

THE PICULETS: *PICUMNUS* AND *SASIA*
A NOTABLE CASE OF AVIAN DISPERSAL
IN THAILAND

by
Leon Croizat

Amongst the many species of birds to be found in Thailand the tiny piculets (Picidae: Picumninae genera *Picumnus* and *Sasia*) might be easily overlooked as amongst the Woodpeckers alone Deignan (1963) lists 13 genera, 33 species and 59 subspecies some of which are very large and others very colourful. The piculets however have a special, global biogeographical interest.

Peters (1948) listing the Picumninae needed but ten per cent of the space allotted to the sub-family to deal with the taxa found in the Indo-Malayan region. The thirty species of the four genera involved are shared as follows"

Genus	New World		Africa		Indo-Malayan Region	
	No. of species	No. of races	No. of species	No. of races	No. of species	No. of races
<i>Picumnus</i>	25	58	—	—	1	5
<i>Nesocittes</i>	1	2	—	—	—	—
<i>Verreauxia</i>	—	—	1	1	—	—
<i>Sasia</i>	—	—	—	—	2	7

To the student of dispersal the first question must be—how did such a small sedentary genus as *Picumnus* come to have such a disjunct distribution? What "means of dispersal" did it have to take it from Borneo to Brazil or vice versa?

This question has been examined before (Croizat 1962, 1968a) and the case is in fact on a parallel with the mainly Texan plant genus *Menodora* which has a representative in South Africa or the American Iguanidae which tern up in Madagascar (Croizat 1960: lb.: 1486). Each represents the combination of characters in a fashion rendered unusual by the geographical distribution of similar taxa, and with such

recombinations of characters previous substantial works have dealt (Croizat 1952, 1958, 1960, 1962, 1968a and 1968b.).

The dispersal of *Picumnus* and *Sasia* in and around Thailand is however of particular interest. The distribution of the three Indo-Malayan species of Piculet namely *Picumnus innominatus*, *Sasia ochracea* and *Sasia abnormis* may easily be found in Peters (1948). Deignan (1963) differs somewhat in his treatment of the races of *Sasia ochracea* and gives us rather more detail as to racial boundaries; to his data Dickinson (pers. comm.) has added that *Sasia ochracea* subsp. occurs at least as far south as the township of Phangnga.

The overlap that thus exists between *Sasia abnormis*, which ranges north to about Prachuap Khiri Khan, and *Sasia ochracea* which ranges south to Phangnga—although wider than is often the case—occurs in the same general area as for many other meetings between 'sundaic-malayan' taxa coming up from the Malay Peninsula and 'indo-chinese' taxa stretching south. The importance of this divide has been mentioned before (Croizat 1958) in connection with the flora and fauna of 'Tenasserim'. In this work progress was hampered by the lack of data; Deignan's Checklist (1963) was still to appear as were many of the most recent volumes of Peters' Checklist. Deignan (1945) had of course pointed out the existence of a similar divide along the line of the Khun Tan range, which separates Lamphun and Lampang provinces in northern Thailand but this was of limited use without more data on the rest of the country.

This divide is also apparent in the recent work by Dickinson & Somtob (1968) on *Pteruthius flaviscapis* the map in which shows the interesting gulf between *P.f. schauenseei* in the Malay peninsula (which is geographically close to the races *cameranoi*—in the highlands of Malaya and Sumatra—nominated *flaviscapis*—in the highlands of Java—and *robinsoni*—in the highlands of Borneo) and the races of the Himalayan element occurring in northern Thailand, and now shown to stretch south-eastwards into southern Indochina. These two groups of races seem to have two separate 'streams' of archetypal distribution out of a centre which must have been in land, now vanished, which would have occupied the general area of the northern end of the Indian Ocean (Croizat 1952, 1958 and 1968). Thus Thailand would lie in the jaws of a pincer movement in terms of subsequent distributional expansion.

Perhaps this seems far-fetched but such a hypothesis also fits, for example *Rhododendron* (Croizat in prep.) and the interesting sympatry of subspecies of *Porphyrio porphyrio* meeting in the area of Bung Boraphet, Nakhon Sawan province, central Thailand which Deignan (1963) drew attention to, pointing out that the two 'races' apparently behave as good species. A glance at Peters (1934) will show the distribution pattern of the relevant races—*P.p. poliocephalus* forming the northern arm of the pincer and *P.p. viridis* the southern. A situation similar to that found here in *Porphyrio* occurs in *Pyrrhula* and in *Parus* in northern Asia.

