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Correspondence, membership applications, subscription renewals and purchase orders for the Herpetological Journal and British Herpetological Society Bulletin should be sent to the above address.

The British Herpetological Society was founded in 1947 with the broad aim of catering for all aspects of interest in reptiles and amphibians. Initiated by a small number of enthusiastic and well-known naturalists, including the first President and author of the standard textbook on British herpetofauna Dr. Malcolm Smith, the Society expanded rapidly and today enjoys national status with many international connections.

Activities of members range over a number of interrelated fields. In many cases the prime interest is in maintaining, breeding and observing various species in captivity and the Society acts as a forum for the interchange of experiences in this area. Others are concerned with the observation of animals in the wild state. There are active sub-committees which help to cater for these various tastes, notably the Captive Breeding Committee and the Conservation Committee. The former encourages the development of effective breeding techniques for captive specimens, thus providing animals for observation and study in vivaria, and for conservation purposes, while simultaneously reducing the need to take fresh stock from wild and possibly declining populations. The Conservation Committee is actively engaged in field study, conservation management and political lobbying with a view to improving the status and future prospects for our native British species. It is the accepted authority on reptile and amphibian conservation in the U.K. and has an advisory role to the Nature Conservancy Council (the statutory Government body). There are also professional scientists within the ranks of the Society engaged in increasing our understanding of all aspects of reptile and amphibian biology.

Meetings

About ten meetings covering a broad sphere of interests are held each year.

Subscriptions

Ordinary Members £15. Junior Members £5. (Junior Members do not receive the British Journal of Herpetology). Institution rates £25 (U.S. $40).
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The Bulletin is edited and produced by
John Pickett and Simon Townson

Contributions and correspondence arising from the Bulletin should be sent to:
John Pickett, 84 Pyrles Lane, Loughton, Essex IG10 2NW

FRONT COVER
The Golden Mantella, *Mantella aurantiaca*, gravid female. One of the species threatened by deforestation in Madagascar. See *Herpetofauna of the threatened Forests of Madagascar*, by Christopher Raxworthy, Photo Stephen Peltz.

REMAINING LONDON MEETINGS 1990

Meetings are held in the Lecture Theatre of the Linnean Society of London, Burlington House, Piccadilly, London W.1, unless otherwise indicated, and start at 7.00 pm, ending at 9.00 pm.

October 10th Mr Mark O'Shea (Wolverhampton): Reptiles, especially snakes, of Papua New Guinea.

November 13th Mr. J. Denton (Sussex University). Terrestrial ecology of the Natterjack Toad.

EGGSHELLS NEEDED FOR ARCHAEOLOGICAL RESEARCH

Jane Sidell is undertaking an arachaeological research project looking into the identification of egg shells. For this work she is building up a reference collection and would be grateful if any BHS members could help. If any members have pieces of eggshell, size apparently is not important as the work will be done under the microscope, these should be sent, with the name of the species, to Jane Sidell, Institute of Archaeology, 31-34 Gordon Square, London WC1H 0PY.

HERPETOFAUNA OF THE THREATENED RAIN FORESTS OF MADAGASCAR - A UNIQUE HABITAT

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OUTLINE OF A TALK GIVEN AT A MEETING OF THE BHS ON MAY 23rd 1989

During the International Conference on Nature Conservation and Durable Development held in Madagascar, 28-31 October 1985, the island's endemic fauna and flora was declared the world's top conservation priority. Not only because of the extremely rich and unusual diversity of species, much of which is endemic, but also because of the acute and rapidly escalating problems of forest clearance, which is only being worsened by the present economic crisis notwithstanding the "world conservation strategy".

The rainforest reptiles probably exceed 137 species (just over half the island's total), of which at least 95% are endemic to either Madagascar or the Malagasy region. Most rainforest reptiles are restricted to the eastern region of the island. Many appear to be known only from museum specimens, collected sometimes more than 100 years ago, and there are few published accounts of field observations. For further details on the reptiles, see Blanc (1984), and for the amphibians, Bloomers-Schlosser & Blommers (1984).

The Malagasy frogs are still poorly known, although 145 species have been described. Most occur in the humid eastern domain of the Island, especially rainforest. The genus *Mantidactylus* (family Ranidae) is huge, containing 54 species, probably the product of adaptive radiation in consequence of colonisation of such a large island. Similar adaptive radiation is also shown by the microhylid toads and rhacophorid tree frogs, which have reached Madagascar. Forty new species of frog have been described since 1970.

Since the Zahamena Forest (Madagascar) Expedition 1985 of the International Council for Bird Preservation and the University of London Union Natural History Society (Thompson et al., 1987), surveys for species were made in five rainforest sites, which included both mid- and low-altitude forest, and a range of human disturbances (Raxworthy, 1988). A total of 28 identified reptile species were recorded during 79 days in the field (Table 1). Some of these are only known from museum collections, and for most there is no field information available. With the rapid increase of rainforest clearance in Madagascar, such an absence of even the most basic information can only be harmful for conservation projects of the future.

TABLE 1

Rainforest Reptile Species Recorded at Each Survey Site in eastern Madagascar (after Raxworthy, 1988).

Species	*Survey sites*				
	1	*2*	*3*	*4*	*5*
Gekkonidae (geckos)					
Paroedura homalorhinus		*			
Phelsuma lineata	*		*	*	*
Phelsuma bimaculata	*			*	
Phelsuma guttata	*			*	
Ebenavia inurguis		*		*	
Homopholis antongilensis		*			
Uroplatus fimbriatus	*	*	*		
Chamaelontidae (chameleons)					
Chamaeleo pardalis	*	*			
Chamaeleo nasutus			*	*	
Chamaeleo cucullatus	*				
Chamaeleo brevicornis			*		
Chamaeleo parsonii			*		
Chamaeleo willsii			*		
Chamaeleo gastrotaenia	*				
Brookesia superciliaris	*				
Brookesia peyrierasi	*	*			
Scincidae (skinks)					
Mabuya gravenhorsti				*	
Amphiglossus melanopleura	*	*	*	*	
Amphiglossus frontoparietalis	*				
Cordylidae (plated lizards)					
Zonosaurus aenus	*	*	*	*	*
Zonosaurus madagascariensis	*	*	*		*
Boidae (boas)					
Sanzinia madagascariensis	*	*	*	*	
Colubridae (typical snakes)					
Liopholidophis thieli			*		
Pseudoxyrhopus heterurus		*			
Leioheterodon madagascariensis	*			*	
Alluandina bellyi	*				
Lycodryas artifasciatus		*			
Madagascarophis colubrinus	*				

1, Anandrivola; 2, Nosy Mangabe; 3, Perinet; 4, Zahamena; 5, Andranokoditra.

In relation to sampling methods and the effects of seasonality and altitude, an overview of the reptile community in the eastern forest was undertaken at the end of the Malagasy winter and the early stages of spring during the months of August, September and October in 1985 and 1986. Bearing in mind the possible importance of forest reptiles as indicator species, it was proposed that a solution to maintain the biotic diversity of rainforest should be based on a system of multiple use, involving an island archipelago approach, with *Eucalyptus* afforestation and rice cultivation by irrigated terracing.

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NOTES ON HABITAT SELECTION AND COLOURATION IN LIFE OF *PHELSUMA BORBONICA AGALEGAE* CHEKE, 1975 (REPTILLIA: GEKKONIDAE)

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During an excursion from Mauritius to the Seychelles A.S. Cheke had the opportunity to shortly visit Agalega, where he discovered an unknown form of Day Gecko, which he described as a new species, *Phelsuma agalegae* (Cheke 1975). In a subsequent paper (Cheke 1982) he raised *Phelsuma cepediana borbonica* Mertens, 1966, an endemic of Réunion, to specific rank and classified the Agalega population as a subspecies of the latter: *P. borbonica agalegae.*

The senior author had the opportunity to visit Agalega from November 18 to 29, 1989, with the permission of the Ministry of Agriculture, Fisheries and Natural Resources of Mauritius, and supported by the O.I.D.C. Corporation at Port Louis. He was accompanied by Mr. Y. Mungroo as a representative of the Ministry. The results of this herpetological excursion make the following notes possible, where, however, the extensive remarks made by Cheke (1975) will not be repeated in detail.

REMARKS ON HABITAT SELECTION

The main study area was the village Vingt-Cinq on the northern island and its environments (Fig. 1). Vingt-Cinq consists mainly of one street with more or less scattered houses. Half-

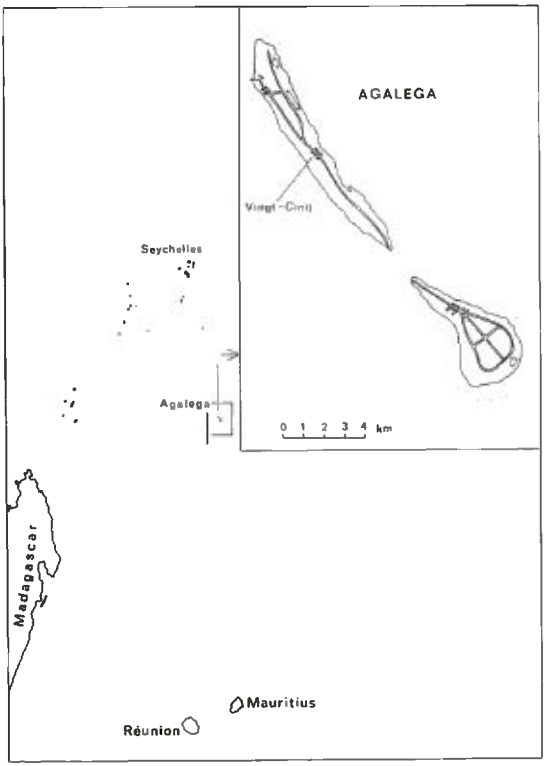

Fig. 1. Position and details of Agalega Islands.

day excursions were made to the northernmost part of the island and also to the southern island. The situation of the *Phelsuma* populations, however, was everywhere similar to that observed around Vingt-Cinq. Preferred microhabitat were generally coconut palms *(Cocos nucifera)* from 2 m height upwards, also dead palms if these were in contact with smaller deciduous trees or living palms. Regardless of this preference, *P.b. agalegae* was also found on other trees, mostly on *Terminalia catappa* (Plate 1) which resembles a mango tree, but

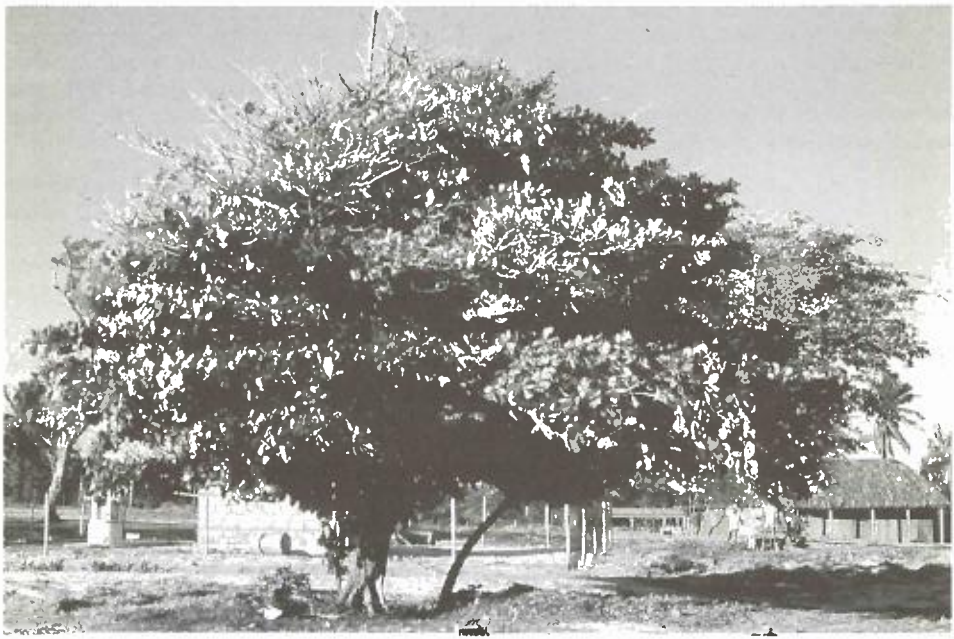

Plate 1. *Terminalia catappa* tree as habitat of *Phelsuma borbonica agalegae.*

has larger leaves. All nine *Terminalia* trees that stood within Vingt-Cinq were populated by 2-6 *Phelsuma,* as was recorded over 5 days. The density per tree, however, may well have

Plate 2. *Casuarina equisetifolia* on Agalega is an unsuitable habitat for *Phelsuma borbonica agalegae* due to leaf shape.

been greater. The habitat selection resembled that of *P. sundbergi* in the Seychelles, which is very common on coconuts, but is not restricted to them (Thorpe & Crawford 1979). The only specialized *Phelsuma* restricted exclusively to *Cocos nucifera* trunks is, according to our present knowledge, the eastern Malagasy *P. serraticauda.*

In contrast to Cheke's (1975: 42) observations we failed to find any *Phelsuma* on *Musa* sp. There was not a single Day Gecko to be seen in 20 thoroughly investigated Banana trunks. Therefore, *Musa* obviously does not play a similarly important role as a *Phelsuma* habitat as compared with Madagascar or the Comoro Islands (see Meier 1982). Another statement by Cheke (op. cit.) viz. that *P.b. agalegae* "occur on all species of tree" should be more precise. At least the Shave-Grass-Tree *(Casurina equisetifolia),* which is widely cultivated in the tropics and common on the Agalega Islands, obviously lacks *Phelsuma;* apparently because the long and scattered Shave-grass-like leaves cannot provide enough shadow (Plate 2).

Only once *P.b. agalegae* was found to inhabit human buildings. 4 specimens were found in a single house, where they obviously lived in the reed of the roof. The vicinity of houses can, however, be well populated, if trees are integrated in such a habitat structure. For instance, in an empty tin-shed (tin-hut), only a few meters distant from the living house, 11 *agalegae* specimens could be encountered on an area of 2-3 square metres. On the *Terminalia* which overgrew this shed only once a single Day Gecko was found.

The daily activity of the *Phelsuma* starts, according to our findings, shortly after 6 a.m. when the first sunrays attract the lizards from their nocturnal hiding places. At 9 a.m. the temperature is already 28°C, the lizards being extremely active and fast. Between 11 a.m. and 4 p.m. no single *Phelsuma* was to be seen on any observation day. Already before sunset (ca. 5.30 p.m.) the night quarters are entered again. Eggs are laid in various hiding places. A site of communal egg-laying (4 females) was discovered under the loose bark of a Coconut Palm at a height of 50 cm; it contained 8 intact eggs (Plate 3).

Plate 3. Communal egg-laying of *P. b. agalegae* under the bark of a coconut palm.

NOTE ON THE COLOURATION IN LIFE

In spite of the very detailed description of pattern and colouration of *P.b. agalegae* by Cheke (1975, 1982) our knowledge remained incomplete, mostly due to the lack of photographic documentation. This will be given here in extenso.

