Desai and Tencer (*11*), who used trypsin digestion of nucleoproteins, also concluded that histone interferes with the ability of tritiated actinomycin D to bind to DNA. It has been suggested (*12*) that most of the gene sites in metabolically active interphase chromatin are repressed as a result of histone binding. Such repression would account for the observed increase in the binding sites available in mealy bug euchromatin after acid extraction.

These findings taken as a whole suggest that the degree of actinomycin D binding to chromatin is related to the degree of repression of the chromatin and that removal of histone increases the capacity of repressed, condensed chromatin to bind actinomycin D.

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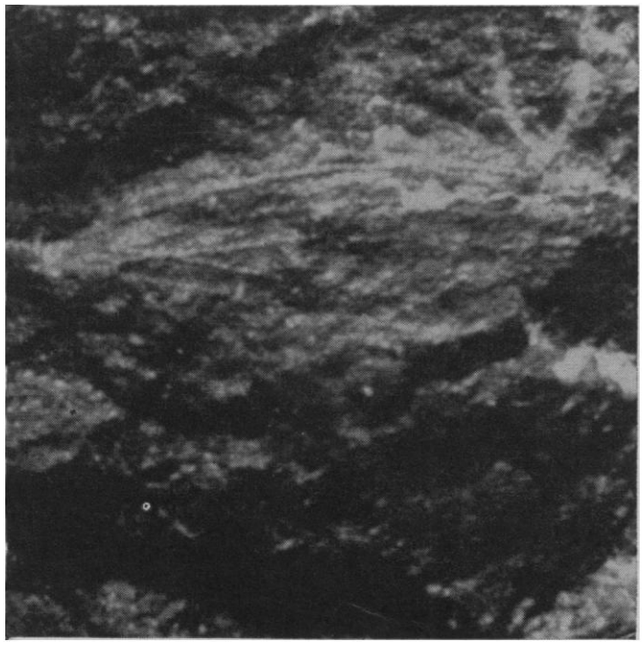
Permian Insect Wing from Antarctic Sentinel Mountains

Abstract. *A homopterous insect wing was found in micaceous graywacke from the Polarstar Formation, Sentinel Mountains. The unusual venation is reminiscent of family Stenoviciidae known from the Permian and Triassic of Eastern Australia and elsewhere. This first documented account of Paleozoic insects in Antarctica bears on drift questions.*

A Permian insect wing was found (*1*) in micaceous graywacke from the Polarstar Formation of the Antarctic Sentinel Mountains. The fossil fragment was collected from the east slope of Polarstar Peak near the 2000-meter contour. Fossil spoor (trails and burrows) and plant debris (*2*) are encountered sporadically almost to the 1800-meter contour [Newcomer Glacier Sheet, 1960, or simplified version of same (in *3*)], but are most dense immediately above and below 2000 m. This dense fossil-spoor zone is a probable correlate of another such zone that was sampled (*4*) at a different exposure of the Polarstar Formation; and it may be placed well below the *Glossopteris* beds (*3*, and field observations).

Although a fossil insect from the *Glossopteris* beds of Theron Mountains has been mentioned (*5*) the specimen was never described and was subsequently lost. Thus, this is the first firm example of Gondwana Paleozoic insect distribution in Antarctica that is pertinent to continental drift theory. Permo-Carboniferous insects are known from South America, Falkland Islands, West Africa, South Africa, and Australia (*6*). A possible transantarctic migratory route was suggested for Gondwana insects; sparcity of reports does not preclude their widespread occurrence in the area during the Paleozoic.

The fossil (*7*) consists of a basal portion of a small wing (Fig. 1) from which the clavus was detached. The length of the fragment (about 3.5 mm) indicates a complete wing of about 5.5 mm. The fact that the insect wing was preserved in this slightly metamorphosed rock is considered to indicate that the wing was relatively heavily sclerotized—it could be compared in texture with the fore wing of many Recent Homoptera. The straight clean break that forms the posterior margin of the preserved portion of the wing is considered to indicate that the clavus became detached along this line before fossilization of the wing—the clavus



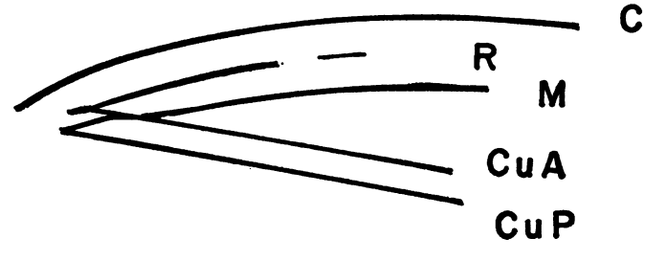


Fig. 1 (left). Portion of fossil wing of a Permian homopterous insect from the Polarstar Formation, Sentinel Mountains, Antarctica (× 20) [E. F. Riek].

Fig. 2 (above). Line drawing of wing venation as seen in Fig. 1. Costa, *C*; radius, *R*; media, *M*; and cubitus, *Cu* (× 20) [E. F. Riek].

was relatively long. The form of the clavus with a straight line of separation is indicative of the suborder Hemiptera.

