were 32mm. in length.

In Barcelona the spawn has been observed in the first days of May, and the adult frogs emerge on the last days of August. In Seva (Plana de Vich, 300m. alt.) on September 20 of 1954, they were in 29 stages. In winter (February, 1954 and January, 1955), in Breda giant and abundant tadpoles were collected.

I acknowledge the help of Dr. Savage for correcting the manuscript.

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OBSERVATIONS ON THE BIRTH OF TWO SPECIES OF LIZARD IN THE VIVARIUM

By

ROBERT BUSTARD

SOUTH AFRICAN DWARF CHAMELEON (*Chameleo pumilis or Microsaura pumilia*)

From a number of Dwarf Chameleons received this year during April one female was rather plump and it was considered that she was possibly gravid. It did not appear that the female was due to give birth in the near future as she was not exceptionally fat, and gravid chameleons are often described as being scarcely able to walk.

On the 22nd of April, at 7.55 p.m., this female was in a vivarium, temperature about 80°F., with other Dwarf Chameleons. She was noticed to be sitting on a branch about 6 inches from the ground. There were two newly-born baby chaemelons lying on the moss directly beneath her. One of these was still struggling to escape from the membraneous envelope or bag, in which it had been born. The other baby was already free, the first to be born. The membranous bag is thin, clearly transparent. Immediately the female was carefully transferred to a vivarium, in which there were geckoes, also two young which were about to be eaten by another chameleon. The following observations were made :—

7.58 p.m. Both young active, climbing branches and breathing deeply. Female had taken up a position on a thin branch about 8 inches from the ground, where it was lying motionless.

8.3 p.m. No movement from female.

8.8 p.m. Swelling of cloacal region.

8.9 p.m. Swelling increases.

8.10 p.m. A yellow object, like the yoke of an egg, appearing.

8.11 p.m. This deposited on branch, circular in shape, diam. about 8 mms.

8.12 p.m. Young chameleon in membranous bag born, falls to the ground. Here it should be mentioned that the female makes no attempt to deposit the young on the branch, all were dropped to the ground. They were curled up in the bag.

8.12 30 secs. Movement in bag.

8.13 p.m. Struggling to free itself, head out, standing still (not lying) half out of bag.

N.B. First movement recorded was of eyes which opened and swivelled while completely shut up in membranous bag.

8.15 p.m. Still in same position.

8.16 p.m. Another young born (No. 4). Falls to ground.

8.16 30 secs. Struggling violently.

8.17 p.m. Out of bag, climbs over No. 3 which tries to bite it.

N.B. Young remain still for about 15 secs. after the bag hits the ground, then take deep breath. After 30 secs. struggling commences, and on an average, they are out of the bag after 60 seconds.

8.18 p.m. No. 4 climbing branch although, of course, still wet. No. 3 also moving off.

N.B. When born are pale creamy-white. Soon show desire to climb, usually in 1-2 minutes, i.e., after rest following struggle to emerge from bag. In about 3 minutes most were dark brown with black markings. Young very similar in appearance to adults (but not in colour.) The main difference is that their heads are very large in comparison with their bodies. Young soon after birth climb very well, even standing on hind legs, and show good use of tail.

8.19 30 secs. Swelling of Cloacal region.

8.20 15 secs. No. 5 born.

8.20 45 secs. Moves inside envelope.

8.21 15 secs. Has broken out.

8.21 30 secs. Completely out.

8.22 p.m. Moving off, breathing deeply, making for a bar of wood.

8.23 p.m. Swelling of cloacal region.

8.23 30 secs. No. 6 born.

8.23 45 secs. Breathing.

8.24 p.m. Eyes moving. Wriggling about inside bag.

8.24 45 secs. Swelling of cloacal region.

8.25 p.m. No. 7 born. No. 6 out of bag, moving off.

8.25 20 secs. No. 6 leaves ground.

8.25 30 secs. No. 7 struggling.

N.B. All leave ground quickly.

8.32 p.m. As No. 7, after 6½ mins., made no movement I helped it out of bag. (It is alive and quite well.) It totters off along branch.

8.23 p.m. Swelling of cloacal region.

8.23 30 secs. Baby No. 8 born.

8.34 p.m. Struggling out of bag.
N.B. Gecko (baby) bit newly born chameleon, but chameleon turned on it and frightened it off by puffing up and opening mouth as adults do. Chameleon moved off unhurt.

8.36 p.m. Swelling of Cloacal region.
8.37 p.m. No. 9 born.
N.B. Up to this time the female was in one position on the branch, now she moved up branch a few inches.

8.37 15 secs. No. 9 struggling greatly in bag.
8.37 45 secs. No. 9 free. Walking about.
N.B. Instinct of young is to climb. Even babies can bite and fight with each other.

