

make it improbable that *Argyope* will ever extend its range outside the southern counties.

I have to thank Mrs. Marshall Bell, Mr. L. Beeching Hall, Mr. E. A. Robins, Lieut.-Commander A. A. D. La Touche, Mr. H. G. Rose and Mr. Bushby for information about the English colonies of *Argyope bruennichi* Scop. and specimens. My thanks are also due to Mr. E. Browning of the British Museum for permission to examine *A. aurantia* Luc. and other species in the collection.

LITERATURE.

- BRISTOWE, W. S. 1941. 'The Comity of Spiders.' Vol. II.
[Protective devices in web-construction.]
- COMSTOCK, J. H. 'The Spider Book.'
[Illustration of *Miranda aurantia* Luc and *Argyope trifasciata* Forsk.]
- HINGSTON, R. W. G. 1927. Proc. Zool. Soc. Lond. pt. 2, pp. 259-293.
[Protective devices in web-construction.]
- PICKARD-CAMBRIDGE, F. O. 'Biologia Centrali-Americana. Araneida.'
Vol. II.
[Illustration of *Miranda aurantia* Luc. and *Argyope trifasciata* Forsk.]
- ROBINS, E. A. 1941. Proc. Bourn. N. S. Soc. xxxiii, p. 26.
[Record of discovery of a spider which "resembles very closely *Miranda aurantia* which occurs in N. America."]
- . 1942. 'Countryside,' xii. (N. S.), no. 2, pp. 25-26.
- . 1942. Proc. Linn. Soc. Lond. 154th Session, p. 1, pp. 46-47.
[Mentioning habits of and recording discovery of a spider "comparable in all particulars with" *Miranda aurantia* Luc.]
- SIMON, E. 1929. 'Les Arachnides de France,' vi. pt. 3.
[Description of *Argyope bruennichi* Scop.]
- WIEHLE, H. 1941. 'Die Tierwelt Deutschlands,' 23 Teil.
[Illustrations and description of *Argyope bruennichi* Scop.]

LXXII. *The Premaxillæ in the Asiatic Rhinoceroses.* By R. I. Pocock, F.R.S. (Zoological Dept., British Museum of Natural History).

IN the Asiatic Rhinoceroses the general structure of the premaxillæ, which carry the pair of upper tusks and occasionally one or two additional but functionless incisors, or their sockets, on each side, is well known. Gray, for instance, pointed out that in *Rhinoceros unicornis* these bones are much stouter than they are in *Rhinoceros sondaicus*. But an examination of the skulls of the three species in the British Museum has recently revealed some

specific and individual variations in the premaxillæ which seem to be sufficiently interesting to be put on record, partly because they are in several cases difficult to explain from the available material.

Out of nine skulls of *Rhinoceros sondaicus*, the lesser one-horned species, five have the premaxillæ missing, detached at the point where they joined the maxillæ. This indicates such loose attachment between the bones that the premaxillæ were lost when the skulls were originally cleaned or subsequently. Two only of these five skulls are youngish. The younger, a ♀ from Lower Tenasserim (Hubback, 21.5.15.1) retains pm^4 of the milk set and shows no sign of m_3 . The older (723 b), one of the skulls Gray assigned to *nasalis*, has the teeth very little worn and m_3 still imbedded but visible. The remaining three are adult or oldish. A ♂ from Java (C. W. A. Buma, 2.12.18.1) has m_3 in use and a little worn. An oldish ♂ from the Malay Peninsula (Cantor, 79.11.21.178) and another (723 a) without locality have m_3 a good deal worn.

Of the four skulls that retain the premaxillæ, two are very much alike. One was from the Sanderbans (Gerrard, 76.3.30.1), the other from Java (723 d). They are adult, but not old, males with m_3 more or less worn. In both the premaxillæ are freely movable on the maxillæ. They differ in a small detail. In the right premaxilla of the Javan skull there is the empty socket of a shed incisor just behind the tusk. On the left side there is no trace of a similar socket; and on the skull from the Sanderbans there is no trace of a similar socket on either side (fig. 1, A). Gray's figures of the now destroyed type-skull of *Rh. floweri* (= *sondaicus*) from Sumatra suggest that it resembled the preceding two in having the premaxillæ separated and attached to the maxillæ by a still open suture. It had m_3 fully erupted and was clearly adult, if not oldish (Proc. Zool. Soc. 1867, p. 1015, figs. 3, 4).

