

Anatomical Studies, No. 61.

A Comparison of two of the so-called Zebu.

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INTRODUCTION.

AN idea of the uncertainty of the definition of the word "Zebu" may be formed by perusal of the *Encyclopaedia Britannica*, 14th Edition, 1929. Under "Zebu" (Vol. XXIII, p. 938) one reads: "Zebu (*Bos indicus*), an Indian species of ox, characterised by its light colour and the possession of a hump on the back. The sacred bulls of India belong to this species, which is much used for draught and farm work, and also supplies milk".

On turning, however, to "cattle" (Vol. V, p. 46), it is learned, in a description furnished by Professor J. A. S. Watson, of Oxford, that cattle may be divided into six groups, one of which⁽¹⁾ is the Zebu or "Eastern and African domesticated cattle"! Professor Watson, in referring to African domesticated cattle, presumably means those cattle resembling the Eastern type, *viz.*, the Shorthorned Zebu, and therefore apparently does not include the humped Sanga and Lateral-horned Zebu (Afrikander) types. If this view is correct, then no provision is made in his classification for Afrikander or Sanga cattle. If, however, one accepts that he means all African domesticated (obviously native) cattle, then he places in a single group, cattle that differ as widely as the Shorthorned Zebu, Lateral-horned Zebu, Sanga and Brachyceros.

The first definition given above resembles that of Lydekker (1912) who applies the designation "Zebu" to "the Indian humped cattle" (p. 147). Watson's definition is somewhat similar but not so precise as that of Kronacher (1921) who refers to the Zebu as "Buckelrinder". In regard to the African Zebu, however, he (Kronacher) gives the synonym "Sanga" which further complicates matters, especially as Epstein uses the term Sanga for a group which is distinct from the Shorthorned Zebu.

Duerst (1931) simply gives "Hockerrind" as the equivalent of Zebu (p. 759), which agrees with Kronacher.

⁽¹⁾ The other groups are:—(a) Buffalo, (b) Bison, (c) Yak, (d) Gaur, Gayal and Bantin and (e) Western or European domesticated cattle.

As indicated by Curson and Epstein (1934), the original Zebu would appear to have been the Lateral-horned beast (represented by the Afrikander to-day), which later with *Brachyceros* gave rise to the Shorthorned Zebu. In West Africa there is further a Lyre-horned Zebu also with a thoracic hump, but the skull is apparently short and broad, due to Hamitic influence.

Summing up, it would seem that one school refers to only Eastern cattle as Zebu, while the second includes all humped cattle whether Asiatic or African.

Provisionally it is intended to include under the term "Zebu" any humped bovine whether of Asiatic or African origin and the subjoined classification is suggested:—

ZEBU	{	TRUE ZEBU (Asiatic origin).	{	1. Original Lateral-horned zebu, now called <i>Afrikander</i> .
				2. <i>Shorthorned Zebu</i> , essentially of Asia but well represented in East Africa.
		PSEUDO-ZEBU (African origin).	{	3. <i>Sanga</i> .—Essentially African and well represented in South Africa.
				4. <i>Lyre horned Zebu</i> .—Best represented in West Africa.

The problem of classification is not simple in that either the skull or the hump may be taken as the determining factor. Above, the skull is the main factor, being generally relatively narrow in (1) and (2), but comparatively broad in (3) and (4).

The two Zebu groups discussed in this paper are the Lateral-horned and Shorthorned Zebus.

According to Epstein, Lateral-horned Zebus entered Africa about the end of the third pre-Christian millenium and during the New Kingdom of Egypt (1550-945 B.C., Yahuda) they were represented on mural decorations. Shorthorn Zebus on the other hand have been introduced into East Africa only during Christian times. The former are scattered throughout the Subcontinent whereas the latter occur along the East coast from Erithrea as far south as the Zambesi River.

In regard to South Africa, as far back as 1904 MacDonald, A. C., expressed himself as being "rather inclined to the idea that the Afrikander cattle are descended from one or other of the breeds which were brought down from North Africa by the native tribes". On the other hand others have believed in an European origin, *e.g.* Holm (1912) supposes that "there exists an indirect though remote relationship between the Afrikander and the Devon". During the past decade or so general opinion has supported MacDonald, and Bosman (1924), for example, writes, "It would seem therefore that the foundation of the Afrikander breed could be attributed to the Hottentot cattle that accompanied the Hottentots to the South on their migration along the West Coast". It was, however, not until 1933 that definite evidence, *e.g.* historical and anatomical, was brought forward by Epstein that the Afrikander was the Zebu in its original form, and that it arose in Asia probably from *Bos namadicus*, whose fossilised remains have been described by Duerst (1908).