There is no evidence for the assumption that there might be two distinct, discernible forms on the North and South Island respectively. On the contrary, the colour pattern is highly variable and also not sexually correlated in such a degree as suggested by Cheke (1975). Only

Plate 4. Male *P.b. agalegae.*

a bluish tinge seems to be more common in males than in females. The light dorsolateral stripes, however, occur in both sexes, as does the brownish head colouration (Plates 4 and 5).

The variability of *P.b. agalegae* as compared with *P.b. borbonica* Mertens (1966) seems to make the status of the former more arguable than before believed. This is also strengthened by the zoogeographical/chorological pattern of both populations, where a human transportation of the Réunion population to the Agalega Islands surely cannot be ruled out. It is, however, necessary to carefully study more material of both nominal taxa in order to assess whether the differences between them are due to evolutionary divergence or merely short-term genetic drift.

Plate 5. Female *P.b. agalegae.*

ACKNOWLEDGEMENT

The senior author thanks first of all Mr. A.W. Owadally, Conservator of Forestry, Curepipe, who finally made this excursion possible, which had been planned for many years. During the excursion great support was given by Mr. K. Sooknah, General Manager of the O.I.D.C. Corporation, and Mr. Y. Mungroo shared his knowledge and moreover helped with collecting. Their help and that of all inhabitants of Agalega are gratefully acknowledged.

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FROG COLLECTION WITH SPECIAL REFERENCE TO CORNWALL

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BACKGROUND

In Britain, our amphibians and reptiles receive varying degrees of protection under the Wildlife and Countryside Act, 1981. The Common Frog *(Rana temporaria),* Common Toad *(Bufo bufo),* Smooth Newt *(Triturus vulgaris),* Palmate Newt *(T. helveticus)* and Adder *(Vipera berus)* receive protection only under section 9(5) of the Act. In effect, this means they cannot be sold without a licence from the Department of the Environment. The Common Lizard *(Lacerta vivipara),* Slow Worm *(Anguis fragilis)* and Grass Snake *(Natrix natrix)* receive the same protection and in addition it is illegal, without a licence, to kill these species intentionally. The remaining four endangered or vulnerable species receive the full protection of the Act: Natterjack *(Bufo calamita),* Crested Newt *(T. cristatus),* Sand Lizard *(L. agilis)* and Smooth Snake *(Coronella austriaca).*

While there has been no trade during the 1980s in wild-caught specimens of the last four species, the Nature Conservancy Council has not sought to limit internal trading in any arbitrary fashion for the remaining eight widespread species. Dealers are required to submit returns to DOE on a six monthly basis stating numbers of animals sold and their origins; NCC has therefore monitored trade with a view to identifying hot spots for collection. The intention for hot spots was to determine the impact of collection and to monitor trends in collection pressure. If conservation problems were encountered, recommendations could be made during a Quinquennial Review of the Schedules to amend the Act. The extra protection (against intentional killing) afforded to the Common Lizard, Slow Worm and Grass Snake resulted from recommendations in the Quinquennial Review of 1986.

One hot spot that has been identified already is Cornwall, where frog collection is the greatest in Britain. Accordingly an enquiry was organised by NCC in 1985 to investigate the fortunes of Cornish frogs (Cooke, 1985). This revealed that although there had been frog losses in the Cornish countryside in the early 1980s, these had been compensated for by gains in gardens. There was no evidence that collection had resulted in any observable impact on frogs in Cornwall, but there was nevertheless concern in the County about collection in the future. Therefore, five years later, NCC has reappraised the situation. This has been done by examining sales data to determine whether numbers collected from Cornwall have decreased or increased. Also as some information has now been collected on frog density, it is possible to estimate the proportion of frogs collected in order to assess likely impact. Finally, details have been sought from local experts on changes in the frog population in Cornwall.

FROG SALES, 1983-1988

Information on reported frog sales in Britain, 1983-1988, on the place of origin of frogs sold and on the vendors is given in Table 1. It should be noted that details for 1984 given by Cooke (1985) were provisional and have been adjusted. Total reported sales showed a significant decrease during the period under study. This was due to a highly significant decrease in the number of frogs collected from Southern Ireland for sale in Britain. Collection in the United Kingdom increased overall, but the trend was not significant. In Cornwall, collection pressure tended to decrease, but again this was not significant; the sudden decrease in 1988 may be attributed to the death of a well-known local collector and organiser of other collectors (Mrs. S. Turk, personal communication). The number of licensed vendors showed signs of an increase probably because of the increasing effectiveness of the scheme. However, there was a significant decline in the mean number of frogs sold per vendor.

PERCENTAGE OF FROGS COLLECTED

Swan and Oldham (1989) provided information on the density of non-garden frog populations at county level in the late 1980s and also estimated the number of non-garden populations in Britain. Information from complete and thorough surveys of areas was used to determine the density of frog populations. Unfortunately only 3km^2 were surveyed in Cornwall, indicating 1.3 frog ponds/km^2. However, 1-2 frog ponds/km^2 is the typical range for south west England, so the figure for Cornwall is probably a reasonably accurate estimate despite the relatively small area surveyed.

At 1.3 ponds/km^2, there would be roughly 5,000 ponds in Cornwall. Using unpublished information collected by Leicester Polytechnic on number of clumps per pond in Cornwall and assuming 2 adults per clump, the non-garden frog population in Cornwall may number 500,000. Average annual collection was about 12,000 adults (Table 1), representing less than 3% of the estimated non-garden population. While we are not aware of published articles on sustainable yield on this species, such a level of collection is an order of magnitude less than the expected natural annual mortality for adult frogs (eg see Heusser, 1970) and would be most unlikely to cause population declines at county level. This does, however, ignore frogs that were collected but not reported or that died before being sold and so are not represented in the statistics in Table 1. The extent of such losses remains unknown.

The number of non-garden frog ponds in Britain was estimated at 67,000 (Swan and Oldham, 1989); again by using data on number of clumps per pond and assuming 2 adults per clump, an adult population of 8,000,000 is indicated for Britain. The average number of frogs collected in the UK was 20,000 per annum (Table 1). If one assumes that all of these frogs were collected in Britain, the rate of collection was less than 0.3% per annum. There were signs that outside Cornwall, collection may have increased, but on average this amounted to only 0.1% per annum. This level of collection was therefore more than an order of magnitude less than that in Cornwall.

TABLE 1

Total number of frogs sold in Britain, 1983-1988, their place of collection and number of licensed vendors. Correlation coefficients and levels of significance are shown for each data set.

	Total sold in Britain	Place of collection: Southern Ireland	United Kingdom	(Cornwall)	Number of licensed vendors	Mean number sold per vendor
1983	59743	42794	16949	(14183)	11	5431
1984	56564	36032	20532	(15267)	14	4040
1985	45510	30140	15370	(9284)	19	2395
1986	53467	29908	23559	(15683)	25	2139
1987	49278	22398	26880	(11886)	18	2738
1988	39033	20481	18552	(6497)	22	1774
	-0.83	-0.98	0.45	(-0.62)	0.76	-0.86
	$P<0.05$	$P<0.001$	Not sig	(Not sig)	Not sig	$P<0.05$

FROGS IN CORNWALL, 1985-1989

Questionnaires were completed by Mr. Jim Wright, Amphibian and Reptile Recorder for Cornwall and by Mrs. Stella Turk of the Cornish Biological Records Unit. Both reported no appreciable change in Cornish frog populations 1985-9 and neither was aware of collection having had even local effects.

CONCLUSIONS AND SUMMARY

The demand for frogs by laboratories in Britain has fallen considerably over the last few decades (Cooke, 1985). Evidence is presented here of a further significant decrease from 1983 to 1988. Imports from Southern Ireland decreased by about 50%, but numbers collected in the UK remained fairly stable. The total from Cornwall was especially low in 1988, perhaps because of the death of one of the main collectors.

Average collection loss in Cornwall was estimated at less than 3% of the non-garden adults per annum. There was no evidence of recent population changes in Cornwall.

ACKNOWLEDGEMENTS

We thank Dr. R. Oldham, Mrs. S. Turk and Mr. J. Wright for help in the preparation of this paper.

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FIELD NOTES ON SOME REPTILES FROM SOUTHWEST CHIAPAS, MEXICO

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INTRODUCTION

A brief account is given of the crocodiles, lizards and snakes observed during an expedition to the state of Chiapas, southern Mexico. The purpose of the visit was to collect plant specimens, and has been one of a series of trips to Central America by staff of the Department of Botany at the Natural History Museum, London, to survey and document the flora of the region. This particular trip was made at the time of the dry season, between January 18th and March 22nd, 1990. The Natural History expedition team also comprised a tropical botanist working on the Flora Mesoamericana Project, Rachel Hampshire, and from the University of Mexico (UNAM), Alberto Reyes Garcia. For part of the time we were also joined by two ornithologists, Adrian Long and Melanie Heath, based at the Institute of Natural History, Tuxtla Gutierrez.

Our work in the field took us to a wide range of vegetation types and it was possible to observe a number of reptile species in their natural habitat. A total of 17 different kinds were identified. Much of our time was spent in areas of montane, deciduous/semi-evergreen forest at relatively high altitudes (1300 - 2000 metres), and this is reflected in the inventory, though some species associated more with tropical lowland areas were recorded as well. Some animals found dead are also included. The following notes are offered as a contribution to their natural history and ecology, with particular emphasis placed on those found in the Sierra Madre region of southwest Chiapas. The species, subspecific name and author are given first, followed by the common names in English and local Latin America/Spanish (where known), general locality, habitat type and altitude reading.

Plate 1. Juvenile *Porthidium godamnii*

Crocodilians

Crocodylus acutus acutus Cuvier. *American crocodile, Cocodrilo de Rio.* Loc: El Sumidero; Habitat: wide slow-moving river; Alt: 500 m. One large adult (approx. 3.5m) was observed basking on a rock at the side of the river, and another (smaller) in the water amongst floating water hyacinth *(Eichhornia).* We approached them quietly by boat and it was possible to observe them at very close quarters. We were informed that there were approximately 50 crocodiles inhabiting that stretch of the river down to the coast, though this may have included numbers of the Caiman *(Caiman crocodilus chiapasius),* which also occurs there. The rare Moreleti's crocodile *(Crocodylus moreletii)* is said to be found in more northerly parts of Chiapas (Alvarez del Toro, 1982).

Lizards

Anolis crassulus Cope. *Anolis Ornado.* Loc: Sierra Madre; Habitat: Cupressus woodland, deciduous and semi-evergreen montane forest, cloud forest; Alt: 1400 - 2000 m. A considerable number of *Anolis* were seen, most of which complied with the descriptions given for this species. They were mostly observed basking on sunny banks, amongst small shrubs and in low vegetation.

Plate 2. Pacific rock iguana *(Ctenosaura pectinata)*

Barisia moreletii rafaeli (Hartweg & Tihen). *Barisia.* Loc. Sierra Madre (El Triunfo); Habitat: cloud forest, Alt: 1900 m. A number of specimens were seen although they were largely secretive and easly disturbed. One was found under a sheet of old corrugated iron in the camp clearing, and several basking amongst leaves on the forest floor.

Basiliscus vittatus Wiegmann. *Brown basilisk. Turipache, Toloque, Pasarrios.* Loc. Montozintla; Habitat: Dry hillside above river; Alt: 1000m. A large male (approx 20cm s-v) was disturbed basking on a rocky ledge above a shallow, fast-flowing river. The surrounding vegetation consisted of dry forest trees, mostly *Bursera sp.* and various Leguminosae, with *Agave* and Candelabra cactus.

Cnemidophorus deppii Wiegmann. *Lagartija Verdiazul.* Loc: widespred in central Chiapas; Habitat: Dry rocky hillsides and scrub. A common, agile ground dwelling lizard often seen active in the hottest part of the day with temperatures ranging into the high 30's celsius.

Ctenosaura pectinata (Wiegmann). *Pacific rock iguana, Iguana de Roca.* Loc. widespread inland and on the coast; Habitat: cliffs, rock faces, dry hillsides, escarpments and rocky outcrops,

often in close proximity to human habitation; Alt: common below 1000m. This was an abundant lizard and was seen in a variety of different habitats, both natural and artifical. A group of about half a dozen comprising a dominant male, an adult female and several juveniles were found to be in residence amongst a pile of building rubble in a turkey pen next to our accommodation, and it was possible to observe their daily movements and social behaviour literally through the window of our room. Another colony of about 10 idividuals of varying ages was found living on a large rock outcrop in the middle of a popular sandy beach.

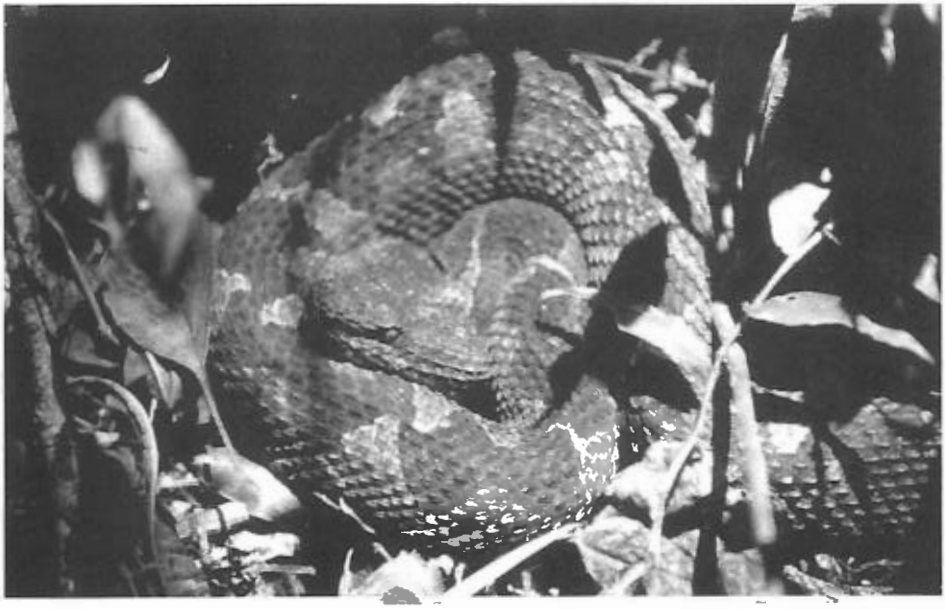

Plate 3. Jumping viper *(Porthidium nummifer occiduus)*

Iguana igunana rhinolopha Wiegmann. *Green iguana, Iguana de Ribera, Guele.* Habitat: Dry, rocky cactus scrub. A large (1m +) brightly coloured adult with orange foreparts (suspected male) ran across the road in front of our vehicle, and a juvenile was seen at the side of the road. They were presumed to be feeding on the flowers of various cacti in bloom.

Sceloporus sp. Fence lizard, Spiny lizard, Escamoso. A large number of Sceloporids were seen, and in drier areas especially they seemed to be the most abundant form of lizard. There is considerable variation amongst this group in Central America, and it was only possible to identify two forms with any certainity. In upland areas of the Sierra Madre (above approx. alt. 1500m) we found the species *Sceloporus melanorhinus stuarti* Smith, where it occurred in *Cupressus* woodland and clearings in cloud forest (1900m). It was mostly seen basking on rock faces or the trunks of trees. At lower altitudes in areas of rocky scrub the species *S. variabilis variabilis* Wiegmann was common.