8.45 15 secs. No. 10 born.
8.45 35 secs. Moving, struggling.
8.46 30 secs. Out of bag.
8.50 p.m. No. 11 hits the ground.
8.51 p.m. Completely out of bag.
9 p.m. No further movement from female. The brood therefore consists of eleven, born at the following times:

1. 7.50-7.53 p.m.
2. 7.54 (First seen in act of escaping from membranous bag.)
3. 8.12 p.m.
4. 8.16 p.m.
5. 8.20 15 secs.
6. 8.23 30 secs.
7. 8.25 p.m.
8. 8.33 30 secs.
9. 8.37 p.m.
10. 8.45 15 secs.
11. 8.50 p.m.

This brood of eleven is, I consider, a good average brood for Chameleon pumilis, but another, a vivaparous species of Chameleon from Kenya, has just had twenty-five young. At the time of writing all were doing well.

Black Zonure (*Cordylus cordylus niger*)

Several Black Zonures were received in March, 1954, and housed temporarily with some Skinks (Mabuia homalocephala) and Horned "Toads" (Phrynosoma cornutum).

The temperature rose to at least 90°F. and sometimes 100°F. in the late afternoon and evening. At 4.30 p.m. one day I noticed a sudden activity in the vivarium, and saw a baby Black Zonure on a rock. It appeared obvious that it had just been born, but despite this showed remarkable activity and tried to evade being caught. It was removed and put in a special vivarium by itself (Temp. c. 80°F.). It remained active and at 6 p.m. ate a large maggot which it pounced on the second it saw it. A close watch was kept

on the vivarium containing the adult Zonures that evening but no further young were noticed.

Knowing that these lizards usually have two young, I decided that either there was still one to be born, or that the second had been born and was hiding somewhere in the vivarium, or had been eaten. A search showed that there were no further young in the vivarium. The following day at 3 p.m. a small Zonure was noticed in this vivarium and from the fact that it was still wet, and had sand adhering to it, had just been born a few minutes before. It appeared considerably smaller than the one born the previous day and was much paler in colour. It was also very active. It was caught and placed with the other baby.

At 6 p.m. it was offered a maggot which it grabbed quickly as the other baby had done the day before. But before it could eat it the elder Zonure baby took it from it. It was then offered another maggot which it ate.

The following day it was noticed that both babies were now darker in colour and like the parents, but at birth instead of being black both were considerably paler—a dark, greyish colour.

On measuring them carefully it was found that baby No. 1 was $3\frac{5}{16}$" and the baby No. 2 was $3\frac{4}{16}$". The first born was the larger; it would be interesting to know if this is always the case.

The babies settled down to a diet of gentles and flies and soon were able to cope with bluebottles and mealworms. The fact that the brood consisted of only two young, of relatively large size (the parents being 7" each), made them easier to feed and consequently rear. The female specimen had not appeared really gravid at time of arrival or before the birth, nor did she appear thin afterwards, but she died about a week after giving birth to the young.

April, 1955. Since writing the above notes I have been able to observe several other Zonure births this year, and confirm that there is frequently a 24 hour lapse between the birth of the two young. This would possibly aid their chances of survival in nature. In my experience the first to be born is always the larger and the females frequently die afterwards. For the benefit of those who may not be conversant with the Black Zonure it belongs to a very interesting family of South African Lizards most of which do well in captivity, are hardy, and good feeders. Most species do well at 75-80°F. Some of the members of this family, e.g., *Cordylus cataphractus,* are very spiny and make very unusual and interesting pets.

NOTES ON THE FOODS OF THE TRINIDAD SNAKES

By

Ludolf Wehekind

Typhlops reticulatus: A burrowing snake which feeds on insects and termites.

Leptotyphlops tenella (*Leptotyphlops albifrons*): White-faced worm snake. Feeds on ants, termites and millipedes. Mr. F. W. Urich found one in a termite nest in an old stump; it vomited several termites.

Anilius scytale: Nothing much is known. However, Dr. Wm. Beebe found three small Typhonectes and four crushed orthoptera in the stomach of one at Kartabo, British Guiana.

Epicrates cenchris: Jack snake, Rainbow Boa. Voracious feeder on rats and mice. In captivity old snakes will take bats, birds and small opossum.

Corallus endyris cookii: Cascabel, Cascabel dormillon, Mapanare. Tree boa. Feeds on rats, mice, bats, squirrels, opossum, occasionally birds; also known to kill the mongoose. One in captivity was given a bat (Hemiderma sp.) which flew up and down the cage. The snake reared, struck and caught the bat on the wing, constricting it at the same time. All this was done with such rapidity that it could not be followed by the eye.

