with students to act as assistants and computers, and welcome visiting travellers as co-workers.

Geological experiment stations on the mountains of Antarctica, the volcanoes of Chile, the sands of Sahara, the tide flats of Fundy, the foothills of Himalaya, the forks of the Amazon, eternally measuring creep, tilt, temperature and flood, will become famous not only as harnessing the globe with a web of pure reasoning, but will be fertile ground for sowing the seeds of peace and international coöperation. Science has been well described by Soddy as man's most eclectic religion, and no nation can object to an invasion by scientific missionaries.

The basis of physical geology resides in hydrogen and the evolution of the elements just as in the case of astronomy. But astronomy is basing all its newer work on astrophysics and astrochemistry. It is frankly pure and does not worry about getting itself applied. Earth science needs a new stimulus in the same direction. The observatory method furnishes a worthy and adventurous outlet for the pent-up energies of inventive young men trained in geophysics and geochemistry.

PALEONTOLOGY.—*Two new aphids from Baltic amber.*¹ A. C. BAKER, Bureau of Entomology.

In several blocks of Baltic amber recently purchased by the writer, there are preserved two interesting species of aphids, and a study of these specimens throws considerable light on the family as a whole. In the writer's generic classification² the genus *Mindarus* Koch was used as the basis of the subfamily Mindarinae, a group supposedly dominant in earlier times and quite distinct from the Eriosomatinae in which it had formerly been placed. Only one living form is known, *Mindarus abietinus* Koch, a cosmopolitan aphid living on conifers.

The blocks obtained show two alate specimens of a *Mindarus* very similar indeed to *abietinus* and a young nymph which we believe represents one of the earlier instars of the same thing. The remarkable similarity between this amber form and our common species can be seen by glancing at the figures in which the parts have been drawn to approximately the same size.

That the genus *Mindarus* was formerly well represented seems to be fairly assured. *Aphis transparens* Germ. & Ber.,³ also from amber,

¹ Received July 26, 1922.

² Bull. 826, U. S. Dept. Agr. 1920.

³ Org. Reste 2¹: pl. 2. 1856.

undoubtedly belongs here. In fact it may even be the same species as that herein described. Unfortunately the description is very inadequate and it is only from the drawing of the wings that the species can with certainty be placed in the genus. *Lachnus dryoides* described by the same authors at the same time seems so similar to our immature form that there may be good reason to conclude that it represents young nymphs of *transparens*. This is also born out by the reports of other workers. Out of fourteen alate specimens found by Menge⁴ in amber he referred thirteen to *transparens*, and along with these he found abundant a form which he referred to *dryoides*. In the same way Mochulskii⁵ lists *dryoides* as the most abundant species represented in his material. Scudder⁶ has erected many new genera from Florissant, basing them on the angle of the wing veins, a procedure which would seem dangerous in view of the fact that living forms show variation in this regard. He believed that the American forms are mostly quite distinct from the European ones. "American fossil plant lice," he says, "appear as a rule to differ from the winged forms so far described from the European Tertiaries with the single exception of the species figured by Berendt from amber under the name *Aphis transparens* The species is indeed an *Anconatus*."

Through the kindness of Nathan Banks I have been able to examine the Scudder material in the Museum of Comparative Zoology at Harvard. *Anconatus dorsuosus* Buckton, type of the genus, is represented by Numbers 3228 and 11175. Number 4827, from which Scudder's figure was made, is not present. The specimens on the other two blocks are not adequate to determine definitely the placing of the species. Neither can this be done from the drawing but Scudder's description, which seems not to agree with his figure, indicates that the species is probably a *Mindarus*. The ground is much more secure in the consideration of *Schizoneuroides scudderi* Buckton. From the very typical figure given by Scudder one would believe this species to be a *Mindarus* and an examination of the specimen shows this to be the case. Scudder's figure of *Pterostigma recurvum* Buckton suggests that this species also is a *Mindarus*. The drawing, however, does not seem to agree with the specimen. While the cubitus and anal are about as indicated, the media seems to arise much nearer the

⁴ Progr. Petrischule. 1856.

⁵ Etudes Ent. 5: 29. 1856.

⁶ Tert. Ins. 1890.

radial sector. The general character, however, seems to be that of *Mindarus*.

It would be impossible to place definitely with their allies many of the species described by Scudder. One thing, however, seems certain. None fall in the subfamily Eriosomatinae (Schizoneurinae) in which he placed them. While details of structure cannot be seen, this fact is evident from the general nature of the specimens.

With the exception of those forms falling in the Mindarinae, all of Scudder's specimens, with one exception, are different from forms in recent genera. This species is *Oryctaphis lesueurii*. I am unable to make this form agree with the description and figure unless what shows as the stigma and radial sector are something quite different. The stigma appears to be truncate and the radial sector short and heavy like certain recent forms in the Lachnina. If this is actually the case, it indicates a remarkable difference from the other Florissant forms, all of which possess an extended stigma and a long radial sector arising far back on it. *O. recondita*, the second species of this genus, is quite different. It is very large and is not improbably a *Mindarus*. Scudder's figure hardly gives an accurate representation of it. The radial sector arises near the base of the stigma. The media can be traced almost to its base, and a branch is indicated very near its tip, much nearer than indicated in Scudder's figure. Scudder believed that this vein was twice branched but I believe the branch visible in the specimen to be the only one and that the insect might with good reason be grouped with *Mindarus*.

