

NOTES ON SOME RODENTS FROM SAUDI ARABIA AND KUWAIT

BY

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The following notes were made on specimens collected while travelling in the Arabian peninsula on desert locust control chiefly during the year 1946 which was a particularly good rat year following the good rains and consequent abundant herbage of the 1945/46 season.

The author is much indebted to the authorities at the British Museum for determinations and for the taxonomic characters which are included under each species.

1. *Tatera indica* Hardwicke

This is a large grey rat (♀ specimen, H & B. 20.5 cm., tail 22 cm.) living in warrens with large entrance holes. Nocturnal.

Tatera was only collected at one place in Arabia and that was in the immediate vicinity of some wells in a shallow depression just to the south of Kuwait town, on 15-3-46. Here a thriving colony existed. This species was unknown to a Nejdi Arab and indeed no rat holes so large as those of these Kuwait warrens were seen anywhere in Saudi Arabia.

The warrens were dug in firm sand which was quite bare of vegetation during the greater part of the year due to the fact that any shrub suitable for fuel had been grubbed out and all the other herbage was heavily grazed by the flock of town goats which daily visited the wells during the hot season. Nevertheless, during the cooler part of the year, the depression supported a rich mat of annual herbage and occasionally crops were grown there.

Extralimital range, Central Provinces of India westward to Syria.

2. *Gerbillus cheesmani* Thomas

A beautiful pinky-sandy backed mouse with white underparts about the size of a large field mouse. Silky hairs present on the soles of its feet. No black hairs in the pencil at the end of the tail. Nocturnal. Vernacular name (Nejd) 'Jerdiya'.

This species is common in sandy places of eastern and N.-E. extra-tropical Saudi Arabia and Kuwait.

It is especially abundant amongst dunes of red sands where deep-rooted perennial shrubs such as *Calligonum* and *Ephedra alata* grow and where varied annual herbs spring up during the cool months following winter rains.

This mouse does not form warrens but lives in a small hole with a single entrance which it leaves open. The hole is often burrowed into the side of a sand hummock built-up around a bush. The species is not at all gregarious though two or three are usually about in the same vicinity.

Specimens from Al Saiyarat ($27^{\circ}10'N. \times 44^{\circ}50'E.$), 22-2-46; Kuwait ($29^{\circ}29'N. \times 48^{\circ}E.$), 15-3-46; Hafar el Batin ($28^{\circ}30'N. \times 46^{\circ}E.$), 17-3-46; Qariya ($27^{\circ}35'N. \times 47^{\circ}40'E.$)

3. ***Gerbillus dasyurus*** Wagner

A small desert mouse difficult to distinguish in the field from the next species, but the hairs of the upperside are clearer yellow without any greyish ones. Soles of hind feet are naked.

Common throughout central and east-central Arabia in limestone escarpment country overblown with red sand supporting steppe vegetation composed of perennial *Rhanterium eppaposum* with abundant and varied annual herbs and grasses in season.

Nocturnal. Feeds on seeds of annual herbs especially *Medicago*. Frequents small holes which are often under loose stone slabs. The entrance and often a chamber just within the entrance, are usually littered with the dry pods of its feasts.

Apparently not gregarious but often abundant where it occurs.

Specimens from Thamami wells ($27^{\circ}40'N. \times 45^{\circ}00'E.$), 24-2-46, ♂, H & B. 10 cm., T. 10.9 cm., H.F. 2.2 cm., E. 1.4 cm., Balum wells ($27^{\circ}15'N. \times 44^{\circ}00'E.$), 24-3-46, ♀, H & B. 8.5 cm., T. 10.5 cm., H.F. 2.4 cm., E. 1.2 cm.; and ♂ H & B. 8.5 cm., T. 12 cm., H.F. 2.4 cm., E. 1.2 cm., and ♂, H & B. 9 cm., T. 8 cm. (tip broken), H.F. 2 cm., E. 1.2 cm.

4. ***Gerbillus nanus*** Blanford (= *arabicum*).

A small desert mouse difficult to distinguish from the last; both are variable but in general *nanus* has shorter and greyer, less silky hairs on the back, and larger bullae. The soles of hind feet are naked. Nocturnal. Vernacular name (Nejd) 'Farr' plural 'Farran', (but this name also applied to rats and mice in general).

Probably commoner and more widespread over extra tropical Saudi Arabia than the last. This is typically a mouse of silty wadis draining escarpment (limestone) country where varied perennial vegetation occurs including trees (*Acacia*), shrubs (*Zizyphus* and *Lycium*) and woody herbs, (*Zilla spinosa*), and varied Chenopodiaceae, etc., together with a mat of annual herbage during the cool season. But *nanus* also extends into the habitat occupied by *dasyurus*.

