

A Herpetological Collection From Northeastern Iraq

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The herpetological collection herein discussed was made by the senior author while a member of the 1954-1955 Iraq-Jarmo Archeological Expedition of the Oriental Institute, University of Chicago. Due to the heavy demands of other duties, little time could be devoted to random collecting and we made no pretense of completeness; even so, a total of 346 herpetological specimens were catalogued from Iraq, Syria, Jordan, and Lebanon, and this number could have been increased if there had been available space for all the frogs, turtles, and common lizards which could easily have been gathered.

In this paper, only the 188 specimens from northeastern Iraq are discussed, as those collected elsewhere in southwestern Asia do not add materially to the herpetological knowledge of the areas. Except for a few specimens from Palegawra Cave, Sulimaniyah Liwa (province) and some frogs from Balad Sinjar, Mosul Liwa, all of these Iraqi specimens are from Erbil and Kirkuk Liwas. Particularly valuable, it is considered, is the circumstance that much of the collection was made at one spot, the archeological site of Jarmo in eastern Kirkuk Liwa, and for this one site the herpetofauna collected is probably quite representative of that actually present at the locality.

Due to the above-mentioned demand of other duties, primarily mammalogical and archeological, the ecological notes on the reptiles and amphibians are not as complete as desirable, but at the same time the area involved is one from which relatively little material has hitherto been known, and so it has been thought valuable to add such natural history notes as were gathered. One favorable circumstance, resulting from work done as part of an archeological expedition, is that a relatively large number of rare burrowing snakes were collected, since the native workmen were paid for finding these animals.

The senior author is responsible for assembling the original collection, for such natural history notes on each species as are included, and for the preliminary discussion of the environment of northeastern Iraq, and particularly of Jarmo. The junior author made all the identifications and observations on the external anatomy. Both authors, however, accept mutual responsibility for the paper as a whole.

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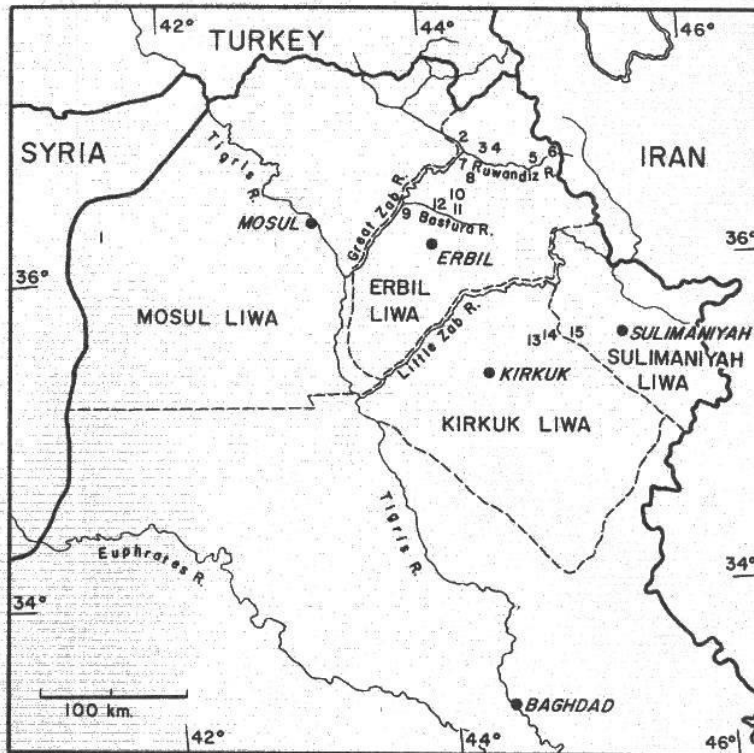


Fig. 1. Northern Iraq, with collecting sites: 1, Balad Sinjar; 2, Shanidar Cave; 3, Havdian; 4, Diyana; 5, Gallala; 6, Haj 'Imran; 7, lower end of the Bekme Gorge; 8, Batas; 9, Gird Momik; 10, Almawan; 11, Salahedin; 12, Khorkawa; 13, Chemchemal; 14, Jarmo; 15, Palegawra Cave.

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times, it must be admitted, had little direct bearing upon the immediate archeological problems.

Environment: Northeastern Iraq consists of three liwas (provinces): Sulimaniyah, Kirkuk, and Erbil, with part of the adjacent Mosul Liwa. None of the area in which we collected is desert, but ranges through grass-covered hills into the higher slopes of the Zagros Mountains to the north and east. These anticlinal mountain series, traversed by deep gorges, have synclinal valleys between them. Deciduous forest, particularly of oak, originally covered the hills and the mountains to timberline, and possibly extended in part onto the plains, but extensive deforestation, cultivation, and grazing for approximately 7,000 years over most of the area have resulted in major changes in macro-and micro-ecology, too profound to be considered here, although obviously such changes have had great influence on the fauna.

The climate is generally of the Mediterranean type, with cold rainy winters, springs with frequent thunder-showers, and summers and autumns hot and dry. The annual grasses make a brave showing in early spring, but what is not eaten off by the ubiquitous flocks has seeded and withered by late May, particularly on the plains and foothills. For the area considered, the annual rainfall (de Vaumas, 1955) varies from a minimum of 40.5 cm. (Kirkuk), 42.0 cm. (Mosul), and 43.0 cm. (Erbil) to a recorded maximum of 104.0 cm. at Aqra in the mountains of northern Mosul Liwa, although many of the higher areas undoubtedly receive more than this, and winter snows of three meters deep are reported common for villages near timberline (c. 1630 meters altitude).

Jarmo: Much of the collection was made at this one foothill-located archeological site, a prehistoric village-farming community (Braidwood, 1952). The 1954-1955 expedition worked at this site continuously from March 9 to June 4, 1955. The altitude is approximately 800 m.

The area consists of tilted Miocene shales, sandstones, and conglomerates, which in early Recent times had been eroded to a peneplane, some parts of which still remain as large cultivated fields. However, with complete deforestation and overgrazing, differential erosion in strata of unequal hardnesses has uncovered a series of upthrust broken ridges with the softer materials forming depressions between. The heavy runoff from the spring thunder-showers accentuates the "bad-land" topography, leaving the few close-cropped bushes aloft on soil hummocks. The spring grasses grow where they can, but are speedily eaten down by domestic goats and sheep.

The winter temperatures may reach slightly below freezing, although snow is never heavy nor long continuous; summers are searingly hot, with



Fig. 2. Temporary stream in wadi at the base of the Jarmo mound; springtime.



Fig. 3. Overgrazed terrain, typical of the Jarmo region.

the daily temperature probably always reaching 38° C. or above. The annual rainfall, as calculated by extrapolation from data in de Vaumas (1955) is probably at least 50.0 cm.; during the winter the rains are long-continuous from low cold clouds, but the spring rains are of the "cloudburst" variety, producing flash-floods. The hot summer winds, from the continental interior, are dry and searing, and the parched land bakes until October. Permanent summer water is restricted to the village wells and a few stagnant pools in the major wadis (small canyons). There are no perennial streams around Jarmo, although archeological evidence suggest that 7,000 or more years ago, prior to deforestation, there may have been.

It is in this impoverished environment that a surprisingly rich herpetofauna survives at Jarmo.

The three species of amphibians are found only close to water when it is present although none was found associated with permanent water of the largest wadi. For the Jarmo reptiles, there would seem to be only four major environmental sub-divisions available: (1) underground; (2) areas of sparse grass with a few scattered clumps of centimeters-high bush; (3) rocky ledges, which furnish many hiding places; and (4) under slabs of fallen rock below rocky ledges. Occasionally man's handiwork, as abandoned mud-brick buildings, supplies another habitat. Thus

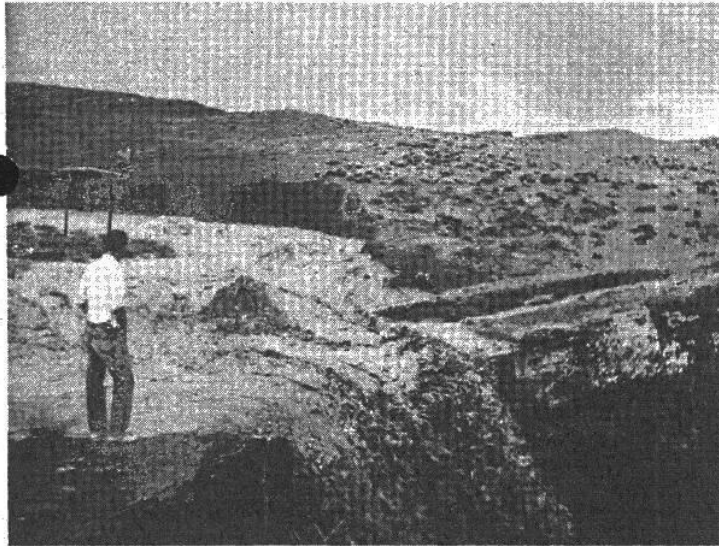


Fig. 4. Flash flood at Jarmo, typical of the many that destroyed all amphibian tadpoles in the spring of 1955.

it is, that in the following species discussions, we do not distinguish between micro-habitats of many of the species, although detailed study would undoubtedly indicate micro-ecological preferences which escaped the busy archeologists.