In 1934 Epstein discussed the physical characteristics and distribution of both the Lateral-horned Zebu and the Shorthorned Zebu; and in the same year with Curson briefly described the skulls of the three *parent* stocks of African cattle, *viz.* Hamitic Loughorn, Brachyceros and Lateral-horned Zebu (Afrikander). The skulls of typical members of the *derived* types, *viz.* the Shorthorned Zebu, Lyre-horned Zebu, Sanga or so-called Kaffir cattle (see footnote 4) have not yet received special attention.

Epstein (1934) believes that the Shorthorned Zebu encountered to-day in Asia, principally, India, and Africa reached Africa "in the post-Christian era, when the power of Persia was at its zenith and afterwards during the Arab invasion". It is furthermore not a pure Zebu in that it represents the influence in Asia of Brachyceros (the first Asiatic bovine immigrant into Egypt) on the Lateral-horned Zebu. Thus the Shorthorned Zebu is a type derived through the intermingling in Asia of the original Brachyceros (still predominant along the littoral of West, North and North-East Africa) and the original Lateral-horned Zebu or Afrikander, as it is called in the Subcontinent to-day.

In India, although the Longhorned Zebu is well represented, *e.g.* in the Amrat Mahal cattle, not only is the horn *not* laterally disposed as in the Afrikander, but the hump is dissimilar in situation and structure. Gunn (1909) in describing the cattle of South India writes "Among the breeds found in Mysore the first place is undoubtedly due to the Amrat Mahal. The Amrat Mahal, literally Milk Department, is an establishment for the breeding of a race of cattle peculiar to the country of Mysore . . . and so distinctive is this breed that they may readily be distinguished from every other breed in India". See Fig. 17.

That there are longhorned Zebras in India possessing *laterally* directed horns would appear to be the case from a photograph of the skull of a "Longhorned Zebu ox from Nepal, British Museum", shown on p. 99 by Epstein in his M.S. on *The Red Afrikander Cattle*.

Lydekker (1912) gives the term "Zebu" as "the designation of the Indian humped cattle"⁽²⁾; but as is clear from what has been said before, the original (Lateral-horned) and later (Shorthorned) Zebras vary in origin. As a result, there are anatomical differences as well as resemblances and it is these which will receive attention in this study.

As evidence of "the undoubted distinctness of humped cattle" (*Bos indicus*) from European cattle (*Bos taurus*), Lydekker mentions the characters indicated by the late Mr. Edward Blyth in the *Indian Field* for 1858. They are as follows:—

- (a) "In general configuration", *e.g.* head, dewlap and hump;
- (b) "in the shape of the ears";
- (c) "in the point where the dewlap commences";
- (d) "in the typical curvature of their horns";
- (e) "in their manner of carrying their heads when at rest";

(2) The Zebu received its name *Bos indicus* from Linnaeus in the XVIII century (Lydekker, p. 149).

- (f) "in their ordinary variations of colour, especially in the frequent presence of nilgai-like markings on their feet"⁽³⁾;
- (g) "they have different habits and their voice is entirely different". Lydekker adds that it is "more of the nature of a grunt than a low";
- (h) "humped cattle in India seldom seek shade and never go into the water and there stand knee-deep, like the cattle of Europe"; and
- (i) "they have given rise to many distinct breeds, differing greatly in size, in the presence of either one or two humps, in length of horns, and in several other respects". Two humps is, of course, incorrect.

While Blyth's description is based on Indian cattle, Lydekker himself had in mind *also* African Sanga cattle, *e.g.* Galla cattle⁽⁴⁾ of Abyssinia, Watasi cattle of East Africa and Ngami cattle of Bechuanaland. Strangely Lydekker describes Afrikanders as being "a breed of long-horned cattle *without* humps".

Epstein (1934) emphasised the value of some of the above criteria, *e.g.* (b), (e), and (g), and adds speed and docility as distinctive features; but as will be shown later, the anatomical characteristics, particularly skull, dewlap, hump and bifid spines of the more caudal thoracic vertebrae, seem to be the most reliable guides.

POINTS OF RESEMBLANCE.