This species lives in small holes burrowed in the sides of hummocks of firm silty soil and at least sometimes it occupies the holes of larger rats, e.g. *Psammomys*.

Specimens from Median Saleh ($26^{\circ}50'N. \times 38^{\circ}00'E.$), 27-4-46, ♂, H & B. 9 cm., T. 11 cm., H.F. 2.4 cm., E. 1.4 cm.; Rumaihiya ($25^{\circ}30'N. \times 47^{\circ}00'E.$), 26-2-46; Balum wells ($27^{\circ}15'N. \times 44^{\circ}00'E.$); 25-3-46; Thamami wells ($27^{\circ}40'N. \times 45^{\circ}00'E.$), 23-3-46; Artawiya ($26^{\circ}30'N. \times 45^{\circ}30'E.$), 20-2-46; Raudha Tinhah ($26^{\circ}15'N. \times 46^{\circ}00'E.$), 17-2-46.

5. ***Psammomys obesus*** Cretzchmar

A desert rat, rather larger than a common rat; upper parts distinctly yellowish at shoulders with rufous tinge on back. The absence of a groove on the outer surface of upper incisors distinguishes this genus from *Meriones*.

Strictly diurnal. Lives gregariously in warrens composed of large-mouthed holes marked by much excavated soil in front of the entrance. The warrens are situated on mounds formed round bushes of *Haloxylon* sp., a plant which provides this rat with both food and shelter and from which it seldom wanders during its hours of activity in the cool of the morning and afternoon.

This rat lives in very populous colonies and although specimens have only been taken in western Arabia at Median Saleh it almost certainly extends into central Arabia at Hail ($27^{\circ}30'N. \times 41^{\circ}45'E.$), but probably does not occur in the limestone escarpment country of eastern Arabia.

6. *Meriones buryi* Thomas

Very distinct from other members of the genus. Hind feet with naked soles. Colour about the same as that of a wild rabbit. Tail very dark. Diurnal in habits.

This is a species confined to S.-W. Arabia, Aden and the Yemen and in the highland trans-montane valleys of Asir in Saudi Arabia. In the last locality colonies occur in wadis draining the inland slopes to the east where large trees of *Acacia* and other robust vegetation provide thickest cover. Probably also the common rat of the terraced cultivated fields up to 8,000 ft. in the vicinity.

Buryi was collected only in the wady Hijla ($18^{\circ}20'N. \times 42^{\circ}35'E.$), 26-6-46, but in future it should be searched for in the Hejaz highlands as far north as Ashaira ($21^{\circ}40'N. \times 40^{\circ}40'E.$) where similar vegetation occurs and to which locality several other Yemeni faunal elements (especially birds) are known to penetrate.

7. *Meriones erythrourus* Gray

A medium-sized rat with the tail sometimes longer than head and body (measurements of some specimens, unsexed, H & B. 16 cm., T. 15 cm.). The upper parts of the body are sandy. Soles of hind feet hairy; skin on soles of hind feet black or dark coloured; nails black; hairs on top of feet yellowish; tail reddish-brown above with a pencil of black hairs at the end.

Very common and widespread at least in north-central and north-eastern Arabia where these rats live in small warrens of open holes usually made in sandy-silty hummocks around bushy vegetation especially in wady beds where varied herbage grows at certain seasons. Nocturnal. Excavate and feed on bulbs of *Iris* sp.

Juveniles, three parts grown, have been trapped in considerable numbers during March. Vernacular name (Nejd) 'Jerd' (*Meriones* in general).

Specimens from Artawiya ($26^{\circ}30'N. \times 45^{\circ}30'E.$), 20-2-46; Hafar et Batin ($28^{\circ}30'N. \times 46^{\circ}00'E.$), 15-3-46; Anaiza ($26^{\circ}05'N. \times 44^{\circ}00'E.$), 30-3-46, ♂, H & B. 15.5 cm., T. 16 cm., H.F. 3.7 cm., E. 2 cm.; Adwa near Hail ($27^{\circ}20'N. \times 42^{\circ}15'E.$), 9-5-46, ♀, H & B. 16 cm., T. 15 cm., H.F. 3.5 cm., E. 2.2 cm., Rumaihiya ($25^{\circ}30'N. \times 47^{\circ}00'E.$), 26-2-47.