The forms collected at, or in the immediate vicinity of, Jarmo are as follows: Gekkonidae—*Phyllodactylus elisae*; Agamidae—*Agama rudrata*, *Agama caucasica*; Anguidae—*Ophisaurus apodus*; Lacertidae—*Ophisops elegans*, *Acanthodactylus schreiberi syriacus*, *Acanthodactylus boskianus asper*; Scincidae—*Mabuya aurata aurata*, *Eumeces schneideri princeps*; Typhlopidae—*Typhlops vermicularis*; Leptotyphlopidae—*Leptotyphlops macrorhynchus*; Boidae—*Eryx jaculus*; Colubridae—*Coluber ventromaculatus*, *Eirenis rotbi*, *Eirenis persica*, *Rhynchocalamus satunini*; Boigidae—*Malpolon monspessulana insignitus*; Elapidae—*Walterinnesia aegyptia*; Bufonidae—*Bufo viridis viridis*; Hylidae—*Hyla arborea savignyi*; Ranidae—*Rana ridibunda ridibunda*.

A single specimen of a viper, some 60.0 cm. long, was also collected, but mysteriously failed to arrive in Chicago to be catalogued with the remainder of the collection, so we can do no more than record it as a part of the Jarmo fauna. The snake, *Coluber rhodorhachis*, is to be expected in the Jarmo area, since it was collected at Palegawara Cave, only a few kilometers away.

Enemies: Time did not allow for such detailed study, except that we can state that probably the major enemy of any snake is man, as the local Kurds are firmly convinced that all snakes are deadly poisonous, and thus kill them on sight. This fear also naturally extends to limbless lizards, and in addition the Kurds are also convinced that at least one other lizard, the gecko *Phyllodactylus elisae*, has a fatal bite.

Parasites: All specimens collected were examined with a hand lens for external parasites, those from each specimen being kept in a separate vial of alcohol. For the herpetological specimens, such parasites were either ticks or mites, and were found only on the chelonians and saurians. The ticks have been identified by Harry Hoogstraal, of the United States Naval Medical Research Unit No. 3, Cairo, Egypt, and these identifications are listed in this paper under the individual herpetological species involved.

Disposal of collections: All herpetological specimens collected by the 1954-1955 Iraq-Jarmo Archaeological Expedition became the property of the Chicago Natural History Museum, as a gift from the Oriental Institute, University of Chicago. All specimen numbers in this paper, therefore, are those of the Chicago Natural History Museum.

Collecting localities: The major collecting localities in northern and

eastern Iraq are shown on the accompanying map and it is not thought that further detailed description is necessary. For more precise location, however, each locality for each species is listed as to Nahiya (county), as determined from Ahmed Sousa's "Atlas of Iraq" (1953).

The major collecting sites, with the altitude of each, are as follows (all elevations in meters):

Mosul Liwa—Balad Sinjar (c. 770 m.); *Erbil Liwa*—Almawan (c. 770 m.); Batas (731 m.); Bekme Gorge, bottom (400 m.); Diyana (646 m.); Gallala (1087 m.); Gird Momik (c. 440 m.); Haj 'Imran (1787 m.); Havdian (c. 770 m.); Khorkawa (c. 610 m.); Salahedin (1080 m.); Shanidar Cave (732 m.); *Kirkuk Liwa*—Chemchemical (707 m.); Jarmo area (800–840 m.); *Sulimaniyah Liwa*—Palegawra Cave (c. 925 m.).

GEKKONIDAE

Alsophylax persicus Nikolsky

Alsophylax persicus Nikolsky 1903, Ann. Mus. Zool. Acad. St. Petersburg, 8:95—Vicus Degak in terra Dizak, Persia orient.

Locality. Iraq: Erbil Liwa; Salahedin Nahiya, Salahedin, Pirman Hotel (74549).

Dimensions. Total length 39 mm., snout-vent length 21 mm., tail 0.48 of total length.

This is the only specimen recorded since the description of the type. The outstanding diagnostic features are as follows: dorsal scales keeled, imbricate, and of different sizes; belly scales uniform in size, keeled, and imbricate; two pairs of chin shields, anterior pair much larger than posterior pair; top of head with uniformly small keeled scales; tail scales keeled, not arranged in annuli; forearm reaches middle of eye.

This species may be confused with *Gymnodactylus heterocercus* Manford but can be readily differentiated, since *G. heterocercus* has smooth belly scales and the forearm reaches the tip of the snout.

Natural history notes. The one specimen was under a bit of bark, on the cement floor of the back porch of a hotel. This gecko may have come in with a load of scrub-oak firewood, which was brought in daily and piled on the porch.

Phyllodactylus elisae Werner

Phyllodactylus elisae Werner, 1895, Verh. Zool. Bot. Ges. Wien, 45:14, pl. 3, fig. 1—ruins of Ninevah, near Mosul, Iraq.

Localities. Iraq: Kirkuk Liwa, Chemchemical Centre Nahiya, Jarmo (74551); Sulimaniyah Liwa, Bazyan Nahiya, Palegawra Cave (74552 [2], 74553).

Dimensions. Snout-vent length 48–60 mm. CNHM 74553 is 125 mm. in length and has a complete original tail which is 0.52 of its total length.

Natural history notes. Of the four specimens found, one was under a canvas in an abandoned house; the other three were in crevices in the limestone walls and ceilings of Palegawra Cave. All were in a cool, humid environment.

The local Kurds are extraordinarily frightened of these harmless geckos, thinking them extremely poisonous. The animals supposedly either bite, or spit the poison, and the afflicted person supposedly suffers greatly from swellings in the neck. It is, therefore, impossible to get these geckos collected by any of the Kurds.

AGAMIDAE

Agama rudrata Olivier

Agama rudrata Olivier, 1804, Voy. Emp. Ottoman, 4:395, pl. 29, fig. 3—Persia and northern Arabia.

Locality. Iraq: Kirkuk Liwa, Chemchemical Centre Nahiya, Jarmo (74568–72).

Dimensions. Snout-vent length 50–73 mm.

Natural history notes. The first specimen collected in Iraq in 1955 was not seen until April 6, although these animals are common throughout the winter months on the stony deserts of Syria and Jordan. This first individual at Jarmo was found on top of an earthen mound two feet high, as if guarding a territory. The animal did not move when a shovel handle was laid across its back and it was picked up without trouble, but was very pugnacious and would bite. Thereafter, these lizards were found in open, stony places, or on the walls of latrines or wash-stands. The micro-habitat of this species does not overlap that of the larger *Agama caucasica* of the Jarmo region, which is always found in areas of rough, broken rock with many crevices.

Parasites. One specimen (74570) had 6 larval ticks, *Haemaphysalis sulcata* Canestrini and Fanzago.

Agama caucasica Eichwald

Stellio caucasicus Eichwald, 1829, Zool. Spec., Rossiae Polon., 3:187—Baku.

Agama caucasica Boulenger, 1885, Cat. Liz. Brit. Mus., 1:367.

Localities. Iraq: Kirkuk Liwa, Chemchemical Centre Nahiya, Jarmo (74574–82 [11], 74584–85 [3]); Erbil Liwa, Daira Harir Nahiya, on road between Bates and Bekme Gorge (74583).

Dimensions. Snout-vent length 45–135 mm.

Natural history notes. These were the largest lizards around the archeological camp at Jarmo; they were always very numerous in areas of tumbled rocks or broken sandstone scarps, where numerous crevices provide retreats. Once in a hole, they were almost impossible to pull out. When the sun came out after a cool period, these lizards occupied high spots on rocks, or crept out onto the flats above a scarp; in the latter situation, however, they were very wary and it was difficult to get between one and its retreat in the scarp. Under the particular circumstance of approaching the base of a vertical cliff at a fast run, these lizards can become temporarily bipedal (Reed, 1956).

This species was not found north of the Harir Dagh; the *Agama* collected in the environs of the Diyana plain were *A. stellio*.

