

jected to the anæsthetic action of ether, becomes insensible to the disturbances produced by induction-currents, even when these are very powerful. We wished to see whether this would be the case with the Sensitive Plant.

For this purpose we placed our plant under a bell-glass with two tubulatures, through which penetrated the copper wires serving to pass the induction current through the plant. A few drops of ether were poured into the interior of the bell-glass, and in a short time the plant had undergone the anæsthetic effects of the liquid; for, when shaken, it no longer closed its leaflets or manifested any sensibility. In this state we subjected it to the action of the induction-current; and then it gave no sign of sensibility: the petioles remained straight and the leaflets continued open.

These fresh experiments harmonize with all those which have been made upon this subject, and furnish an argument in favour of the opinion of those who think that the movements observed in these plants are effected by the intermediation of organs analogous to those possessed by animals.

VI.—*Revision of the Species of Hyrax, founded on the Specimens in the British Museum.* By Dr. J. E. GRAY, F.R.S., V.P.Z.S.

THE species of the *Hyraces* are well marked both externally and anatomically; but there is great confusion as to the names that have been given to them in the systematic catalogues.

Prosper Alpinus, in his list of animals of Egypt and Arabia, indicated a species of *Hyrax* under the name of *Agnus filiorum Israël*, which Shaw regarded as a large *Jerboa*; but Bruce corrected this error in his account of the *Ashkoko*.

Pallas described and figured the Cape species under the name of *Cavia capensis*, and Buffon as the *Marmotte du Cap*. It is well known to naturalists as *Hyrax capensis*.

Bruce notices a *Hyrax* under the name of *Ashkoko*, which he described as coloured like a wild rabbit, with scattered black bristles and white beneath. This well agrees with a *Hyrax*, now found in Abyssinia, Dongola, and Upper Egypt, which is in the British Museum. Bruce states that the animal is also found in Mount Lebanon and Arabia Petræa.

Schreber, who only knew the animal from Bruce's figure and description, applied to it the scientific name of *Hyrax syriacus*. The Asiatic species is very like the African; but I believe it is distinct; and in that case Schreber's name is

not applicable to the African animal to which Bruce gave the name of *Ashkoko* ("coloured like a wild rabbit, and white beneath"), and which has a yellow dorsal streak. Capt. Harris, who collected animals in Abyssinia, sent home several specimens of a large blackish *Hyrax* having a large black dorsal spot and grey beneath, which he says is called *Ashkoko* by the natives; but it can scarcely be the *Ashkoko* of Bruce, as it does not agree with either his description or figure: perhaps this name is generic. *Hyrax* is also called *Gike* in Abyssinia, according to Salt.

Mr. Tristram informs us that the *Hyrax* in Palestine and Sinai is called *Weber*, and *Thofun* in Southern Arabia. Bruce evidently confounds these *Hyraces* together as one species.

Several zoologists have doubted whether the *Ashkoko* of Bruce was distinct from *Hyrax capensis*: no one can doubt the fact who compares the two. But the large blackish animal which is also found in Abyssinia, and called by the same name as Bruce applies to his species, is so like the *H. capensis* that it would be doubtful if it is a distinct species, if there were not such a difference in the skull. Hemprich and Ehrenberg regard it as distinct, and call it *H. habessinicus*.

Hemprich and Ehrenberg, in the 'Symbolæ Physicæ,' described and characterized by their colours and osteological characters four species of *Hyrax*, viz.:—1. *H. capensis*, 2. *H. syriacus* vel *sinaiticus*, 3. *H. habessinicus*, 4. *H. ruficeps* vel *dongolicus*. They figure three; for the dark animal figured with *H. syriacus* represents a young *Hyrax habessinicus*.

There is no specimen in the British Museum that has a red head, although Prof. Ehrenberg called one of his species *H. ruficeps*; but I think that probably he gave that name to the species which we received from Dr. Rüppell as *H. abyssinicus*, and which I believe to be the *Ashkoko* of Bruce.

There are specimens of four distinct species in the British Museum that have a more or less distinct yellow dorsal streak; and there is another, discovered by Dr. Welwitsch. Four came from Africa, and one from Arabia in Asia. They differ from each other in the texture and the general colour of the fur and of the hairs of which it is composed. Most probably two of these are the species with yellow dorsal spots, characterized by Hemprich and Ehrenberg, viz. *Hyrax syriacus* or *sinaiticus* of Asia, and *H. ruficeps* vel *dongolicus* of Africa.

Two of these species have rather harsh rigid hairs.

Three specimens of the first were sent from Upper Egypt by Mr. James Burton. They are larger in size and much paler in colour than the other species of the group, and very slightly punctulated with black. They have the dorsal

streak comparatively slightly marked and of a pale colour, and the fur is short and close. There is a single young specimen, received from a French collector as from Senegal, very like those from Egypt, showing that this species has a very wide distribution in Africa.

The second, of an iron-grey colour, was brought from Angola by Dr. Welwitsch. Dr. Peters names it *H. arboreus*; but it is quite distinct from that species. I have called it *H. Welwitschii*.

