The well-known accuracy of the late Mr. Sowerby makes it needless to do more than repeat his statement, that the species which he called *elatior* and *concinna* were found in the "Calcaire grossier." Whether those species, or the *S. decussata* and *elegans* of D'Orbigny, are *extinct*, is another question, with which Mr. Woodward is probably not more familiar.

If Mr. Woodward would take the trouble of reading again my paper in the 'Annals' for April, he will, or ought to, be convinced that his remarks as to the separation of *Schismope* from *Scissurella* were unnecessary and uncalled for, because D'Orbigny and Sowerby evidently took their characters of what they regarded as the same genus from different and uncongeneric species.

My reason for wishing Mr. Woodward, instead of myself, *in the first instance*, to refer to D'Orbigny, was simply that he, and not I, might have the credit (if any) of making this separation. I am therefore sorry that he should have put such a strange construction upon our conversation.

I never heard of any "protest" from Mr. Woodward until I saw his letter in print.

Yours obediently.

J. Gwyn Jeffreys.

Montagu Square, London, 21st May 1856.

P.S. Since writing the above, Professor King has reminded me that in his "Monograph of the Permian Fossils of England" (pp. 213 and 214), he satisfactorily made out *Scissurella* to be the same as *Pleurotomaria*, and that Mr. Morris, in his "Monograph of the Mollusca from the Great Oolite," follows him in that view. It can hardly be said that these naturalists are also "unacquainted" with the subject, so far as regards the palæontological part of it. Professor King quite approves of the separation of *Schismope* from *Scissurella*, although he suspects the former may approach too closely to Deslongchamp's genus *Trochotoma*.

XLV.—*On the Orang-Utan or Mias of Borneo.*

By Alfred R. Wallace.

Having spent nine months in a district where the Mias is most abundant, and having devoted much time and attention to the subject, I wish to give some account of my observations and collections, and particularly to record their bearing on the question of how many species are yet known from Borneo.

I have altogether examined the bodies of seventeen freshly killed Orangs, all but one shot by myself. Of eleven of these

I have preserved the skins, either in spirits or dried. Of seven I have perfect skeletons, and of the remainder the skulls; and of all, the sex, colour and other external peculiarities were accurately noted at the time, as well as all the principal dimensions. I have besides two other skeletons and two skulls, the sex and external characters of which are determined on the authority of Europeans or natives who saw them when freshly killed. Of this extensive series sixteen are fully adult, and their skulls are therefore strictly comparable with each other, nine of them being males and seven females. They were moreover all obtained in a very limited tract of country watered by the same small river and of very uniform physical features. We may therefore assume, unless the contrary can be supported by the very strongest evidence, that the male and female specimens are sexes of the same species, whether they be one or more.

The males procured by me may be divided into two groups, differing considerably both in the external characters and in those of the cranium. The first and most abundant is the large animal known among the natives as the "*Mias pappan*" or "*Mias chappan*," the latter name being used by the Dyaks as well as that of "*Mias Zimb*," while the former is, on the authority of Sir James Brooke, a name applied to it by the Malays. It is known by its large size and by the lateral expansion of the face into fatty protuberances or ridges over the temporal muscles, which have been mistermed *callosities*, as they are perfectly soft, smooth and flexible. Five of this form measured by me varied only from 4 feet 1 inch to 4 feet 2 inches in height from the heel to the crown of the head, the girth of the body from 3 feet to 3 feet $7\frac{1}{2}$ inches, and the extent of the outstretched arms from 7 feet 2 inches to 7 feet 8 inches; the width of the face from 10 to $13\frac{1}{2}$ inches. The colour and length of the hair varied in different individuals and in different parts of the same individual; some possessed a rudimentary nail on the great toe, others none at all, but they otherwise present no external differences on which to establish even varieties of a species. Yet when we examine the crania of these individuals we find remarkable differences of form, proportion and dimension, no two being exactly alike. The slope of the profile and the projection of the muzzle, together with the size of the cranium, offer differences as decided as those existing between the most strongly marked forms of the Caucasian and African crania in the human species. The orbits vary in width and height, the cranial ridge is either single or double, either much or little developed, and the zygomatic aperture varies considerably in size. This variation in the proportions of the crania enables us satisfactorily to explain the marked difference presented by the single-crested and double-