Eunectes murinus gigas: Huile, Huillia, Water Boa, Anaconda. This snake feeds on rodents and the larger animals as the agouti (Dasyprocta aguti), lappe (Coelogenys paca), peccary, deer, turtles, alligators (Caiman). Will also take ducks, fowls, sheep and dogs. One was shot in Nariva which measured 25 ft. and when opened was found to contain a 6 ft. alligator. A mongoose was put into a cage with several Constrictors and an Anaconda lying in a water trough in the same cage. The mongoose, after attacking the snakes two or three times, seemed to have got scared and started running around the cage in an agitated manner. In climbing the wire at the side of the cage it fell in the trough, and was promptly taken by the Anaconda. The catching and swallowing of the mongoose took 17 minutes, the snake staying under water the whole time.

Boa constrictor constrictor (*Constrictor c. constrictor*): Macaruel, Macajuel, Boa constrictor: Feeds on birds, rats, squirrels, opossum, agouti, lappe (paca) and the larger lizards, viz. Tupinambis and ameiva. Will eat ducks and also chickens if it gets the chance of raiding a hen roost. The remains of mongoose have been found in its stomach. Mr. R. R. Mole reports that in 1894 an ocelot weighing between 30 and 40 lbs. was found in the stomach of a 10 ft. Constrictor at Maraval. It will also take dogs if the opportunity arises.

Helicops angulatus: Water mapepire. Feeds on frogs and fish. Brown Banded water-snake.

Drymobius b. boddaerti: Machette Couesse. Feeds on birds, mice, frogs and lizards and will, in captivity, take small chickens readily. Mr. R. R. Mole records one unsuccessfully chasing a hopping cricket.

Pseustes s. sulphureus (*Phrynonax sulphureus*): Yellow belly puffing snake. Dr. Wm. Beebe reports that those caught in Venezuela fed wholly on birds. A young one in my possession fed readily on anolis and gonatodes lizards but refused frogs. Will also take mice and young rats.

Pseustes poecilonotus polylepis (*Phrynonax fasciatus and eutropis*): Liana

snake, bird-eating snake. As its name implies, it feeds on birds.

Spilotes p. pullatus: Tigre. Eats rats, mice, birds, and possibly squirrels; one was seen in Tamana caves hunting bats. Will raid the fowl roost to take eggs. At Mount St. Benedict, Tunapuna, one was killed in the fowl run and when opened was found to contain three porcelain nest eggs. Somewhat difficult to feed in captivity.

Drymarchon c. corais: Yellow tail Cribo. This snake preys on all small animals including frogs and snakes. It is an inveterate destroyer of rats and mice and has been observed to catch fish. Says Mr. R. R. Mole in his "Trinidad Snakes": 'There is a record of one actually being seen in the sea close to the shore and capturing a small grouper (Epinephelus Sp.).' April, 1955, one was seen swallowing a Fer-de-lance (Bothrops) but disgorged when some people approached.

Chironius carinatus (*Herpetodryas carinatus*): Yellow Machete. Feeds principally on frogs, but will take mice and birds.

Thalerophis richardi coeruleodorsus (*Leptophis ahaetulla*): The Laura. Feeds on frogs and lizards.

Leimadophis melanotus (*Liphis melanotus*): Beh Belle Chemin. Feeds on small lizards, frogs and tadpoles. One was seen at Ortinola Estate, Maracas, feeding on the eggs in the froth made by frogs. Also known to take small fish.

Leimadophis r. reginae (*Liophis reginae*): High Woods Coral. Eats frogs and lizards. When in captivity will catch small fish from its water trough.

Liophis cobella (*Rhadinaea cobella*): Mangrove snake. A good swimmer, it catches fish on which it principally feeds, also frogs. One was seen to eat a gecko.

Hydrops triancularis: Water Coral. Feeds principally on fresh water eels and small fish.

Sibon nebulatus (*Petalognathus nebulatus—Dipsas nebulatus*): Cloud Snake. Feeds entirely on slugs.

Dipsas trinitatis: This is a new species and nothing is yet known of its habits.

Atractus trilineatus: This ground snake feeds on insects. One in the writer's possession fed on an earth-worm, it did not swallow it whole as other snakes do, but ate pieces out of the worm.

Siphilophis C. cervinus (*Lycognathus cervinus*): Nothing is known here of the feeding habits of this snake, but Dr. Wm. Beebe calls it the yellow frog snake.

Trypanurgus compressus: Nothing is known of the feeding habits of this snake. Mr. R. R. Mole had one which fed on an anolis.

Imantodes c. cenchoa : Mapepire Corde Violon, Violin string snake. Feeds on gonatodes and anolis lizards.