The other three species have very soft close fur; and they differ from one another in the colour of the fur and of the separate hairs. The first, which I believe is the *Ashkoko* of Bruce, is very like a wild rabbit in general colour, and is white below; the hairs have a black subterminal band and a yellow tip, which gives the fur a minutely and closely punctulated appearance. The second is somewhat like the former, and also said to come from Abyssinia; but the fur is pale yellow grey, minutely and slightly varied with black hairs, but not punctulated, and the hairs have no subterminal band; and the underside is yellowish. The third, which is the species found in Palestine and Arabia, is of a nearly uniform reddish-yellow colour, and has longer and softer hairs of a nearly uniform colour.

Sir Andrew Smith, in the Trans. Linn. Soc., described a South African species under the name of *H. arboreus*; and Mr. Fraser described a West African species under that of *H. dorsalis*. Both these species are distinguished by having a white dorsal spot. The type specimen described by Mr. Fraser, and a young specimen received from Sir Andrew Smith of his *H. arboreus*, are in the British Museum.

M. Blainville and other French zoologists have confounded the *H. dorsalis* of West Africa with the *H. arboreus* of the Cape, which are most distinct species, as proved by the types in the British Museum. Dr. Peters described the *H. arboreus* as found on the coast of Mozambique and also in the interior at Tete.

The animals with the white dorsal spot have a very different skull and teeth from the other species which have a black or yellow dorsal spot. Sir A. Smith observed the peculiarity of the teeth when he described *H. arboreus*.

The colour-spots on the back consist of the hair that covers the situation of a dorsal gland on the vertebral line, about halfway between the shoulders and the pelvis.

In the species which have the hair yellow or white the streak is generally narrow and linear; in the species in which the spot is black, it is generally broad and diffused. In some

specimens of *H. sinaiticus* the yellow streak is deeper and brighter-coloured than in others. It appears more marked in the younger and smaller specimens in the British Museum than in the larger and older ones; and it is rather indistinct in the two skins which I believe may be *H. ruficeps* from Abyssinia.

Professors Hemprich and Ehrenberg proposed to use the form of the interparietal bone as a distinctive character for the species: thus they described it as large and trigonal in *H. capensis*, small and pentagonal in *H. syriacus*, large and nearly tetragonal in *H. ruficeps*, and large and semiorbicular in *H. habessinicus*.

M. de Blainville, in the 'Ostéographie,' "Onguligrades," figures the hinder part of the skull of three species to show the interparietal bone; he figures it as elongate and subtriangular in *H. syriacus*, large, broad, and roundish four-sided in *H. capensis*, and very broad in *H. ruficeps*. The part figured as the interparietal in the last species is the broad upper edge of the occipital bone.

Dr. G. v. Jaeger, who has several skulls from the Cape, collected by Dr. Ludwig, and from North Africa by Dr. Heuglin, has written an essay to show that the interparietal bone of the same species varies much in form and size; he figures ten varieties of it in *H. capensis* and three in *H. habessinicus*. He seems to have confounded two species under the latter name, for fig. 14 is evidently a *Dendrohyrax*, Dr. Jaeger having mistaken the broad upper edge of the occipital bone for an interparietal: he also figures the interparietal of a species sent from West Africa by Mr. Dieterle, which he names *H. sylvestris*, which is also a *Dendrohyrax*; but the interparietal is of a very different shape from those of the two skulls of the West African *D. dorsalis* in the British Museum.

Dr. Jaeger shows that the interparietal is variable in shape in *Cavia aguti* (Würzb. naturw. Jahresb. 1860, xvi. p. 158, t. 2).

There is considerable difference in the form of the bladebone in the genera *Hyrax* and *Dendrohyrax*. In *Hyrax* (Nos. 724 *b*, 724 *g*, & 724 *h*) it is elongate, half as long again as broad, with a short, broad process at the lower side of the condyle. In *Dendrohyrax* (No. 1142 *b*) the bladebone is broad, irregular, four-fifths as broad as long, with an elongate compressed process on the lower side of the condyle; the lower edge of the bone in *Hyrax* is sloping for half its length, and then nearly straight; in *Dendrohyrax* this edge is arched from the condyle to the end, the broadest part being near the middle of the lower edge (see Cuvier, Oss. Foss. t. 3. f. 1; Blainville,

Ostéog. t. 3). The following are the measurements, in inches and lines :—

	<i>Hyrax</i> , 724 b.		<i>Dendrohyrax</i> , 1142 b.	
Length of upper edge	2	2	1	9
" lower edge	2	1	1	7
Width at widest part	1	7	1	6

Skulls with the teeth in change show the milk- and permanent cutting-teeth at the same time, thus having four upper cutting-teeth. A skull with teeth in this state is figured by Cuvier (Oss. Foss. ii. p. 135, t. 2. f. 5).

In most skulls there is a small hole on each side near the back edge of the cutting-teeth, which Cuvier calls the *trous incisifs* (t. 2. f. 2 n); see also Jaeger, Würzb. naturw. Jahresb. 1860, xvi. t. 2. f. 20 x, who regards it as the remainder of a deciduous second cutting-tooth. This pit is less distinct and nearer the base of the cutting-teeth in the skull of *Dendrohyrax*.