***Agama stellio* Linnaeus**

Lacerta stellio Linnaeus, 1758, Syst. Nat., p. 202—Delos, Cyclades, and Egypt (type locality restricted to Delos; Mertens and Muller, 1928, Abh. Senckenberg. naturf. Ges., 41:26).

Agama stellio, Boulenger, 1885, Cat. Liz. Brit. Mus., 1:368.

Locality. Iraq: Erbil Liwa, Ruwanduz Centre Nahiya, approximately 5 miles west of Diyanah, and 1/2 mile northwest of village of Havdian (74465 [2]).

Dimensions. Snout-vent length 106–108 mm.

Natural history notes. Within the area represented by this collection, only two specimens of this lizard were found; they were together under a large flat rock (in company with a *Bufo v. viridis*) on a steep grassy hillside covered with scrub oak. In Palestine and Lebanon *Agama stellio* is the common large lizard of rock-fences and of broken, rocky areas in general; the immediate environment of these Iraqi specimens was therefore quite different. Haas (1952) has used this lizard as an environmental marker, where its bones are found in archeological context, as he states it is never present in steppe or desert conditions.

No *A. caucasica* were found in the area where *A. stellio* were collected, either in Iraq or elsewhere in southwestern Asia; specimens of *A. caucasica* were collected only south and east of the Harir Dagh.

Parasites. Twenty nymphs of the tick, *Haemaphysalis sulcata* Canestrini and Fanzago, were found on the neck of the larger of the two specimens, no external parasites were observed on the other.

***Uromastix* sp.**

One lower jaw of a spiny-tailed lizard has been identified from a depth of 12 m. in Shanidar Cave, northern Erbil Liwa. This is near the bottom (13.4 m.) of the archeological excavation; since material from a depth of 4.6 m. gave a radio-carbon date of more than 34,000 years

(Solecki, 1955, p. 416), we can only conjecture that this *Uromastix* is probably more than 70,000 years old.

ANGUIDAE

Ophisaurus apodus Pallas

Lacerta apoda Pallas, 1775, Novi Comment. Acad. petrop, 19: S. 435, fig. 9-10—Naryn Steppe, north coast of Caspian Sea.
Ophisaurus apodus, Mertens and Muller, 1928, Abh. senckenberg, naturf. Ges., 41: S. 16.

Localities. Iraq: Sulimaniyah Liwa, Bazyan Nahiya, hillside below Palegawra Cave (74501); Kirkuk Liwa, Chemchemical Centre Nahiyah, Chalga (a village near Jarmo) (74502).

Dimensions. Total length 1167-1256 mm., tail length 0.59 of total.

Natural history notes. So far as can be determined from two males, these large slow-worms are found in areas of grass and broken rock. The longer animal is relatively more robust, in contrast to the shorter and slimmer one.

Parasites. The larger male had many hundred nematode parasites, which appeared to occupy the coelomic cavity entirely.

LACERTIDAE

Apathya cappadocica Werner

Lacerta cappadocica Werner, 1902, Sitzb. Ak. Wien, 111:1086—Erdshias Mountains in Cappadocia.

Apathya cappadocica, M hely, 1907, Term sz. Koslon, Budapest, 85:26.

Localities. Iraq: Erbil Liwa, Daira Harir Nahiya, Bekme Gorge, left bank of Greater Zab River (74533 [2]); Erbil Liwa, Ruwanduz Centre Nahiya, left side of Ruwanduz Gorge, at auto bridge across gorge (74534).

Dimensions. Total length 120-174 mm., tail length 0.60-0.65 of total.

Natural history notes. Only three specimens of this beautiful lizard were seen, all of which were collected. All were on or near the base of high vertical rock cliffs in deep gorges, two in the Bekme Gorge on Nov. 12, 1954, and one in the Ruwanduz Gorge, April 14, 1955. The first two were in the sun, although near shade, of a late afternoon of a clear warm day, but the spring-caught specimen was in thick grass and heavy brush of a completely shadowed travertine cliffside, very wet and immediately adjacent to a waterfall (Hamilton, 1937, pl. 23).

With their orange throats (lacking on one specimen), pale stripes, and brilliant blue of the tails, these are beautiful lizards. The blue begins to fade immediately after death, even before preservation.

***Ophisops elegans* Ménétries**

Ophisops elegans Ménétries, 1832, Cat. Rais. Obj. Zool. Voy. Caucase, p. 63—near Baku, Transcaucasus, U.S.S.R.

Localities. Iraq: Kirkuk Liwa, Chemchemical Centre Nahiya, Jarmo (74518–24, 74529 [15]); Erbil Liwa, Daira Harir Nahiya, near Batas (74511 [4]); Erbil Liwa, Daira Harir Nahiya, Bekme Gorge, left bank of Greater Zab River (74512, 74525); Ruwanduz Centre Nahiya, 1 mile east of Diyana (74526); Ruwanduz Centre Nahiya, approximately 5 miles west of Diyana and 1/2 mile northwest of Havdian (74527–28 [5]).

Natural history notes. This is the commonest lizard seen in the foothills of northeastern Iraq. They are seen everywhere in the stubble of the harvested fields or in the dry grass of hillsides. In the deep rocky gorges they would be found wherever grass-covered flats occurred along streams. None were seen in northeastern Iraq after the first rains came, November 21, 1954, until the expedition returned the following spring, when one was found on March 10, 1955, in dry grass on a cold windy day. Four days later, after several heavy rains, two more were collected on a sunny morning, and after that they were ubiquitous around Jarmo, appearing at first whenever the sun shone between showers and later being found at almost all times, disappearing only during actual periods of rain. As spring continued, and the grass was eaten off by the sheep and goats, these little lizards remained on practically bare ground, hiding in low thorn bushes and down any available hole or crack.

Almost any number of them could have been collected; they were not considered to be worth shooting, but after some experience could be collected by hand (the quick-pounce method). As time went on there seemed to be no particular point in further collecting, and the last one was caught on April 27, 1955.

There is considerable individual variation in the pattern of the longitudinal striping; almost all have five stripes, but the stripes on some are more yellow and on some more tan (sometimes almost brown) with shadings between. CNHM 74525 (♂), picked up at the lower end of Bekme Gorge, April 13, 1955, differs from the Jarmo individuals by not having a mid-dorsal stripe and by having orange on the lateral abdomen. Another individual (CNHM 74526 [♀]) caught in the same place at the same time, also lacks the mid-dorsal stripe, but does not have orange. CNHM 74528 (♂), collected the next day at Havdian, also has orange on the

sides. Finally, the last specimen from Jarmo (74529 [♀]), was also noted to have orange sides.

Parasites. Many individuals of this species were noted to have red mites on the tail, and some in the shoulder pocket, although some had no external parasites visible. Four individuals had ticks, *Haemaphysalis sulcata* Canestrini and Fanzago, clustered around the bases of the front legs.

***Acanthodactylus schreiberi syriacus* Boettger**

Acanthodactylus boskianus var. *syriacus* Boettger, 1880, Ber. Senck. Ges., 1879-1880:69—Haifa, Palestine.

Acanthodactylus schreiberi syriacus, Wettstein, 1928, Sitzber. Akad. Wiss. Wien, (Math. Natur.), 137: Abt. I, p. 781.

Locality. Iraq: Kirkuk Liwa, Chemchemical Centre Nahiya, Jarmo (74536-39).

Dimensions. Largest specimen's total length 107 mm., complete tail 0.56 of total length.

Natural history notes. In general, these lizards inhabit the same environment as do *Ophisops elegans* and *Acanthodactylus boskianus asper*, as they can all be collected together in areas of short grass and dwarf shrub. The two species of *Acanthodactylus* however, will also be found in areas of broken rock or sandstone scarps, where *O. elegans* is generally absent. The earliest specimen seen in the spring of 1955 was found dead on a hillside, March 14.

Parasites. On one specimen of *A. schreiberi syriacus* small mites were seen attached around the anus.

***Acanthodactylus boskianus asper* Audouin**

Lacerta aspera Audouin, 1829, Descr. Égypte, Suppl., p. 173, pl. 1, fig. 9—Egypt.

Acanthodactylus boskianus var. *asper*, Lataste, 1885, Ann. Mus. Genova, (2), 2:496.

Locality. Iraq: Kirkuk Liwa, Chemchemical Centre Nahiya, Jarmo (74539-43).

Dimensions. Total length 174-233 mm., tail length 0.58-0.68 of total length.