Sphaerodactylus continentalis Werner. *Gequillo Cabeciamarillo.* Loc: suburbs of Tuxtla Gutierrez. A large number were seen on the exterior walls of hotels and houses. The Mediterranean species *Hemidactylus turcicus* is also a well established introduction in this area.

Snakes

Conophis vittatus Cope. *Listada.* Habitat: Dry rocky hillside. One adult approximately 0.5 m in length was found actively hunting among rocks and dry scrub in the early afternoon.

Masticophis mentovarius mentovarius (Dumeril, Bibron & Dumeril). *Coachwhip, Lagartijera.* Habitat: open agricultural land and dry lowland scrub. Two large (1.5 m) freshly killed specimens were found dead on a main road.

Oxybelis fulgidus (Daudin). *Green vine snake, Bejuquillo Verde.* Loc: Tuxtla Gutierrez. Habitat: One was seen heading away through a bamboo thicket.

Pituophis lineaticollis gibsoni Stuart. *Cincuate.* Loc: Sierra Madre (El Triunfo); Habitat: montane cloud forest; Alt: 1900 m. A sub-adult (approx. 0.5 m) was found during the late afternoon, coiled in a rodent nest under a sheet of old corrugated iron, at the edge of the camp clearing by the rubbish dump. The surrounding vegetation consisted mostly of tall grasses, small shrubs and sapling trees. The temperature at this altitude frequently dropped to 13 degrees celsius and frosts were not uncommon. Moreover the cloud at times remained low, shrouding the vegetation in cool mist for much of the day.

Spilotes pullatus mexicanus (Laurenti). *Chicken snake, Rat snake, Thunder and Lightening snake, Volandora.* Habitat: semi-deciduous dry forest; Alt: approx. 600 m. Two freshly killed adults (one estimated at measuring well in excess of 2 m) were found dead on the road at different locations, both with what appeared to be machete wounds to the neck. The snakes were in close proximity to settlement houses and outbuildings, around which numerous hens and turkeys and their broods wandered freely. No doubt this snake is a major predator of domestic fowl in these situations and persecuted indiscriminantly, which would account for the apparent cause of death.

Micrurus browni browni Schmidt and Smith. *Brown's coral snake, Coral de Canutos.* Loc. Sierra Madre (Pacific slope); Habitat: deciduous montane rainforest, Alt: approx. 1350 m. A large adult (approx. 50cm) was found at the side of a mule trail in an area of loose rocks with grasses and sprawling aroids *(Philodendron sp.),* and was observed for several minutes as it foraged for food. The time of day was early afternoon and the weather conditions were overcast and humid.

Porthidium (Bothrops) godmani (Gunther). *Godman's Pit Viper, Nauyaca del Frio.* Loc: Sierra Madre; Habitat: semi-evergreen and deciduous montane rainforest, *Cupressus* woodland and cloud forest; Alt: 1400- 2000 m. A total of eleven were seen, all at relatively high altitudes. They ranged from small, presumably new-born/juvenile specimens, to adults of approximately 40cm, and occurred in a diversity of habitats, including cloud forest, cypress forest, stands of *Heliconia, Ficus* dominated woodland, and rocky banks with grasses and small shrubs. Most were found basking at the side of mule trails or in sunny clearings amongst leaves on the forest floor, and at times presented something of a hazard during our work. Their ground colouration varied considerably, from dark red brown to pale grey. Some of those seen were more boldly marked than others; on one occasion such a snake was found basking entwined with a paler, more drably coloured specimen, which we construed to be indicative of sexual dimorphism, but it was not possible to identify their individual sex. When provoked one juvenile struck fiercely and vibrated its tail, but generally these snakes were of a placid disposition.

Plate 4. American crocodile *(Crocodylus acutus acutus)*

Porthidium (Bothrops) nummifer occiduus (Hoge). *Jumping viper, Mano de Piedra, Nauyaca Saltadora.* Loc: Sierra Madre (Pacific slope); Habitat: deciduous montane rainforest; Alt: approx 1300 m. An adult specimen approx. 0.50 m in length, was found basking amongst dry leaves on a bank above the trail. The snake was not disturbed and despite our close proximity remained coiled in front of us for some considerable time, occasionally inflating its body and flattening its head. The occurrence of this snake in southwest Chiapas was first suspected by Hoge (1965); it is known mostly from the Pacific slopes (low – intermediate altitudes) of the Sierra Madre in western Guatemala, and also ranges into El Salvador. The subspecies *B. n. mexicanus* in Mexico is found at lower altitudes on the eastern (Caribbean) side of the mountains, and the nominate form occurs in Oaxaca north to San Luis Potosi.

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THE CHINESE CROCODILE LIZARD, *SHINISAURUS CROCODILURUS*, NOTES ON CAPTIVE BIRTHS AND HUSBANDRY

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INTRODUCTION

The Crocodile Lizard was not discovered until 1928, when it was found to inhabit a small isolated area of the Chinese province of Eastern Kwangsi in south western China. It was first described in 1930 by the German herpetologist Ernst Ahl. From the little information available it would appear to inhabit the edges of rivers and streams with rocky bottoms, in damp montane forest. Rainfall in the area where it is found averages 2000 mm annually, and winter frost is not uncommon. *Shinisaurus* is diurnal and basks on branches overhanging water, where it can dive in if threatened. It can remain submerged for a considerable time, emerging in thick marginal vegetation when "the coast is clear".

During May 1988 two females and one male living specimens were obtained by the author. Males have proportionately larger heads and predominantly orange colouration, especially ventrally.

The females obtained weighed 100 grams each, the male 50 grams – obviously underweight as it was about the same size as the females. In August 1988, two more animals were obtained: half grown, probably males, with a weight of 20 grams.

All the animals were treated with "Nilvern" worming solution 0.2 ml 100g body weight, orally. For use as an injection the dose is 0.1 ml per 100g. Injection can be less stressful than forcing open the mouth, but in this case *Shinisaurus* were only too willing to open their mouths, in hope of biting a finger.

One adult female showed signs of a suspected *Pseudomonas* infection in its mouth, and was swabbed with a 5% Hydrogen peroxide solution. This proved effective in curing the infection.

ACCOMMODATION

Housing consisted of a clear plastic container 600 mm (23¾") x 420 mm (16½") x 305 mm (12") high. ("Critter pen", manufactured by Rolf Hagen, Canada).

A Philips TL 20W/09N "Blacklight" was fixed across the rear of the unit 9" from the base and 2" from the rear wall. A 60w incandescent spot light was also provided, in an angled fitting 8" from the base near the front of the unit.

The entire base of the cage was covered with water to a depth of 23 mm. A rock projecting from the water below the spot light provided a "hot spot". A network of branches for climbing and basking above the water were inserted into the remainder of the cage. A drain was fitted in the base to enable fresh water to be flushed through daily, with ease: an important feature as the water is fouled regularly.

Bottom heat to the cage was supplied by a "Jemp" heating cable, at 23w per 10ft. This also served an adjoining vivarium. Temperatures were 38°C at the "hot spot", ambient air temperature 25-26°C, and water 26°C. Apart from the hot basking area this is a similar regime to that used by San Diego Zoo (Schafer, 1986, 1987). At San Diego ambient cage temperatures were 27°C day, 21°C night, with a "hot spot" at 32°C. Day length was 12 hours. This compares to temperatures in the wild of an average 18.6°C, maximum 35°C, and minimum -2.1°C.

FEEDING

Food items offered and taken included "giant mealworms" (*Zophobas morio*), crickets, locusts, earthworms, and to a lesser extent fish, frogs, tadpoles and new-born mice. Although not offered by the author, freshwater shrimps and various aquatic insect larvae are reputed to

be popular. Slugs and snails were offered but refused.

In an environment such as described above many food items can drown before being eaten, so some items are best fed from tweezers if time, and the lizards permit.

The adults have generally been more erratic in their feeding habits than the younger specimens.

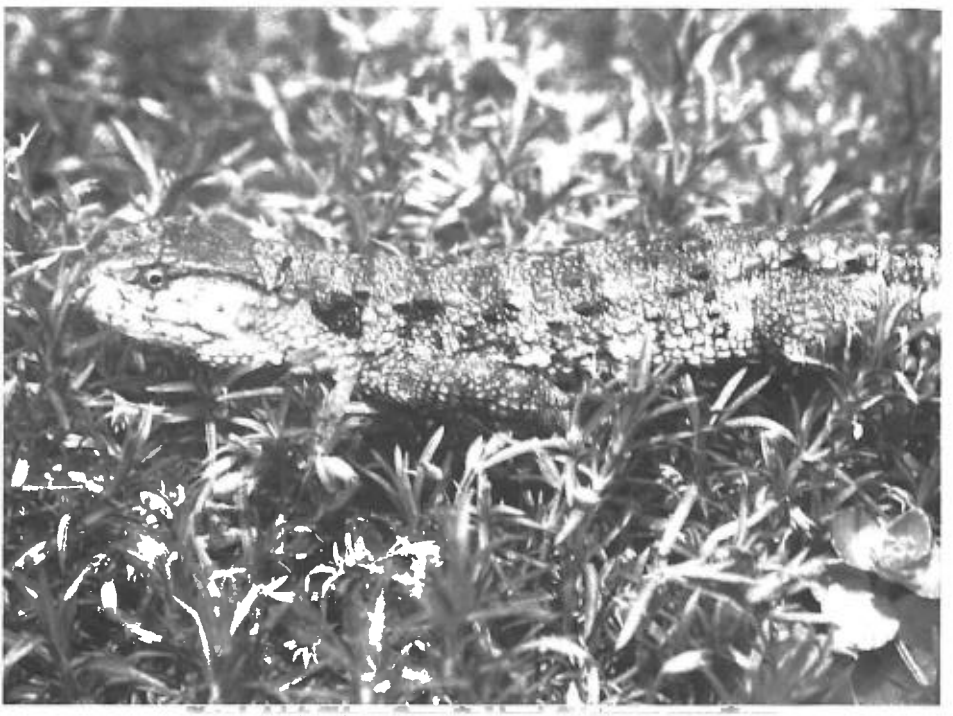

Plate 1. Adult Chinese Crocodile Lizard, *Shinisaurus crocodilurus*.

REPRODUCTION

Almost immediately after acquisition some interaction was observed between the sub-adults, with chasing and some head bobbing. One youngster incurred a wound on the neck, but no further aggression occurred and the wound healed quickly.

On 11 January, 1989, two live young were born, with some underdeveloped eggs. The young were removed to rear separately. On 5 March, 1989 a second female produced two live young, sometime before 10.30 am; unfortunately these were not removed immediately and an hour later had been eaten. During the course of the day four more dead young and one live were born. This time, the lesson learnt, the live animal was rescued. The last birth on that day was around 7.15 pm but the next day one more dead youngster was passed, making a total of 8.

Some of those born dead were enclosed tightly in their birth membranes, others slightly free but with the membrane constricting the neck. It seemed they were born dead but it is possible one or two may have drowned trying to release themselves from their birth sacs. There were no signs of deformities.

The females were suspected to be gravid when obtained, though this is not certain. The females measured 366 mm in total length, of which 200 mm was tail. The head width was 24 mm. The new-born young were 53-54 mm s.v. length, tails 72-73 mm, head width 9 mm. The young born in January had after two months reached 57 mm s.v., 59-65 mm tail.

In the collection of San Diego Zoo, mating was observed on 7 March 1986, and young were born on 22 November 1986 and 19 December 1986. The average litter size was nine.

Plate 2. Juvenile *Shinisaurus crocodilurus.*

Previous reports of clutch size are 2-7 (Lan-tian and Han-han, 1982; Murphy, 1986). Gravid females have been seen in the wild between July and September, but not giving birth until April or May of the following year, after a period of hibernation. The length of development would agree with the females in this collection. These were also exposed to fairly cool conditions during December, January and February.

These unusual lizards have proved reasonably hardy in captivity, provided the environment does not dry out, and access to water is available at all times. They take a while to settle down to an alien diet, but once this is achieved they feed well.

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A REPORT ON HERPETOLOGICAL OBSERVATIONS IN AFGHANISTAN

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A herpetological expedition to Afghanistan in the early part of 1968 resulted in a collection of more than 1,000 specimens belonging to 58 taxa: 4 amphibians, 1 tortoise, 41 lizards and 12 snakes. In addition two species were collected and subsequently released after identification: *Varanus bengalensis* and *Varanus griseus*. The bulk of the collection is accessioned at the California Academy of Sciences for safe-keeping and study and a smaller part is on deposit at the Senckenberg Museum, Frankfurt-am-Main. Of the 57 species and 1 subspecies many were either first time records for the country or positive documentation of finds made at the end of the last century by the various Boundary Commissions working on frontier delimitations along the Afghan/Baluch borders. Many of these species were not known with any certainty from Afghanistan itself. As a result of more detailed studies made on the gecko genera by the staff at the CAS and from various institutions in the USSR three new taxa have been described in which material collected both in 1968 and in 1964 played a significant part. These are: *Tropicolotes levitoni* Golubev and Scherbak 1979, *Tenuidactylus longipes voraginosus* (Leviton & Anderson 1984) and *Tenuidactylus turcmenicus* (Scherbak 1978). The former existence of *Tenuidactylus fedtschenkoi* in Afghanistan is disallowed. Most of the work was carried out in the southern desert (Registan region) and the steppe country to the north of the Hindu Kush where weather conditions were at their optimum, resulting in the entire spectrum of *Phrynocephalus* and *Eremias* being collected. Two visits to the Jalalabad region resulted in two new records: *Ophisops jerdoni* and *Xenochrophis piscator*. In the same area were found further specimens of the rare and endemic *Eremias aria* as well as the little known and territorially restricted *Eremias regeli*. It needs to be stressed that the systematics of many Afghan reptiles is unresolved, notably the genera *Agama*, *Eremias* and *Coluber* and it is understood that work is currently on hand on these. Because of this I do not deal with taxonomic problems in this report since these can only be dealt with by museum researchers who have comparative material available.

INTRODUCTION

In this report is presented an account of a herpetological expedition to Afghanistan made between the 23rd February and the 12th May 1968. It is unfortunate that publication of the results should have been so long delayed but the reasons are many and varied. Despite the fact that 20 years have elapsed this collection is probably one of the last to have been made before increasing political problems caused the borders of Afghanistan being closed to the ordinary traveller in 1978. Despite the Soviet withdrawal Afghanistan remains in a state of political and national crisis and it seems unlikely that the country will once again become accessible for some time into the future. Not only is the 1968 expedition certainly the most recent with herpetology as its primary objective, it is the most significant with regard to the number of species contained and the total quantity of specimens assembled at any one time.

Certain aspects of the expedition were more successful than others. It was the intention to visit the country as early in the year as possible to work on the herpetofauna of the southern and northern lowlands. This went more or less according to plan except that a proposed visit to the swamps of the Seistan Basin south of Juwain had to be abandoned because the route was unnegotiable even by Land Rover due to badly drifted sand and boggy conditions. It was also a disappointment not to be able to travel to the remote tongue of territory that extends far into the Pamirs in the north east of the country. Heavy rains and floods resulted in the unmacadamised roads being rendered impassable. The expiry of visas and financial considerations did not permit a later attempt. We were also denied travel permission to the province of Nuristan north of Jalalabad, one of the few forested and heavily vegetated parts of the country. This area was visited in 1965 by Mr. and Mrs. William Street who found a new species of *Agama* at Kamdesh (Anderson & Leviton 1965). Doubtless this region holds much of herpetological interest.