Now whilst the two species of *Sasia* seem to fit pretty well with this hypothesis (see Fig. 1) the case of *Picumnus* seems different. In fact however the distribution of the individual races of *Picumnus innominatus* suggests that the whole distribution has been developed along the northern arm of the same pincer. However the particular path followed in this southward distribution is at the moment impossible to define. Interesting features of the distribution which need to be explained by any hypothesis put forward are the distribution in peninsular India, the apparent absence from peninsular Thailand and the presence in Malaya, Sumatra and Borneo—all this of a form treated by Peters (1948) as *P.i. malayorum* and supposedly homogenous. Ripley (1961) treats the Indian populations a little differently the chief result of which is to widen still further the range of *malayorum* both west into Mysore and—logically—north-eastwards from the limited foothold at Vizagapatam allowed by Peters around through Orissa, southern Bengal and eastern Assam to link up with the Burmese element. Fig. 2. is intended to show two possibilities: the bold lines suggest that the 'stream' of dispersal southwards split at about the Khun Tan divide with the Burmese element then continuing south to Tenasserim and thence to Malaya and Sumatra whilst the other fork leads to Indochina and thence to Borneo, the alternative—illustrated by a broken line—is a direct link between the Himalayas and Sumatra and Malaya (a pattern which appears to be reflected amongst birds by *Pyrrhula* and amongst plants by *Terminalia* and *Primula*).

The same figure has been plotted with black triangles to illustrate broadly the distribution of pitcher-plants (*Nepenthes*) which occur in Madagascar, the Seychelles, Ceylon and the Himalayas, reoccur in Malaya and the Greater Sundas, New Guinea, New Caledonia, the Palaus and

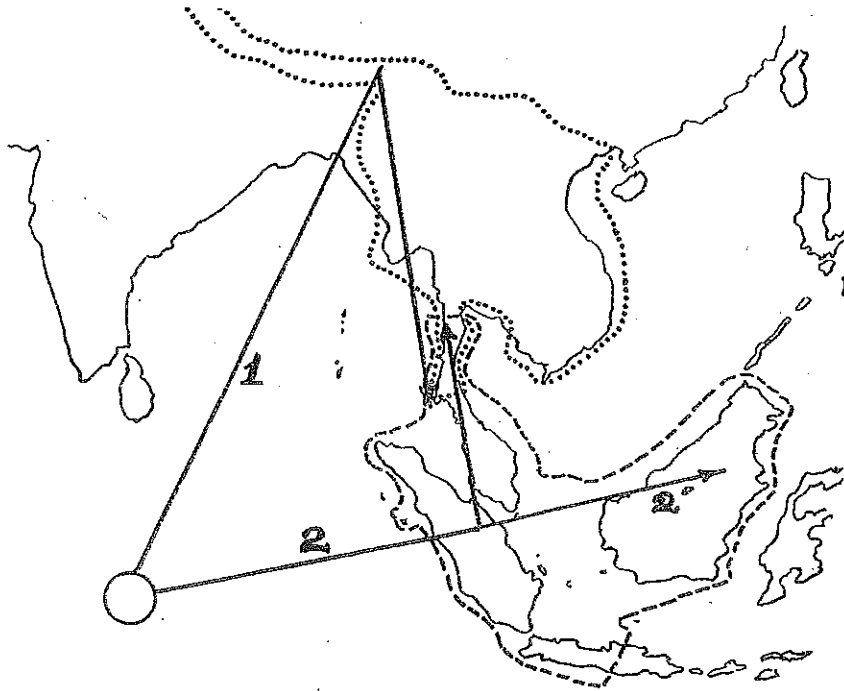


Fig. 1. The biogeographic pincer affecting Thailand with its axis in the India Ocean. *Sasia ochracea* - range illustrated by dotted line spreading southward from the "sino-himalayan" area and *Sasia abnormis* - range within broken line - spreading northwards. The axis 1 and 2. connect the sources of these two elements with the postulated Indian Ocean land mass out of which ancestral archetypes dispersed.