crested skulls, which have been thought to prove the existence of two large species of Orang. The external surface of the skull varies considerably in size, as do also the zygomatic aperture and the temporal muscle; but they bear no necessary relation to each other, a small muscle often existing with a large cranial surface and *vice versâ*. Now those skulls which have the largest and strongest jaws and the widest zygomatic aperture, have the muscles so large that they meet on the crown of the skull and deposit the bony ridge which separates them, and which is highest in that which has the smallest cranial surface. In those which combine a large surface with comparatively weak jaws and small zygomatic aperture, the muscles on each side do not extend to the crown, a space of from 1 to 2 inches remaining between them, and along their margins small ridges are formed. Intermediate forms are found in which the ridges meet only in the hinder portion of the skull. The form and size of the ridges are therefore independent of age, being sometimes more strongly developed in the less-aged animal. Professor Temminck states that the series of skulls in the Leyden Museum shows the same result.

Sir James Brooke first noticed these differences in the ridges, and finding that the Dyaks affirmed that two large species of Orang existed, very naturally concluded that they respectively belonged to them. Mr. Blyth of Calcutta has adopted this view, considering that the animal possessing the double-crested skull has the large cheek-excrescences, while that with the single-crested skull is deprived of them; but my specimens, as well as the series at Leyden, show that these various forms of skull belong to one and the same species of animal, in which view Sir James Brooke, after an examination of my specimens, perfectly coincides. I may here mention, that Mr. Blyth has since written to Sir J. Brooke acknowledging the receipt of some skeletons from Sarawak, and stating that he has found a *new species* among them distinguished by its shorter and more robust limbs and slightly projecting jaws. The great amount of variation, however, which exists in these respects among animals whose external characters are identical, would show that it is not possible to establish a new species on such grounds from a single specimen. As an instance of the extreme variation which occurs in the skull of the fully adult male Orang with cheek-excrescences, I may mention that the width between the orbits externally is only 4 inches in one specimen and fully 5 in another, while the two animals did not differ 1 inch in their total height.

The second form of male Orang which I have procured differs so remarkably from the first, that it seems well entitled to be considered a distinct species. The two fully adult specimens

which I obtained were respectively 3 ft. 8½ in. and 3 ft. 9½ in. in height, 6 ft. 6 in. in extent of arms, and about 2 ft. 6 in. in girth of body. They possessed no signs of the cheek-excrescences, but in other respects resembled the larger kinds. The skull is smaller and weaker, and the zygomatic arches narrower than in the large species; it has no bony crest, but two faint ridges from 1¾ inch to 2 inches apart, exactly as in the *Simia Morio* of Prof. Owen, figured in the 'Transactions of the Zoological Society.' The teeth however are in proportion to the skull, of immense size, equalling, and in one case surpassing, those of the larger animals: the molars extending further backward, and the incisors and canines being set closely together, room is found for them in a much smaller jaw. The great canine teeth are quite as large as in most specimens of the larger animal, and of exactly the same form. These animals the Dyaks called "Mias Kassu."

The adult females, five in number, examined by me exhibit a remarkable uniformity among themselves, and a striking difference compared with the large males. In size they vary only from 3 ft. 6 in. to 3 ft. 7 in. in height, from 2 ft. 4 in. to 2 ft. 6½ in. in girth below the arms, and from 5 ft. 9 in. to 6 ft. 5½ in. in extent of arms. None possess any cheek-excrescences, some have and some want the nail on the great toe, the colour varies considerably, but the external characters are in general remarkably similar to those of the smaller males before mentioned, from which they only differ in a stature from 1½ in. to 3 inches lower. Their crania are either equal to or slightly less than those of the small males; but their teeth differ remarkably from those of all the males, in the canines being comparatively small, and of the peculiar subtruncated form, dilated at the base, which is represented in the plate of *Simia Morio* before alluded to. With that plate most of these crania exactly agree; I presume therefore that it represents a female specimen, and that the peculiar form of canine tooth is characteristic of the female sex. The question then remains, to which of the two forms of male animal are these the females. From a careful examination of my specimens I am induced to consider that most of those, the crania of which equal in size those of the small males, may be referred to the larger species, while one or two, slightly smaller in all their dimensions, but remarkable for having the two middle incisors in the upper jaw larger than in the other specimens, may be considered as the females of the smaller species, the male of which has also those teeth larger than in the animals which possess huge crested skulls and cheek-excrescences. These smaller females so exactly correspond with Prof. Owen's figure, that there is no doubt of their belonging to

the same species, the adult male of which will, I believe, now be made known for the first time. The skins of the two small males and of the females, now on their way to England, in spirits, will, when strictly compared, serve to determine accurately the characters of the two species of Bornean Orang, *Simia Satyrus* and *S. Morio*.