The remaining two skulls, with the premaxillæ in place, differ from the preceding in having those bones firmly welded to the maxillæ. They are obviously much older skulls, indeed very old. In one (722 h) received from the Zoological Society, without locality, all the cheek-teeth are greatly worn, and the tusks had been shed so long before death that their sockets are nearly filled with corrugated

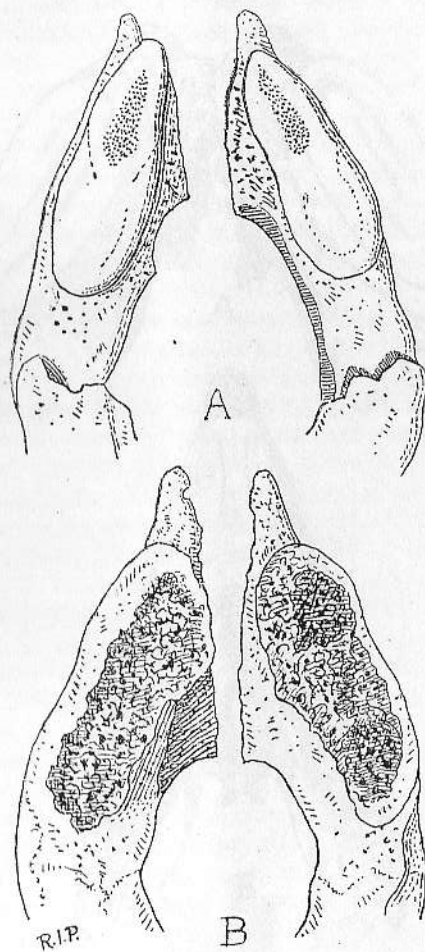
bone. The maxillo-premaxillary suture is almost obliterated, the premaxillæ are separated from each other in front by a narrow space, and each carries a longish bony prominence projecting anteriorly beyond the socket of the tusk (fig. 1, B). The second skull, that of an exceedingly old female from the Kroh forest, Perak (A. S. Vernay, 32.10.21.1), has all its cheek-teeth so loose from the absorption of the roots with age that most of them have fallen out of the jaw. The tusks also are missing, but the alveoli are not filled with corrugated bone as in 722 h. There is no trace of the maxillo-premaxillary suture, and the premaxillæ are ankylosed in the middle line in front, except for a small space between the anterior halves of the sockets of the tusks; and this ankylosis has extended to the anterior processes, which are exceptionally long, and form a projection, wide at the base, narrowed towards the apex, which reaches distally to the level of the tip of the nasals. In the fusion of the premaxillæ and in the great development and coalescence of the processes this skull of *sondaicus* is unique, so far at all events as the British Museum collection is concerned* (fig. 2, B).

In a series of twelve skulls of *Rhinoceros unicornis* †, the greater one-horned species, the premaxillæ are missing in only three, indicating a much smaller percentage than in *Rh. sondaicus*. The three in which they are missing, attesting loose attachment to the maxillæ, vary considerably in age. The youngest, Gray's type of *stenocephalus* (722 c), of which the locality is unknown, retains the premolars of the milk dentition. The next, from the Nepal Tarai (The Prince of Wales), is a good deal older, but has *pm*⁴ of the milk dentition still in use and *m*3 imbedded but visible in its alveolus. The third, from between the Monas and the Brahmaputra Rivers (Vanderbhyl, 1.3.10.1),

* There were, I understand, some local expressions of disapproval at the shooting of this rhinoceros owing to the probability of her being one of the last representatives of the species inhabiting the Malay Peninsula. But from her advanced age, so clearly indicated by the skull and teeth, there can be no doubt that she was long past breeding, and would have died a lingering death of old age in the forest in perhaps about a year's time. Even if she had escaped being "poached" by the natives, she would consequently have been irretrievably lost to science. It was fortunate, therefore, that she was secured for the British Museum, where her mounted skin is on exhibition in the public gallery.

† For the settlement of the identity of this species see Ann. & Mag. Nat. Hist. (11) xi. p. 616, 1944.

Fig. 1.



A. Lower side of premaxillæ of adult ♂ *Rh. sondaicus* from the Sanderbans, (76.3.30.1), with the tusks worn in front.
B. The same of an unlocalized, much older specimen (722 h), with the tusks shed.