The anatomical features common to both Zebu types are:—

External.

- (a) *Head*.—From frontal view, the head is generally long and narrow (coffin-shaped) and the orbital region is *not* so pronounced as, for example, in the Sanga. On lateral view, the profile is generally convex, the most prominent point being behind and above the eyes. Convexity is less marked in females.
- (b) *Dewlap*.—"Well developed, tied in slightly at throat, starting from chin to back of chest"⁽⁵⁾.

⁽³⁾ Lydekker explains (p. 150) that these "take the form of white rings round the fetlocks in the darker coloured Indian strains or individuals". Kelley (1932) in comparing European and Indian cattle (p. 15) makes no reference to voice.

⁽⁴⁾ Lydekker uses Sanga as a synonym of Galla, and Kronacher (1921) in the widest sense as including any humped African bovine. Epstein, however, considers that it represents the type originating from the Hamitic Longhorn and Lateral-horned Zebu intermixture.

⁽⁵⁾ This is taken from the scale of points adopted in March, 1932, by the Afrikander Cattle Breeders Society. The meeting resulting in the foundation of the Society was held at Potchefstroom in June, 1912.

Bisschop (Lectures, Faculty of Veterinary Science, University of Pretoria) gives the following description: "The dewlap commences from the chin as two separate folds which converge a few inches further back. In the region of the throat the dewlap shows an indentation, but from this point backwards it hangs evenly and conspicuously to well between the front legs. In the region of the brisket it may be rather pendulous and so create the impression that the thorax is deeper than is actually the case. The dewlap is never "filled" but consists of two directly apposed layers of skin. Vertical folds of the dewlap such as sometimes seen in the Short-horned Zebu are considered undesirable."

(c) *Hump*.—Large and prominent.

Internal.

(i) *Skull: Frontal surface*.—Long and comparatively narrow. The margin of the orbit is not prominent, and the profile is convex. The stalk of the horn core is well marked.

Lateral surface.—The temporal fossa is deep and curved and the horn has a lateral direction.

Nuchal surface.—The frontal ridge is thick and prominent especially centrally. From the front it is convex and curved from side to side. As a result the fronto-nuchal angle is acute. It is apparent that the features of the head are governed by the form of the skull.

(ii) *Dorsal Vertebra*.—The superior spines are bifid from the sixth vertebra caudally. As will be seen from Figs. 11, 12 and 16, not only is the upper one-fifth divided medially, but it is also compressed antero-posteriorly.

POINTS OF DIFFERENCE.

Typical specimens of the two Zebu types are differentiated thus:

<i>Feature.</i>	<i>Lateral-horned Zebu (Afrikander).</i>	<i>Shorthorned Zebu (6).</i>
<i>External.</i>		
(1) Horn—		
(a) Length.....	Long and slender.....	Comparatively short.
(b) Direction....	Lateral.....	Upward and lateral.
(2) Hump—		
(a) Situation....	Cervico-thoracic.....	Thoracic.
(b) Attachment..	Firm.....	Less firm.
(c) Shape.....	Less prominent and generally pyramidal	More prominent and generally dome-shaped.
(3) Colour.....	Chiefly red.....	Of many colours.
(4) Size.....	Large beef type.....	Of all sizes, chiefly small.
<i>Internal.</i>		
(1) Temporal fossa...	Deep and markedly curved, being much influenced by lateral direction of horn core	Deep and less markedly curved owing to upward direction of horn core.
(2) Horn core—		
(a) <i>Direction</i>	Lateral.....	Upward and lateral.
(b) <i>Base</i>	Pearled wreath absent.....	African Zebus have frequently a pearled wreath (?).
(c) <i>Cross section</i> .	Oval.....	Circular.
(3) Hump—		
(a) <i>Structure</i>	Muscular. See Fig. 13.....	Musculo-fatty. See Fig. 14.

(6) Many of these features obviously depend on *Brachyceros* influence.

(7) It is possible this is a difference between typical Asiatic and African Shorthorned Zebus. This feature is derived from the Hamitic Longhorn, and is marked also in Sanga cattle.

SUMMARY.

Summarising the position⁽⁸⁾ we have:—

Resemblances.

1. Both Zebu types originated in Asia.
2. *Externally*:—
 - (a) They have a coffin-shaped head with convex profile;
 - (b) the dewlap is prominent;
 - (c) the hump is well marked, but not characteristic, for it occurs also in the Sanga type.
3. *Internally*:—
 - (a) The thoracic vertebrae from No. 6 backwards have bifid spines.
4. Both have adapted themselves well to unfavourable environmental conditions, *e.g.* poor pasture, and parasites.