Professors Hemprich and Ehrenberg propose as a specific character the length of the feet compared with the tibiae; but this is difficult to observe in dried specimens or in set-up skeletons, as the length of the feet must depend greatly on how the specimens are mounted.

It is the fashion with certain naturalists (as M. Claparède, for example) to find fault with zoologists for describing specimens in museums; but, as far as mammalia are concerned, it is much more difficult to describe them from living specimens; for then one cannot observe their teeth and bones, or compare many specimens with one another, and can rarely have the opportunity of comparing several species at the same time,—all much greater evils than not being able to tell the sex &c. of the specimens contained in museums. I must say that I think the accusation that “museums are a great incubus to science” must have arisen from the naturalist making it taking a very limited view of the subject. Museums may cause some evil (what does not?); but the advantages of a large collection far exceed any evil I have ever experienced or can ever conceive to arise from them.

Fam. Hyracidæ.

Nose blunt, without horns. Body covered with hair, with scattered longer bristles; toes rather elongate, blunt, with flat claws. Tail short or none produced. Teeth 34: incisors $\frac{1.1}{2.2}$, canines $\frac{0.0}{0.0}$, premolars $\frac{4.4}{4.4}$, molars $\frac{3.3}{3.3}$.

Hyrax, Hermann *Lipura*, Illiger; *Hyracidæ*, Schinz, Syst. Mamm. 338.

The species may be thus arranged:—

1. HYRAX.

- | | | |
|------------------------|----------------------------|------------------------|
| a. Dorsal spot black. | 1. <i>Hyrax capensis</i> . | South Africa. |
| b. Dorsal spot yellow. | | |
| * Fur harsh | 2. <i>H. Burtonii</i> . | North and West Africa. |
| | 3. <i>H. Welwitschii</i> . | Angola. |
| ** Fur soft | 4. <i>H. Brucei</i> . | Abyssinia. |
| | 5. <i>H. Alpini</i> . | Abyssinia? |
| | 6. <i>H. sinaiticus</i> . | Sinai. |
| 2. EUHYRAX | 1. <i>E. abyssinicus</i> . | Abyssinia. |
| 3. DENDROHYRAX . . . | 1. <i>D. dorsalis</i> . | West Africa. |
| | 2. <i>D. arboreus</i> . | South Africa, Tete. |
| | 3. <i>D. Blainvillii</i> . | (Skull only.) |

These animals form themselves into three very natural groups or genera, according to their skulls and teeth.

1. HYRAX.

Skull with a distinct narrow sagittal crest on hinder part of crown when adult; nose short. Diastema short, not equal in length to the outer sides of the first three premolars; grinders in an arched line; molars large, broad, square, much larger and broader than the compressed premolars, the first one very compressed. Orbit incomplete behind. Lower jaw very broad behind. Bladebone elongate trigonal.

Skull—nose short; forehead flat or rather convex below the orbit; orbit incomplete behind; the lower jaw much dilated behind. The diastema between the canines and the first premolar short, not so long as the outer edges of the first three premolars. Lower cutting-teeth elongate, narrow at the base, broader above, with three lobes; but the lobes are soon worn away, only leaving indistinct grooves on the surface of the teeth. The lobes of the lower cutting-teeth are distinct in the very young animals which have not yet cut their premolars and last grinder. The upper cutting-teeth of the milk series are rounded in front, broad and spathulate at the end; those of the adult series are trigonal, with a strong central keel in front. The grinders form an arched series; the true grinders large, much larger than the rather compressed premolars; the first (permanent) premolar (that is, the second in the series) small, compressed; the first premolar in the upper jaw of the milk series is triangular, with three roots, the two hinder ones being close together.

De Blainville, in the 'Ostéographie,' figures the skeleton and the skull of a species of this genus under the name of *Hyrax syriacus*; but I am not able to determine to which of the four species of this genus it belongs. *H. syriacus* has almost a generic signification.

The skull in the British Museum (725 *c*) that agrees with De Blainville's figure of the interparietal bone of *H. syriacus* is rather larger and has the front upper premolar rather larger than the skulls of *H. capensis* according with the same distinctive mark, viz. 724 *b*, 724 *c*, and 724 *d*, which were all received from the Zoological Society without skins; and the hinder openings to the nostrils are more contracted in those named *H. capensis* than in *H. syriacus*.

De Blainville (Ostéograph. t. 2) figures the skull of the very young *Hyrax capensis* as having all the four lower cutting-teeth three-lobed. They are so in a young skull so named in the British Museum; but the lobes are much less distinct and narrower than in skulls of the half-grown and adult *H. dorsalis* in the same collection; and the lobes of *H. capensis* evidently wear away much sooner than in the Tree-Hyraces or *Dendrohyrax*.

The skulls named *Hyrax capensis* in the British Museum, are without skins, and therefore cannot be determined with certainty; they differ in the width of the forehead at the hinder edge of the orbits being greater compared with the length of the skull; they differ considerably in the form of the flat space on the crown, even the skulls of adult animals.

No. 725 *c* (of Gerrard's Catalogue). The front of the crown is triangular, uniting into a very narrow sagittal crest level with a line over the condyles; the teeth are very large, and the palate wide.

No. 724 *b*. Rather smaller and wider than 725 *c*, with the teeth equally large and the palate wide; but the crown is flat, wider in front, becoming narrower and continued behind, and forming a smooth space above.