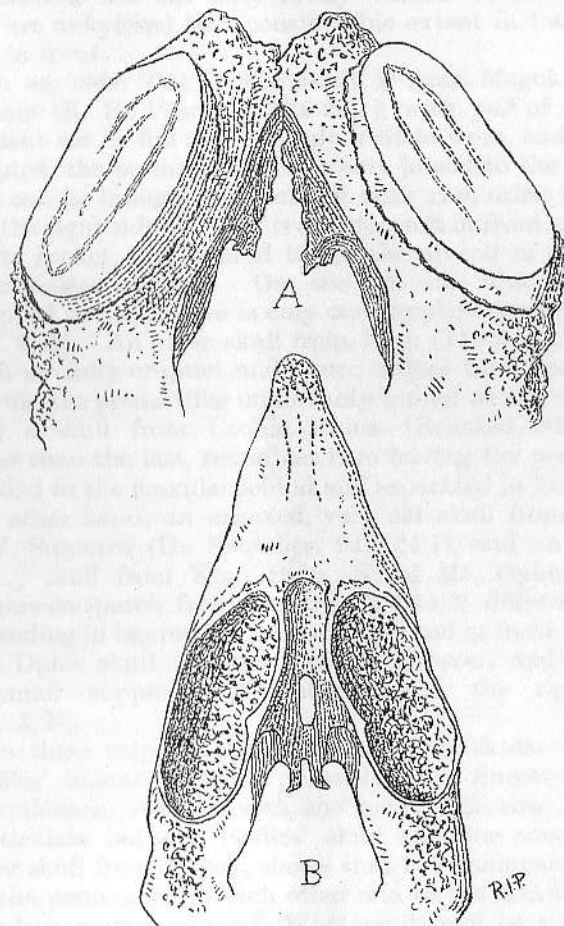
is oldish, having the permanent set of cheek-teeth in use and worn.

In the skulls with premaxillæ attached, the youngest, labelled "India" (70.3.10.18), resembles the type of *stenocephalus* in retaining its milk premolars and differs in this respect from Vanderbuhl's much older skull. The premaxillæ, moreover, are firmly fastened to the maxillæ. An older but barely adult skull from Dacca (G. P. Sanderson, 84.1.22.3), with m^2 only a little worn and m^3 imbedded, differs from the last, although considerably older, in having the premaxillæ movably attached to the maxillæ. A slightly older ♂ skull from Kuch Behar (The Maharajah, 3.2.13.1), with pm^4 of the permanent set in use and m^3 visible in its alveolus, the premaxillæ are movable as in the skull from Dacca. In the rest of the skulls, all considerably older than the preceding, the premaxillæ are immovably, and practically invisibly, fused with the maxillæ, and, with one exception, are almost or quite in contact, without fusion in the middle line in front. Three have definite localities: one from Assam (Zool. Soc., 84.1.22.1), another from Gauripore, Assam (Col. Sir C. Russell, 72.12.30.1), and a third, an old ♀ from Nepal (Dr. Oldfield, 1926.6.7.8). In the last two all the cheek-teeth of the permanent set are in use and worn. Two, both old, have no localities, one being unregistered, the other purchased from a dealer (722*f* and 51.11.10.2). In the exception above referred to, the unlocalized skull of an old ♂ (722*d*), with all the teeth worn, the premaxillæ are firmly ankylosed together in the middle line in front (fig. 2, A).

In *Didermocerus sumatrensis*, the two-horned Asiatic Rhinoceros, the premaxillæ are relatively stouter than in *Rhinoceros sondaicus*, although not so stout as in *Rhinoceros unicornis*: but judging from the available skulls they are more firmly attached to the maxillæ than in either of those species. There are seven young and adult skulls in the British Museum, and in not one of them are the premaxillæ missing.