8. *Meriones crassus* Sundevall

Distinguished from *erythraurus* by its slightly smaller size and by the tail being usually shorter than head and body (measurements ♂, H & B. 14 cm., T. 12.5 cm.; ♀, H & B. 15 cm., T. 14 cm.). Soles of feet and nails flesh coloured; tail cream coloured with blackish pencil of hairs at the end. Cranial characters distinguish the two species immediately, in *crassus* the auditory bullae being enormously developed.

Very common and widespread throughout Arabia, even extending into the tropics along the Tihama coastal plain. Lives in warrens which are sometimes of great extent. The warrens are very often made in silty flats which may support rich annual herbage after rain but are quite bare at other times of the year, though of course subterranean parts of the plants such as bulbs, tap-roots, seeds, etc., remain available to the rats as food during dry periods. Warrens have even been found on what are probably perennially barren flats where the only available food appeared to be grains of wheat, etc., which had fallen from passing camel trains. Common amongst *Rhantherium* steppe on limestone over-blown with sand where their food was chiefly seeds of *Medicago*. Feeds also on locusts (*Schistocerca*) when opportunity arises. Nocturnal, crepuscular and probably diurnal as well.

Specimens from Qunfidah (19° 10' N. × 41° 05' E.), Gariya (27° 35' N. × 47° 40' E.), Hafar el Batin (28° 30' N. × 46° 00' E.), 19-3-46, H & B. 15 cm., T. 14 cm., H.F. 3.2 cm., E. 1.6 cm.; Balum wells (27° 15' N. × 44° 00' E.), 25-3-46, ♀, H & B. 13 cm., T. 12 cm., H.F. 3 cm., E. 1.5 cm., 9-4-46, 10-5-46; Rumaihiya (25° 30' N. × 47° 00' E.), 26-2-46; Kuwait (29° 25' N. × 48° 00' E.), 15-3-46; Ajibba (27° 20' N. × 44° 20' E.), 24-3-46, ♂, H & B. 10 cm., T. 8.8 cm., H.F. 2.8 cm., E. 1.5 cm.

9. *Acomys dimidiatus* Cretzchmar

Rocky country, frequenting niches and crevices amongst boulders where annual herbage springs up in abundance after rains, and stony hills with scattered small trees and woody herbs or scanty cushion plants. These mice move with lightning rapidity amongst boulders but remain quite still while under cover. Food consists of seeds of various herbs and grasses. Special feeding shelters are frequent in which debris of their feasts are scattered about. Captive specimens drink water with avidity.

When alarmed the spines are erected causing the animal to appear much larger than it really is.

Much commoner in western Arabia, Hejaz, where suitable habitats are widespread. Apparently less common in central and eastern Arabia where specimens were only taken occasionally amongst limestone rocks.

Specimens from Rumah, Nejd (25° 30' N. × 47° 00' E.), 25-5-43; Shaib Hajlil (27° 30' N. × 44° 30' E.), 24-3-46, ♂, H & B. 11 cm., T. 11.3 cm., H.F. 1.7 cm., E. 2 cm.; Birka (27° 30' N. × 44° 30' E.), 6-6-46, ♀, H & B. 11 cm., T. 11 cm., H.F. 1.8 cm., E. 1.8 cm. and ♀, H & B. 12.2 cm., T. 12 cm., H.F. 1.7 cm., E. 2 cm., (4 foetae); Wady Liya near Taif (21° 15' N. × 40° 20' E.), 17-6-46, ♂, H & B. 11 cm., T. 10.5 cm., H.F. 1.9 cm., E. 2 cm., and ♂, H & B. 11 cm.,

T. 11 cm., H.F. 1.9 cm., E. 1.9 cm.; Abha ($17^{\circ}00'N. \times 43^{\circ}05'E.$), 21-6-46, ♀, H & B. 11 cm., T. 11.3 cm., H.F. 2 cm., E. 2 cm.

10. **Acomys russatus** Wagner

This species is recognised by its grey belly and feet and by the spines starting on head. Habitat similar to the last, the two species having been collected together at Wady Liya near Taif. Habits also similar.

Common in suitable rocky places in Hejaz and Jebel Shammar, Hail, in north-central Arabia.

Specimens from Wady Liya, near Taif ($21^{\circ}15'N. \times 40^{\circ}20'E.$), 17-6-46, ♂, H & B. 11.5 cm., T. 7.5 cm., H.F. 1.7 cm., E. 1.5 cm.

11. **Eliomys melanurus** Wagner

This dormouse, which had not previously been recorded from Saudi Arabia, was only collected upon one occasion. However, it appeared to be locally common in the district frequenting crevices in sand-stone outcrops.