Because of the large number of species to be described and the desirability to give some background information on the Afghan herpetofauna as well as physiographical accounts, a detailed itinerary has not been attempted. Several localities were visited on more than one occasion and main collecting locations with dates visited are given in tabular form. In the Map all localities referred to in the text are shown, both those actually visited and others which are mentioned in references. Place names on different maps are not always in agreement. I have indicated these where relevant.

HISTORICAL PERSPECTIVES

Prior to 1950 references to the Afghan herpetofauna were to be found in a number of standard publications: Boulenger (1921) 'Monograph of the Lacertidae', Smith (1945) 'Fauna of British India' and Terentev & Chernov (1949) 'Key to Amphibians and Reptiles'. The Boulenger and Smith publications contain the results of the findings of the Persian Boundary Commission of 1870-1872 (Blandford 1876), the Afghan Delimitation Commission (Boulenger 1889) and the Afghan-Baluch Boundary Commission of 1896 (Alcock & Finn 1897). The majority of listings refer to animals found along the southern border of Afghanistan and the extent of penetration of these into the country was mostly unknown.

An awakening of interest in the reptile fauna of Afghanistan began in 1950 when the California Academy of Sciences (CAS) San Francisco received a small collection of reptiles from Chah-i-Angir in the Dasht-i-Margo desert collected by John Gasparetti. This was reported on by Leviton in 1959. Two subsequent collections by Gasparetti followed in 1961 made in the spring and autumn further east in Afghanistan, from north of Kandahar and south of Kabul. These were discussed also by Leviton & Anderson (1961, 1963). Encouraged by positive contacts with the CAS via the British Museum (Natural History) I undertook an expedition in July and August 1964, the first to Afghanistan with herpetology as its main aim. This resulted in an assembly of 236 specimens representing 26 species and was the largest collection to date containing two new lizard species and four first time records (Clark, Clark, Anderson & Leviton 1969). In the following year, 1965, the Street expedition visited the country to survey the mammalian fauna and collected an even more significant assignment of 247 specimens comprising 43 species. Amongst this were two new *Agama* species and seven new records. Despite the large number of species found only four were lacertids. This collection, reported on in 1969 by Anderson & Leviton, is of special value since a lot of work was done north of the Hindu Kush, a region hitherto virtually unknown herpetologically. In 1968 I revisited Afghanistan and made a sizeable collection of amphibians and reptiles which is here reported on. A paper published in 1969 by Dr. B. Kral lists three more valuable first records: the first documented find of *Psammophis leithi,* formerly suspected but not proven, *Oligodon arnensis* and *Bungarus caeruleus.* The total number of taxa now documented from Afghanistan stands at over 100. Several of these are known from very little material and from few localities and it is clear that our present knowledge of the reptile life of the country is far from complete. The central mountain massif across from Herat to Kabul is virtually unexplored and the north eastern provinces present a great challenge to the herpetologist should Afghanistan once again become accessible in the future.

PHYSIOGRAPHY

In reporting on the expedition made in 1964 (Clark et al. 1969) a detailed physiographical account was given of the areas visited. To some extent the 1968 trip was a re-run of this since residence and travel permits could only be obtained in Kabul, which meant journeying along the only practicable route to the capital, a distance of rather over 1,000 kilometres. I am therefore not attempting a description of this. The Jalalabad and Nimla areas were also revisited. I will gladly provide on request information on these regions to interested readers. An account of the Lashkargah/Darweshan localities is here given as well as the northern steppe and desert zones since these were not travelled to in 1964.

South of a line roughly from Farah to Kandahar the landscape is a virtually featureless desert, sloping from about 1000 metres down to 500 metres in the Seistan Basin. Along the northern edge the bare and rough alluvial semi-desert plains are studded with isolated rocky peaks through a process of erosion that has levelled the land. Here and there can be found spiny

bushes and sparse patches of vegetation as well as shallow drainage channels formed during occasional flash storms. In the spring groups of nomadic tribesmen graze their flocks of goats, camels and fat-tailed sheep on the scanty pastures. The gathering of spiny bushes for fuel helps to destroy what little growth there is. Along the line of the Helmand river, from the confluence with the Argandab at Lashkargah, is a road that passes through an area undergoing development: an irrigation system that attempts to reclaim the salty desert soil for cultivation. The Helmand swings westward south of Darweshan to terminate in the swamps south of Juwain. To the north and west of the Argandab/Helmand systems lies the bare stony desert, to the south sand desert forming the area known as Registan. The rivers play a major part in limiting and retaining the sand which extends south to the Afghan/Baluch border and eastwards to just south of Kandahar. At Darweshan, a small village that provided essential supplies, the river can be crossed and from here it was possible to drive southwards along a track that skirts the margins of the sand-desert and from this considerable distances over the firm sand and gravel-strewn plain to different centres of dune activity. The sand desert is not without relief and different ecological zones could be recognised: the broad, firm sand-plains overlain with fine gravel were interrupted by encroaching tongues of active dune hills. These in turn, as they rose higher in the distance, were broken by basins of mud and salt-crust or by smaller pockets and hollows of firm-based sand with an occasional naked clay hillock. Vegetation was very sporadic but present: spiny bushes in the indefinite drainage courses and on the active dunes tough and stunted trees and shrubs. In March and early April the weather was unsettled with considerable temperature fluctuations with maxima up to 32°C and minima around 21°C. Some days were clear but others more cloudy with strong winds that lifted the sand and obscured all visibility. Along the line of the Helmand there were occasional thunderstorms, short but violent with just a sprinkling of rain on the desert sands. Heavy rain and hail showers occurred along the route from Lashkargah to Kandahar in March producing a brief flowering of annual plants and prominent patches of greenery on the bare earthy soil. These had all but disappeared a fortnight later. Climatological data is scarcely available but that for the Seistan basin region indicates summer mean temperatures of 31°C for the hottest month (July) with extremes of 46.2°C. Winter means (December/January) are around 6°C with extremes of -11°C. Annual precipitation is 47.5 mm, 68% falling in winter. In 1964 45°C was recorded at Farah in July implying that the thermometer can on occasion exceed 50°C. In 1968 in the Herat region freezing temperatures and snow showers with some snow cover was experienced at the end of March. There is therefore a marked climatic contrast between the southern deserts at this season and the higher lying regions further north. The rise in temperature in spring is very rapid.

The northern steppe region north of the Hindu Kush lies under 500 metres altitude and there is little variation in altitude along the stretch of country from approximately Khanabad in the east to the Afghan/Iranian/Soviet boundary in the west. East of Khanabad the altitude increases dramatically towards Faizabad and the approach to the Pamirs. Descending from the Salang Pass at over 3500 metres the terrain falls away steeply. The northern foothills are well-watered with a lot of cultivation but away from here arid steppe, mostly clay and loess, extends far into Central Asia. Sand desert is encountered west of Mazar-i-Sharif mostly in the form of erratic though quite extensive wind-blown drifts. There is not the same sharp division of sand desert/steppe desert as in the south due to the lack of a river system to act as a retaining agent. However in the extreme north western corner the dune hills are larger and more continuous. Another feature in the north is the much greater amount of vegetation on the sand which helps to stabilise the dunes, and also provides essential shelter and protection to many reptile species. The weather in the northern steppe was more settled than in the south though windy at times causing some movement of sand dunes and spits. These migrating dunes resulted in some sand-dependant species altering their positions appreciably in the course of a few days. Temperatures by late April were rising to maxima values of close on 35°C. The fall of temperature after sunset was quite sharp. Nevertheless a lot of nocturnal activity was noted in the first two or three hours after dusk. No rainfall occurred in this region though a marked change in weather was experienced later in April east of Taliqan – see under Introduction.

SPECIES ACCOUNT

This is presented alphabetically. The numbers in brackets refer to specimens accessioned at the CAS.

Class AMPHIBIA
Order SALIENTIA
Family BUFONIDAE
Genus BUFO

Bufo stomaticus Lütken (4) 20/30 Km. SW Jalalabad 940/730 m. Originally this small series, together with one example from Khost taken in 1964, as well as specimens caught by the Streets from Jalalabad in 1965, were identified as *B. andersoni* Boulenger which is also known from the Seistan Basin. Eiselt & Schmidtler (1973) regard *B. andersoni* and *B. stomaticus* as synonymous. Mating was observed on 21st May.

Bufo viridis Laurenti (59) 40 Km.S Herat 1500m., Juwain 575m., 35 Km.NW Lashkargah 820m., 12 Km.S Lashkargah 820m., Kabul 1820m., 70 Km.S Kabul 2100m., 15 Km. N Ghazni 2500m., 24 Km.NE Taliqan 1000m.
At the site south of Herat swarms of newly metamorphosed juveniles were seen in and around a small stream. At Juwain this toad was observed early in the day both in and close to holes in earth banks in a poorly cultivated area. On a distributional basis populations from the west of the country belong to the subspecies *oblongus*, those from the Hindu Kush and N.E. Afghanistan to *pseudoraddei* (Eiselt and Schmidtler 1973).

Family RANIDAE
Genus Rana

Three species of *Rana* are documented. *R. sternosignata* was found by us in 1964 in Khost province. It is also known from Kabul (Leviton & Anderson 1963) as well as Kandahar and Paghmann (Anderson & Leviton 1969).

Rana cyanophlyctis Schneider (12) 15-45 Km.W Jalalabad., Lashkargah 730 m.
The Helmand river provides a corridor for the penetration of this frog deep into the southern deserts. The series from Lashkargah were taken from irrigation channels and in steep-sided pools. It is also known from the Seistan Basin close to the Afghan/Iranian border (Leviton & Anderson 1984). The other site west of Jalalabad is near where we found this species in 1964 (Clark et al. 1969). *R.cyanophlyctis* is a thoroughly aquatic frog and was always found in water or on banks and rocks nearby from which it would dive when alarmed.

Rana ridibunda ridibunda Pallas (30) Khenjan 1110m., 24 Km.E Khanabad 610m., 24 Km.E Taliqan 610m., 65 Km.NE Taliqan 1110m.
This frog was extremely abundant at the Khenjan site from which most of the specimens were caught. This is a well-watered region and *R. ridibunda* occurred in streams, ponds and irrigation ditches. The Street expedition collected it in the Herat area and Paghmann as well as in the extreme NE corner east of Faizabad. There are no records for southern Afghanistan where it seems to be replaced by *R. cyanophlyctis.*

Class REPTILIA
Order Chelonia
Family Testudinidae
Genus TESTUDO

Testudo horsfieldi Gray (2) 25 Km.SW Aqcha 365m., 70 Km.W Mazar-i-Sharif 350m.
This is the only tortoise in central Asia. It was found plentifully throughout the northern steppe occupying both sandy tracts, where its twin tracks could be seen scarring the sand surface, as well as firmer ground, clay and loess. Also known from Paghmann (Anderson & Leviton 1969) south of Kabul by Gasparetti (Leviton & Anderson 1961) and Herat (Král 1969). No specimens were found by us south of the Hindu Kush.

Order SQUAMATA
Suborder SAURIA
Family AGAMIDAE

Five genera are found in Afghanistan. *Uromastyx*, with two species, *U. asmussi* and *U.hardwickii*, is poorly known. Neither of these was collected.

Genus AGAMA

Agama caucasica (Eihwald) (17) Pul-i-Khumri 730 m., 10 Km.W Tashkurgan 560m., 24 Km.E Taliqan 1000 m., 80 Km.S Kabul 2333 m., 15 Km. N Ghazni 2500 m., 40 Km. S Herat 1425 m.
The identification of specimens collected north of the Hindu Kush is open to some doubt (see below). *A. caucasica* was found sporadically and unpredictably over a wide area and seems to keep close to the peripheries of the central massif reaching a height of at least 3100m (Clark et al. 1969). This is a typical rock dwelling agamid living in colonies of several animals, sheltering in narrow crevices and amongst tumbled boulders. We found it active south of Herat in late February under chilly conditions, air temperature 6.5°C (ground 17.5°C), basking on sunny rock faces and ledges protected from the penetrating wind.

Agama lehmanni (Nikolsky) (2) 50 Km.NE Taliqan 1636 m.
The range of this species is inadequately known in Afghanistan. The Street expedition collected but a single example from Mazar-i-Sharif, which was the first record for the country. Our specimens come from considerably further east at a much higher altitude. At this site it was observed sparsely, living amongst rocks and boulders in a river valley, air temperature 17.5°C.

Agama nupta De Filippi (10) 45/30 Km. SW Jalalabad 820/1045m., 55 Km. W Girishk 1045m., 20 Km. E Farah., 833m., 65/40 Km. NW Delaram 1410/970m.
This large and striking lizard can be recognised in the field by the silhouette it presents in its rocky habitat, very often being seen against the skyline from a considerable distance. It was always observed on high vantage points and was very difficult to approach. Its long tail, black on the latter half, is a prominent feature. This characteristic is also shared by *A.agrorensis* and it is possible in the Jalalabad region that this species was sight misidentified as *A.nupta* on occasion. Although found in some numbers at all the above localities *A.nupta* was noted to be less colonial and more solitary than *A.caucasica*. *A.nupta* reaches a total length of at least 40 cms., the tail being one-and-a-half to twice the body length. Occurring mostly below 1200 metres it is known to reach at least 2000 metres in the Kabul area (Clark et al. 1969).

It is worth noting that in the 1968 collection only three out of the nine Agama species known to inhabit Afghanistan were found. Amongst these can be mentioned *A. agrorensis* taken by the Streets near Jalalabad and *A.badakshana*, also collected by the Streets, near Mazar-i-Sharif. Since the latter resembles *A.caucasica* in many features it is desirable that our *A.caucasica* from the northern foothills should be re-examined.

Genus CALOTES

Calotes versicolor (Daudin) (5) 30/45 Km. SW Jalalabad 820/1060m.
One of the several eastern species that just penetrate Afghanistan in the valley of the Kabul River. At the above stations it was collected on stone walls near streams. Its habitat is therefore less restricted than was observed in 1964 near Sarobi higher up the Kabul River. Here it was common on earth banks, bamboo thickets and amongst vegetation on the margins of rice fields, diving into the irrigation channels when pursued. *C.versicolor* seems to need a dampish environment and the humid conditions of the region fulfills this requirement.

Genus PHRYNOCEPHALUS

Nine species are recognised from Afghanistan, all of which were found in 1968. Since toad-headed agamids occupy mainly low elevations, though up to 2200 metres in the case of *P.scutellatus*, there is a marked north/south divide with taxa north of the central mountains being quite distinct from those occurring in the south. Furthermore all species have marked habitat preferences: "deep" sand-dune species; "firm" sand and dune-margin dwellers and non-sand inhabitants. These precise distinctions means that in a small area several forms may be found in close proximity but kept apart by reason of their exacting requirements. Another interesting observation is the case of parallel evolution between northern and southern species which closely resemble one another not only in appearance but in the ecological niches that they occupy.