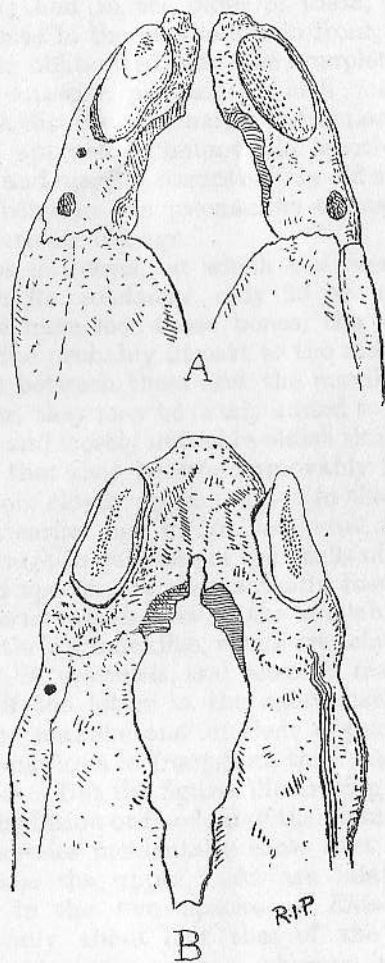
Two young skulls differ surprisingly in the extent of the fixation of these bones. In the youngest, a ♀ from Suam Lambah, British North Borneo (H. O. Rowe, 1.8.15.1), which has pm^4 of the milk dentition still in use and the tip of m^3 hardly visible in the bone, the premaxillæ do not quite touch in the middle line and are movable on the

Fig. 2.



A. Lower side of the premaxillæ of an old skull of *Rh. unicornis* (722*d*)
 B. The same of a very old ♀ skull of *Rh. sondaicus* (32,10.211) from Perak.

Fig. 3.



- A. Lower side of premaxillae of barely adult ♀ of *Didermocerus sumatrensis* from Mogok, Upper Burma (31.5.28.1).
 B. The same of very old ♂ from N. of Mt. Ophir, Malay Peninsula (79.6.14.2).

maxillae. In the other, probably from Sumatra (Raffles. 1411 *b*), which is only a little older, still retaining the milk pm^4 and showing only the tip of the imbedded m^3 , the premaxillae are not only firmly welded to the maxillae but are ankylosed to a considerable extent in the middle line in front.

In an older but barely adult ♀ from Mogok, Upper Burma (E. H. Peacock, 31.5.28.1), with pm^4 of the permanent set in full use, but only a little worn, and m^3 half erupted, the premaxillae are loosely joined to the maxillae and can be brought into contact with each other in front. On the right side the tusk is a little worn in front and loose in its socket, and behind it are the alveoli of two shed functionless incisors. On the left side the tusk has dropped out and there is only one supplementary alveolus (fig. 3, A). An older skull from Pegu (Theobald, 1461 *a*), with m^3 fully erupted and worn, differs from the last in having the premaxillae immovably united to the maxillae: and a skull from Cochin China (Boucard, 81.6.30.9), older than the last, resembles it in having the premaxillae welded to the maxillae behind and separated in front. On the other hand, an unsexed, very old skull from Siboga, S.W. Sumatra (Dr. Schreber, 94.9.24.1), and an equally old ♂ skull from Kian Putu, N. of Mt. Ophir, Malay Peninsula (purch. from Gerrard, 79.6.14.2), differ from the preceding in having the premaxillae fused in front. In the Mt. Ophir skull the tusks are much worn and there is a small supplementary alveolus on the right side (fig. 3, B).

In these respects these two very old skulls resemble Raffles' immature skull, probably from Sumatra. This resemblance, coupled with the great difference in those particulars between Raffles' skull and the considerably older skull from Mogok, shows that the immovable fusion of the premaxillae to each other and to the maxillae is not purely a matter of age. Whether it may be a question of sex remains to be ascertained.

Summary.

In *Rhinoceros sondaicus* about 50 per cent. of the young and oldish available skulls have the comparatively slender premaxillae missing, a defect attesting loose attachment to the maxillae. In two adult skulls that

retain them they are freely movable on the maxillæ in a horizontal plane. In two very old skulls they are firmly fused to the maxillæ; and in the older of these, an aged ♀, they are ankylosed in the middle line in front, all trace of the suture being obliterated, and the complete ankylosis involves their anterior processes, which form a long, proximally wide, distally attenuated, triangular projection. In this species apparently immovable junction between the premaxillæ and maxillæ occurs only in old animals, and similar union between the premaxillæ themselves takes place only in extreme old age.