The Dyaks of N.-Western Borneo, however, have names for three species of Mias, although I could never find any one who could determine them with precision. All the animals with large cheek-excrescences form the "*Mias chappan*," but they declare that females are also found of the same form. Authenticated female specimens, however, with cheek-excrescences do not exist in Europe, and if they ever do occur, seem far too rare in proportion to the males to be any other than an accidental variety in which the one sex has assumed characters generally confined to the other. All Orangs of smaller size and without cheek-excrescences are called by the Dyaks *Mias Kassu*, and my small males and females are undoubtedly of this kind; but these people have asserted that every female I shot was a *Mias Kassu*, so that I am rather inclined to think that they have regarded the larger males as distinct species from the smaller and differently formed females. In one case however they said that a female was a *Mias chappan*, though it possessed no cheek-excrescences, nor differed from the other females except in having the skin of the throat rather more loose and inflated than usual,—a character generally very prominent in the large males. The third kind they call the *Mias rambi*, and they say it equals the "chappan" in size, but has no cheek-excrescences and very long hair. This seems very rare, and is probably one of the large species in which the excrescences have been little or not at all developed. One of my females they asserted with hesitation to be a "rambi," but I could not perceive that it in any way differed from the others except in a much paler colour than usual.

The conclusions therefore at which I have arrived are as follows:—

1. That two species of Orang have been ascertained to exist in Borneo.

2. The differences between them are well marked in the males, but much less distinct in the females.

3. That all the females are characterized by the small-sized skull without prominent ridges and by their subtruncated dilated canine teeth.

4. The males of both species possess large conical canines.

5. That the form, size and proportions of the crania, and the size and position of the teeth, vary in each individual to such an

extent, that these variations alone cannot be taken to mark distinct species.

Most of these conclusions are fully supported by Prof. Temminck, from an examination of the very extensive series of specimens in the Leyden Museum, though, from not possessing specimens of the smaller male, he was unable to detect any specific difference in the females.

Prof. Owen, in his admirable papers published in the 'Transactions of the Zoological Society,' has described the apparent confusion in the position of the second set of teeth in the jaws of the young animal, and observes that it seems wonderful that they should all fall into their proper places in the adult, without those irregularities which are so frequent in Man. My specimens however prove that such irregularities are very frequent, as more than one-half of my crania exhibit them in a greater or less degree. In two cases a sixth molar tooth occurs on one or both sides of the jaw; the incisors are often unsymmetrical and the whole jaw is frequently oblique, in one case so much so, that while the upper canine closes inside the lower on one side of the jaw, it is outside on the other.

A striking peculiarity, not, I believe, hitherto noticed, exists in the mammæ of the female, which are scarcely perceptible even when giving suck. In two specimens which I shot with their infant young, the nipples rose from a breast not more developed than in the male animal.

The preceding observations might have been very much extended, but the object has been merely to give some account of the writer's observations and collections, believing that no definite and certain conclusions can be arrived at without a comparison of his materials with those which already exist in England and at Leyden, a comparison which he looks forward to making on his return.

Sarawak, Dec. 1855.

XLVI.—*On* Prof. Huxley's *attempted Refutation of* Cuvier's *Laws of Correlation, in the Reconstruction of extinct Vertebrate Forms.* By H. Falconer, M.D., F.R.S. &c.

The printed Proceedings of the Royal Institution contain a full abstract of the principal part of an evening lecture, delivered by Prof. Huxley, on the 15th February last, "On Natural History, as Knowledge, Discipline, and Power," authenticated with his initials, and thus leaving no doubts as to the authorship. It contains some statements which are so remarkable,—emanating