Natural history notes. At Jarmo, this species inhabited approximately the same environment, of short grass and low shrub, as did *Ophisops elegans* and *Acanthodactylus schreiberi*. The two species of *Acanthodactylus* may also be found in rougher areas of broken rock along sandstone scarps or wadi sides. Neither species of *Acanthodactylus* would seem to be common, particularly in contrast to the numerous individuals of *Ophisops elegans*. These three species, of approximately the same size

and overlapping in whole or in part in environmental niches, must compete ecologically, at least for space, but time and the necessity of other duties did not allow study of this problem.

At Jarmo, the first specimen of *A. boskianus* was collected March 19, 1955. It is interesting that a specimen of *A. boskianus* was also collected February 17, 1955, on the northwest shore of the Dead Sea, Palestine, at an altitude of — 400 m. The environment adjoining the Dead Sea is a true desert, whereas that of Jarmo is a steppe grassland; further, the two areas differ profoundly in their botanical relationships, as Regel (1956) considers the lower end of the Jordan valley to belong to the desert zone of the Red Sea, whereas he states that the hills and mountains of Iraq show altitudinal zones agreeing with those of the more typical eastern Mediterranean.

Parasites. Two of the five specimens collected had one tick apiece, a nymph and a larva of *Haemaphysalis sulcata* Canestrini and Fanzago. The larva was in the left shoulder groove.

SCINCIDAE

Mabuya aurata aurata Linnaeus

Lacerta aurata Linnaeus, 1758, Syst. Nat., p. 209—*Jersea anglorum*, Cypro.

Mabuya aurata aurata, Mertens, 1924, Abh. Ber. Mus. Magdeburg, 3:376.

Localities. Iraq: Kirkuk Liwa, Chemchemical Centre Nah'ya, Jarmo (74591-93 [5], 74595, 74600); Erbil Liwa, Ruwanduz Centre Nahiya, about 5 miles west of Diyana and 1/2 mile northwest of Havdian (74594 [2]); Erbil Liwa, Ruwanduz Centre Nahiya, near Diyana (74596).

Dimensions. Longest specimen's total length is 233 mm., tail length 0.56 of total length.

Natural history notes. The first of these beautiful golden skinks to be taken in northern Iraq by members of the expedition was on December 4, 1954. It was coiled under a cot, inside a floored tent, on a subfreezing morning with heavy frost. The animal could not move enough to straighten itself. The next specimen collected in Iraq was on March 13, 1955, at Jarmo, and was taken from a demolished mud-brick wall. The first spring-time specimen seen in the open was April 30, 1955, although several had been collected in the meantime from under slab-rock and in the debris of fallen mud-brick walls, both in the grasslands of Jarmo and the oak forest above Havdian. In Syria and Lebanon, on sunny days in mid-winter, these animals were found in grass and brushland.

Eumeces schneideri princeps Eichwald

Euprepis princeps Eichwald, 1839, Bull. Soc. Nat. Moscou, 2:303

—Talysch region, Transcaucasus, U.S.S.R.

Eumeces schneideri princeps, Mertens, 1924, Abh. Ber. Mus. Magdeburg, 3:384, pl. 12, fig. 4.

Locality. Iraq: Kirkuk Liwa, Chemchemical Centre Nahiya, Jarmo (74588-90).

Dimensions. Longest specimen's total length is 334 mm., complete tail is 0.62 of total length.

Natural history notes. Only three specimens of this skink were caught, the earliest being on April 29, 1955, in a field of ripening barley. The other two were captured at different times inside tents. None was found under rocks or in fallen walls of mud-brick, favorite haunts of the other Jarmo skink, *Mabuya aurata*.

One right lower jaw of *E. schneideri* is identified from Layer B (almost 2 meters depth) at Shanider Cave. If the jaw is not intrusive, its age would be approximately 12,000 years (Solecki, 1955, p. 414).

TYPHLOPIDAE

Typhlops vermicularis Merrem

Typhlops vermicularis Merrem, 1820, Tent. Syst. Amphib., p.

158—Greek Islands (type locality restr. by Mertens and

Muller, 1928, Abh. senckenberg. naturf. Ges., 41:45).

Locality. Iraq: Kirkuk Liwa, Chemchemical Centre Nahiya, Mound of Jarmo (74618-19).

Descriptive notes. Mid-body scale rows 24; total length 184-259 mm.; diameter of body 0.02 of total length.

Natural history notes. The relative rarity of this species of burrowing snake is indicated by the fact that only two specimens were found in three months of excavation at Jarmo, in spite of the fact that some 40 workmen engaged in the archeological excavations were promised extra pay for finding and saving burrowing snakes.

LEPTOTYPHLOPIDAE

Leptotyphlops macrorhynchus Jan

Stenostoma macrorhynchus Jan, 1862, Arch. Zool. Anat. Phys., 1:190—Senaar.

Leptotyphlops macrorhynchus, Corkill, 1932, Snakes and Snake Bite in Iraq, p. 8.

Localities. Iraq: Kirkuk Liwa, Chemchemical Centre Nahiya, Mound of Jarmo (74620); Erbil Liwa, Salahedin Nahiya, river terrace of Greater Zab River, village of Gird Momik (74621).

Descriptive notes. Mid-body scale rows 14; total length 170–179 mm., body diameter 0.01 of total length.

Natural history notes. The extreme rarity of this slim pink burrowing snake is indicated by the fact that only two individuals were found, in spite of the fact that the Kurdish workmen had been promised extra pay for recovering them. On the Jarmo mound, *Leptotyphlops* and *Typhlops*, so similar in size, appearance, and superficial behavior, seem to occupy very similar if not identical habitat, as does also *Eirenis rothi*. The ecological inter-relationships of these burrowing snakes should make an interesting, even if difficult study.

BOIDAE

Eryx jaculus Linnaeus

Anguis jaculus Linnaeus, 1758, Syst. Nat., p. 288—Egypt.

Eryx jaculus, Daud., 1803, Hist. Rept., 7:257.

Localities. Iraq: Kirkuk Liwa, Chemchemical Centre Nahiya, Jarmo (74622–24).

Descriptive notes. Three males; ventrals 187–193; anal entire; subcaudals 28–29 (1 specimen incomplete tail); mid-body scale rows 51–55; supralabials 9–11; scales in ocular ring 8–10; scales between eyes 5; mental groove present. Total length 173–1127 mm.; tail 0.09–0.10 of total length.

Natural history notes. Each of these three snakes was collected in or adjacent to areas of short, sparse grass. Two of these were personally collected by the senior author, one at night and one at dawn, so this snake may be mainly nocturnal. The first one was found April 5, 1955.

COLUBRIDAE

Coluber ventromaculatus Gray

Coluber ventromaculatus Gray, 1834, Illus. Indian Zool., 2: pl. 80, fig. 1—Bengal.

Locality. Iraq: Kirkuk Liwa, Chemchemical Centre Nahiya, Jarmo (74633–35, 74636 [2], 74637).

Descriptive notes. Six specimens: scale rows 19, supralabials 9, fourth and fifth entering orbit; infralabials 10, the anterior four pairs in contact with the anterior chinshields; preocular 1; postoculars 2; subocular 1; anterior temporals 2; posterior temporals 2–3; anal divided.

Five males: ventrals 192–201 (mean 194.2); subcaudals 90–95 (mean 92.8); total length 579–919 mm.; tail length 0.26 of total.

One female: ventrals 201; subcaudals 89; total length 686 mm.; tail length 0.26 of total.

Natural history notes. The first of these snakes was collected March 11, 1955, on a cold, drizzling day, when it was turned out of a cavity in loose dirt and brick-rubble from a fallen wall that was being cleared; possibly the snake had been there all winter. The first specimens found in the open, two the same day, were collected April 3, 1955. Other than the one specimen, mentioned above, removed from a cavity in a fallen wall, all these snakes were collected in or about camp during daylight, in sparse, short grass.

Coluber rhodorhachis Jan

Zamenis rhodorhachis Jan, 1865, in De Filippi, Viagg. Pers., p. 356—Iran.

Coluber rhodorhachis, Parker, 1931, Ann. Mag. Nat. Hist., 8(10), 8:516.

Localities. Iraq: Erbil Liwa, Salahedin Nahiya, village of Gird Momik (74613); Sulimaniyah Liwa, Bazyan Nahiya, entrance to Pal-egawra Cave (74615).

Descriptive notes. Two females. CNHM 74615 is extensively damaged so that many ventrals are missing and the tail is incomplete. It has 19 scale rows; anal plate divided; supralabials 9, sixth on the left side and fifth and sixth on the right side entering orbit; 10 infralabials, five on the left side and four on the right side in contact with the anterior pair of chin shields; preocular 1; postoculars 2; suboculars 2-1; temporals 2-3. CNHM 74613: scale rows 19; ventrals 231; anal plate divided; subcaudals 130; supralabials 8, fourth and fifth entering orbit; infralabials 10, four pairs in contact with anterior chin shields; preocular 1; postoculars 2; subocular 1; temporals 2-3; total length 413 mm.; tail length 0.29 of total length.