Nos. 724 *c* and *d* are smaller than either 725 *c* or 724 *b*. The teeth are very large, the nose is narrower and more compressed; and they differ from both the above in the crown being wider and forming a broad band to the occipital crest. In 724 *d* the crown is only slightly broader in front, and more nearly of the same width throughout its length. In 724 *c* it is quite as broad behind as in 724 *d*, but much wider in front.

The interparietal bones of these two skulls are visible; they are nearly four-sided, and the width of the crown, similar to, but not so large as the interparietal bone figured by Blainville (Ostéograph. t. 2) as that of *H. capensis*.

There is the skull of a young animal, with the milk cutting-teeth, developing the second true molar, in the British Museum (724 *g*), that has the interparietal similar to those of 724 *c* and *d*, but considerably larger, though the skull is smaller, like the figure referred to in De Blainville.

The skeleton with a skull (724 *e*), in the British Museum, of a young animal with milk cutting-teeth, has a subtriangular interparietal, somewhat like that of *H. Burtonii*.

In the British Museum there is the skull and skeleton of a very young animal, received from the Zoological Gardens (No. 724 *h*), which is peculiar for having a very broad, half-oblong interparietal bone occupying the hinder edge of the crown, with only the narrow upper edge of the occipital bone behind it. The front edge of the interparietal is regularly rounded, and the hinder one straight. The orbit is incomplete. De Blainville figures a skull of a young specimen (Ostéog. t. 2) as *H. capensis* which somewhat resembles this skull. This skull, in the form of the interparietal, agrees with the nearly adult skull of *Dendrohyrax dorsalis* (No. 1142 *c*); but we have a skull of a very young animal of that genus in the Museum Collection which has the orbit complete and the upper part of the occipital bone dilated. This skull is so distinct from any other in the collection that I propose to designate it provisionally *Hyrax semicircularis*.

The interparietal bone being on the edge of the occipital region of the skull is a character (as well as the incomplete orbit) that separates the skull of *Hyrax* and *Dendrohyrax*, even in the youngest state.

* *Dorsal spot black, well marked.* Africa.

1. *Hyrax capensis*. The Klipdas.

Fur black, minutely punctulated with white, with a black dorsal streak.

Hyrax capensis, Schreb. Säugeth. 920, t. 240; Cuvier, Oss. Foss. ii. 127, 141, t. 1, 2, 3; Gray, List Mam. Brit. Mus. 187; Gerrard, Cat. Bones Brit. Mus. 283; Blainville, Ostéograph. t. 2 (teeth & skull); W. Read, P. Z. S. 1835, p. 13.

Cavia capensis, Pallas, Misc. 34, 35; Spicil. ii. 22. t. 2.

Marmotte du Cap, Buffon, Suppl. iii. 177, t. 29.

Hab. South Africa, Cape of Good Hope. (Dr. Andrew Smith.)

Var. Dorsal streak indistinct.

Cape of Good Hope (Dr. Krauss). Skull and skeleton, B.M.

For anatomy, see Pallas, Miscell. *l. c.*; Owen, P. Z. S. 1832, p. 202; Martin, P. Z. S. 1835, p. 13; Murie, P. Z. S. 1865, p. 329.

But I am by no means sure that several species may not be confounded under this name; for all the specimens formerly received at the Zoological Gardens were called *H. capensis*.

** *Dorsal streak yellow, linear.*

a. *Fur harsh.*

2. *Hyrax Burtonii*.

Fur rather harsh, pale yellow grey, very slightly punctulated with blackish; dorsal streak small, yellow; the hairs of the back rather rigid, black or dark brown nearly the whole length, with a moderate yellow tip; underside pale yellow; interparietal bone half-ovate, as long as broad.

Hyrax syriacus, Gray, List. Mam. B. M.

H. abyssinicus, Burton, MS. B. M.; Gerrard, Cat. Bones B. M. 284.

Hab. North Africa, Egypt (James Burton, Esq.): three specimens and a skull in B.M. Senegal (Parzudaki): a young specimen in B.M.

The imperfect skull sent by Mr. James Burton from North Africa, with the skins, which I have named *H. Burtonii* (No. 725 *b*), is not quite adult, as the hinder or third upper true molar is not quite developed. It is very like No. 724 *c* in size, form, and in the form of the crown; but the notch left by the interparietal (for it is lost with the hinder part of the skull) shows that that bone was of a half-oval shape, and rather longer than broad, being rather wider but not near so long compared with its width as the interparietal figured as that of *H. syriacus* by De Blainville (Ostéograph. t. 2). This skull differs from those numbered 724 *c* and *d* in being higher behind when placed on its upper grinders, and in the forehead being slightly more convex in the middle below the orbit.

3. *Hyrax Welwitschii*.

Fur short, rather harsh, iron-grey-grizzled; hairs of upper part of the back black, with a large white subapical ring; of the sides dirty brown, with a white ring; dorsal streak yellow, moderate.

Hyrax arboreus, Peters, P. Z. S. 1865, p. 401 (not A. Smith).

Hab. Rocky places on the shores of the River Maiomba, in the district of Mossamedes (Welwitsch, *l. c.*).