In *Rhinoceros unicornis*, in which the premaxillæ are thicker than in *Rh. sondaicus*, only 25 per cent. of the available skulls have lost those bones, the smaller percentage being due probably in part to the more extensive area of contact between them and the maxillæ. In this species, however, they may be firmly united to the maxillæ in young skulls and loosely united in oldish skulls. On the whole it seems that they become immovably fused to the maxillæ and more closely approximated in the middle line in front at an earlier age in *Rh. unicornis* than in *Rh. sondaicus*, although in only one of the skulls of the former, as of the latter species, do they actually fuse anteriorly.

In *Didermoceros sumatrensis* all the available skulls are provided with their premaxillæ, which are relatively about as thick as in *Rh. unicornis*, and seem to resemble more closely those of the latter in the age-variation of their fusion with the maxillæ and in their approximation to each other or ankylosis in front than they resemble those of *Rh. sondaicus*. But the figures illustrating some of the variations in the fusion or freedom of the premaxillæ in the three Asiatic species incidentally show that in *Didermoceros sumatrensis* the upper tusks are relatively much smaller than in the two species of *Rhinoceros*, their length being only about half that of the premaxillæ, excluding the anterior processes, whereas in *Rhinoceros* they are about three-quarters the length of those bones.

ERRATA.

"New Species of South African Staphylinidæ (Col.)," *Ann. & Mag. Nat. Hist.* (11) xi. 1944, by Malcolm Cameron.

Page 706, line 1, for "*minimus*" read "*mimus*."
Page 718, line 4 from bottom, for "*Tachyusia*" read "*Tachyusa*."

INDEX TO VOL. XI.

- ACANTHOCEPHALA, new, 462.
Acanthocephalus, new species of, 463.
Achanops, new species of, 336.
Acolastus, new species of African, 410-418.
Acrididæ, fossil, 359.
Acticola, gen. et sp. n., 618, 619.
Actobius, new species of, 714.
Acylophorus, new species of, 716.
Agabus falkenströmi, nom. nov., 352.
Agropistes, new species of, 819.
Agrostes, gen et sp. n., 447, 448.
Aleochara, new species of, 730.
Alexander, C. P., on new or little-known Tipulidæ, 154, 284, 586.
Allicospermum, new species of, 424.
Allodape, new species of, 807.
Allodapula, new species of, 806.
Ambonyehinia, new species of, 213.
Aphthona, new species of, 551.
Apion russeolum and A. tropicum, on, 133.
Arrow, G. J., on the Asiatic beetles of the Melolonthine genus Schizozoncha, 194; systematic notes on Melolonthine beetles belonging to Holotrichia and related genera, 631.
Artaba, new species of, 600.
Asporus, gen. et sp. n., 441.
Astenus, new species of, 782.
Asynetus, gen. et sp. n., 93, 94.
Atarba, new species of, 172-175, 602.
Atheta, new species of, 319, 320, 720-726.
Baccha, new species of, 50.
Balfour-Browne, J., on Apion russeolum and Apion tropicum, 133; on new names and new synonymies in the Dytiscidæ, 345.
Barnard, K. H., and von Bonde, C., an adult specimen of Dinetmus, 236.
Baryrhinus, gen. et sp. n., 81, 82.
Bate, Miss D. M. A., on pleistocene shrews from the larger Western Mediterranean islands, 738.
Baylis, H. A., on three new Acanthocephala from marine fishes of Australasia, 462; on two new species of the Nematode genus Heterakis, 621; on some parasitic nematodes, 793.
Bees, on some African, 804.
Beetles of the Melolonthine genus Schizonycha, on the Asiatic, 194.
Bidessus granularis, nom. nov., 346.
Bledius, new species of, 707, 708.
Blepharhymenus, new species of, 729.
Bonde, C. von, see Barnard, K. H.
Brachyderina, a key to the genera of, 503.
Brahmina, new species of, 639, 640.
Bristowe, W. S., on a foreign spider established in England, 829.
Bryant, G. E., on new species of African Cryptocephalus, 117-124, 137-144; on new species of African Chrysomelidæ, 335; on new species of African Acolastus, 410; on new species of Nonarthra, 472; on new species of South American and West Indian Chrysomelidæ, 551; on new species of South American Chrysomelidæ, 648, 698; on new species of African Chrysomelidæ, 817.
Cæcidotea, on the freshwater Lepad genus, 815.
Casoporis, new species of, 702.
Ann. & Mag. N. Hist. Ser. 11. Vol. xi. 61