Natural history notes. The two specimens of this racer were captured in somewhat different environments; one was found under a thorn-bush during the dry season (November 24, 1954), on very dry ground, but adjacent to the Greater Zab River at an elevation of 440 m. The second specimen was captured May 9, 1955, following the rainy season, at a much higher altitude (c. 925 m.). The first was found in barren steppe-land, the second in deep grass on a steep slope in rocky hill-country (Braidwood, 1952, fig. 15). The two specimens were collected 150 km. apart, but presumably occupy all of the intervening country.

Coluber ravergieri Ménétries

Coluber ravergieri Ménétries, 1832, Cat. Rais. Obj. Zool. Voy. Caucase, p. 69—Georgia.

Locality. Iraq: Erbil Liwa, Balik Nahiya, bottom of Berserini Gorge, between Gallala and Ruwanduz (74631).

Descriptive notes. One male: scale rows at mid-body 23; scales keeled; ventrals 219; anal plate divided; subcaudals 96; supralabials 9, fifth and sixth entering orbit; infralabials 10, anterior four pair in contact with anterior chin shields; preocular 1; postoculars 2; subocular 1; temporals 2-3; total length 1076 mm.; tail length 0.23 of total length.

This specimen appears to be intermediate between *Coluber ravergieri ravergieri* and *Coluber ravergieri nummifera*.

Natural history notes. Only one specimen was collected in Iraq, from dry ground above the Berserini River at an altitude of approximately 745 m. This racer crossed the road in front of the car and took refuge in a rock pile. The gorge is steep-sided, with small flats along the river; coarse dry grass with some scrub oak dominates the flora.

In Lebanon this same species was found on the seaward side of the Lebanese Mountains, in rather densely wooded mountains above Beirut at an altitude of 310 m. Since both specimens were collected in forested areas, and since the species was not found in the open hills around Jarmo, it is presumably a snake requiring some degree of cover.

***Eirenis persicus* Anderson**

Cyclophis persicus Anderson, 1872, Proc. Zool. Soc. Lond., 1872:392, fig. 8—Bushire, Iran.

Contia persica, Boulenger, 1893, Cat. Snakes Brit. Mus., 2:263.

Eirenis persicus, Forcart, 1950, Verh. Nat. Ges., Basel, 61:153.

Locality. Iraq: Kirkuk Liwa, Chemchemical Centre Nahiya, Jarmo (74953).

Descriptive notes. One male: scale rows 15-15-13; ventrals 205; anal plate divided; subcaudals 81; supralabials 7, third and fourth entering orbit; infralabials 8, first four pair in contact with anterior chin shields; anterior chin shields longer than posterior pair; nasal single; no loreal; prefrontals in contact with second supralabials, separating nasal from preocular; preocular 1; postocular 1; temporals 1-1-1; parietals 1-1/2 as long as frontal; total length 199 mm.; tail length 0.22 of total.

This specimen appears to have the juvenile color pattern. Smith (1943, p. 188) reports that the "young may have the anterior half or two-thirds of the body above with narrow black cross-bars or with a reticulate pattern." This animal (in alcohol) is uniformly black barred on a reddish ground color, there being 41 bars on the body and 19 bars on the tail. These bars are two dorsal scale rows wide (two halves and an entire scale) and separated from each other by three dorsal scale lengths.

Natural history note. The only specimen collected was found April

10, 1955, in sparse wet grass on a cold windy day after a night of hail and torrential rain.

Eirenis rothi Jan

Eirenis rothi Jan, 1863, Arch. Zool. Anat. Phys., 2:259—
Jerusalem.

Localities. Iraq: Kirkuk Liwa, Chemchemal Centre Nahiya, Mound of Jarmo (74609-10); Erbil Liwa, Ruwnaduz Centre Nahiya, archeological site of Banahilk, near Diyanah (74607 [3]); Erbil Liwa, Ruwanduz Centre Nahiya, about 5 miles west of Diyanah and 1/2 mile northwest of Havdian (74608 [2]).

Descriptive notes. Seven specimens: mid-body scale rows 15; supralabials 7, third and fourth entering orbit; infralabials 7-8, first four pairs in contact with anterior chin shields; preocular 1; postoculars 2; temporals 1-2; loreal present; nasal single; body color uniform.

Four males: ventrals 158-161 (mean 159.75); subcaudals 50-59 (mean 54.5); total length 118-268 mm.; tail length 0.19-0.25 (mean 0.21) of total.

Three females: ventrals 174-175 (mean 174.7); subcaudals 43-47 (mean 51.7); total length 128-337 mm.; tail length 0.17-0.20 (mean 0.19) of total.

The only difference between this series and the Palestinian specimens that we have examined is the presence of two posterior temporals in the Iraqi animals.

Natural history notes. Six of the seven specimens here reported, plus one other too mangled to be preserved, were collected from below the surface of the ground. Two of these were found beneath adjacent rocks on a steep, grassy hillside in an oak forest (near Havdian), and five were collected by the workmen during archeological excavations (Banahilk and Jarmo). One was collected from a boulder-island in a rain-filled excavation pit (Jarmo), after a heavy thunder-shower and presumably had been forced to the surface by the rain. The four specimens at Banahilk, one of which was not saved, were collected in early December, 1954, during cold weather with nightly sub-freezing temperatures, coiled together in a hollow 50 cm. underground.

While the most numerous burrowing snake collected, this circumstance may well be due to chance, as only two of the eight individuals found were from Jarmo, during three month's intensive excavations by some forty workmen, whereas four were found together during a short excavation with only a few workmen, and two were found in a few minutes of random rock-turning one morning.

Eirenis breviceaudus Nikolsky

Contia breviceauda Nikolsky, 1907, *Annuaire Mus. St. Petersburg*, 10 (1905) : 296, fig. 10—Arabistan (Khuzistan), Iran.

Eirenis breviceauda, Schmidt, 1939, *Field Mus. Nat. Hist., Zool. Ser.*, 24:81.

Locality. Iraq: Erbil Liwa, Salahedin Nahiya, Bastura River valley, 4 miles upstream from the Erbil-Salahedin Road, c. 765 m. altitude (74606).

Descriptive notes. One female: scale rows 15; ventrals 153; anal divided; subcaudals 36; supralabials 7-6 (6th and 7th fused on right side), third and fourth entering orbit; infralabials 8, first four pairs in contact with anterior chin shields; preocular 1; postoculars 2; temporals 1-1; loreal 1; nasal single; body bands 45; total length 122 mm.; tail length 0.15 of total.

This is the only specimen recorded since the original description. Its color pattern matches very closely Nikolsky's original description and figure. Its relationship to, or validity with, other forms will have to await additional material. It differs from the type material of *E. cornella fraseri* Schmidt, (1939, p. 79) in coloration and in having slightly fewer subcaudals, and indeed may prove to be a subspecies of *E. cornella*; if so, *fraseri* would become a synonym of *brevicauda*.

Natural history notes. The single individual of this species collected was picked up October 9, 1954, among small loose rocks on a dry river terrace above the channel of the Bastura River. The day was hot, the river dry, and there had been no rain since spring. The snake was eating a small spider. The general area is one of gravelly, grass-covered hills.

Rhynchocalamus satunini Nikolsky

Conti satunini Nikolsky, 1899, *Ann. Mus. Zool. Akad. Petersb.*, 4:449—Megri, Armenia. Nikolsky, 1905, *Herpt. ross.*, p. 277, tab. 2, fig. 1, la. Nikolsky, 1913, *Herpet. caucas*, p. 165. Nikolsky, 1915, *Fauna Russie*, 1:175, fig. 38.

Oligodon melanocephalus Jan var. *septentrionalis* Werner, 1905, *Zool. Anz.*, 29:411—Adana, Turkey. Venzmer, 1922, *Zool. Jahrb. Syst.*, 46:53.

Oligodon melanocephalus septentrionalis, Bird, 1936, *Ann. Mag. Nat. Hist.* (10) 18:276. Bodenheimer, 1944, *Rev. Fac. Sci. Univer. Istanbul*, 9:48.

Oligodon melanocephalus satunini, Chernov, 1937, *Moscow: Akad. Nauk SSSR (Armenian Branch)*, p. 37, fig. 22. Terentjev and Chernov, 1949, *Ency. Rept. and Amph., Moscow [Russian title]*, p. 257.

Type locality. Megri, Elisabethpol Province, Armenia, (Transcaucasia), U.S.S.R. Type specimen Leningrad Museum No. 9343.