The adult skull of *H. Welwitschii*, lent to me by Dr. Welwitsch, differs from all the preceding in being considerably broader in proportion to its length. The nose is compressed, the crown is flat to the occipital ridge, wide in front, and gradually narrowing behind. The interparietal bone (which is partly destroyed by a hole made to extract the brain) is very small and nearly triangular; the teeth are large, and the palate rather narrow, compared with the other skulls. The diastema

is very short, not exceeding the length of the outer side of the first two premolars. The shortness and width of this skull at once separate it from the skulls of all the species of true *Hyrax* that are in the Museum Collection. This species is only known from a flat skin and a skull collected by Dr. Welwitsch and named by Dr. Peters as above.

Dr. Peters, in a note to me, observes, "I probably made a mistake, and the *Hyrax* (Proc. Zool. Soc. 1865, p. 401) with rather harsh and short hair does not belong to *H. arboreus*, Smith. It has, if I am not mistaken, much shorter ears than *H. arboreus*; and therefore I said the *H. arboreus* has much shorter ears than *H. capensis*, which is not the case. Dr. Welwitsch's specimen resembles more the *H. habessinicus* of Ehrenberg in this respect, and may prove to be identical with that species."

I may add that it differs from *H. abyssinicus* in the skull, the short diastema, and the colour and nature of its fur. It is more allied to *H. Burtonii*, but differs in the colour of the fur. It is very difficult to state the size of the ears of the different species from stuffed or dried skins.

Dr. Welwitsch says, "It always differs by its larger size from a second species living in the interior of Angola." I have not seen any specimens from the latter locality.

b. *Fur soft, close.*

4. *Hyrax Brucei*.

Fur soft, close, yellow grey brown, closely and minutely punctulated with black; underside white; dorsal streak distinct, dark reddish yellow; hairs of the back soft, dark grey brown, with a narrow subterminal band and a yellow tip. *Skull*: interparietal bone oblong, longer than broad.

Ashkoko, Bruce's Travels, t.

Daman d'Israël, Buffon, Suppl. vi. 276, t. 24 (from Bruce).

Hyrax syriacus, Schreb. Säugeth. iv. t. 240. 13 (from Bruce); Blainville, Ostéograph. t. 2 (skull and teeth).

Hyrax abyssinicus, Rüppell, MS. B. M.; Gerrard, Cat. Bones B. M. 284; Burton, MS. B. M.

?*Hyrax ruficeps* vel *dongolanus*, Ehrenberg, Symbolæ Phys. t. 2 (not Blainville).

Hab. Africa, Abyssinia (Dr. Rüppell): type in B.M.
?Dongola (Ehrenberg): adult skull in B.M.

The name of *H. syriacus* cannot be retained for this species, as it does not come from Syria.

Dr. Peters, in a note which he sent to me respecting Ehrenberg's specimen in the Berlin Museum, observes, "His *Hyrax ruficeps* is hardly different from *H. syriacus*." By the second

name which Ehrenberg gives to this species it evidently came from Dongola in Africa; so it can scarcely be the *H. syriacus* of Ehrenberg from Mount Sinai.

5. *Hyrax Alpini*.

Fur very soft, rather long, pale yellowish brown, very slightly washed with blackish; hairs soft, of uniform length, blackish brown, with yellow tips, and a few scattered black hairs: lips, chin, throat, chest, belly, and inner sides of the limbs pale reddish yellow; hairs yellow to the base: crown and cheeks grizzled, with white tips to the hairs; hairs at the outer base of the ears yellow white; dorsal spot small, reddish yellow.

Hab. North Africa, "Abyssinia (Leadbeater)."

There is only a single specimen of this species in the British Museum; it was purchased in 1843, with the skin of a *Capra nubiana*, from Mr. Leadbeater, who said they came from Abyssinia. The special habitat may be doubtful; but there is no doubt they were from North Africa, and probably from the borders of the Nile.

It agrees with the *H. Brucei* of Abyssinia in the softness of the fur, but differs from it in its general colour, not being closely punctulated, and also in the separate hairs not having any indication of the subterminal black band that produces the punctulated appearance of the fur of that species; and the underside of the animal is yellower. It differs also from *H. sinaiticus* in the general colour being much darker and slightly washed with black, and in the dark colour of the hairs.

H. Burtonii, which we received from Mr. James Burton, with specimens of *Capra nubiana*, is at once known from it by the rigid harshness of the fur, as well as by the colour of the hairs.

6. *Hyrax sinaiticus*.

Fur rather long, soft, pale yellow brown; dorsal streak bright yellow; head and front slightly punctulated with whitish; chin, throat, and underside of the body pale reddish grey. "Interparietal bone small, pentagonal" (Ehr.).

Hyrax syriacus vel *sinaiticus*, Hemp. & Ehrenb. Symb. Phys. t. 2, lower front figure (not Schreber).

Coney (*H. syriacus*), Tristram, Nat. Hist. Bible, p. 75 (not figured).

Uabr, Forsk. Fauna, p. 5.

Hab. Asia, Palestine (Tristram): B.M. Arabia, Mount Sinai (Ehrenberg).