Leptodeira a. annulata : The annulated night snake. Feeds on little lizards and frogs, also tadpoles which it catches under water with a scythe-like movement of the head. Mr. R. R. Mole records one in captivity devouring its whole clutch of eggs, and Mr. A. T. Carr observed a case of cannibalism, when one in captivity took a smaller specimen.

Oxyrhopus p. petola : False Coral : Feeds on mice which it readily accepts dead when fed in captivity.

Cloelia c. cloellia (*Oxyrhopus cloelia*) : Black Cribo, Mussurana. Feeds almost exclusively on snakes, including the crotaline snakes to the venom of which it appears to be immune. Dr. Vital Brazil of Brazil says that it, however, succumbs to the bite of the venomous coral snakes (*Micrurus* sp. formerly *Elaps*).

Pseudoboa coronatus (*Oxyrhopus coronatus*) : Ratonero. It is omnivorous and feeds largely on lizards which it constricts; also devours its own as well as snakes of other species. Mr. R. R. Mole records that two specimens declined to notice some young Fer-de-lance (*Bothrops atrox*) offered them.

Pseudoboa neuwiedi (*Oxyrhopus neuwiedi*) : The notes on *P. coronatus* can apply to this snake.

Oxybelis fulgidus (*Oxybelis accuminatus*) : Green Whip snake. Feeds on lizards, frogs and small birds.

Oxybelis a. aeneus : Ashby Whip snake. Same as above.

Tantilla melanocephalum (*Homalocranium melanocephalum*) : Pink headed snake. Feeds on insects, wood roaches, etc. One was taken by Mr. F. W. Urich in the act of swallowing a small centipede.

Micrurus corallinus : Coral snake. Feeds on ground snakes and young snakes. It is also cannibalistic.

Micrurus Lemniscratus : The Large Coral's feeding habits are the same as above. One in Venezuela was brought to the writer when it was in an almost dying condition, and on being put in a jar with alcohol disgorged three young ones of its own species. A 26″ live specimen acquired by Mr. A. T. Carr one morning, disgorged during the night a slightly decomposed 22″ specimen of *M. corallinus;* the following morning his captive was found dead in its cage.

Lachesis muta & *Bothrops a. atox* : Bushmaster (Mapepire Z'anana) and Fer-de-lance (Mapepire Balsin) respectively. The Mapepires prey on all small animals. *L. muta* will not feed in captivity, except when taken very young; will then feed regularly on mice. *B. atrox* has also been known to catch and feed on cray-fish. On February 2, 1935, a small

16″ *L. muta* which was caught in Arima, came into the possession of Mr. F. W. Urich. A mouse was given to it, but it refused to feed. Exactly two months later it fed on a mouse and started to feed regularly. It ate 29 mice and shed its skin twice in Trinidad. Dr. R. L. Ditmars then took it up to the Bronx Zoo where it continued to feed and shed, but had an untimely death by accident when it had grown to about four feet. As far as the writer can ascertain this Bushmaster is the only one that has fed regularly in captivity.

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These notes are humbly dedicated to the memory of two noted Trinidad herpetologists, Mr. R. R. Mole and Prof. F. W. Urich, whose valuable work in this field has made these notes possible.

I wish to thank Dr. William Beebe for his valued interest and encouragement during the preparation of these notes, and Mr. Andrew T. Carr for his suggestions and co-operation.

REPTILIAN SOCIETY

Having recently read W. Saville Kent's "The Naturalist in Australia," Chapman & Hall, 1897, I came across the following extract which may well have been the Society's predecessor. It would be interesting to hear if any copies of the Journal "Vivarium" are still in existence.

To quote (pp. 99-100) : ". . . an association, styling itself the "Reptilian Society", has been recently established under the able Presidentship of Dr. A. Stradling. There is also lying on the author's table at the present moment the first number of a new magazine, the "Vivarium", which is being started as the recognised organ of the Reptilian Society. This serial, as is notified in its introductory chapter, will seek to supply information of a more practical nature than has hitherto been available for those who make reptiles their particular hobby and desire fuller knowledge concerning the habits and treatment of their adopted favourites. Whilst this earliest number of the 'Vivarium' has been produced through the talented energies of the Society's Secretary, the Rev. J. E. Spain, of the Rand Rectory, Wragby, in a most creditable and artistic method by a lithographic process only, it is hopefully anticipated that a sufficient number of supporters of the Society and those subjects which the periodical specially advocates will be forthcoming to justify the early advancement of this magazine to the dignity of print. The author experiences an especial pleasure in directing the attention of those who may elect to adopt for their hobby the very interesting subject of reptile life, to the facilities and advantages provided for their particular benefit by the Society and Journal named."

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