form of the head and the character of the tail it is distinctly Kudu-like.

In conclusion, I may reiterate my opinion that *Tragelaphus buxtoni* tends to connect the Bushbuck group so closely with the Kudus as to render the generic separation of the latter from *Tragelaphus* (in which, as already stated, I include *Limnotragus* as a subgenus) inadvisable.

EXPLANATION OF PLATE XVI.

The type specimen, a subadult buck, of the Mountain Nyala, *Tragelaphus buxtoni*.

18. Observations on different Gibbons of the Genus *Hylobates* now or recently living in the Society's Gardens, and on *Symphalangus syndactylus*, with Notes on Skins in the Natural History Museum, S. Kensington. By Dr. F. D. Welch, F.Z.S.

[Received November 29, 1910: Read February 21, 1911.]

Very few specimens of the genus *Hylobates* arrive in good health in England or live for more than a few months, but during the last five years the Society has exhibited examples of different species, of which the following are now living in the Gardens:— A male of the rare *H. hainanus* from Hainan, which arrived in December, 1907; a male *H. leuciscus* from Borneo, which arrived in May 1908; and a female *H. agilis* from Sumatra, which arrived in December 1905. In addition to these an adult male *Symphalangus syndactylus* in good health arrived on October 26, 1910, and is the finest specimen the Society has yet received. As some external characters and the coloration and voice can be studied only in living specimens, some observations I have made on these genera may be worth recording.

In the genus *Hylobates*, from observations taken at intervals on four males living in the Gardens, I am strongly of the opinion that the development of certain parts of the external genital organs is delayed to a later period of life than is the case in *Anthropopithecus* and Man, and, so far as I can discover, no notes have been published on this subject. My attention was first drawn to the subject by Mansbridge, keeper of the Society's Apes, but I have not accepted any information from him until I have confirmed it myself, and I am well aware that several mistakes have previously been made about the sex of *Hylobates* on account of the large clitoris being mistaken for the penis (see Pocock, P. Z. S. 1905, vol. ii. p. 169). I have made a careful examination of all the specimens, and am certain that the sex is as I have stated.

The male *H. hainanus* has altered greatly in the external

genital organs. On arrival in December 1907 it was in good health and measured about 14 inches from crown to ischial callosities, and there were then no signs of a scrotal bag, the skin between penis and ischial callosities being quite flat. About the end of March 1909 a scrotal bag gradually formed, and by the first week in July 1909 this could be seen quite easily when the animal was at the opposite side of the cage with its hind legs separated. The scrotal bag had then reached its present size and appearance, being just over an inch long with a broad base and tapering rapidly towards a point, thickly covered all over with short black hair, and placed well above and in front of the anterior ends of the ischial callosities, there being a space over half an inch between the callosities and its posterior surface. The scrotal bag is not at all pendulous, and the long axis runs downwards and forwards. At that time, July 1909, the animal's height, measured against the bars when sitting, was 16 inches. It was impossible to measure this male out of the cage or to handle it, and as all *Hylobates* specimens stoop when sitting, the real height of the animal when hanging at full length was probably about 1 inch more than this. The measurement against the bars was repeatedly taken to ensure accuracy. Only one male *H. hainanus* has been exhibited in the Gardens before, a younger animal, to the skin of which, now in the Natural History Museum, I shall refer later.

Retention of the testicles, either within the abdominal cavity or in the inguinal canal, is a common human abnormality. One or both testicles may be thus retained, and in some cases they descend, later in life, into the scrotal bag. I certainly do not think that this male *H. hainanus* was abnormal, but that the absence of a scrotal bag before March 1909 was the normal condition in the genus and species, and my reasons for this opinion are as follows :—

The male *H. leuciscus* from Borneo, now in the Gardens, had on arrival no scrotal bag, and in December 1909 I made a careful digital examination of the external genital organs. The skin between the penis and ischial callosities was slightly wrinkled, but would not stretch when pulled, and did not hang down when the animal was standing erect. There was nothing to be felt under the skin between penis and callosities which I could say with perfect certainty were the testicles, and consequently these organs must be exceedingly small in proportion to the size of the animal. This *H. leuciscus* was in good health on arrival and has continued so, and at the present time (November 1910) there is no sign of a scrotal bag. The animal at present measures 14 inches from crown to callosities when sitting. Exactly the same condition of no scrotal bag or testicles to be easily felt was found in two other males I examined, one 14 inches high from crown to callosities, the other 11 inches. This condition in these four *Hylobates* males was very different from that of a young *Anthropopithecus troglodytes* I examined, as in this latter male the scrotal bag was large and well developed, being seen quite easily at a distance of fifteen feet, and both testicles could be felt easily.