Localities. Iraq: Kirkuk Liwa, Chemchemal Centre Nahiya, Mound of Jarmo (74605). Iran: Khuzistan, south of Dizful, Shalgahi (MCZ: H.F. 40).

Discussion. The Jarmo animal was collected 25 April, 1955, by a Kurdish workman during the archeological excavation; the depth at which it was found is not known.

Chernov's (1937) description and figure of Nikolsky's form (*satunini*) agree fully with Werner's form (*septentrionalis*) and preoccupies it. The color pattern of *satunini*, which Chernov figures, and which Terentjev and Chernov (1949) describe, is the same as on the material examined by us. The coloration of Werner's Adana type has been well described and completely matches the specimen from Jarmo.

The relationship of the Adana animal to the Palestinian and Lebanese *R. melanocephalus* Jan has been in question. Bodenheimer (1944, p. 48) considered the Adana animal to be an aberrant specimen, not mentioning Nikolsky's *satunini*. Now, however, with the knowledge of the material in Russia, and with an individual from Iran, and the specimen from Jarmo, we consider *R. satunini* Nikolsky to be a distinct species.

The Jarmo and Shalgahi specimens differ from five specimens of *R. melanocephalus* from Palestine, that we have examined, in having a greater number of upper labials and lower labials and in not having the top of the head and nape uniformly black (Fig. 5). These Palestinian specimens agree fully with Jan's original description and figure of *melanocephalus* in coloration and counts and also with Günther's form of *melanocephalus* (1864, p. 491), a synonym of Jan's form. Boulenger (1894, p. 246) reported 7 upper labials for *melanocephalus*, including Günther's type. Günther's original description gave the upper labial count as six. Anderson (1898, p. 277, pl. 34, fig. 2) stated that there are six to seven upper labials, and figured Günther's type. This figure has six upper labials. Angel (1936) recorded two specimens from Beirut (type locality of *melanocephalus* Jan) with six upper labials. Nowhere can we find a record of a specimen of *melanocephalus* reported to have seven upper labials. It therefore appears that there are only six upper labials and that upon re-examination, the additional two specimens mentioned in Boulenger's Catalogue probably will also have six upper labials.

We find no intergradation between the two distinguishing characters differentiating the northern *satunini* and the southern *melanocephalus* and we therefore consider these two populations as distinct species.

Nikolsky (1899, 1913, and 1916) recorded *satunini* with seven

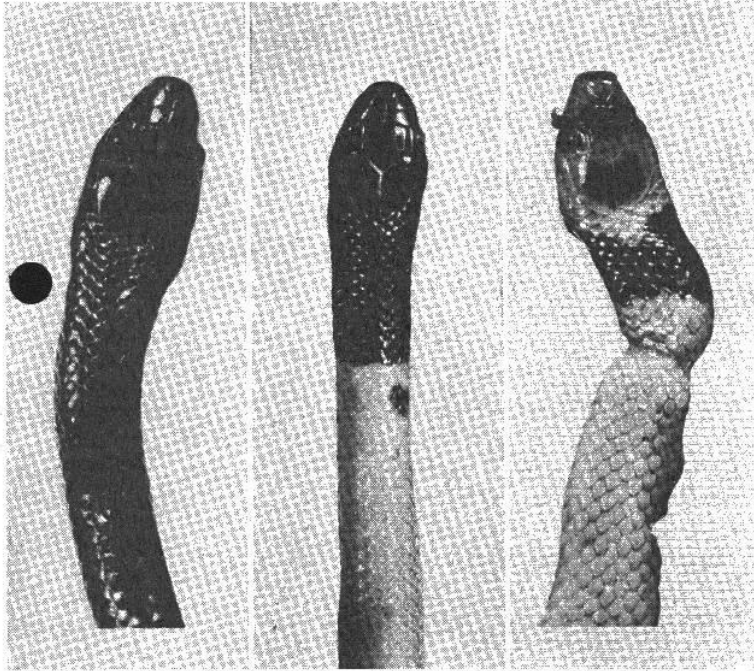


Fig. 5. Heads of the known species of *Rhynchocalamus*. A) *R. arabicus* (type); B) *R. melanocephalus*; C) *R. septentrionalis*.

upper labials. We find no reference to the labial counts of the type of *septentrionalis* Werner and an effort to check its labial counts has not been successful. We contacted Dr. Josef Eiselt of the Naturhistorisches Museum, Vienna, believing that Werner may have deposited the type there as he had done with other material. Dr. Josef Eiselt has informed us that the type specimen of *septentrionalis* is not located in the Vienna museum.

This group of burrowing snakes still remains one of the rarest genera in southwestern Asia.

The following is a description of the Jarmo specimen. Female: Body elongate and slender; head slightly distinct from neck. Rostral very large and offset from the adjacent shields, extending as far posteriorly as the nostrils; internasals almost triangular, the inter-nasal suture one-half length of the prefrontal suture; frontal as long as wide and equal to its length to snout; parietals large, as long as the distance from posterior tip of frontal to posterior tip of rostral; nostrils directly posteriorly, in a

very large undivided nasal; loreal present; one preocular; one postocular; temporals 1-1; upper labials 7, third and fourth entering orbit; diameter of eye equal to its distance to mouth; lower labials 8, first three pairs in contact with anterior chin shields; posterior pair of chin shields very small, separated from each other by two scales. Scale rows 15-15-15; ventrals 220; anal divided; subcaudals 52. Total length 323 mm.; tail length 0.17 of total length.

Color (in alcohol); body above with very fine brown specks, more densely situated along posterior borders of the dorsal scales, becoming gradually less dense on the lateral scales; body below uniformly yellow. Head (Fig. 5) yellow with the following markings: a black band running across forehead through eyes; a central patch of black on inner surface of parietals; a black collar covering the second and third to the eighth and ninth dorsal scales.

A juvenile female of *R. satunini*, collected at Shalgahi, Iran, by Dr. Henry Field (H. F. no. 40) has been loaned to us by Dr. Ernest Williams, Museum of Comparative Zoology. The specimen was collected by the Peabody Museum—Harvard Expedition to the Near East, 1950.

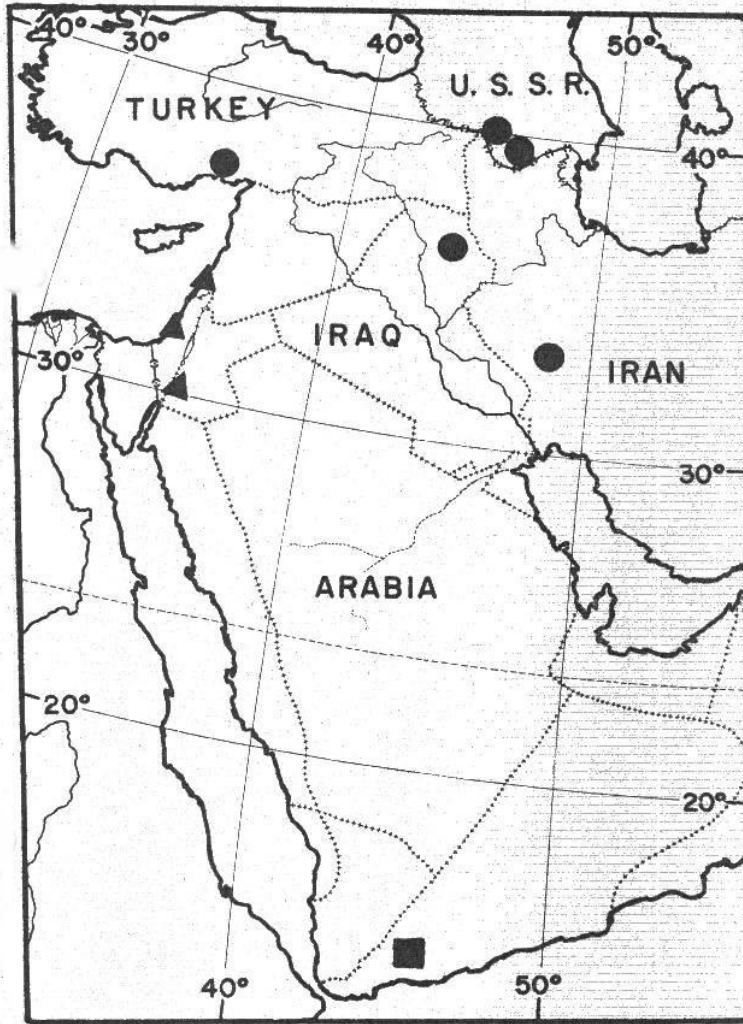
This snake agrees with the Jarmo individual. The ground color is the same, but there are two short dorsal-lateral dark lines at the neck region suggesting the lateral borders of the neck band. This may be the juvenile pattern, for this animal's size is approximately half that of the Jarmo female.