Locality: Dar el Hamra station on the abandoned Hejaz railway ($26^{\circ}50'N. \times 38^{\circ}20'E.$), 24-4-46, ♀, H & B. 13 cm., T. 12 cm., H.F. 2.5 cm., E. 3 cm.

12. **Jaculus jaculus** Linnaeus

Common in sandy places, especially in eastern Arabia where its tracks may be seen all over the dunes, but as it is strictly nocturnal and retires by day below the ground blocking the hole behind itself, this species is seldom seen. Vernacular name, 'Jerboa'.

Artawaiya ($26^{\circ}30'N. \times 45^{\circ}30'E.$), 20-2-46.

STUDY OF THE MARINE FAUNA OF THE KARWAR COAST AND THE NEIGHBOURING ISLANDS

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PART IV: ECHINODERMATA AND OTHER GROUPS

(Continued from p. 41 of this volume.)

This is the concluding part of the series of articles on the marine fauna of the Karwar coast and neighbouring islands. It deals mainly with the Echinoderms and minor groups, while some vertebrate fauna has merely been referred to.

ECHINODERMATA

This group is easily recognised by the presence of some degree of radial symmetry, usually pentaradiate. They move about by means of their tube-feet which are arranged along the radii. All the five classes of this phylum are well represented in Karwar. In December 1949, representatives of all the five classes of Echinoderms were collected in Kamat's Bay alone. The most common echinoderms found here are the starfishes, sea-cucumbers and sea-urchins. The larval forms have also been observed in the plankton.

ASTEROIDEA

Astropectinidae:

Astropecten is the only starfish that has been collected in good numbers. They are easily recognised by their five slender arms bordered by a row of large plates. These marginal plates are conspicuous and bear spines on their outside. The tube-feet have no suckers and they are pointed at their tips. There is no anus. They are usually found half buried in sand, exposed at low tide. They have been collected in large numbers in the southern region of Karwar Bay and also in Kamat's Bay from November to January. During the rest of the year they are only occasionally seen on the shores.

OPHIUROIDEA

Ophiothricidae:

A number of small brittle-stars have been collected from among the sponges and the ascidians encrusting the rocks in Kamat's Bay. They all belong to the genus *Ophiothrix*, recognised by their distinct central disc and long slender arms which are covered with fine serrated spines. They are greyish in colour and are seen struggling with their

long arms when the encrusting sponges and the ascidians are scraped off from the rocks. The number of arms in these brittle-stars varies from three to seven.

HOLOTHUROIDEA

H o l o t h u r i i d a e:

The sea-cucumbers are quite common in Karwar. They have been collected in Devagad Island and Kamat's Bay. *Holothuria atra* (Jager) is the only species collected in this area. They are elongated sausage-shaped animals without any arms. Their skin is very thick, leathery and is pigmented with purplish brown. At low tide, they can easily be observed half buried in sand in the crevices of rocks. They are very common at the northern end of Kincaid Bay and they have also been collected from Devagad Island. Those found in the latter area were very big, measuring about twelve inches in length.

ECHINOIDEA

Two families of sea-urchins, Temnopleuridae and Stomopneustidae are represented in Karwar. Only a few specimens of the former have been collected occasionally. Stomopneustidae are available in good numbers.

T e m n o p l e u r i d a e:

This family is represented by two genera in Karwar. *Temnopleura* is the commonest and has been collected in Kamat's Bay. It is a small form covered with slender spines which have faint brown bands. Live specimens have been collected in the crevices of rocks. Occasionally entire coronas are cast upon the shores and a few have been collected in Karwar Bay and Kamat's Bay. The corona is greyish in colour with very small tubercles arranged in two vertical rows in each area.

The other form is represented by only two specimens, probably belonging to the genus *Salmacis*. They have been found on the surface of the rocks in Kamat's Bay. They are fairly large in size covered with fine slender banded spines.

S t o m o p n e u s t i d a e:

Bits of the corona and spines of *Stomopneustes* have always been collected washed ashore on almost all the beaches of Karwar. Occasionally a number of entire spines in heaps have been seen on the rocks which were slightly above the high tide level. Sometimes half-broken coronas have also been collected. These sea-urchins are recognised by the presence of big tubercles on their coronas and broad ambulacral areas. The spines are long, thick and of a deep violet colour. At the northern end of Kincaid Bay these sea-urchins are found in large numbers attached to rocks, which are always submerged in water. They have been collected from about one to two fathoms deep. It is said that they are available in large numbers in the Devagad islands also.