Phrynocephalus clarkorum Anderson & Leviton (28) 56 Km. SSE Darweshan 790m., 40 Km. SE Kandahar 1100m.

This species was originally described by Anderson & Leviton (1967) and defined as distinct from *P.ornatus* with which it had been hitherto included. Its range is restricted to the southern deserts of Afghanistan and Baluchistan, living on firm sand pockets and dune margins running to and fro across the sand and taking refuge at the base of spiny bushes and sparse clumps of vegetation. Although sympatric with *P.ornatus* at the Darweshan site it was never found at the isolated localities mentioned under *P.ornatus*, see below. This tendency to keep close to the main sand desert and not to follow migrating sand movement across the alluvial desert plains is probably a contributing factor in its genetic isolation from *P.ornatus.*

Phrynocephalus euptilopus Alcock & Finn (3) 56 Km.SSE Darweshan 790m.
A "rediscovered" species. This small series is the first to be found since the six syntypes were collected along the Afghan/Baluch border at the end of the last century. A relative giant amongst the southern phrynocephalids, reaching a total length of about 15cms., *P. euptilopus* is an exclusive inhabitant of the deep dune areas, sinking itself rapidly into the loose sand when alarmed, leaving the body outline clear on the sand surface. Apparently rare even at Darweshan and it was found at the sand desert site SE of Kandahar. Very little is known about its precise distribution but it can be assumed to have its northernmost limit at Darweshan.

Phrynocephalus lutteoguttatus Boulenger (60) 56 Km.SSE Darweshan 790m: 50 Km.SE Kandahar 1100m.
Another species apparently rare in collections although at the localities visited it was extremely abundant. The types, described by Boulenger in 1887, come from "between Nushki and Helmand" along the Baluchistan frontier. In all probability it has the same range as *P.euptilopus*, the parameters being defined by the sand desert margins which are contained by the Helmand river system. *P.lutteoguttatus* is an exclusive sand dweller, sinking itself into loose sand by rapid lateral body movements. This lizard, only reaching 8cms. in total length, is sandy brown above with numerous cream and black spots. The under side of the tail has one or two asymmetrical black marks which are conspicuous when the lizard adopts a defensive posture by raising the tail tip and coiling it up into a tight spiral.

Phrynocephalus maculatus Anderson (2) 56 Km.SSE Darweshan.
Little is known of the range of this species within Afghanistan although it extends into central Iran and the coasts of Arabia and Iraq. This would seem to be a first record from Afghanistan itself although the boundary commissions took samples from Nushki, south of the Afghan/ Baluch border. Apparently uncommon or at least difficult to detect since it lives on the gravel strewn semi-desert plain with which it intimately blends. This lizard twirled its tail into a tight spiral when handled. It was found fully exposed to the midday heat (ground temperatures over 50°C.

Phrynocephalus mystaceus galli Krassowsky (10) 20 Km.E Mazar-i-Sharif 410m., 30 Km.NW Sheberghan 378m., 50 Km.S Andkhoy 410m.
The giant of the genus reaching at least 25cms. in total length. It was locally plentiful in sandy habitats in the northern desert region and its habits are similar to sand-burying species in southern Afghanistan. According to Terentev & Chernov (1949) it digs long burrows into the sand dunes. This lizard is very bold and aggressive and will hold its ground when threatened, opening the mouth and extending the cutaneous folds at the side of the jaws, which become a vivid red. When handled it bites ferociously and painfully, clamping the jaws tight in "bulldog" manner.

Phrynocephalus ornatus Boulenger (63) 18 Km.E Girishk 864m., 30/75 Km.S Lashkargah 788m., 32 Km.S Darweshan 758m., 50 Km.S Darweshan 680mm., 45 Km.N Juwain 637m., 35 Km.S Farah 728m.
Very abundant at all the sites listed. We could find no marked ecological differences between this and the related *P.clarkorum* in as much as both species live on firm sandy terrain. However *P.ornatus* is probably less sand dependant and the populations at Girishk, Lashkargan, Juwain and Farah were found on local sandy tracts of no great extent isolated from the main sand desert by the intervening alluvial plain. These sand areas have been transported by wind action and *P.ornatus* appears to have followed their migration, thus enabling it to extend its range considerably outside the sand desert proper. In common with *P.clarkorum* the under side of the tail has up to four black bands, not black-tipped as in *P.lutteoguttatus.* These are

displayed when the lizard raises the tail over its back and lashes it to and fro. Again the warning gesture is different from *P.lutteoguttatus* in which the tail tip is coiled. A slim, elongate phrynocephalid seldom exceeding 9cms. in total length.

Phrynocephalus raddei boettgeri Bedriaga (28) 10 Km.W Tashkurgan 455m., 20 Km.E Mazar-i-Sharif 410m., 30 Km.NW Sheberghan 378m., 10 Km.SE Andkhoy 394m.
This species is a common inhabitant of the non-sandy steppe region of northern Afghanistan, living on firm clay and loess intermixed with pebbles and intermittent vegetation. Parallels the southern non-sand dwellers in relying on its inactivity to escape detection. When pressed hard it would reluctantly move to a new position, flattening its squat body close to the ground against which it was almost invisible.

Phrynocehalus scutellatus (Olivier) (1) 32Km.N Kandahar 1167m.
This single example was taken near the site where it was found in 1964. Similar to *P.maculatus* in behaviour relying on camouflage to avoid detection on its habitat of bare earth and stones. Seemingly rare in Afghan collections. Gasparetti found it at Chah-i-Angir (Leviton 1959).

Phyrnocephalus soqdiarus (Lichtenstein) (50) 20 Km.E Mazar-i-Sharif 410m., 30 Km.NW Sheberghan 378m., 20/32 Km.S Andkhoy 410m.
This is the northern parallel to *P.ornatus*, living in sand spits and ridges hiding amongst clumps of coarse grasses. When alarmed it would raise the tail, lashing it to and fro revealing the black tip and the two to four dark bands. Also resembles *P.lutteoguttatus* in colouring though unlike that species *P.sogdiarus* is not a sand burrower.

Genus TRAPELUS

Certain species formerly included under *Agama* are now considered to be distinct enough to be worthy of generic status in their own right. Two species of *Trapelus* inhabit Afghanistan.

Trapelus agilis (Oliver) (44) Collecting sites not individually listed.
This is the most ubiquitous agamid in Afghanistan, being found at nearly all the localities visited. However it is absent in the Kabul Valley river system. Although it avoids rock formations it has a considerable altitudinal range, certainly up to 2500 metres. *T.agilis* is most typically an inhabitant of semi-desert plains provided with at least some vegetation, stone piles where ground has been cleared for cultivation, earth banks and the neighbourhood of holes and rodent burrows. Capable of tolerating extremely high temperatures it can be found abroad at the hottest time of day climbing into spiny bushes to avoid the scorching ground surface, which can reach as high as 60°C. *T.agilis* is often to be seen along roadsides, bobbing its head in typical agamid manner. This lizard displays heterogenous colouring and patterning correlated with environmental conditions. At low temperatures the background colour is dark becoming paler as the temperature rises, the throat in males turning blue and the venter suffused with purple. This occurs also on handling.

Trapelus ruderata (Oliver) (5) 70/80 Km.S Kabul 2106/2333m., 50 Km.S Qalat 1895m.
Our knowledge of this species in Afghanistan is fragmentary. It is very likely that *Trapelus megalonyx* Günther, described from Ghazni, is a synonym and any separation of the two taxa remains unresolved. In 1968 we found it only at the two sites above listed north and south of Ghazni respectively although in 1964 it was taken in some numbers on the plain of Charikar north of Kabul. It seems to prefer more barren habitats than *T.agilis*, living on naked earthy and stony terrain against which it is hard to detect from its habit of lying quiescent when approached. Although recorded from southern Afghanistan we did not find it there. This species complex has a broad range in S.W.Asia extending as far as S.E.Turkey.

Family GEKKONIDAE

Eight genera of geckos are listed from Afghanistan (Scherbak & Golubev 1986). Six are represented in the 1968 collection. *Alsophylax* is now excluded – see under *Tropicolotes*. The two other genera not taken in 1968 are *Eublepharus* and *Hemidactylus*, both represented by a single species: *E.macularius* and *H.flaviviridis*.

Genus AGAMURA

Agamura persica (Duméril) (1) 50 Km.E Girishk 1045m.

This gecko is known from only four stations in Afghanistan, the above site being one of them, and from a handful of specimens. All localities are to the south of the Hindu Kush the most northerly being Paghmann in the mountains west of Kabul at 2440 metres. Outside Afghanistan known from scattered localities in Iran and western parts of Pakistan south to the coast of the Arabian Sea. The single specimen was found on open ground after dark.

Genus BUNOPUS

Bunopus tuberculatus Blandford (5) 35 Km.S Farah 728 m., 10 Km.E Darweshan 833 m., 56 Km.SSE Darweshan 790 m.
Known from six stations in Afghanistan, all to the south of the Hindu Kush from Herat in the west to Mucur in the east at 2440 metres. This series of five specimens together with the single example collected at Mucur in 1964 represents nearly the sum total of this species assembled in Afghanistan to date. A single example from Kandahar was collected by the Street expedition in 1965.

Genus CROSSOBAMON

In 1969 (Clark et. al.) Anderson and Leviton questioned the validity of *Stenodactylus (Crossobamon) lumsdeni* as a valid species pending further investigation. In Leviton's & Anderson's Check List (1970) three species of *Crossobamon* are mentioned: *C.eversmanni, C.lumsdeni* and *C.maynardi.* Scherbak & Golubev (1986) amalgamate *lumsdeni* and *maynardi* as a subspecies of *C.eversmanni: C.eversmanni lumsdeni* (Boulenger 1877) status nova.

Crossobamon eversmanni eversmanni (Wiegmann) (15) 30 Km.NW Sheberghan 378m., 20 Km.S Andkhoy 365m.
This would appear to be the first record from Afghanistan, which was not unexpected since it is known from the Soviet side of the border. It was plentiful at both localities on the sand hills after sunset. *C.eversmanni* seems to be an exclusive sand dweller and could be anticipated as far east as Mazar-i-Sharif.

Genus TENUIDACTYLUS

The recent taxonomic designation replaces that of *Cyrtodactylus* Underwood 1954. This genus is probably one of the most complex of the many gecko genera in S.W.Asia. Five, possibly six, species are definitely known from Afghanistan, three of which were collected in 1968. A fourth, *T.scaber*, was found in 1964 and in 1965 the Street team made the first and only record of *T.watsoni:* four examples were taken near Jalalabad. The sixth, *T.russowi*, is postulated from the country by Leviton & Anderson (1970) but its presence needs to be verified. The reader is further referred to a paper by Leviton & Anderson (1984) on the speciation within this group caused by isolation of the various forms from southern Afghanistan caused by the spreading out of the alluvial fans for considerable distances into the low-lying deserts. Although the nomenclature has very recently been revised (Scherbak & Golubev 1986) the notion of generic isolation is valid and doubtless further taxa remain to be discovered in the south of the country and possibly elsewhere. Although *Tenuidactylus* spp. can sometimes be found concentrated densely, as for example on buildings both occupied and abandoned, these situations are infrequently provided in a country which is so sparsely populated. Many of the finds are of individual specimens taken in open country vast distances from habitation. This means that we have but little knowledge of the various taxa and scanty material from which to make comparisons.

Tenuidactylus caspius caspius (Eichwald) (5) 10 Km.W Tashkurgan 455m., 25 Km.SW Aqcha 365m.
This species is known from only four localities in northern Afghanistan and again only four stations on the southern margin of the Hindu Kush, Islam Qala, Herat, Sar-i-Pul and Paghmann. The Street expedition collection 19 examples of which two came from Zebak, 100 kms. east of Faizabad, at 2653 m. the highest known elevation to date. Whether it is so thinly distributed in Afghanistan is difficult to say. In Soviet Central Asia there are many records from the eastern side of the Caspian Sea and from Turkmenistan near the Afghan/Iranian/Soviet frontier. From Iran itself most of the records are from the north east of the country but from only a few stations.

Tenuidactylus longipes voraginosus (Leviton & Anderson) (2) HOLOTYPE 55 Km.E Girishk 1045 m., 1 PARATYPE 32 Km.N Kandahar 1167m.

Originally described as a new species: *Cyrtodactylus voraginosus* Leviton & Anderson 1984. Scherbak & Golubev (1986) redescribed this as a subspecies, *T.longipes.* A further paratype of the new taxon was amongst specimens collected in 1964 (Clark et al. 1969) and included under *C.fedtschenkoi* in erratum. The middorsal scutellation is quite distinct from the other *Tenuidactylus* species mentioned here in that the keeled dorsals are very much smaller and the granules small and numerous. The two specimens above listed were found in hiding amongst stones and rocks.

Tenuidactylus turcmenicus (Scherbak) (6) 60 Km.NE Taliqan 1167m., 24 Km.E Khanabad 610m.

This gecko has a very similar range in Afghanistan to *T.caspius*, being known from eight stations to the north of the Hindu Kush from Sheberghan to Faizabad covering an altitudinal range of 350 to 2653 m. There is also a record from Paghmann. The specimens collected in 1968 were originally identified as *T.fedtschenkoi.* According to Scherbak & Golubev (1986) *T.fedtschenkoi* does not occur within Afghan territory although it is found in Turkmenistan and Uzbekistan. The Oxus (Amu Darya) River could well act as a barrier to the spread of certain species southwards, as in this case and in *T.russowi*, and also northwards as with *T.turmenicus* for which there are only three sites known outside Afghanistan, well to the west and south of the Oxus just north of the Afghan/Soviet border. *T.turcmenicus* is separable from *T.fedtschenkoi* in a number of features, the most obvious being in the character of the dorsal scalation. In *T.turcmenicus* the prominently keeled dorsals are large but relatively few in number, tending to converge on each other, whilst the interlying granules are less numerous than in *T.fedtschenkoi*, larger and more irregular in appearance. Both species are readily distinguishable from *T.caspius* which has small, moderately keeled dorsals arranged in regular longitudinal rows separated by fine, minute granules.

Genus TERATOSCINCUS

Three species are on record from Afghanistan. *T.bedriagai*, collected by the Street expedition in 1965 from near Juwain and Kandahar, was not found by us.

Teratoscincus microlepis Nikolsky (7) 56 Km.SSE Darweshan 790m.

This seems to be a first time record for Afghanistan although known from extreme eastern Iran and N.W. Baluchistan. At Darweshan it was sympatric with *T.scincus keyserlingii*, appearing soon after dusk. When observed on the prowl this gecko was seen walking very slowly over the sand with the body and short fat tail well raised above the surface. On being caught all specimens bit deliberately but painlessly and often defecated. When released in daylight it would run clumsily for shade and dig itself into the sand with its short, spade-like forelimbs.

Teratoscincus scincus keyserlingii Strauch (6) 56 Km.SSE Darweshan 790 m.

Although sympatric with the above species this gecko was found more in sandy pockets and hollows and not on the main sand desert. Evidently not so exclusively a sand-dweller. When alarmed it adopts a defensive posture, waving the tail to and fro in rapid motion causing the large overlapping plates to vibrate, producing a rustling sound. Two *Teratoscincus* specimens extracted from the stomachs of *Coluber rhodorachis* on the sand desert near Kandahar could not be identified with any certainty. The skin of this gecko is fragile and delicate and is easily damaged.