The venation of the preserved portion of the wing is very unusual (Fig. 2). The stem of the radius is slightly bowed and subparallel to the costal margin, and the stems of *CuA* and *M* are fused toward their bases for some distance. In most Homoptera the stem of *R* is either straight or else bowed away from the anterior margin, and the stems of *M* and *CuA* are usually not fused, although they may be, for example, in many Recent Membracidae.

The combination of a radius bowed toward the fore margin and the distinct basal fusion between the stems of *M* and *CuA* occurs in the Stenoviciidae, a family of unusual small Homoptera, well represented in the Upper Permian of Australia and recorded also from the Permian of Russia and the Triassic of Australia. The fossil is tentatively referred to this family.

This Antarctic homopteran wing resembles those of certain Newcastle Coal Measures insects and possibly also some from the Bowen Basin of Queensland, Australia. Both of these have conchostracan beds of Permian age. Thus, the postulation of proximity of Antarctica and Australia, suggested by fossil clam shrimp from the Ohio Range (*8*), gains another bit of support from this Sentinel Mountain find.

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Generation of Adrenergic and Cholinergic Potentials in Sympathetic Ganglion Cells

Abstract. *Norepinephrine elicited a hyperpolarizing response, and acetylcholine (during nicotinic blockade) elicited a depolarizing one. Both responses showed no increase in membrane conductance. The norepinephrine response was suppressed by initial depolarization; the acetylcholine response (frog cells); by hyperpolarization. These neurotransmitters apparently can activate electrogenic mechanisms which do not involve movement of ions down their electrochemical gradients.*

Sympathetic ganglion cells can respond to suitable input of preganglionic impulses not only with the well-known fast excitatory postsynaptic potential (EPSP) but also with two much slower postsynaptic potentials (*1*), one hyperpolarizing or inhibitory (slow IPSP), the other depolarizing (slow EPSP) (Fig. 1A). The membrane mechanisms involved in generating the slow PSP's are different in principle (*2*) from those for the fast EPSP's and IPSP's (*3*). We now report that norepinephrine (NE) can elicit in these cells a hyperpolarizing response that has unique characteristics similar to those already found for the slow IPSP (*2*); that is, the response is not accompanied by any increase in membrane conductance and it is suppressed [rather than increased (*3*)] by an initial depolarization of the resting membrane potential. In addition, acetylcholine (ACh), in the presence of strong nicotinic blocking agents, still elicits a depolarizing response which has the unique characteristics of the slow EPSP (*2*); that is, the response is accompanied by either little or no change (rabbit cells) or a decrease (frog cells) in membrane conductance, and it is suppressed or reversed in polarity (frog cells) by an initial hyperpolarization [rather than by a depolarization (*3*)] of the resting membrane potential. The choice of these neurotransmitter substances followed from the proposals that the slow IPSP is directly mediated by an adrenergic transmitter (*1, 4*) and that the slow EPSP is mediated by ACh acting at muscarinic postsynaptic receptor sites (*4, 5*). There are already reports which indicate that adrenergic agents can produce the postulated hyperpolarizing effect (*1, 6*) and that ACh can produce the postulated muscarinic depolarizing action (*7, 8*); we have studied this point further in the single cell.

The methods used for intracellular recording in amphibian and mammalian ganglion cells (*1*) and for passing currents via the recording microelectrode either for measuring changes in ohmic resistance or for steady polarization of the membrane (*2*) have been described (*9*). The superior cervical ganglia of young rabbits were studied at 35° to 37°C; the most caudal ganglia (9th or 10th) of the bullfrog's paravertebral sympathetic chain were studied at room temperature (about 20° to 22°C). We elicited responses to the neurotransmitters by adding a small volume (0.3 ml) of the test solution to the 30-ml chamber, which already contained a monoamine oxidase inhibitor (harmine, 5 μg/ml) for NE tests or an anticholinesterase (eserine sulfate, 2 μg/ml) for ACh tests. To obtain, in frog ganglia, responses to ACh which have relatively little or no contamination by the nicotinic action of ACh, the blocking agent nicotine ($10^{-4}M$) was added at least 30 minutes before the ACh tests (*10*); in rabbit ganglia, *d*-tubocurarine (50 μg/ml) was added earlier for the same purpose (*5*).

Addition of NE ($1.5 \times 10^{-4}M$) elicited a hyperpolarizing response (Fig. 1B) in 11 out of 12 resting ganglion cells tested under the above conditions in rabbit ganglia (*11*). The response averaged about 4 mv of hyperpolarization (from resting potentials of about 50 mv); this value is not far from the average peak amplitude for the slow IPSP itself (*1*). The hyperpolarization induced by NE was sustained at a steady level, at least for the duration of observation lasting some minutes. Ohmic resistance of the membrane measured during the NE response was not significantly different from that measured before addition of this compound (Fig. 1, C and D). (Ohmic resistance of the membrane was indicated by the height of the voltage change across the membrane produced by long-lasting pulses, usually 1-second, of constant current.) An initial steady depolarization of the membrane had the unique effect of depressing the hyperpolarizing response to NE, as found for the slow IPSP (*2, 12*). In nine cells, in which a steady depolarization of 20 mv from the resting level depressed the slow