

Reprinted from BIOLOGICAL BULLETIN, Vol. 93, No. 2, 112-113, October, 1947
Printed in U. S. A.

BINARY ANTERIOR OCELLI IN ANTS

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In a paper by this name in the *Biological Bulletin* William Morton Wheeler (1936) published an account of binary anterior ocelli which was believed to be the first record of this condition in adult insects. He was led into a search of the literature by finding a doubling of the anterior ocellus in 15 out of more than 4,000 of a colony of anomalous ants (*Cephalotes atratus quadridens* DeGeer), which he called gynandromorphs. This colony was one which I collected in Trinidad, British West Indies. The discovery led him to examine other ants, an examination which revealed a comparable condition in a soldier of the Indomalayan ant, *Pheidologeton diversus laotina* Santschi, and in more than 60 per cent of a series of 300 soldiers from 25 colonies of the neotropical leaf-cutting ant, *Atta cephalotes* L.

The anterior ocellus of the insect eye has long been known to have a double innervation, while the lateral ocelli have a single innervation. In the ontogeny of insects there are also two primordia for the anterior ocellus itself, one for each of the lateral ocelli.

It is the purpose of this note to give credit to a much earlier discoverer of the binary anterior ocellar condition in ants and to add several additional records.

H. W. Bates in "*The Naturalist on the River Amazons*," of which the first edition was published in 1863, while writing of the large leaf-cutting ants or Saüba at Pará, Brazil, says:¹

"The third order of workers is the most curious of all. If the top of a small, fresh hillock, one in which the thatching process is going on, be taken off, a broad cylindrical shaft is disclosed. . . . If this be probed with a stick . . . a small number of colossal fellows (Fig. 3) will slowly begin to make their way up the smooth sides of the mine. Their heads are of the same size as those of the class Fig. 2; but the front is clothed with hairs, instead of being polished, and they have in the middle of the forehead a twin ocellus, or simple eye, of quite different structure from the ordinary compound eyes, on the sides of the head. This frontal eye is totally wanting in the other workers, and is not known in any other kind of ant."

A new record which is here figured (Fig. 1) is that of another fungus-grower, *Acromyrmex* (A.) *coronatus* Fab. In this genus, however, there is no soldier caste, although the workers are otherwise as polymorphic, and the large workers do not normally have ocelli. Three large workers from Bolivia (Rosario: L. Rocagua, W. M. Mann, collector) show the condition as represented. The frontal area,

¹ His description and figures (Everyman's Libr. ed., 1930, pp. 10-16) of the large, shiny-headed soldier with distinct ocelli fits *Atta cephalotes* L. and this is the species he names (as *Oecodoma cephalotes*). He, however, states that the male is not much more than half the size of the female and this is characteristic of *Atta sexdens* L., the common Brazilian species. It is possible that most of his extensive account, which is not quoted, refers to *sexdens* and the condition of double ocelli refers to *cephalotes*. When he returned to England he may have examined the latter in collections and then discovered the ocelli, or he may have seen the condition in life along the upper Amazon where *cephalotes* and *laevigata* occur.

above the convex posterior margin of the clypeus and between the bases of the antennal scapes, is shown. The ants are normally rugose here and this condition is indicated by short irregular lines. The dotted lines constituting the margin of each figure represent the frontal carinae which are expanded anteriorly as frontal lobes covering the insertions of the antennae. In the middle of each frontal area posteriorly lie the paired ocelli. Each pair is in the position of the normal single anterior ocellus of the functional female caste of the species. In the female of *A. coronatus globoculis* Forel, for example, the lateral ocelli lie immediately outside the frontal carinae in the position indicated in the figures by a pair of short, converging, dotted lines forming the most posterior portion of the drawings.

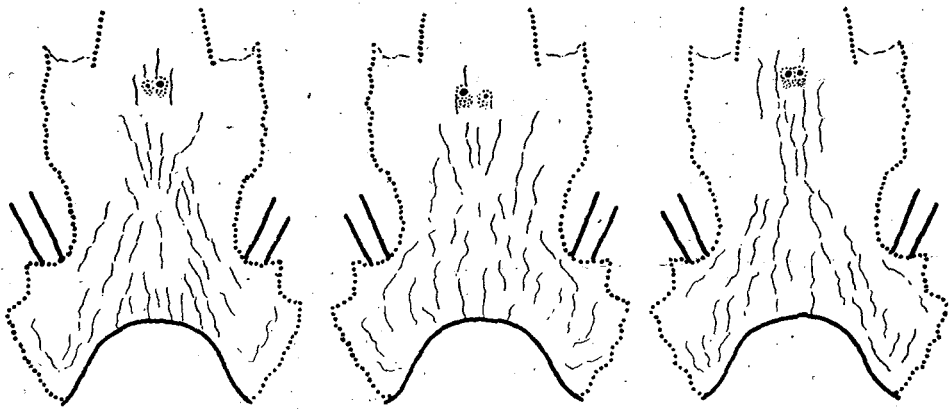


FIGURE 1

Other species of fungus-growers in my collection show binary anterior ocelli or other variations from the usual absence of ocelli.

Soldiers of *Atta cephalotes* from Peru show the condition described by Dr. Wheeler. The three mounted maxima soldiers of the type colony of *A. cephalotes isthmicola* Weber from Panama have large binary anterior ocelli and vestigial or no lateral ocelli. Three smaller soldiers of the same colony have each a minute anterior ocellus and no lateral ocelli.

Out of three soldiers of *Atta sexdens rubropilosa* Forel (det. Gonçalves) from Rio de Janeiro, only the largest shows ocelli and these are a minute lateral pair. Three soldiers of *A. sexdens robusta* Borgmeier from Rio de Janeiro (Gonçalves) show minute anterior and much larger lateral ocelli.

Large soldiers of *Atta laevigata* (F. Smith) from Venezuela, Brazil and Bolivia have a variable anterior ocellus which in some is smaller, in others larger, than the lateral ocelli. Several of the anterior are binary.

It may be pointed out that all of these records, now comprising four genera, are from the subfamily Myrmicinae which occupies a position about midway in the phylogeny of ants.

LITERATURE CITED

- WHEELER, WILLIAM MORTON, 1936. Binary anterior ocelli in ants. *Biol. Bull.*, 70: 185-192, 3 figs.