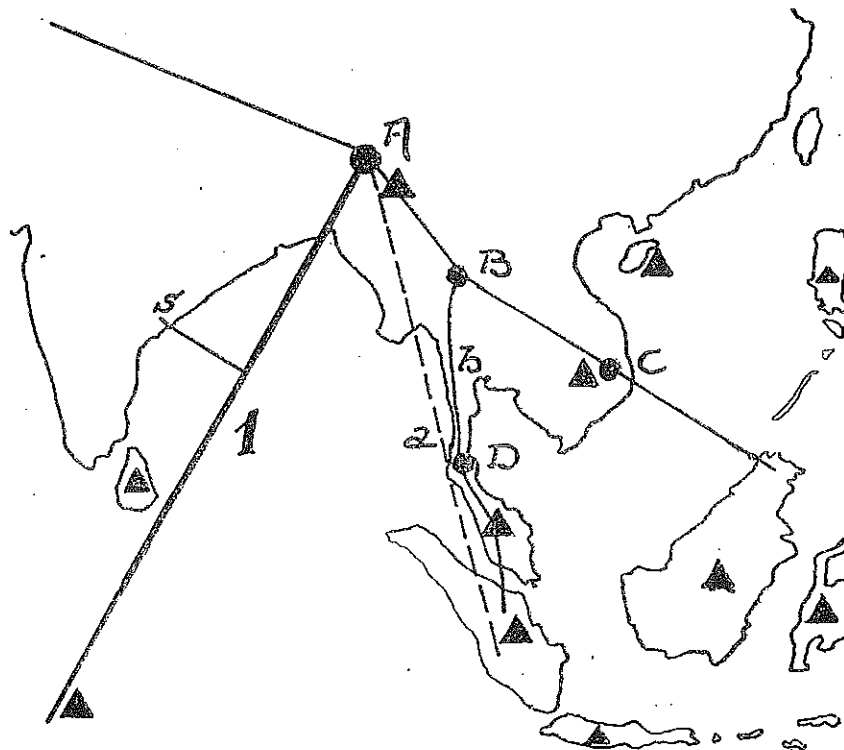


Fig. 2. Key: S: the Vizagapatam area of India; A: northern Assam; B: Khun Tan range; C: Annam; D: Tenasserim/Prachuap area of the Malay Peninsula. See text for explanation of the solid or broken "tracks" and of the solid black triangles.

northeastern Australia, and whilst absent from all of Thailand (except possibly the extreme southernmost peninsular provinces) occur again in southern China, Hainan and Indochina. So once again we have something of a pincer movement with its axis out in the Indian Ocean but in this case the southern arm of the pincer seems to have had all the genetic strength (18 species of endemic *Nepenthes* in Borneo) and to have forked both up into the Malay Peninsula and north from Borneo into Indochina, Hainan and southern China whilst the northern pincer, seemingly genetically exhausted, failed to move southwards out of the Himalayas into Burma and northern Thailand. (See also Croizat 1958 : 2b : 1387) This hypothesis contrasts interestingly with that given by Danser (1928) and the reader is recommended to see which explanation best accounts for the absence of *Nepenthes* in Burma/Thailand—a fact hard to explain with reference to climate or casual means of distribution.

We have remarked upon apparent direct links between Indochina and Borneo in a north-south direction in *Picumnus* and in a south-north direction in *Nepenthes* and these are not isolated cases, consider also the babblers *Yuhina castaneiceps* and *Timalia pileata*; consider also the slightly different case of the avian genus *Crocias* which clearly shows a direct link between southern Annam (the Langbian Plateau) and Java. In fact Indochina typified by the birds found on the Langbian and Bolovens Plateaus is also a focal point of dispersal. Its links with Hainan and southern China mentioned for *Nepenthes* are again not an isolated phenomenon. Keeping to the babblers we can see these links in the laughing-thrushes, genus *Garrulax*, and in the small babbler *Stachyris ruficeps*. Fig. 3. is to illustrate the importance of this focal point and its relationships to the Khun Tan divide and then 'Tenasserim' focal point.

It is important to stress that the points made here are not restricted to birds and plants; similar patterns can be traced with snakes, *Trimeresurus*, (Croizat 1958 : 2a. : 470) or, amongst fishes, the gobies *Gastromyzon* and *Neogastromyzon* (Croizat 1962 : 423). In fact there is nothing haphazard about dispersal, all animals and plants have had the same geographic factors affecting their history and distributional hypotheses put forward for each must always be consistent with these constant factors.