There is a young specimen in the British Museum, that was

purchased at a sale with *Capra nubiana*, which appears to belong to this species; it has the same long hair and fur, showing no sign of the punctulation characteristic of the African species with a yellow dorsal spot.

Mr. Tristram gives a good account of the habits and manners of this animal in his interesting 'Natural History of the Bible,' published by the Christian Knowledge Society.

2. EUHYRAX.

Skull with a distinct narrow sagittal crest the whole length of the crown when adult; occipital not dilated above; nose elongate, produced. Diastema elongate, longer than the length of the outer sides of the first three premolars; grinders in a nearly straight series; molars square, larger than the compressed premolars. Orbit incomplete behind.

The skull is very similar to that of *Hyrax syriacus*?, *H. Brucei*, *H. Burtonii*, and *H. capensis* in general form; but the space between the upper cutting-teeth and the first premolar is nearly twice as long as in those species. In the *H. Brucei* it is as long as the length of the outer sides of the first three premolars and the half of the fourth one; in *H. capensis* it is only as long as the outer sides of the first two premolars and one-third of the third one. The grinders are large, the first upper one being compressed as in *H. capensis*; but they are all smaller, compared with the size of the skull, and are placed in a straighter line, than they are in the other skulls of the species named, and the inner sides of them are more nearly parallel, so that the palate is scarcely wider in the middle of the series of grinders than it is at the front and hinder ends of them. Lower jaw dilated behind. The bladebone elongate trigonal like that of *Hyrax*.

I may observe that Mr. Gerrard, in his 'Catalogue of Bones of Mammalia in the British Museum,' has pointed out that there is a distinction in the skeleton between this species and *H. capensis*. He states that the specimen 724 *a*, in his Catalogue, "has twenty-two pairs of ribs, the first of which are articulated to the last cervical vertebra, and five sternal bones," the *H. capensis*, 724 *b*, in the same collection having only twenty-one pairs of ribs and seven sternal bones. (See Cat. Bones, p. 283.)

It is well worthy of observation that all these osteological characters exist in two species scarcely to be distinguished by their skins. The skull of *Euhyrax abyssinicus* is intermediate between *Hyrax* and *Dendrohyrax*, but more allied to *Hyrax*.

Euhyrax abyssinicus.

Fur blackish, minutely punctulated with white, with a black dorsal spot.

Hyrax habessinicus, Hemp. & Ehrenb. Sym. Phys. (specific characters).

Hyrax abyssinicus, Gieber, Mam. 213.

H. syriacus, Hemp. & Ehrenb. Symb. Phys. t. 2 (hinder figures only).

Hab. Abyssinia, Ankober, Dec. 1847 (male and female); called "Ashkoko" (Capt. Cornwallis Harris). B.M.

Ehrenberg describes the interparietal of *H. capensis* as triangular, and of *H. habessinicus* as semiorbicular, and the space between the canine and grinders of *H. habessinicus* as being longer than in *H. capensis*; he also says that the fur of *H. capensis* is soft, and of *H. habessinicus* more rigid; but I cannot discover any appreciable difference in this respect between the Cape and the Abyssinian species.

The skull of the adult *Euhyrax abyssinicus*, from the Abyssinian skin, is larger than that of any species of *Hyrax*, and nearly as large as that of *Dendrohyrax dorsalis*; it is narrow, and the smooth space on the crown is linear, of nearly equal width from a line on a level with the front of the condyles.

The second skull (from the skeleton No. 724 a) which I believe to belong to this species, has decayed grinders, having been kept in confinement. It is very like the type specimen, but it is rather shorter, and the hinder part of the crown or sagittal crest is narrower. This skull is exceedingly like the skull figured with its skeleton under the name of *Hyrax syriacus* by M. de Blainville (Ostéograph. t. 1 & 2). It differs from the figure a little in the form of the process of the lower jaw in front of the condyle; but in this respect it also differs from the type specimens of *Euhyrax abyssinicus*. In both skulls the upper edge of the occipital bone is narrow, as in *Hyrax*.

Dr. Peters has, since the above was written, sent me the following observations on Professor Ehrenberg's specimen in the Berlin Museum:—" *H. habessinicus* is a very good species, and may prove to be the same as the *H. dorsalis*. There is a figure of a younger specimen in his work 'Symbolæ Physicæ,' Mammalia, pl. 2. f. 2, together with *H. syriacus*. As you will see from the text, the skull is quite different from that of *H. capensis*, *H. syriacus* (*ruficeps*), and *H. arboreus*. The zygomatic arch is lower than on its junction with the zygomatic process of the maxillary bones; but the teeth are small, as in *H. arboreus*. The hair is harsh, black and grey; and the hair of the belly is much shorter, greyish, sometimes yellowish, without soft fur."

"The skull of my specimen from the coast (regarded as *H. arboreus* in the 'Mammalia of Mossambique') agrees pretty well with that of *H. habessinicus* and with another skull sent by Heuglin from Abyssinia. I cannot understand how this species could be confounded with *H. capensis*."

I may add that *H. abyssinicus* cannot be *H. dorsalis*, as the former has a black and the latter a white dorsal spot, which is well marked in both species.