Differences.

<i>Feature.</i>	<i>Lateral-horned Zebu.</i>	<i>Shorthorned Zebu</i> ⁽⁹⁾ .
1. Origin.....	A pure parent stock.....	A derived type arising through intermixture of Lateralhorned Zebu and Brachyceros.
2. Arrival in Africa.....	In pre-Christian times.....	In Christian times.
3. Distribution in Africa.	Scattered and mainly south of the Zambesi River	Form compact groups chiefly in East Africa, north of the Zambesi River.
4. Horns.....	Are oval in cross-section, long and laterally placed	Are circular at base, short to medium length and upright.
5. Hump.....	Cervico-thoracic and muscular	Thoracic and musculo-fatty.

ACKNOWLEDGEMENT.

It is a pleasure to express indebtedness not only to the workers with whom I am constantly in touch, *viz.* H. E. Hornby, Esq., F.R.C.V.S., Director of Veterinary Services, Tanganyika, Major H. H. Brassey-Edwards, M.R.C.V.S., C.V.O., Kenya, and Dr. H. Epstein, at present at the British Museum; but also to A. D. MacGregor, Esq., F.R.C.V.S., Principal, Bengal Veterinary College, Calcutta, and J. H. R. Bisschop, Esq., B.V.Sc., Onderstepoort, each of whom has provided me with important information.

Mr. Meyer's photographs are as usual excellent.

⁽⁸⁾ A useful list of references concerning the Afrikander is given in an Appendix to Curson and Bisschop's paper (Anatomical Study No. 60) *Some Comments on the Hump of African Cattle. Onderstepoort Jl. Vet. Sc. Anim. Indus.* Vol. 5, No. 2. Oct., 1935.

⁽⁹⁾ There are of course big differences between the various breeds of Shorthorned Zebus. Matson, quoted by Kelley (1932), divides the Indian Zebu into five chief subtypes.

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ADDENDUM.

Anatomical Study No. 61 was submitted to Dr. H. Epstein, who in a reply (10/4/36) to the Director of Veterinary Services kindly made the following observations:—

"I would like to pass a few comments on Dr. Curson's paper Anatomical Studies No. 61.

(a) On page 2 (the fifth line down) he writes with reference to the *Brachyceros* cattle: "The first Asiatic bovine immigrant into Egypt". I no longer hold the view that the Hamitic Longhorn cattle were pure descendants of *Bos primigenius Hahni*, but rather that they originated from a mixture of *Primigenius* cattle imported into Africa from Asia by Hamitic immigrants, and the local Egyptian variety of *Bos primigenius*, viz., *Bos primigenius Hahni* Hilzh. Therefore the *Brachyceros* breed was the second bovine immigrant from Asia. But even if the Hamitic Longhorn cattle were pure descendants of *Bos primigenius Hahni*, their upright lyre-shaped horns would be no obstacle to such an assumption (as you suggested

in the above mentioned letter). For it is one of the first effects of domestication that the heavy horn of the wild beast becomes lighter and consequently changes its position. Duerst (1926) gives an account of these changes in his work *Das Horn der Caricornia*.

(b) Referring to the same paragraph in Anatomical Studies No. 61, I am still doubtful whether all shorthorned zebu breeds owe their short horns to the intermingling in Asia of the original *Brachyceros* with the original Longhorned Zebu⁽¹⁰⁾. It is quite feasible that numerous shorthorned zebu breeds acquired their shorter horns during the long process of domestication spontaneously without any external "assistance". (The difference in the structure of the hump between the Shorthorned Zebu and the Afrikander may also be attributable to the long period of domestication in Asia, and need not of necessity owe its origin to the influence of other cattle on the Longhorned Zebu.)

(c) *re* page 2 lower down:—The skull of the Longhorned Zebu ox from Nepal in the Kensington Branch of the British Museum does not possess laterally directed horns, but upright lyre-shaped ones. In all other respects, however, it resembles the Afrikander skull.

I am very grateful for the assistance and interest you have shown in my work which is always a great encouragement to me".