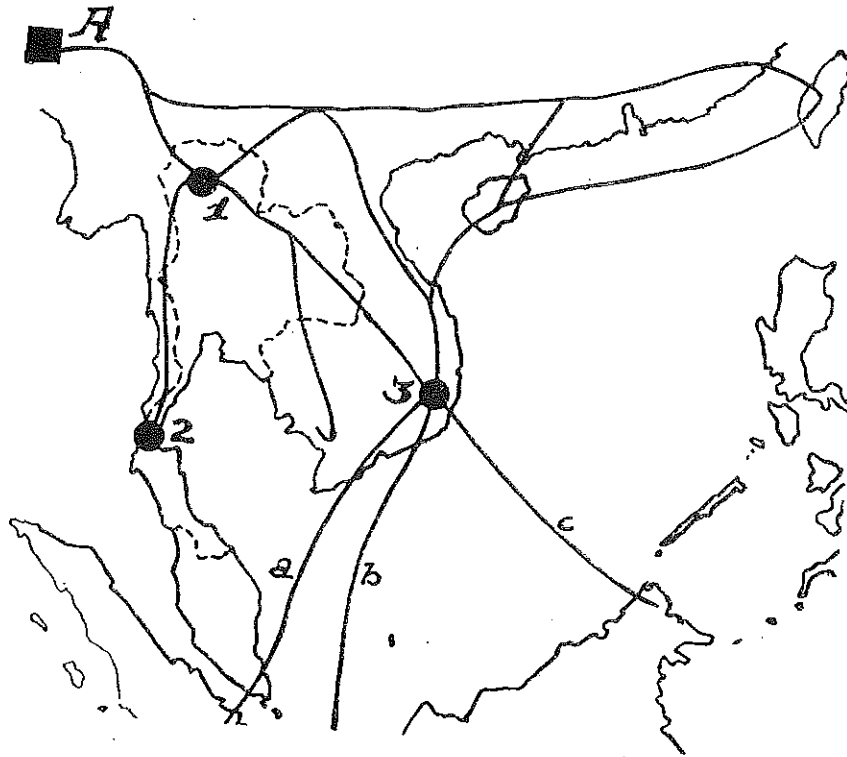


Fig. 3. The main nodes of distribution linked to the northern or sino-himalayan end of the pincer. Key: Square A: Assam; Circles: 1. Khun Tan, 2. Tenasserim/Prachuap, 3. Annam (Langbian Plateau). From the latter the 'tracks' a, b and c link it respectively with Sumatra, Java (off the map), and Borneo (Kinabalu massif).

REFERENCES

- CROIZAT, L. 1952. *Manual of Phytogeography*. Ed. Junk, The Hague.
- CROIZAT, L. 1958. *Panbiogeography*. 3 vols. Caracas.
- CROIZAT, L. 1960. *Principa Botanica*. 2 vols. Caracas.
- CROIZAT, L. 1962. *Space, Time, Form : The Biological Synthesis*. Caracas.
- CROIZAT, L. 1968a. *The Biogeography of the Tropical Lands and Islands east of Suez-Madagascar : with particular reference to the dispersal and form-making of *Ficus* L. and different other vegetal and animal groups*. *Atti. Inst. Bot. Lab. Crittog. Univ. Pavia*, ser. 6 (4): 1-400.
- CROIZAT, L. 1968b. *Introduction Raisonnée à la Biogéographie de l'Afrique*. *Mem. Soc. Broteriana (Coimbra)*, 20: 1-451.
- DANSER, B.H. 1928. *The Nepenthaceae of the Netherlands Indies*. *Bull. Jard. Bot. Buitenzorg*, Ser. 3. 9 (3-4): 249.
- DEIGNAN, H.G. 1945. *The Birds of Northern Thailand*. U.S. National Museum, Bull. 186, Washington D.C.
- DEIGNAN, H.G. 1963. *Checklist of the Birds of Thailand*. U.S. National Museum, Bull. 226, Washington D.C.
- DICKINSON E.C. & Somtob Chaiyaphun, 1968. *Notes on Thai Birds I. On a small collection of birds from in or near Nakorn Ratchasima Province, Eastern Thailand*. *Nat. Hist. Bull. Siam Soc.* 22 (3/4): 307.
- PETERS, J.L. 1934. *Check-list of Birds of the World*. Vol. II. Harvard University Press, Cambridge, Mass.
- PETERS, J.L. 1948. *Check-list of Birds of the World*. Vol. VI. Harvard University Press, Cambridge, Mass.
- RIPLEY, S.D. 1961. *A Synopsis of the Birds of India and Pakistan*. Bombay Nat. Hist. Soc., Bombay.