The following is a description of the Iranian snake: scale rows 15-15-15; ventrals 226; anal plate divided; subcaudals 58; upper labials 7, third and fourth entering eye; lower labials 8, first four pairs in contact with anterior sublinguals; preocular 1; postocular 1; temporals 1-1. Total length 166 mm., tail length 0.16 of total length.

Distribution. Eastern Turkey, northern Iraq, western Iran, Armenia S.S.R., and Azerbaijan S.S.R.

The following key will differentiate the three known species of *Rhynchocalamus*.

1. Body color uniformly blackish, same color as head (Fig. 5A) *arabicus* Schmidt, 1933
Body color yellowish 2
2. Top of head and neck uniformly black (Fig. 5B); 6 upper labials; 7 lower labials *melanocephalus* Jan, 1862
Top of head not uniformly black (Fig. 5C); 7 upper labials; 8 lower labials *satunini* Nikolsky, 1899



- *R. satunini*
- ▲ *R. melanocephalus*
- *R. arabicus*

Fig. 6. Known distribution of the three species of *Rhynchocalamus*.

BOIGIDAE

Malpolon monspessulana insignitus Geoffroy

Coluber insignitus Geoffroy, 1827, Descr. Égypte, Hist. Nat., 1:151—Lower Egypt.

Malpolon monspessulana insignitus, Mertens and Muller, 1928, Abh. Senck. Ges., 41:51.

Localities. Iraq: Kirkuk Liwa, Chemchemical Centre Nahiya, Chemchemical, (74625); Jarmo (74626–28).

Descriptive notes. Four specimens: scale rows 17; supralabials 8–9, fourth and fifth entering orbit; infralabials 10–11, first five pairs in contact with anterior chin shields; preocular 1; postoculars 2–3; temporals 2–3; anal divided.

One male: ventrals 174; subcaudals 90; total length 796 mm.; tail length 0.24 of total length.

Three females: (two with incomplete tails) ventrals 172–174 (mean 172.3); subcaudals of one 89; total length of one 883 mm.; tail length of one 0.25 of total length.

Natural history notes. The first individual was found under a large boulder on March 29, 1955. This snake had the trick of "coiling" laterally and then striking, but not directly at the person trying to capture it; instead, the animal would strike just beside it, then continue on as fast as it could go, until cornered again, whereupon it would repeat the performance. The second specimen captured was undoubtedly the most pugnacious individual ophidian ever met by the senior author; with its good protective coloration (uniformly steel-gray dorsally), it undoubtedly would have escaped detection, but chose instead to attack from a waist-high, grassy, rock-covered ledge. The day was sunny and the snake was warm and active; it would rear upright for almost half its length and throw itself forward, repeated the performance several times until finally captured. The use of the word "attack" seems completely justified.

ELAPHIDAE

Walterinnesia aegyptia Lataste

Walterinnesia aegyptia Lataste, 1887, Le Naturaliste, 1887:411—Egypt.

Locality. Iraq: Kirkuk Liwa, Chemchemical Centre Nahiya, Jarmo (74500).

Descriptive notes. One female: scale rows 23; ventrals 192; anal plate divided; subcaudals 40, second and third entire; supralabials 7, third and fourth entering eye; infralabials 9, first four pairs in contact with

anterior chin shields; preocular 1; postoculars 2; subocular 1; temporals 2-3; total length 330 mm.; tail length 0.12 of total length.

Natural history notes. The discovery of this snake at Jarmo was most unexpected, as the area occupied by this species is thereby extended into the foothills of the Zagros Mountains, enlarging the known ecologic range from desert and steppe into foothill areas with higher rainfall and lower winter temperatures than hitherto reported.

The animal had previously been known (Marx, 1953) from true desert areas of Egypt, Palestine, Iraq, and Iran. It has also recently been recorded from a desert region of Saudi Arabia, near the Persian Gulf (Haas, 1957). Of the previously known range, only the record from Mosul (Corkill, 1932) lies north of the desert, as the Mosul region is a steppe-grassland with an annual rainfall of approximately 42.0 cm. (de Vaumas, 1955).

The known distribution of *Walterinnesia* (from the Egyptian deserts to the desert hills of Khuzistan [formerly Arabistan] Iran) suggests that this monotypic genus is primarily a true desert form which can extend its range into peripheral grassland plains or foothills. It is possible that the range extension into formerly forested foothills, such as those around Jarmo, may have occurred since deforestation, which, on the basis of archeological evidence, began more than 7,000 years ago.

The single specimen collected at Jarmo, March 25, 1955, was coiled under a stone step of an abandoned house. Although the day was clear and warm, rains had been heavy all winter, and continued so for more than a month. Any protected spot, such as this snake occupied, was damp if not actually wet; in consideration of this factor (particularly in contrast to the more usual desert environment) it would be interesting to know what range of humidity this species can tolerate.

This particular specimen was very aggressive, and would strike two-thirds the length of its own body, although no tendency was observed toward spreading of a hood or maintenance of an upright stance, as seen in some other elapids.

TESTUDINIDAE

Testudo graeca ibera Pallas

Testudo ibera Pallas, 1827, Zoogr. rosso-asiat., 3: S. 18—Iberia, Transcaucasia.

Testudo graeca ibera, Mertens, 1946, Senckenbergiana, 27:112.

Localities. Iraq: Erbil Liwa, Erbil Centre Nahiya, valley of Bastura River, west of Erbil-Salahedin road (74504); Erbil Liwa, Shaqlawa Nahiya, in field near village of Sisawah (74950); Erbil Liwa, Balik

Nahiya, in open field near tree-line, between Rayat and Haj'Imran (74951); 0.4 km. from latter, on road between Haj'Imran and Iranian border (74952).

Natural history notes. This was the only land tortoise seen in the hills and mountains of Erbil Liwa, and was not seen in the hills of eastern Kirkuk Liwa or western Sulimaniyah Liwa, where conditions seemingly are similar. In the hills and mountains of northern Erbil Liwa, this animal was collected in open grasslands from altitudes of c. 525 m. up to, and above, timberline, which in this area lies at c. 1630 m. In our experience, they were most numerous on the grass-covered hills above timberline; the highest one collected was at c. 1785 m., but they probably could be found higher. Thus the range is from lower areas of cool winters and hot summers, with an annual rainfall of some 45 cm., up into regions of cold winters (with three m. of snow reported) and cool summers.

These tortoises are not eaten by the Kurds today, but may have been eaten in times past, as the bones of this species have been found in Shanidar cave throughout all culture levels, thus dating back 75,000 years or more into the Pleistocene.

Inasmuch as these tortoises are not molested by the local inhabitants, they would seem to have few enemies. One specimen, collected just above timberline near the Iranian border in northernmost Iraq, was healing multiple physical injuries (chewed legs, broken carapace edge, holes in carapace), which had probably been inflicted by a bear, *Ursus arctos*, the only large mammal found above timberline in the area. This tortoise was also suffering psychic trauma; it withdrew into its shell at the slightest stimulus, and remained therein more than twice as long each time as any other tortoise did. In fact, some of the tortoises, after a few false alarms, refused to withdraw at all.

Parasites. One of the tortoises collected above timberline in Iraq had two ticks, *Hyalomma aegyptium*, also found on another tortoise of the same species collected in southern Lebanon.

***Clemmys caspica caspica* Gmelin**

Testudo caspica Gmelin, 1774, Reise durch Russland, 3:59, pls. 10-11—Hircania.

Clemmys caspica, Wagler, 1830, Icon. Amphib., pl. 24.

Localities. Iraq: Erbil Liwa, Salahedin Nahiya, village of Gird Momick, river terrace at confluence of Bastura and Greater Zab Rivers (74949); Erbil Liwa, Salahedin Nahiya, village of Khorkawa, in small, short, isolated creek (74505).

Natural history notes. These water turtles were very common in springs, and short creeks running therefrom, at the base of the mountain

called Safin Dagh, as elsewhere described (Reed, 1957). As noted in this reference, these turtles seemed quite incapable of swimming. Those reported to be present elsewhere in permanent rivers in Iraq are said to swim normally.

ORDER SALIENTA

Only three species of amphibians, all anurans, were collected. Salamanders were watched for, in the permanent streams of the higher mountains, but none was seen.