CRINOIDEA

Mariametridae:

A good number of feather-stars have been collected in the southern corner of Kamat's Bay only once in the month of December, 1949. They belong to the genus *Lamprometra*. The tide was low at the time of collection and they were found in a large depression of the rock covered over by water. It was a very interesting sight to see the continuous wriggling of the fine plumed arms of the animals and also the peculiar experience of the sticky feeling of their touch. They are flower-like in appearance with forty pinnate arms and a bunch of cirri at the base of the calyx. They were deep brown in colour with white blotches all over.

POLYZOA

This group is represented in Karwar by two families. They include plant-like colonial forms which are usually found in the shallow waters of the coast. Each colony consists of a number of individuals known as 'polyps' or 'zooids'. Each polyp is a cup-shaped structure with the mouth situated at the centre of the free end. The mouth is surrounded by a circlet of ciliated tentacles springing from an expanded base known as the 'lophophore'. They possess a U-shaped alimentary canal with the mouth and the anus at the same end. The colonies are usually fixed to some solid substratum. Their ciliated free-swimming larval forms have often been observed in the plankton.

Membraniporidae:

In Kamat's Bay *Membranipora* is quite common, growing on seaweeds and the rocks. They form white encrusting colonies in which the zooids lie flat on stones, shells or algae. The colonies are membranous and calcareous or semi-calcareous and hence they are popularly known as 'sea-mats'. Bivalve shells with dry colonies of *Membranipora* encrusted on their inner surface, are also washed ashore.

The other form is plant-like, found attached to empty shells or sea-weeds cast upon the shore. Occasionally a few such colonies have been collected on the Karwar beach. These colonies are small, transparent and dichotomously branched. They may probably belong to the family *Bicellariidae*.

BRACHIOPODA

This group includes solitary animals enclosed by a bivalve shell which is secreted by the surface of the body. They are popularly known as 'lamp shells'. The only representative of this group recorded in Karwar is *Lingula*. It belongs to the family Lingulidae and order Ecardines. The two valves of the shell are thin, horny, somewhat rectangular in shape and of equal dimensions. There is a long fleshy stalk passing out between the two valves. The two valves are held together by a set of muscles; there is no hinge. They live in deep vertical burrows in muddy sands. However, only dry shells of *Lingula* have occasionally been collected on the Karwar beach.

CHAETOGNATHA

This is a small group including transparent pelagic animals. They are small, worm-like and often observed in the plankton darting about and appearing like cellophane arrows. They are popularly known as 'arrow-worms'. The body of these worms is divided into head, trunk and tail, bearing fan-like transparent projections. The mouth is on the ventral side of the head surrounded by curved bristles. *Sagitta* is the common arrow-worm abundantly seen in the plankton and easily recognised by its graceful swimming movements and the two pairs of lateral fins.

UROCHORDA

These animals are mostly sessile growing permanently attached to rocks or sea-weeds. A few are pelagic. They are easily recognised by the jets of water coming out of their body, when the animals are disturbed. They are commonly known as 'sea-squirts'. The forms collected and observed in Karwar are mostly colonial animals of the 'Compound Ascidian' type, and probably they belong to the family *Botryllidae*. Some solitary forms—'Simple Ascidians', have also been observed in the shell debris ('shell sand'), attached to bits of shells and dry pieces of weeds. The compound ascidians are commonly seen between tide marks as massive colonies encrusting the rocks which do not face the breaking waves and they are also found in the crevices of the rocks. These animals are abundant in Kamat's Bay, Binge Bay and Kincaid Bay. The rock surfaces near the low tide mark are usually covered with these ascidian colonies along with sea-weeds and sponges. These encrustations harbour a variety of animals such as planarians, nemertine worms, polychaete worms, sipunculid worms, isopods, amphipods, prawns, crabs, nudibranchs, ophiuroids, etc.

The free-swimming larva of ascidians, popularly known as the 'Tadpole larva of Tunicata', is often seen in the plankton in good numbers. It is usually seen swimming about by means of a short straight tail containing the dorsal nerve-cord and notochord.

The plankton also contains the free-swimming pelagic solitary tunicate, *Oikopleura*. They are found in large numbers almost throughout the year. They can easily be recognised by the jerky movements of their large locomotor tail which contains the notochord. Their body is comparatively small and is periodically cast off.

HIGHER CHORDATA

In these groups no attempt has been made to make intensive collections and also to classify them in detail. However, all those specimens which were easily available on the coasts have been collected. The chordates are numerous even if only the different kinds of fishes caught in the nets are included; and they would be too many if they were to be dealt with here in detail. Hence only the names of those that have been collected on the shores and those that are commonly seen in the area are recorded here.