3. DENDROHYRAX.

Skull rather elongate, with a broad flat crown, separating the entire length of the temporal muscle in the adult animal; nose elongate, produced. Diastema elongate, longer than the length of the outer sides of the first three premolars; grinders and premolars in a nearly straight line, and nearly of the same form, the front premolar being only a little smaller. Orbit complete (or incomplete even in a mature skull).

Nose rather produced; forehead flat; temporal muscles moderate, separated in the adult skull by a broad flat crown; the upper edge of the occipital bone thick, broad, forming part of the crown; lower jaw broad, rounded behind. Lower cutting-teeth moderately long, rather contracted at the base; upper edge dilated and divided into three nearly square, rather spathulate lobes. The lower cutting-teeth are rather elongated in the older animal, but never so long and slender at the base as in the true *Hyraces*. The upper cutting-teeth of the milk series are rounded in front, and obliquely truncated, spathulate at the end. The canine of the adult series is trigonal, with the keel in the front as in the true *Hyraces*. The diastema between the canine and the first premolar, in the adult skull, is elongate, as long as the outer margin of the three premolars. The grinders form a very slightly arched series. The true grinders moderate, not much larger than the broad square premolars. The first permanent premolar nearly as large as the second one.

The skull of *Dendrohyrax dorsalis* may be known from those of *Hyrax* and *Euhyrax*, in the youngest state, by the large size of the half-oblong interparietal bone, which is nearly twice as wide as long. In the nearly adult skull it occupies the whole space of the hinder part of the crown. The skull of this genus is also peculiar for the upper part of the occipital bone being produced and expanded, and forming the hinder part of the crown, the hinder edge of the flattened part being keeled and sharply produced in the centre.

There is the skull, with only a few teeth, of a very young

animal in the British Museum (No. 724 f) that agrees with the skull just described in having the upper part of the occipital bone broad and forming part of the crown, and in having complete orbits. It also has a very large, broad, transverse interparietal bone, nearly as wide as the convex crown of the skull; but this is four-sided, and twice as wide as high, as if formed of two squares united in the middle; the outer sides of the bone are rather angular in the middle. I suspect this is the young animal of *D. dorsalis*.

a. Orbit complete. Dendrohyrax.

1. *Dendrohyrax dorsalis*.

Fur rigid, bristly, blackish; dorsal spot elongate, pure white. Young—fur soft, silky, reddish brown; back with a broad dorsal streak.

Hyrax dorsalis, Fraser, Proc. Zool. Soc. 1852, p. 99; Verreaux, Cat.

H. abyssinicus, Read, MS. Mus. Zool. Soc.; Gerrard, Cat. Bones B. M. 284 (no. 725 a).

Hyrax arboreus, Blainv. Ostéogr. t. 2, skull and teeth (not A. Smith); Gerrard, Cat. Bones B. M. 284.

Hab. West Africa (Verreaux). Fernando Po (Fraser): B. M. Ashantee (Read).

There are two adult skulls of this species in the British Museum—one obtained from Fernando Po, and the other received from Mr. James Read, who obtained it from the cap of an Ashantee negro. In both the forehead is flat, rather concave between the orbits, and the orbits have a complete bony ring; they both agree exactly with the figure of the skull of *H. arboreus* in De Blainville's 'Ostéographie,' and with the skull without a lower jaw in the British Museum.

There are the skeleton and skull of a young specimen in the British Museum, purchased from Mr. Jamrach; and this skull agrees with the two adult ones in the concavity of the forehead over the orbits and the complete bony rings to the orbits.

2. *Dendrohyrax arboreus*. The Boomdas.

"Fur reddish fulvous, varied with black; sides reddish white mixed with black; underside and inner sides of limbs whitish; with a central white dorsal streak." (A. Smith.) Young—fur very soft, long, abundant, dark black grey, varied with paler grey; lips, chin, throat, underside of body, and inner sides of limbs white. B. M. Skull — ?

Hyrax arboreus, A. Smith, Linn. Trans. xv. p. 468; Peters, Mossamb. 182? (not Blainville); Kirk, P. Z. S. 1864, p. 656?

Hab. South Africa (A. Smith): a young specimen with *Ann. & Mag. N. Hist.* Ser. 4. Vol. i.

milk-canines, South Africa, from Sir Andrew Smith. Mosambique, Tete (Peters, Kirk).

There is no adult specimen of this species in the British Museum; there is a young specimen, with the milk-teeth, received from Sir Andrew Smith, the original describer of the species. It is so different from the young specimen of the West African species received from M. Verreaux, which agrees with the adult tropical species described by Mr. Fraser, in the British Museum Collection, that there can be no doubt that the South and West African species are distinct, though the French zoologists and osteologists have confounded them.

The young specimen is at once known from the young of *D. dorsalis* by the paler colour of the fur, the want of the dark dorsal streak, and the whiteness of the under surface.

Dr. Peters, in his 'Mammalia of Mossambique,' says that *D. arboreus* is the only species of *Hyrax* he found in Mozambique. It occurs near the capital of Mozambique, on the coast, and at Tete in the interior, where it is called *Mbira*.

It would be interesting to know if this is the same as *H. dorsalis*, as the latter occurs at Ashantee.