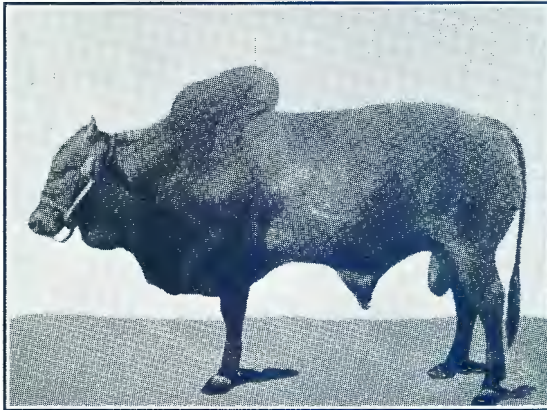
⁽¹⁰⁾ or Afrikander. Obviously one may consider the Shorthorned Zebu as constituting a parent stock, at any rate as far as Africa is concerned (see Curson and Epstein, 1934). *Footnote by H.H.C.*

EXPLANATION OF FIGURES.

Figures 3-12 and 16 are approximately one-quarter of original.



1. *Lateral-horned Zebu (Afrkander)* Bull "Holmesdale Stemreg". Photo sent by former owner, Dodds Pringle, Esq., Jun., P.O. Adelaide, C.P., Colour light red, born 1917.



2. *Shorthorned Zebu (Tanganyika)* Bull (McCall, F. J., Ann. Rept. for 1929, Tanganyika). The Shorthorned Zebu from the East came in such large numbers (over a long period of time) that it eventually replaced the Sanga. There seems very little difference, if any, between the Asiatic and the African Shorthorned Zebu.



3. Skull of *Lateral-horned Zebu (Afrikander)* Ox A. 26, Onderstepoort. Front view. Length of "forehead" is 260 mm. Note lateral horn-cores with distinct neck, convex frontal ridge, and generally long coffin-shaped appearance of skull—Curson and Epstein, 1934.



4. Front view of skull of *Shorthorned Zebu* (*Tanganyika-Masai*) Cow A. 20. Onderstepoort. Sent by McCall, F. J. Note the comparatively short horns and elongated head. Length of "forehead" is 201 mm.



5. Lateral view of skull of *Lateral-horned Zebu* (*Afrikaner*) Ox A. 26. Observe the strongly convex profile, especially over cranium and the deep and curved temporal fossa—Curson and Epstein, 1934.



6. Lateral view of skull of *Shorthorned Zebu* (*Tanganyika-Masai*) Cow A. 20, Onderstepoort.



7. Nuchal view of skull of *Lateral-horned Zebu (Afrikander)* Ox A.26. Frontal ridge is prominent and convex from side to side. The median occipital crest is scarcely perceptible—Curson and Epstein, 1934.



8. Nuchal view of skull of Cow A. 20.



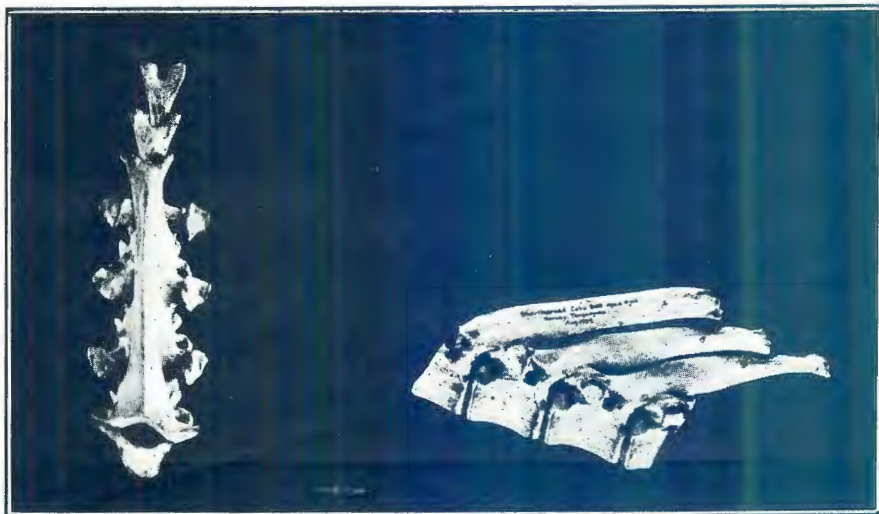
9. Palatine view of skull of *Lateral-horned Zebu (Afrikander)* Ox A. 26 Long coffin-shaped appearance is marked, as is the neck at the base of the horn-core.