Teratoscincus scincus scincus (Schlegel) (2) 20 Km.S Andkhoy 410m.

The second record from Afghanistan, the only other locality known being Herat (Scherbak & Golubev 1986). None of our *Teratoscincus* spp. are mentioned in the aforementioned authors' monograph and this gecko genus awaits more detailed study.

Genus TROPICOLOTES

This genus is represented by a single species in Afghanistan. Six others are known from Iran and Pakistan. All have narrowly restricted ranges. The group is not found in Soviet Central Asia. Two other species inhabit North Africa and the Nile region south to nearly lattitude 20°.

Tropicolotes levitoni Golubev and Scherbak (1) HOLOTYPE Kabul 1786 m.
The holotype of this recently described form, hitherto confused with *Alsophylax pipiens*, was taken by night on the plastered external walls of the International Club in Kabul. 10 paratypes were found at the same site in 1964 (Clark et al. 1969). *T.levitoni* is only known from locations in the Kabul area and from a site west of Paghmann.

Family LACERTIDAE
Genus ACANTHODACTYLUS

A genus of fringe-toed lacertids that occupies a range from south west Europe across north Africa, eastern Mediterranean countries to northern India. The greatest concentration of taxa is in the western part of the range. A single species is to be found in southern Afghanistan and the Kabul river valley. As was pointed out (Clark et al. 1969) Afghan specimens appear to differ from *A.cantoris cantoris* and *A.cantoris blanfordi.* Evaluation of the material collected in 1964 and 1968 has resulted in Afghan populations being renamed as *A.blanfordi.*

Acanthodactylus blanfordi (Boulenger) (42) 10/18 Km.E Girishk 880m., 40 Km.SE Kandahar 1030m., Jalalabad/Nimla 1045m., 45/55 Km.S Lashkargah 803m., 10 Km.N Darweshan 712m., 35 Km.S Darweshan 758m., 56 Km.SSE Darweshan 788m., 45 Km.N Juwain 636m.
Commonly found at all the above stations but particularly abundant at the site near Kandahar. *A.blanfordi* was always found in sandy pockets and on fine, drifted sand spits but not on the main dune areas. Those from between Jalalabad and Nimla were taken from sand banks and islets close to and in the river bed and at the same location as those collected in 1964. It was never found on the stony terrain nearby. Another species, *A.micropholis*, is on record from extreme S.E.Iran near the Seistan Basin (Boulenger 1921). Although not yet recorded from Afghanistan itself it could well occur in the Helmand Basin, bearing in mind the herpetofaunal content of this region.

Genus EREMIAS

The genus *Eremias* is represented in Afghanistan by at least eleven species which parallel the geographical and ecological dispersals found in the agamid genus *Phrynocephalus.* The Jalalabad region is unique in containing two species that appear restricted to this part of the country, with their closest affinities to species found north of the Hindu Kush. Most *Eremias* live at moderate to low altitudes under about 1300 metres. Only one species is ubiquitous throughout southern and central Afghanistan, *E.persica*, which has been found at least up to 2500 metres altitude. It needs to be stressed that this group of lacertids is very complex and is comprised of several subgenera (Boulenger 1921). One of these, *Mesalina*, has recently been reinstated. Further evaluation of the considerable amount of material now available for study will doubtless lead to further revisions being made. Boulenger recognised *Scapeira* as being generically self-standing although accepting that it stands close to *Eremias* and intergrades with it. The majority of Afghan species were described under *Scapteira*, which has more strongly fringed digits adapting it to living under sandy conditions. A further species, *E.aporosceles* (Alcock & Finn), was originally named as *Macmahonia aporosceles. Macmahonia*, a mono-specific genus, was distinguished from *Scapteira* by the absence of femoral pores. This was found by the boundary commission workers south of the present Afghan frontier in Baluchistan. This taxon was not found by us in 1968 but its subsequent discovery within Afghanistan itself is probably only a question of time.

Eremias acutirostris (Boulenger) (22) 35 Km.S Darweshan 758m., 10 Km.NE Darwshan 833 m., 56 Km.SSE Darweshan 790m.
A valuable series of specimens since this species was formerly described from a single specimen (Boulenger 1887). At the time of its collection it represented the first sample available for study. More recently Steven Anderson collected it in Iranian Seistan (Anderson & Leviton 1984). No examples were seen at the sand desert location near Kandahar, which suggests that *E.acutirostris* is perhaps confined to the more western parts of the southern sand desert. This is difficult to decide on the very limited collecting localities at which this lizard has been found. At the Darweshan sites it was plentiful but awkward to catch being amazingly fleet, speeding over the open dunes in a flurry of flying sand when alarmed. In the cooler early morning hours it was possible, by carefully scanning the neighbourhood, to observe this lizard

hunting for food, dipping its snout into shallow holes to extract insects, which it was seen to do on several occasions. A characteristic habit while foraging was to bob the head rapidly up and down in jerky motion. *E.acutirostris* is one of the largest of the Afghan species, attaining a total length of 25cms.

Eremias aria Anderson & Leviton (3) 30 Km.SW Jalalabad 1060m.
These few specimens supplement the small series collected by us in 1964, confirming the status of *E.aria* as a hitherto unknown species (Anderson & Leviton 1967). The present series was taken at the same site as those collected in 1964 and none were seen elsewhere, thus making it impossible to determine the range of this lizard. *E.aria* is an inhabitant of rocks and boulders and the intervening stony ground, hiding amongst the base of shrubby vegetation. It was only found in small numbers and often in the immediate vicinity of water. This lizard seems to fill the ecological niche left vacant by the absence of the ubiquitous *E.pesica* and *E.velox*, either of which might be anticipated in the area but which do not seem to occur. However *E.persica* is found in Khost province not far to the south of Jalalabad (Clark et al. 1969) from which region *E.aira* has not been taken. This suggests, on the very limited information available, that *E.aria* may well have an extremely restricted range.

Eremias fasciata Blandford (5) 56 Km.SSE Darweshan 790m., 64 Km.W Kandahar 940m., 16 Km.NW Delaram 867m.
A seemingly sporadic species occurring in small numbers throughout the Helmand basin, at least along the northern limit. This seems to be the second firm record for Afghanistan, the first certain documentation being made by Leviton (1959). A typically "striped" *Eremias* species with nine dark stripes alternating with the greyish ground colour. This pattern is present at birth. Although a sand dweller *E.fasciata* is kept apart from both *E.acutirostris* and *E.scripta* by occupying isolated sandy pockets and wind-dispersed sandy areas away from the main sand desert. It thus occurs over a broader area than the other two taxa and resembles *P.ornatus* in following migratory sand movements.

Eremias grammica (Lichtenstein) (35) 20 Km.E Mazar-i-Sharif 410m., 30 Km.NW Sheberghan 378m., 20/50 Km.S Andkhoy 394/410m.
Parallels the southern *E.acutirostris* in many respects both in size, biotope and behaviour. It was found not to be so nervous and this may be due to the much greater amount of vegetation on the sand hills which provides the lizard with more readily available hiding places. This is apparently the first documented record of this species from Afghanistan although it was previously known from N.E.Iran and contiguous areas of Soviet Central Asia. It was not found further east than the Mazar-i-Sharif locality. The ground colour of this lizard is greyish with a grey-black network. It is worth mentioning that the sand is much lighter in colour than in the great sand desert in southern Afghanistan, where it is a deep yellow or even orange. *E.grammica* is thus as well colour-adapted to its environment as *E.acurostris* is in the south. The reticulated dorsal patterning helps to camouflage it amongst the grasses and vegetation present on the sand hills.

Eremias intermedia (Strauch) (22) 20 Km. E/75 Km.W Mazar-i-Sharif 410/350m., 25 Km.SW Aqcha 365m., 30 Km.NW Sheberghan 378m., 20/50 Km.S Andkhoy 394/410m.
First documented by Král (1969). *E.intermedia* was reasonably plentiful at all the above localities and sympatric with *E.grammica* and *E.lineolata* though preferring firm sandy soils and shunning loose sands and dunes. It thus parallels the ecological requirements of *E.fasciata* from southern Afghanistan. The digits are not as markedly fringed as in the northern desert sand-dwelling species.

Eremias lineolata (Nikolsky) (15) 65/75 Km.W Mazar-i-Sharif 455/350m., 20/50 Km.S Andkhoy 394/410m.
Another first time record for this delicately built lizard. It was only observed at these two sites and would seem to live entirely on large expanses of loose sand. Where found it was always close to or in vegetation, never venturing far from cover. Like *E.fasciata, E.scripta* and *E.regeli* this species retains the juvenile striped livery throughout life, having up to seven dark dorsal lines on the pale grey ground. In appearance, habitus and mode of behaviour it resembles the southern *E.scripta* to a remarkable degree.

Eremias nigrocellata Nikolsky (8) 10 Km.W Tashkurgan 560 m., 20 Km.E Mazar-i-Sharif 410m.,

25 Km.SW Aqcha 365m., 50 Km.S Andkhoy 410m.
First recorded from Afghanistan by the Street expedition, who collected three examples east of Faizabad at 2653 metres elevation. Nowhere was this lizard observed to be plentiful. *E.nigrocellata* is an inhabitant of open firm ground, clay or loess provided with some vegetation. An ocellated *Eremias* with black-ringed whitish spots against a grey ground. The spotting becomes less marked with age.

Eremias persica (Blandford) (19) 36/56 Km.N Kandahar 1120/1258 m., 10 Km.N Darweshan 803m., 15 Km. N/10 Km.S Ghazni 2500/2258m., 50 Km.N Qalat 1894 m., 72 Km.S Herat 1410 m., Girishk 850m.
Terentev & Chernov consider *E.persica* to be distinct from the closely related *E.velox*. Boulenger (1921) considered *velox* and *persica* to be varieties of *E.velox*. It is now accepted that Terentev & Chernov are more correct. Widespread through southern Afghanistan up to at least 2500 metres elevation at Ghazni. It inhabits mainly open ground, hiding in holes or rodent burrows or at the base of bushes. Where sandy soils are available it shows a preference for these. Absent from the Jalalabad area, see under *E.aria*. This species demonstrates ontogenetic changes, the striped juvenile livery gradually disappearing as the animal nears maturity (Clark et al., 1969).

Eremias regeli Bedriaga (3) 30/45 Km.W Jalalabad 1060 m.
This was first recorded from Afghanistan in 1964 (Clark et al. 1969). The small series was taken in the same region as in 1964 but at a different locality close to the main route from Jalalabad to Kabul near the Kabul river. So far only known in this part of the country, to the south of the Hindu Kush. Otherwise *E.regeli* is known from Soviet Tadjikistan and has been taken from near the Afghan/Soviet border but not in Afghanistan itself. Boulenger (1921) questions the validity of *E.regeli* =*E.bedriagai*) considering the single specimen then known to be an aberrant *E.velox*. Could possibly be mistaken for a juvenile *E.velox* which lives in northern Afghanistan. That *E.regeli* is a good species is not open to doubt. That populations from Jalalabad are synonymous with those in Tadjikistan is more dubious and the real affinities within this species need clarifying, as does the distribution of this interesting form.

Eremias scripta (Strauch) (22) 35 Km.S Darweshan 758 m., 10 Km.NE Darweshan 833 m., 56 Km.SSE Darweshan 790 m., 40 Km.SE Kandahar 1060 m.
This is the first documented record from within Afghanistan. It was reasonably common at all the sites visited. Like *E.lineolata* in the north it inhabits the permanent sand hills and ridges, keeping close to sparse patches of vegetation into which it readily climbs, hopping nimbly amongst the leafless branches well disguised in the shadow pattern. *E.scripta* has the typical striped patterning of many desert *Eremias* species but the stripes tend to form reticulations along the dorsal midline. Both Nikolsky and Boulenger state that this species is to be found in Soviet Central Asia and Kazakhstan. In view of the north/south division of the majority of Afghan *Eremias* we question whether *E.scripta* populations in the south are synonymous with those to the north of the Afghan/Soviet border, a point raised by Leviton & Anderson (1970). Clearly more research is here needed as indeed it is with many other species within the group.

Eremias velox velox (Pallas) (25) 70 Km.W Mazar-i-Sharif 350 m., 25 Km.SW Aqcha 365 m., 10 Km.W Tashkurgan 560 m., 24 Km.E Khanabad 610 m., 30 Km.E Taliqan 1180 m.
Found occasionally throughout the northern steppe and in the low foothills of the Hindu Kush. Inhabits firm, never sandy ground, normally provided with scrub and vegetation. Its precise point of range separation from *E.persica* is difficult to determine since the latter species is known from the Herat area in the west and from Paghmann in the east. In 1964 we found *E.persica* on the plain of Charikar north of Kabul. This region is tucked in near to the steep climb to the Salang Pass (3700 metres) which links across the Hindu Kush, a distance of only some 100 kilometres from south to north.

Genus MESALINA

One species in Afghanistan formerly referred to under *Eremias guttulata watsonana*.
Mesalina watsonana (Stoliczka) (37) 30/70 Km.NE Herat 1121/1621 m., Shindand 1227 m.,

30 Km.E Girishk 879 m., 25 Km.SW Jalalabad 1100 m., Kabul to Lataband 1924 m., 80 Km.S Kabul 2333 m., 24/50 Km.N Qalat 1758/1894 m., 32/40 Km.N Kandahar 818/1167 m.
It has been remarked earlier (Clark et al., 1969) that this is the most ubiquitous lizard in SW Asia covering a range from Syria to Rajputana. It was never found abundantly but occurred in reasonable numbers at all the above mentioned localities. *M.watsonana* is a typical inhabitant of firm earthy soils, hiding under stones, holes in the ground or at the base of spiny bushes and clumps of vegetation. It was not found in northern Afghanistan and in Soviet territory is only known from Turkmenistan east to the Oxus (Terentev & Chernov 1949). In 1964 we found it in Khost province at 2500 metres elevation in conifer forests and east of Jalalabad near to the Khyber Pass. Evidently active at low temperatures as was observed near Herat in late February with air temperatues around 10°C.

Genus OPHISOPS

A single species in Afghanistan.
Ophisops jerdoni Blyth (3) Near Nimla SW of Jalalabad 940-1150 m.
The first record of this Indian species in Afghanistan and the only known locality in the country which otherwise has a range from the NW frontier provinces east to Rewa State and Bellary. A small and inconspicuous lacertid seemingly uncommon, inhabiting broken terrain where it lives amongst rocks and vegetation. Our specimens were taken in early March and no examples were seen when the area was revisited in early May.

Family SCINCIDAE
Genus ABLEPHARUS

Two species are known from Afghanistan. *A.bivittatus linbergi*, not found by us, is on record 'from upland Afghanistan 2900 metres' (Leviton & Anderson 1970): no locality is given.

Ablepharus pannonicus Lichtenstein (1) 72 Km.S Herat 1410m.
This was the only specimen found and was taken on May 12th. Its further distribution is unclear. John Gasparetti took two examples just south of Kabul (2300 m) on April 10th. 1961 (Leviton & Anderson 1963).