It is to my mind most unlikely that four *Hylobates* males should arrive in the Gardens one after the other with abnormal external genital organs, and I think that in these cases the absence of scrotal bag and small size of the testicles during the early years of life were normal, and this opinion is strengthened by the condition of some young skins in the Natural History Museum, which I examined by kind permission of Mr. Oldfield Thomas. The skins in that collection are of different ages, sizes, and species (*H. hainanus*, *H. hoolock*, *H. lar*, *H. leuciscus*, *H. agilis*, *H. agilis martini* and *pileata*, *H. müllleri*, *H. leucogenys*, *H. gabriellæ*). Some of these skins, those of old males, have a large and conspicuous scrotal bag; in others, younger males, the scrotal bag is only beginning to form and not so obvious, while in some of the youngest skins, one of which is the male *H. hainanus* above mentioned, it cannot be seen or felt. In these the skin between penis and ischial callosities is perfect and has not been cut at all, so it is quite certain no scrotal bag existed during life.

The delayed development of the scrotal bag and diminutive size of the testicles correspond to the late commencement of menstruation, and on this latter subject few observations have been made in *Hylobates*.

I have compared the size of the skull as felt through the skin, and also the canine and other teeth, of the female *H. agilis* now living in the Gardens with skulls in the Museum which are obviously adult, and this comparison shows that the Society's female *H. agilis* is almost adult at the present time; although it has been in perfect health since arrival in December 1905, it has not yet begun to menstruate. Mr. Pocock has also recorded that the female *H. hainanus* previously exhibited did not begin to menstruate until almost adult (P. Z. S. 1905, vol. ii. p. 169), and from these two cases it seems to be the normal course that in *Hylobates* menstruation is delayed until a much later period than is normal in Man.

When the female *H. hainanus* just mentioned was living in the Gardens, I noticed that it was in proportion to height more slenderly built in both body and limbs than other species (such as *H. agilis*, *H. lar*, *H. leuciscus*, and *H. hoolock*) then or recently living. As the animal had one fore limb, which it rarely used, partially paralysed, I thought at that time the slender build was the result of poor health and not a specific character. This being the first female brought either alive or in skin to England, so far as was known, there was nothing to compare it with, but since then the male now in the Gardens arrived and showed the same slender body and limbs. As this male has been in perfect health since arrival in December 1907, and as its appetite is good and it has not become stouter at all, although it has grown taller, I think it is quite justifiable to state from these two living specimens that *H. hainanus* is more slenderly built in body and limbs than other species such as *H. agilis*, *H. lar*, *H. hoolock*, and *H. leuciscus*.

A comparison of the external genital organs of the male *H. hainanus* with those of *Symphalangus syndactylus* shows certain differences. In *H. hainanus* the distal half of the penis, which is covered by mucous membrane, is a dull red, making that organ very conspicuous in the otherwise jet-black coloration.

In *S. syndactylus* the penis is black all over, and both it and scrotal bag are very small indeed in proportion to the size of the animal. When hanging the penis is on a level with the ischial callosities, and not above them as in *H. hainanus*. In *S. syndactylus* the large tuft of long hair growing from below the penis and between the callosities, and spreading out as it runs downwards and backwards between the animal's legs, is most conspicuous, hiding a large part of the ischial callosities from view when the animal is hanging and seen from below. In the skins of *Hylobates* in the Museum the hair on the scrotal bag in old males is no longer than that on other parts of the body, except in one very aged *H. hoolock*, and in this single specimen it is not nearly so long in proportion as in *S. syndactylus*; in skins of *S. syndactylus* males it is very long indeed, as in our living male.

I might add that in *H. hoolock* and *H. leuciscus* the penis is black all over, even in the distal half covered by mucous membrane.

H. hainanus presents three points distinct from *H. hoolock* as shown in living specimens.

When Mr. O. Thomas described the type of *H. hainanus* (Ann. Nat. Hist. ser. 6, vol. ix. p. 146), he was doubtful as to the validity of the species of *Hylobates*; Mr. Pocock (P. Z. S. 1905, vol. ii. p. 169), from examination of a living female example of *H. hainanus*, supported the distinctness of the species, and my own observations on our living male confirm this.

The differences between living specimens of *H. hainanus* and *H. hoolock* are as follows:—

(1) *H. hainanus* is more slenderly built in body and limbs than *H. hoolock*, as I have already pointed out, even when in perfect health.

(2) In living males the colour of the penis is different. In *H. hainanus* the proximal half covered by the skin is black, and the distal half covered by mucous membrane is *dull red*. In *H. hoolock*, on the other hand, both proximal and distal halves are black.

(3) In two living specimens of *H. hoolock*, male and female, the hair on the crown of the head lay quite smooth and there was no erect crest whatever. In the male *H. hainanus* now alive the hair on the crown of the head stands erect in a crest, as it did in the female, as Mr. Pocock remarks (P. Z. S. 1905, vol. ii. p. 175).

I might add that the hair on the crowns of the living specimens of *H. agilis* and *H. leuciscus* is quite flat and there is no erect crest whatever. *H. hainanus* is the only species that I have yet seen which has an erect crest on the crown; it also has a short beard on the chin.