Common on rocky hillsides, living in colonies. Caught by spring-traps; flesh good to eat (Kirk, P. Z. S. 1864).

Dr. Peters, in a note to me respecting the *Hyraxes* mentioned in his 'Mammalia of Mossambique,' observes, "It may be that there are two species of *Hyrax* in Mossambique—one on the coast, and the other in the interior. From the coast I only got a female specimen: the skull of this species shows small grinders compared with those of *H. syriacus*, and seven in number." See further observations on this skull under *Euhyrax abyssinicus*. "The other specimen from the interior, the Carnera Hills near Tete, agrees perfectly with the *H. arboreus* from the Cape." This species is easily to be distinguished by its soft fur and want of rusty colour; the hairs of the under-side are white, and brownish grey at the base.

b. *Orbit incomplete*. Heterohyrax.

3. *Dendrohyrax Blainvillii*.

An adult skull in the British Museum (No. 724 e), without its lower jaw, was received from the Zoological Society without any habitat or history attached to it. It has small, more equal-sized molars and premolars, in a nearly straight line, and the great length of the diastema which is so characteristic of this section of the genus. It may be the skull of the *D. arboreus* of South Africa. It differs from the skull of *D. dorsalis* in being small, in the forehead being convex in the centre between the orbits, and in the orbits being incomplete behind.

It has the alveoli of the upper cutting-teeth each raised into a cup round the base of the tooth; but this may be only an individual peculiarity.

This skull has all the characters of the genus *Dendrohyrax*, except that the orbit is incomplete behind. I think that it indicates a new group, to which the name *Heterohyrax* may be given. The skull is much smaller and the tooth-line much shorter than in *D. dorsalis*; and I propose to name it provisionally *Heterohyrax Blainvillii*. The skull which M. de Blainville figures as that of *Hyrax rufipes* (Ostéograph. t. 2) exactly represents the hinder part of that in the Museum. It cannot be the *H. ruficeps* of Ehrenberg.

Dr. G. v. Jaeger figured, under the name of *Hyrax habessinicus* (t. 2. f. 14), the upper part of the skull of a *Dendrohyrax* obtained from Gondar by Dr. von Heuglin. Dr. Jaeger, by mistake, figures the upper edge of the occipital for the interparietal. This skull is interesting as showing that the genus is found in Abyssinia.

Dr. G. v. Jaeger also figures the back of the skull and interparietal bone of a species he calls *Hyrax silvestris*, collected in West Africa by the missionary Dieterle. It is probably a *Dendrohyrax*. The hinder part of the figure is the upper edge of the occipital. The interparietal is urn-shaped, broader in front and contracted behind, very unlike that found in the skulls of either of the two species in the British Museum, and especially differing from *D. dorsalis* of West Africa; so it may be a new species of the genus, *Dendrohyrax silvestris* (Würzb. naturw. Jahresb. xvi. p. 162, t. 2. f. 15).

The Measurements of the Skulls, in inches and lines.

	<i>E. abyssinicus</i> , 725 d.	<i>E. abyssinicus</i> , 724 a.	<i>Hyrax</i> , 725 c.	<i>Hyrax</i> , 724 b.	<i>Hyrax</i> , 724 d.	<i>Hyrax</i> , 724 c.	<i>H. Burtonii</i> , 725 b.	<i>H. Welwitschii</i> .	<i>Hyrax</i> , 724 g (junior).	<i>H. semicircularis</i> , 724 h.	<i>D. dorsalis</i> , 1142 a.	<i>D. dorsalis</i> , 1142 c (junior).	<i>D. dorsalis</i> , 724 f.	<i>D. Blainvillii</i> , 724 e.
Length of skull	4 0	3 7	3 6	3 6	3 2	2 11	.....	3 2	2 7½	2 2½	4 0	3 4	2 1	3 4
" tooth-line.	1 6	1 4½	1 6	1 6	1 4	1 2	.....	1 8	.....	.....	1 7	.....	.....	1 2½
Width, at centre of zygoma, of fore- head	2 2½	2 0½	2 0½	2 1	1 9	1 8½	1 8	2 0	1 7	1 3	2 3	1 10	1 2½	1 11
Width at back end of orbit	1 7	1 6	1 6	1 6	1 3	1 3	1 2½	1 6	1 2	1 0	1 9	1 6½	1 0	1 5½
Width of band at middle of crown over condyles ...	0 3	0 2	0 0½	0 6	0 6	0 7	0 6½	0 8	.....	.....	0 9	1 0	.....	0 10
Width of nose.....	0 7	0 7	0 8	0 7	0 6	0 5½	0 7	0 6½	0 6	0 5	0 8½	0 7	0 5	0 7
" at outer edge of tooth-line, at first molar.....	1 3	1 2	1 4	1 2	1 1	1 0½	1 0	1 0½	0 10½	0 9	1 2½	1 0	.....	0 11½
Width of palate at first molar	0 7½	0 7¼	0 8	0 7	0 6	0 7	0 6½	0 6½	0 8	.....	0 9	0 8	.....	0 6



Gray, John Edward. 1868. "VI.—Revision of the species of Hyrax, founded on the specimens in the British Museum." *The Annals and magazine of natural history; zoology, botany, and geology* 1, 35–51.

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