Genus OPHIOMORUS

Ophiomorus tridactylus Duméril & Bibron (5) 35 Km.S Darweshan 758 m., 10 Km.E Darweshan 833 m.
This skink is exclusively a sand dweller and is hard to capture because of its fossorial habits. It favours small sandy tracts rather than the main dune areas and its undulating track could often be seen on the sand surface. Capturing these skinks meant in many cases following the trail and digging the animals out of hiding. Many attempts proved abortive. The minute limbs are only used when the skink progresses in a leisurely manner but the normal form of locomotion seems to be "sand swimming".

Several other genera in the family Scincidae are reported from Afghanistan. *Mabuya dissimilis* was taken on the 1964 trip near Jalalabad and also from the same area by the Streets in 1965. *Eumeces schneideri* is on record from both northern and southern lowland Afghanistan and *E.taeniolatus* from a single locality near Kandahar. A montane species, *Scincella himalayana*, has been reported from Nuristan (Leviton & Anderson 1970).

Family VARANIDAE
Genus VARANUS

Varanus bengalensis bengalensis (Daudin) Sight observations as well as specimens that were captured and released. 50 Km.E Kabul 1300 m., several localities west and south west of Jalalabad around 1000 m.
The first positive documentation of this monitor lizard in Afghanistan was made in 1964 when it was commonly found at the site east of Kabul. On visiting this site in early March 1968 no monitors were found, the weather being too cool with temperatures around 15°C. In early May there was plenty of activity at this station. Around Jalalabad in early March the weather was appreciably warmer and several examples were seen. *V.bengalensis* was always found near

water but ranged into drier terrain but never far from rivers, streams and irrigated plots of cultivation. A detailed account of its habits and activity patterns has been presented earlier (Clark et al. 1969). In 1965 the Streets found it north of Jalalabad at 2600 metres, indicating a wide altitudinal range. It was also taken on the 1964 trip in Khost province to the south of Jalalabad. This monitor is restricted to the eastern part of Afghanistan but its range parameters need to be defined. Monitors caught in early March near Jalalabad were in poor condition: the tail base was thin and numerous folds of skin down the body made them look emaciated. By May monitors from this region were plump and healthy-looking with the tail base full and firm.

Varanus griseus caspius (Eichwald)
One example was located between Herat and Islam Qala in early May on open ground amongst sparse vegetation. When chased and cornered it held its ground and made threatening motions, opening the mouth, hissing loudly and lashing its tail. On being picked up it attempted to bite. This is in contrast to *V.bengalensis* which would use its long powerful tail as a defence but would never try to bite. This lizard was also encountered in the Farah region but only now and again.

Suborder SERPENTES
Family BOIDAE
Genus ERYX

Three species of *Eryx* are on record. *E.elegans* has only one positive record, namely at Paghmann collected by the Street expedition in 1965, and *E.johnii* is included in the Afghan fauna on the basis of a record by Murray in 1892 from near Kandahar. *E.tataricus* would seem to be much more common and widespread.

Eryx tataricus (Lichtenstein) (2) 30 Km.NW Sheberghan 378 m., 20 Km.S Andkhoy 394 m.
This sand boa was locally plentiful. All were found shortly after dusk roaming over the dunes. Although listed from the southern deserts none were found. The tail markings, a short horizontal line terminating in a black spot, closely resemble the mouth and eye, which is presumably a defensive feature. On being alarmed this sand boa will raise the tail tip and wave it to and fro in order to distract a potential enemy from attacking the fore part of the body.

Family COLUBRIDAE
Genus COLUBER

A complicated genus in S.W. and Central Asia. Three, possibly four, species in Afghanistan.

Coluber karelini Brandt (7) 10 Km.W Tashkurgan 455 m., 10 Km.N Darweshan 803 m., 15 Km.NE Darweshan 833., 40 Km.SE Kandahar 1060 m., 45 Km.W Herat 880 m.
Very common at the Darweshan and Kandahar sites; only a few of those seen being caught. Occurred sporadically elsewhere. It was found both in non-sandy and sandy biotopes, both firm and loose sands. Those on the sand dunes south of Kandahar and Darweshan were seen prowling over the sand, entering and leaving holes at the base of xerophytic shrubs evidently on the search for prey. One of the specimens obtained here was found lying in the open so bloated with a large gecko *(Teratoscincus)* that it had just consumed that it was incapable of movement. Another was found dead partly down a hole and stuck fast. The stomach also contained a *Teratoscincus.* All specimens were of the sandy/brown/black-barred form. In the Kabul bazaar one of the snake charmers was displaying a variety of snakes, amongst them *Coluber* species, with a prominent red vertebral stripe. Since this colour variety is common to both this and to *C.rhodorachis* and I was not allowed to handle and examine the snakes, being told they were very dangerous (!), I was not able to determine to which species they belonged. The two examples from Tashkurgan and Herat were of a light grey ground colour.

Coluber rhodorachis (Jan) (2) 30/40 Km.SW Jalalabad 1045/818 m.
This species was only found at the above stations. One was seen lying on a narrow ledge up a low cliff. When approached it remained motionless and seemed totally inactive. The snake was grossly distended and was found to have devoured a half-grown *A.nupta.* It seems unlikely that such an active lizard could be overcome unless it was attacked when in hiding.

Genus LYTORHYNCHUS

This genus of leaf-nosed snakes contains four species. Two are to be found in Afghanistan.

Lytorhynchus maynardi Alcock & Finn (3) 10 Km. NE Darweshan 833 m., 56 Km.SSE Darweshan 790 m.
The first positive documentation from Afghanistan, previously known only from the type specimens taken from the Afghan/Baluch border. They were found after dark on the sand dunes, on which they left a wavy track. When threatened they would hold the tip of the tail erect and wave it slowly from side to side, simulating head movement.

Lytorhynchus ridgewayi Boulenger (1) 35 Km.S Darweshan 758 m.
This single specimen was also found active after sunset on the gravel strewn alluvium. The range of this species is better than *L.maynardi* being on record from both N.W.Afghanistan, southern and central Iran and Turkmenistan. Gasparetti took one specimen in 1950 (Leviton 1959).

Genus PSAMMOPHIS

Represented by three species. *P.leithi* was not found.

Psammophis lineolata (Brandt) (3) 70 Km.W Mazar-i-Sharif 455 m., 45 Km.S Andkhoy 410 m., 30 Km.SE Shindand 1258 m.
This snake was occasionally seen in the northern steppe where it lived amongst the vegetation on firm clay or baked earth terrain. Found at both low and high elevations throughout the country. Outside Afghanistan ranges far into the USSR as far north as Latitude 49°.

Psammophis schokari (Forskål) (10) 18 Km.E Girishk 880 m., 32 Km.NW Lashkargah 818 m., 45 Km.W Jalalabad 818 m., 40 Km.SE Kandahar 1060 m.
A very commonly seen snake particularly near Lashkargah in late February and mid March where it was active at relatively low temperatures around 15°C. Usually found near bushes and on man-made earth banks, often in the vicinity of rodent holes into which they escaped when alarmed. Only known from the south of the country at low altitudes.

Genus PTYAS

Ptyas mucosus (Linnaeus) (1) Kabul
This juvenile was obtained from one of the Kabul snake charmers in exchange for a *Psammophis schokari*. No collecting locality available. The Street expedition collected several examples ranging from Herat in the west to Kamdesh in Nuristan as well as from Kandahar. Evidently broadly distributed.

Genus XENOCHROPHIS

Xenochrophis piscator (Schneider) (1) 40 Km.SW Jalalabad 1045 m.
The first documented find for Afghanistan of this Indian and far eastern snake. Smith (1945) includes Baluchistan in its range. The single specimen, the only one seen, was found amongst rocks on the edge of a stream. When alerted it hid under the rocks and was easily caught. On being caught it bit forcibly and deliberately. Smith comments on the extreme aggressiveness of this snake, in Ceylon, which will spring at its aggressor when cornered. This was a female containing 7 eggs, 19 x 11mm.

Family ELAPIDAE
Genus NAJA

Naja oxiana (Eichwald)
This was not found in the field. However several were on display in the Kabul bazaar. A guide told me that they had been obtained locally and that the snake was common in the Kabul area. In 1965 the Streets took a single example from near Jalalabad.

Family LEPTOTYPHLOPIDAE
Genus LEPTOTYPHLOPS

Leptotyphlops blanfordi (Boulennger) (6) Nimla 1167 m.
These examples represent the first documented Afghan record. This secretive snake was collected

by Alcock & Finn in extreme north western Baluchistan near the Afghan/Iranian boundary but not within Afghanistan itself. The present series was taken under rocks and stones in dampish conditions in early March. As with other *Leptotyphlops* species they would be extremely difficult to find later in the year under hotter, drier conditions since they retreat deep into the ground. See Clark & Clark (1973) concerning *L.macrorhyncus* in Turkey.

Family VIPERIDAE
Genus ECHIS

Echis carinatus (Schneider) (6) 20 Km.SE Islam Qala 788 m., 32 Km. NW Lashkargah 818 m., 10 Km.W Tashkurgan 560 m.

DIAGNOSTIC DATA ON SNAKES COLLECTED

Species	Total Length (mm)	Body Length (mm)	Dorsals	Ventrals	Subcaudals
Eryxtartaricus	368;375;231	339;328;209	47;49;51	211;194;181	23;32;30
Coluber karelini	R 740-1260 x 959 n 8	R 550-940 x 628 n 8	R 19 x 19 n 8	R 209-242 x 227 n 8	R 91-126 x 112 n 8
C. rhodorachis	1147;378	810;276	19	225;224	134;129
Lytorhynchus maynardi	229;412;363	192;343;298	19	199;192;203	59;53;53
L. ridgewayi	394	324	19	171	45
Psammophis lineolata	677;518;434	497;377;404	17	190;196;186	92;113;84
P. schokari	R 655-1089 x 903 n 10	R 437-715 x 601 n 10	R 17 x 17 n 13	R 176-191 x 184 n 13	R 116-132 x 122 n 13
Ptyas mucosus	624	465	17	204	117
Xenocrophis piscator	778	577	18	155	78
Leptotyphlops blanfordi	R 103-215 x 160 n 6	R 93-191 x 146 n 6	†	-	-
Echis carinatus	R 292-543 x 378 n 10	R 263-487 x 379 n 10	R 31-33 x 31-6 n 11	R 177-196 x 184 n 11	R 31-36 x 34 n 11
Eristocophis macmahoni	349;636	314;591	21;23	146;144	35;23

† scales round body, at mid-body, 14.
N.B. Adults only included in measurement calculations. R = range, x = mean, n = number.

The single specimens taken at the first two localities were found in late February, the individual from Islam Qala beside the road, the one from Lashkargah caught while sunning itself at the edge of a rodent hole on open ground. No others were seen in the south. However at the Tashkurgan station visited in mid April these snakes were very common. The habitat here was earth and clay soils covered with stones and vegetation. Most of these seen, both early and late in the day but not after dusk, were close to rodent holes. They were easy to approach but when disturbed acted with extreme aggression, throwing the body into an S-shape and vibrating the rough scales against each other, producing the characteristic rasping sound. This snake must be regarded as highly dangerous from the point of view of its small size, under 60 cms., its inconspicuousness against its background, holding its position when threatened and the highly toxic venom. On several occasions they were nearly trodden on. The status of *Echis* in Afghanistan needs clarifying. Gans (1988) has pointed out that there are six species of this genus across the broad range from North Africa to Sri Lanka. A number of specimens were collected and dispatched to the Zoological Society of London for exhibition at Regent's Park. None survived for long, (David Ball personal communication). Probably the dry conditions favoured by this snake make it difficult to keep in captivity unless low relative humidity can be provided. However the nervous and irascible disposition of this viper is doubtless a contributing factor.

Genus ERISTOCOPHIS

A mono-specific genus of sand vipers with a distribution restricted to the deserts of southern Afghanistan, N.W. Baluchistan and S.E. Iran.

Eristocophis macmahoni Alcock & Finn (2) 10 Km.NE Darweshan 833 m.
Only these two examples of this rare snake were found. One was seen lying on the sand surface in the early morning and buried itself with surprising speed by lateral body movements. The outline was clearly visible and the snake caught without difficulty. It was not aggressive and seemed reluctant to bite. The other was found dead on the firmer dune margins, apparently having been trampled by a camel train that had passed overnight. Along with several other reptile species from this region the finding of this viper comes as a rediscovery since the species was originally described in 1896. Darweshan lies well to the north of the type locality along the Afghan/Baluch frontier.

DISCUSSION

In the first instance it is perhaps useful to compare the results of the 1968 expedition with that made by me in 1964 and that undertaken by the Streets in 1965. Each of these provides us with fresh insights into the Afghan herpetofauna and each concentrated its activities in different ways and in different areas with some overlap. The 1964 trip produced two new species, *Eremias aria* and *Phrynocephalus clarkorum* as well as six new species records for the country, either totally new or positive confirmation of earlier dubious records: *Bufo stomaticus, Rana cyanophlyctis, Calotes versicolor, Eremias regeli, Mabuya dissimilis* and *Varanus bengalensis.* In addition two geckos, misidentified at the time, have been awarded the status of new taxa: *Tenuidactylus longipes voraginosus* and *Tropicolotes levitoni.* The Street expedition in 1965 found two hitherto undescribed species, *Agama nuristanica, Agama badakshana* and eight first time records: *Agama agrorensis, Agama erythrogastra, Agama lehhmanni, Tenuidactylus watsoni, Hemidactylus flaviviridis, Eremias nigrocellata* and *Eryx elegans.* The 1968 expedition did not locate any new species, as far as is known at the time of writing, but an abundance of first time records and confirmation of earlier doubtful findings which are indicated in the text, the most notable being *Tenuidactylus turcmenicus, Ophisops jerdoni, Phrynocephalus euptilopus* and *Eristocophis macmahoni.* In 1964 only one snake was found alive in the field, *Coluber karelini,* but in 1968 12 snake species were found though there remained a number of gaps in this collection which are worth mentioning since these were found by the Streets who were in Afghanistan for a longer period from July through to November: *Eryx elegans, Coluber ravergieri, Natrix tessellata, Ptyas mucosus, Sphalerosophis diadema, Naja oxiana* and *Vipera lebetina.* The Streets spent the second half of July at Paghmann collecting seven snake species and four *Agama* species including *Agama erythrogastra,* which is otherwise restricted to low elevations in N.E.Iran (Clark, Clark, Anderson & Leviton 1966) and neighbouring areas of N.W.Afghanistgan and S.E.Turkmenistan. The implication is that

there must be other regions in Afghanistan that will, on investigation, be found to contain "anomalies" based on our current and still limited knowledge of the herpetofauna.

Apart from the mountainous regions of central and eastern Afghanistan which are poorly known much more work needs to be done in the valley of the Kabul River and Jalalabad. This is an area of high zoogeographical interest with the majority of species being of Indian origin. For this reason a special table has been compiled to demonstrate the reptile content of this zone. How far some of these animals range north and south out of the immediate area is a matter of great importance and one that warrants more systematic investigation.