There are two points in *H. agilis* worth mentioning which are well shown in the female now living:—

(1) The tongue is of a dark bluish purple, the colour when first seen suggesting that the organ had been very severely bruised and that there was much extravasated blood in it; the absence of any swelling, however, soon showed it to be quite normal. In the other species (*H. hainanus*, *H. leuciscus*, and *H. lar*) the tongue is, as one would expect in a genus so near to Man, of a pale reddish colour, as is also the case in *Symphalangus syndactylus*.

There is considerable resemblance between young specimens of *H. agilis* and *H. leuciscus*, and consequently this dark bluish-purple tongue of *H. agilis* should be of value in distinguishing the species from *H. leuciscus*, in which, as already mentioned, the tongue is pale red. So far as I can discover, this peculiarly coloured tongue of *H. agilis* has not been previously noted.

(2) In addition to the common chatter of excitement and laugh which all species of *Hylobates* make, *H. agilis* has a loud cry, quite distinct from the "hoo hoo hoo" &c. of *H. hainanus* and the "hah hoo hah hoo" &c. of *H. hoolock* (see Pocock on *H. hainanus*, P. Z. S. 1905, vol. ii. p. 176), and I have not as yet heard either *H. lar* or *H. leuciscus* utter a similar sound. This peculiar cry of *H. agilis* is best described by a word "whopp," and is shouted out, the mouth being wide open and the throat conspicuously dilated. It is only uttered once and then silence ensues for about thirty seconds, then another "whopp," then a period of silence, then another "whopp," and so on. Usually this cry continues for about ten minutes, but a few times I have heard it continued for over an hour; and very occasionally the "whopp" is prolonged into a long loud screech lasting a minute or longer, the mouth being kept wide open the whole length of the screech and the throat dilated. I have never heard it uttered when playing or quarrelling with the *H. hainanus* (both species utter the common chatter at these times), but only when the *H. agilis* is swinging by itself. It is also a quite different sound from anything uttered by *S. syndactylus*.

The voice of *Symphalangus syndactylus* is remarkable for the variety of cries, which follow rapidly one after another, and at least five sounds can be distinguished, with all of which the gular bag dilates. Anyone with their eyes shut would certainly think there was more than one animal in the cage. These cries are:—

(1) The usual and loudest, best described by the words "woe, woe, woe," &c., repeated rapidly and for a variable number of times, sometimes forty or fifty. Judging from the deafening noise the animal made with the "woe woe" &c. on the first occasion I heard it, I should think it could be heard much further off than an adult *H. hoolock*, but unless one hears two adults shouting against one another, it is very difficult indeed to be certain which of the two has the louder cry.

(2) A gurgling noise, best described by the word "moo," drawn

out over several seconds and sounding somewhat like a human being beginning to vomit. It follows rapidly after the "woe, woe, woe," &c., as a rule, and the gular bag dilates to the greatest size with this sound, occasionally reaching a diameter of nearly 8 inches. The "moo" is made mostly during inspiration.

(3) What I can best describe as a wailing-shriek like the word "wair" shrieked out for twenty or thirty seconds and sometimes longer, the voice being alternately raised and lowered a little. It usually follows rapidly after the "woe, woe, woe," &c., and is about as often heard as no. 2—the gurgling "moo." It is, however, louder than the "moo."

(4) A "ho, ho, ho," &c., repeated, as a rule, four or five times. I have only heard it on a very few occasions and it is not nearly so loud as the previous three sounds.

(5) A squeal somewhat resembling the noise made by some Eagles. This is as rare as the "ho, ho, ho," &c., and not so loud as the first three sounds.

When at rest the gular bag is black in sunlight and slightly wrinkled, but on dilatation it becomes dull red. In its walk *S. syndactylus* is bipedal like *Hylobates*.

EXHIBITIONS AND NOTICES.

March 7th, 1911.

Dr. A. Smith Woodward, F.R.S., Vice-President, in the Chair.

The Secretary exhibited a series of lantern-slides prepared from photographs kindly given to him by Mr. Carl Hagenbeck, Silver Medallist of the Society, and illustrating some of the most remarkable features of Mr. Hagenbeck's new Tierpark at Stellingen near Hamburg.

Mr. R. I. Pocock, F.L.S., F.Z.S., on behalf of Mr. Ernest C. Oberholtzer, exhibited a large number of lantern-slides and photographs illustrating the habits of Moose. Mr. Oberholtzer had presented to the Society the series of enlargements exhibited and communicated the following account of

Some Observations on Moose.

Of late it has become almost a heresy to associate big game with any land but Africa. Like the bonneted old lady in the corner, even America, humiliated, lives in the past; the stride of the elephant steadily lengthens; and one would suppose that all save the jungle folk must soon be content with their barn-yards