The three anurans (a frog, a tree-frog, and a toad) have the same basic problems each spring in the foothill areas such as at Jarmo: to find a pool for egg-laying, from which the larvae will not be washed to their death by flash-floods. In the spring of 1955, at least around Jarmo, all such efforts were unsuccessful and no tadpoles survived. Eggs were laid three times, three populations of tadpoles were washed away, and thereafter (the last of such flash floods, several in number, were May 2-3) no more eggs were laid, although seep-fed pools persisted in several protected spots.

Eggs were not laid in the well at the Jarmo camp, possibly in part because an effort was made (not always successful) to exclude animals from it, and all that gained entrance were collected. Two copulating *Hyla* were collected in the well on May 25; thus it is possible that wells provide protected places for survival of young.

Seemingly no eggs were laid—at least no tadpoles appeared—in the permanent pools of the one big wadi (fig. 2) at the foot of the mound of Jarmo.

The last rain of any consequence in the spring of 1955 at Jarmo was the night of May 21; after this all frogs disappeared (except those found in the well), probably to aestivate in the damp stream-bed gravels. The last toad was seen on the night of May 25, and it was near the well.

Unfortunately none of the tadpoles was collected, and thus their identity cannot be determined.

BUFONIDAE

***Bufo viridis viridis* Laurenti**

Bufo viridis Laurenti, 1768, Synopsis Rept., p. 27, pl. 1, fig. 1
—Vienna.

Bufo viridis viridis, Mertens, 1926, Senckenbergiana, 8:258.

Localities. Iraq: Erbil Liwa, Salahedin Nahiya, village of Almawan (74671); Erbil Liwa, Daira Harir Nahiya, left bank of Greater Zab

River, in Bekme Gorge (74672); Erbil Liwa, Salahedin Nahiya, right bank of the Bastura River, near Erbil-Salahedin road (74673); Erbil Liwa, Ruwanduz Centre Nahiya, about 5 miles west of Diyana and 1/2 mile northwest of village of Havdian (74682-83, [5]); Kirkuk Liwa, Chemchemical Valley, Jarmo (74677-81, 74684 [2]).

Natural history notes. This toad is common and ubiquitous over all the foothill areas visited. The first one was found in a dry field, some 35 meters from permanent water, on the evening of October 24, 1954, at an elevation of c. 770 m., near Saladehin, Erbil Liwa. There had been no rain since spring and everything away from the stream-edge was exceedingly dry, but solitary toads can, under such circumstances, be found foraging in the evenings.

The senior author did not ascertain the vertical extent of their distribution in Iraq, as he did not collect on the plains and, perhaps by chance, did not find them in the mountains.

These toads can be found, although not commonly, on the Mediterranean coasts of Lebanon and Syria during the rainy months of January and February. On the eastern side of the Syrian coastal mountains, at the Danish Mission Medical Center, Nebek (some 80 km. north of Damascus) these toads are so common that they are collected and kept for pregnancy tests.

In eastern Iraq (eastern Kirkuk Liwa and the adjacent western Sulimaniyah Liwa) these toads were common throughout the spring, although never concentrated around temporary pools as are *Rana* and *Hyla*. In the rock-shelter of Palegawra (Braidwood, 1952, fig. 15) these toads, isolated or in small groups up to four, were found in the damp crevices in the floor of this small cave, and their bones were found throughout the cultural debris, dating to some 12,000 years ago. Since these caves and rock-fissures are numerous in this limestone county, toads could probably be found in them throughout the year.

No copulating pairs were seen, but a female caught the evening of March 21, 1955, was extremely active within a plastic bag, and by morning had laid 40 eggs in a single mucous string. By the evening of March 23, she had laid almost 3 cc. of eggs, in spite of being contained in a dry can in total darkness away from any male.

The last toads seen were on the evening of May 25, 1955. One was in a well, but the other was out and hopping about on a warm night. These toads presumably retire into damp cracks or under stones in the daytime, but many such rocks were turned over, looking for reptiles, and only one toad was found. This was on a steep hillside in a scrub oak forest near Havidan, and the space under a large boulder was shared with

two *Agama stellio*. The three animals were in close proximity, but not in contact.

HYLIDAE

Hyla arborea savignyi Audouin

Hyla savignyi Audouin, 1812, Descr. Égypte, Rept., Suppl., pl. 2, fig. 13—Syria (presumed).

Hyla arborea savignyi, Mertens, 1924, Abh. Ber. Mus. Magdeburg, 3:356.

Localities. Iraq: Erbil Liwa, Salahedin Nahiya, village of Almawan (74639); Erbil Liwa, Salahedin Nahiya, right bank of Bastura River, near Erbil-Salahedin road (74640 [4]); Kirkuk Liwa, Chemchemical Centre Nahiya, Jarmo (74645-48 [15]).

Natural history notes. This species was first met by members of the expedition at an altitude of approximately 525 m., on October 12, 1954, a day so hot that the senior author had a touch of sunstroke. There had been no rain since spring; these lovely little frogs, however, were dotted all over the bushes and heavy legumes surrounding a few springs near Khorkawa, where low gravel hills abut against the base of the limestone anticline that is the Safin Dagh. These *Hyla* were completely exposed to the sun at high noon, absolutely quiescent, and presumably remained thus for several hours. One would expect them to be completely desiccated in a relatively short time, but obviously this behavior was normal.

The first rains came November 21, 1954, and the *Hyla* were then quite common wherever heavy grass could be found; they do not need trees to climb upon.

These animals were collected in Iraq only between elevations of 525 m. and 810 m., but little collecting was done at lower altitudes, and that at higher altitudes was sporadic and hurried, so their altitudinal range may well be greater than indicated.

When the expedition arrived at Jarmo, eastern Kirkuk Liwa, on March 8, 1955, these animals were already active. This date is still well within the rainy season, with all intermittent streams flowing, and the *Hyla* were numerous and active at night wherever there was grass and/or bush beside the water. Several such nights were near freezing, but the *Hyla* remained active and calling in a cold rain mixed with hail. None was seen copulating during these times, or later, until May 25, which date (as discussed before, p.) seems abnormally late.

The typical, continuous, high-pitched "frog-chorus" that one hears throughout this part of the world at night is produced by these *Hyla*,

and not by *Rana ridibunda*, which abound in the same habitat and are often more numerous, but have a solitary, lower, and more guttural call.

Hyla collected in the spring from the same locality at the same time, and thus members of a micro-population, exhibit an amazing variation of color in life. The basic plan of the pattern is identical, but almost any color variation is possible from very pale green to a dark gray with overtones of blue and green. It was not possible to determine whether the same individuals change colors, or different individuals maintain their same individual color patterns. However, it was determined that color differences are not sexual in origin, as two of the color extremes (one pale green, one gray-blue with some dark green) were both males, as proved by dissection. Each had small testes (approximately 4.0×1.75 mm. each), but both had been actively calling when caught. One extra-large pale green individual was a female, with well-developed ovaries filled with yellow ova.

The size discrepancy that one notes in the *Rana* is not found in the *Hyla*.

RANIDAE

Rana ridibunda ridibunda Pallas

Rana ridibunda Pallas, 1771, Reise Russ. Reich, 1:458—Gurev, north coast of the Caspian Sea.

Localities. Iraq: Mosul Liwa, Sinjar Centre Nahiya, Balad Sinjar (74651 [5]); Erbil Liwa, Ruwanduz Centre Nahiya, near Diyana (74650); Erbil Liwa, Daira Harir Nahiya, left side of the lower end of Bekme Gorge (74670 [2]); Erbil Liwa, Balik Nahiya, Gallala (74649 [2]); Kirkuk Liwa; Chemchemical Centre Nahiya, (74663-69 [23]).

Natural history notes. These frogs are abundant throughout all the foothills and mountains of northeastern Iraq, wherever either permanent water or spring-streams are to be found. *Rana* were not collected above 1140 m. altitude, but opportunity for looking for them higher did not occur. Where there is permanent water, these frogs will be found in the dry seasons; at least they were abundant in such places when the expedition arrived in northern Erbil Liwa in late September.

No *Rana* were found in copulation at Jarmo in the spring, although they were calling each evening from our arrival there, March 8, 1955, until the intermittent streams dried in early May. *Rana* has a guttural, low-pitched, solitary call, in contrast to the high-pitched "frog-chorus" produced by *Hyla*. Even where the *Rana* locally outnumber the *Hyla* it is the latter's chorus that one notes and can hear for a considerable distance.

The only herpetological specimens collected by this expedition in Mosul Liwa were five *Rana* taken January 5, 1955, in a creek flowing from a warm spring at the town of Balad Sinjar.

Extreme size variation, from very small individuals to adult, was noted in both autumn and spring, a situation not found in *Bufo* or *Hyla*, all of which appeared to be adult.

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