Any attempt to map distribution patterns in a country with such a poor and limited road network is a formidable task. Certain regions can only adequately be penetrated from well organised base camps and with local guides, which involves considerable financial outlay. Not least, in 1968, was the problem of obtaining travel permission to visit some areas. I was denied access to Nuristan on the grounds that it was a most dangerous region for foreigners to visit due to local unrest. In 1964 a visit to Khost Province was only possible in an official party under the auspices of Kabul University and with Afghan drivers. Again in 1968, due to border sensitivities, an attempt to travel north from Herat to Kushk on the Soviet border was made impossible by military check points which could not be passed without written authority, which was not forthcoming. Not least it should be mentioned that in a country with such an enormous range of topography, altitude and climate there is a considerable variation in optimum activity. In the summer the desert zones are unbearably hot and up to May or even June the high mountains are impenetrable due to snow, rain and flooding which makes the unpaved roads impassable. It is clear that even a visit of several months cannot possibly sample the entire faunal spectrum. Although some aspects of 1968 were disappointing in the main the trip was successful, since activities were concentrated in the northern and southern lowlands and in the Kabul River valley at a time of year when temperatures were tolerable and reptile activity at a peak. It is interesting that the Streets collected no Phrynocephalids from northern lowland Afghanistan in the summer and very few Lacertids. This must be partly attributable to the time of year though whether this gap in their collection was also due to priority of interests in other directions is not altogether clear.

Regarding the systematics of certain groups I have been advised that work is currently in hand: Darevsky, Ananjeva and Borkin (Agamid lizards) – Leviton personal communication. Also Golubev (*Phrynocephalous* and *Eremias* species) – Golubev personal communication.

Without doubt these investigations will lead to some important taxonomic revisions, the results of which are eagerly awaited.

The affiliations of the Afghan herpetofauna have been discussed in earlier papers: Leviton (1959), Clark et al. (1969), Král (1969) but in no great depth due to many unknowns, and a complete analysis must await further study. A few remarks can be made in the light of our present knowledge. Most of the fauna is deserticulous, receiving genera and species from the Central Asian zone and from the vast area westwards to the eastern Mediterranean. Amongst the typical genera can be mentioned *Agama, Phrynocephalus, Trapelus, Crossobamon, Tenuidactylus, Teratoscincus, Acanthodactylus, Eremias, Coluber, Lytorhyncus, Psammophis, Echis* and *Naja*. The special zoogeographical significance of the Kabul River Valley system, which receives its fauna from the N.W. Frontier Provinces, Sind and further east (the "Oriental" zone) has been elaborated upon. I would speculate that *Vipera russelli* is by no means an impossible inclusion since this occurs in Sind. Other restricted distributions occur in the Registan desert which relates to the sand deserts of S.E. Iran and Baluchistan. Although only one genus seems endemic, *Eristicophis*, several species are confined to this area notably *P.lutteoguttatus, P.euptilopus, E.acutirostris* and *E.scripta*. Some montane species related to himalayan and high altitude elements further east occur in the eastern highlands: *Batrachyperus mustersi, R.sternosignata, A.himalayana, Scincella himalayana* and *Akgistrodon himalayana*. These must be only a small fraction of high altitude species awaiting future discovery. Finally a few Palearctic/European species attain their most easterly points of distribution in Afghanistan: *B.viridis, R.ridibunda, Ophisaurus apodus, Natrix tessellata* and *Typhlops vermicularis*. The genus *Lacerta* does not appear to have extended into Afghanistan. However in view of the penetration of the above named species it is not impossible that one or more representatives could exist in the north of the country.

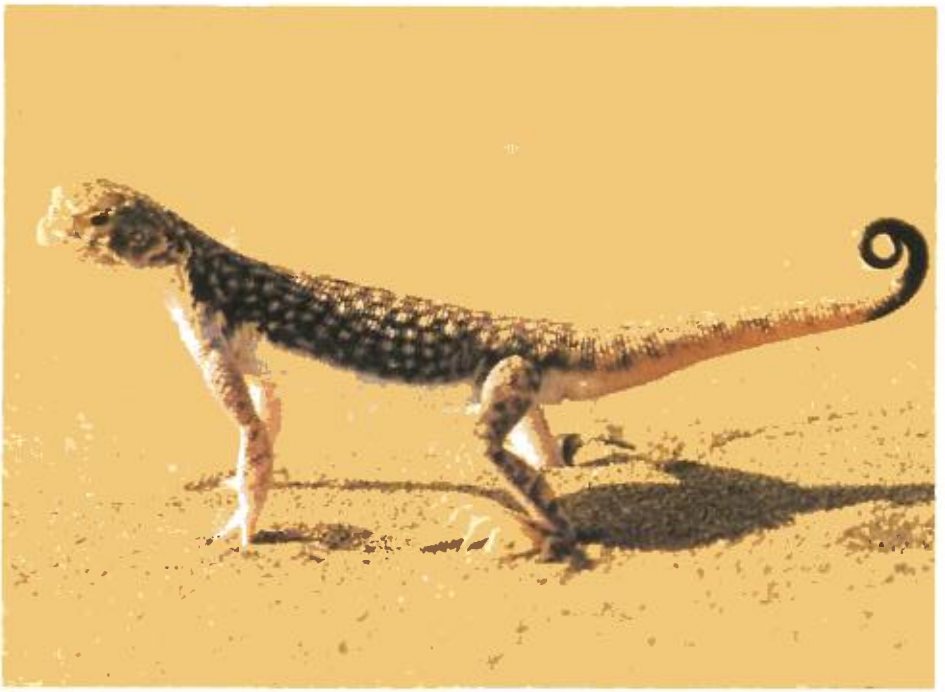


Plate 1: *Phrynocephalus lutteoguttatus* with body well raised above the sand surface. Note the tail tip coiled up in typical defensive posture.

Plate 2: *Eristocophis macmahoni* photographed in situ having been exhumed after burying itself below the sand.

EXPLANATION OF TABLE

A. Species apparently endemic. The improbability of *Eremias regeli* being synonymous with populations in Tadjikistan warrants this inclusion.

B. Eastern/Oriental species restricted to this region on available information. For *Leptotyphlops blanfordi* see text.

C. Eastern/Oriental species which have also been taken in Baluchistan and/or S.E. Iran as well as Khost province in some cases. The implication is that those in category B may also be more widely found in the extreme eastern and southern parts of the country.

D. Species with a much broader distribution both within Afghanistan and in neighbouring territories.

Remarks: it cannot be assumed that this categorisation is completely correct but gives a good picture of species dispersal with certain reservations. Král (1969) lists a juvenile *Eremias persica* a few kilometers east of Jalalabad. This record seems suspect and may be based on misidentification, possibly with *Eremias regeli*. Furthermore the Table gives no indication of abundance. Some records are founded on single specimens.

TABLE OF SPECIES INHABITING THE KABUL RIVER VALLEY SYSTEM

A	B	C	D
Eremias aria	Agama agrorensis	Bufo stomaticus	Agama nupta
Eremias regeli	Tenuidactylus watsoni	Rana cyanophlyctis	Trapelus ruderata
	Ophisops jerdoni	Calotes versicolor	Tenuidactylus scaber
	Mabuya dissimilis	Uromastyx hardwickii	Mesalina watsonana
	Psammophis leithi	Eublepharis macularius	Psammophis lineolata
	Oligodon arnensis	Varanus bengalensis	Ptyas mucosus
	Xenochrophis piscator		Sphalerosophis diadema
	Leptotyphlops blanfordi		Naja oxiana
	Bungarus caeruleus		Echis carinatus
			Vipera lebetina

SPECIES NOTABLY ABSENT

Bufo viridis
Testudo horsfieldi
Trapelus agilis
Phrynocephalus species
Eremias persica
Eremias velox

COLLECTING SITES

In the text collecting sites are indicated by the distance in kilometres from the nearest town or village. Because of altitudinal differences and variety of habitat encountered over quite short distances in some instances precise localities are stated in the text. Only main reference points on the map.

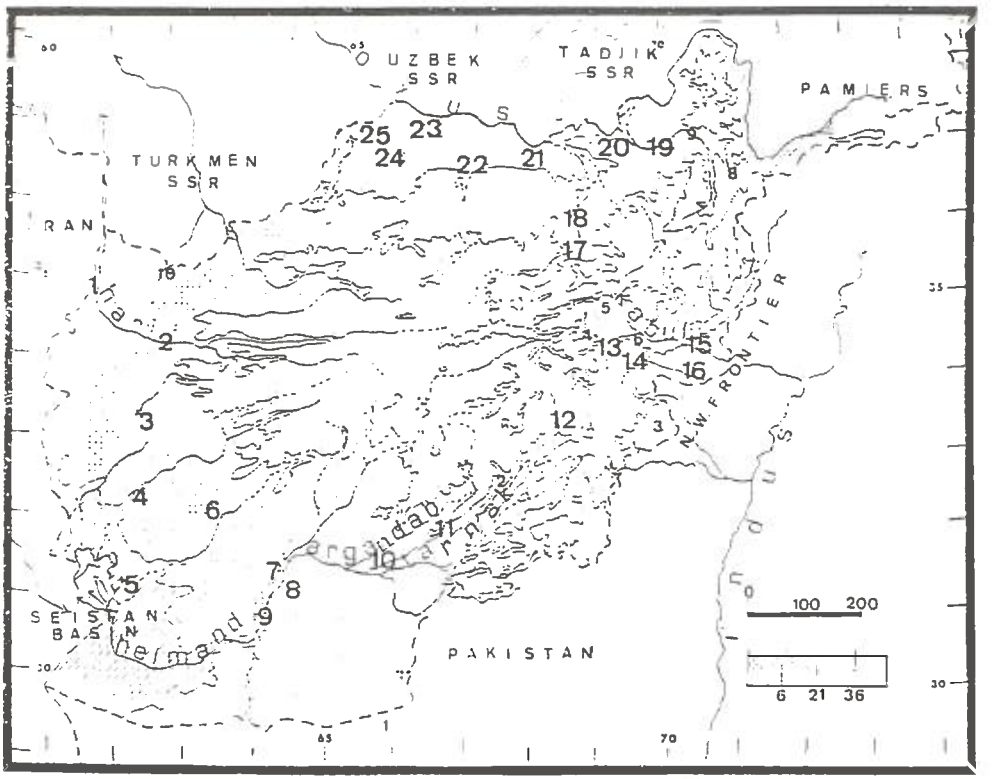
1. Islam Qala (frontier post)
2. Herat
3. Shindand (Sabzewar)
4. Farah
5. Juwain
6. Delaram
7. Girishk
8. Lashkargah (Chah-i-Angir)
9. Darweshan
10. Kandahar
11. Qalat
12. Ghazni
13. Kabul
14. Lataband
15. Jalalabad

16. Nimla
17. Pul-i-khumri
18. Khenjan
19. Taliqan
20. Khanabad
21. Tashkurgan
22. Mazar-i-Sharif
23. Aqcha
24. Sheberghan
25. Andkhoy

OTHER LOCALITIES

1. Nushki
2. Mucur
3. Khost
4. Paghmann
5. Charikar
6. Sarobi
7. Kamdesh
8. Zebak
9. Faizabad
10. Kushk

MAP OF AFGHANISTAN



LEGEND TO MAP OF AFGHANISTAN

Numbers referring to collecting sites are given in large: **4**

Numbers referring to other localities are given in small: 4

Rivers named in lower case

Distances in kilometres

Altitude contours in hundreds of metres

DATES ON WHICH PRINCIPLE COLLECTING SITES WERE VISITED

Herat – 24th February; 24th-29th March; 12th May
Shindand – 24th February

Farah/Juwain – 23rd-25th March
Delaram – 31st March; 11th May
Girishk – 26th-29th February; 21st March; 10th May
Lashkargah – 27th February; 13th & 14th March; 4th April
Darweshan – 14th-20th March; 1st-4th April
Kandahar – 28th & 29th February; 12th March; 6th & 7th April; 9th & 10th May
Qalat/Ghazni – 9th April; 8th & 9th May
Kabul – 5th-8th May
Jalalabad – 7th-10th March; 2nd-4th May
Northern Steppe & Desert including Pul-i-Khumri and Khenjan – 11th-25th April
Khanabad & Taliqan – 28th & 29th April

ACKNOWLEDGEMENTS

1. To the California Academy of Sciences, San Francisco, who partly funded the expedition. To Alan Leviton and Steven Anderson who confirmed identifications and to Jens Vindum, Collections Manager, who recently provided me with a computer print-out of specimens accessioned at the CAS. This enabled me to revise some of the nomenclature.

2. To the staff at the British Museum (Natural History) and specially to E.N. Arnold and A.F. Stimson for sight of papers dealing with the Afghan Herpetofauna.

3. To Henrik Bringsøe who provided me with the paper by Eiselt & Schmidtler dealing with *Bufo* and *Rana* systematics.

4. To the people of Afghanistan whom I met on my travels and who were always friendly and hospitable.

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LETTERS TO THE EDITORS

Dear Sir,

Snakebite Error

The article by Saul Halpern on snakebite in Bulletin No 32 made interesting reading but in particular demonstrated how some people seem to suffer ill-luck well beyond their deserved share. I refer to the picture of the poor chap with the appalling injury inflicted by *Echis carinatus.* Would you believe that this same individual suffered an identical injury illustrated in a paper by H.A. Reid et al. in The Lancet (1963), but that time after an encounter with *Ancistrodon rhodostoma?*

To be more serious, I discussed the Lancet paper soon after publication with the late Dr. Reid and I am almost certain the picture was taken by him at the Sungei Patani Hospital in Kedah, Northen Malaya. The casualty was a rubber estate employee and he had been bitten by *A. rhodostoma* in the course of his work. I have seen a number of bites by this animal and they were all rather an ugly sight, including my own hand after a single fang puncture in my right index finger. I have never seen the result of a bite by *Echis* though I believe them to be capable of equally or even more horrendous results.

Incidentally, the photograph shows the marks made on the arm to identify the points at which a series of measurements were taken, and the rate and degree of swelling were used to assess the degree of envenomation. Dr. Reid was a pioneer, if not the originator, of this aid to diagnosis.

Michael Buchanan-Jones, Perry's Acre, Micheldever, Hampshire SO21 3DR

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Ed. Note: The editors apologise for the mis-labelling of Dr. Halpern's slide – this was due to a printing error which we failed to notice before publication.

Dear Sir/Madam,

Dead *Varanus exanthematicus* wanted

I am currently carrying out a study on the "Sonographic anatomy of the Savanna or Bosc monitor *Varanus exanthematicus*" using real time ultrasound, with a colleague Dr Claudia Gili. We need to describe the normal sonographic anatomy to aid the diagnosis of abnormalities in this and similar species.

For this study we need dead specimens of this species, preferably frozen, in order to determine the normal anatomy. To our knowledge, no detailed studies have been carried out on the anatomy of this lizard. We hope that you will be able to help us by placing a request in your newsletter for any dead specimens which your members have or hear about over the next six months. We would be willing to collect or pay for a carrier. I should stress that it needs to be *V. exanthematicus* and no other species.

Thank you very much for your help in advance,
Yours sincerely,
A.W. Sainsbury, MRCVS, The Zoological Society of London Institute of Zoology, Regent's Park, London NW1 4RY

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