10. Palatine view of skull of Cow A. 20. Note the well defined neck at the base of the horn-core.



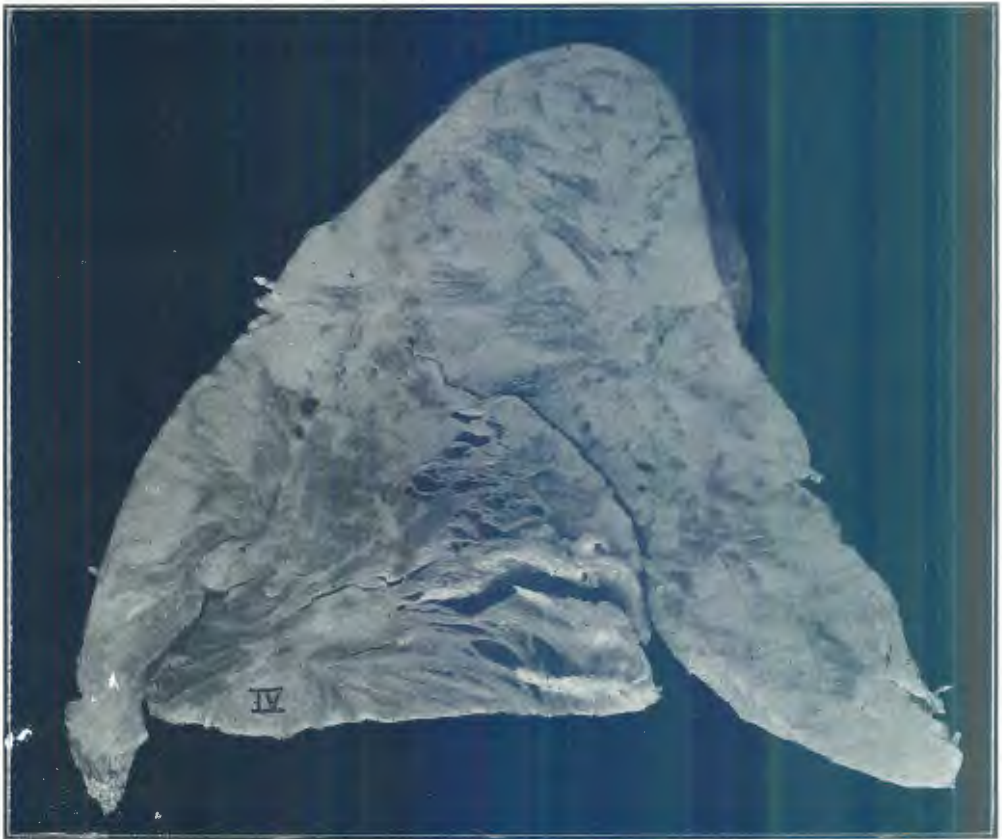
11. *Lateral-horned Zebu (Afrikander) Cow* (Curson). Front and lateral views of 9th dorsal vertebra. The superior dorsal spine is cleft—Curson and Epstein, 1934.



12. *Shorthorned Zebu (Tanganyika) Bull*. Front and lateral views of the 7th-9th dorsal vertebra (from H. E. Hornby, Esq., O.B.E., F.R.C.V.S., Mpapwa).



13. *Lateral-horned Zebu (Afrikander) Bull 5572.* . Cross section of summit of hump over second thoracic vertebra, showing the following structure: *Mm. trapezius, rhomboideus, serratus ventralis and splenius, and ligamentum nuchae*—Curson and Bisschop, 1935—Magn. 2/3.



14. *Shorthorned Zebu (Tanganyika) Calf (Hornby)*, Cross section of summit of hump over fourth thoracic vertebra. Distorted appearance due to tight packing in drum—Curson and Bisschop, 1935—Magn. $1\frac{1}{2}$.



15. *Shorthorned Zebu (Krishna Valley) Bull.* (McCall, F. J. *Annual Report for 1929, Tanganyika.*) Imported from India for use in Tanganyika. A typical zebu with short horns, circular at base, convex profile, well developed dewlap and musculo-fatty thoracic hump.



16. *Shorthorned Zebu (Bengal).* Front and lateral views of 9th dorsal vertebrae of bull and cow sent by A. D. MacGregor, Esq., F.R.C.V.S.



17. *Longhorned Zebu (Amrat Mahal) Bullock*—Gunn, 1909—Note long horns and thoracic hump.