Many of the fossil aphids in the Scudder collection are not well preserved and it is perhaps as well to let them rest in the genera he described for them. Certain general characters are, however, worthy of mention. The most striking is the extension of the stigma and the insertion of the long radial sector. In many specimens the antennae are very long, suggesting some of the slender antennae in the Callipterina. Cornicles appear not to be present, and there seems little doubt that if the aphids possessed these heavily chitinized structures in any prominence traces of them would be preserved with the less delicate ones. Prominent cornicles are present in some of the species in amber, but these species have quite a recent aspect. We are forced to conclude that the cornicles were not prominently developed when the Florissant deposits were laid down. In only one specimen can I find traces of what may have been cornicles. This is a form which Scudder described as *Aphidopsis* sp. (No. 1044). In his description

Fig. 1.—1, *Mindarus magnus*, wings; 2, *M. abietinus*, wings; 3, *M. magnus*, antenna; 4, *M. abietinus*, antenna; 5, *M. abietinus*, cauda and anal plate; 6, *M. magnus*, cauda and anal plate; 7, *Calaphis scudderi*, cornicle; 8, *C. scudderi*, cauda and anal plate; 9, *C. scudderi*, antenna; 10, *C. scudderi*, fore wing; 11, *C. scudderi*, head.

he mentioned these structures and described the insect as immature. It is, however, an alate specimen which has lost the wings, or possibly an intermediate, for the structure of the thorax is well preserved and the ocelli are visible. The cornicles, if they are cornicles, are broad at the base, short and somewhat tapering. The cauda seems to be knobbed and the anal plate bilobed. The entire insect suggests the genus *Eucерaphis*.

A detailed reference to the other specimens in the collection could add little to the knowledge already available, but I believe that the remarks here given, together with the detailed description of the amber species, are sufficient to support the view that *Mindarus* is a genus formerly dominant but now represented by the solitary, cosmopolitan, conifer-feeding species *abietinus*.

The descriptions of the amber species given herein are the first in which any attempt has been made to give the more minute details of structure as is done in the description of living forms. This has been possible by use of the same high magnification adopted in studying recent aphids and the employment of powerful illumination. Even with the best light available, however, certain desirable characters remain obscured.

***Mindarus magnus* Baker, n. sp.**

Alate viviparous female.—Head, thorax, and appendages appearing as dark brown. Abdomen yellowish, possibly greenish in life, with a large dark central dorsal marking irregular in outline. Wings transparent, the veins and stigma brown.

Length from vertex to tip of cauda 2 mm., width of head across the eyes 0.48 mm. Fore wing (Fig. 1) 2.88 mm. $\times$ 1.2 mm. at its greatest diameter. Hind wing 1.28 $\times$ 0.56 mm. Antenna (fig. 3) extending about to the wind insertions, segment III 0.24 mm. with 9 or 10 transverse sensoria, IV 0.08 mm., V 0.096 mm., VI (0.112 + 0.048 mm.), these segments distinctly imbricated and bearing the usual fringed sensoria. The measurements given for the antennal segments cannot be considered absolutely exact in view of the fact that they are not perfectly horizontal in the amber. In the second specimen, segment III of one antenna is 0.304 mm. long and segment IV appears to have 2 or 3 sensoria. Cauda and anal plate not distinctly visible but apparently as in Fig. 6, cauda possibly more extended in life. Cornicles obscured. Beak long, extending to about the middle of the abdomen.

Nymph.—What is possibly the 2nd instar of this species is herewith described.

Length from vertex to tip of cauda 0.896 mm. Length from vertex to tip of beak 1.36 mm. Antennal segments with the following measurements: I 0.032 mm., II 0.048 mm., III 0.032 mm., IV 0.032 mm., V 0.048 mm., IV (0.048 + 0.048 mm.). Form elongate, rather slender, segmentation distinct, color appearing brownish.

Mindarus magnus differs from *M. abietinus* in being much larger, in having a longer beak and in having somewhat stouter and relatively shorter antennae.

Described from three specimens in as many blocks, two alate specimens of which the type has the wings spread and one young nymph. The type and paratypes are temporarily retained in the author's collection.

***Calaphis scudder* Baker, n. sp.**

Alate viviparous female.—Head, thorax, and appendages appearing dark brown. Wings transparent with rather heavy veins. Abdomen brownish with dark markings above.

Length from vertex to tip of cauda 1.28 mm. to tip of wings 1.92 mm. Head (fig. 11) with the eyes very prominent and the antennal insertions distinctly transverse, median ocellus outstanding. Antenna (fig. 9) as follows: III 0.352 mm. with a row of sensoria which stand out distinctly, IV 0.256 mm., V 0.32 mm., VI (0.08 + 0.864 mm.). Segments distinctly imbricated, the distal one with the base not prominently marked off from the unguis, in this respect resembling *Monaphis antennata* (Koch). Cornicles (fig. 7) faintly visible but apparently short, somewhat tapering, with a slight constriction, and a large opening. Wings not unusual, the fore wing (fig. 10) showing a truncate stigma with a short distally set radial sector which is little curved.

Cauda and anal plate (fig. 8) not clearly visible, but the anal plate somewhat bilobed and the cauda from the visible portion in all probability knobbed.

Described from one specimen with the wings folded over the back. Type temporarily retained in the author's collection.

I have placed this species in the genus *Calaphis* because it seems nearer this than to any described and I am loath to erect a new one for its reception. It represents a type of insect not present in the Florissant material but which is the usual type of living forms. This is especially evident in the wing, in the shape of the stigma and the radial sector. It indicates that while the more primitive forms represented by *Mindarus* are present in the Florissant beds and abundant in amber, the more recent type, dominant today, appears only in the amber.

GEOLOGY.—*The Lower Paleozoic section of southeastern Pennsylvania.*¹

GEORGE W. STOSE and ANNA I. JONAS, Geological Survey.

The facts here presented are the results of comprehensive geologic studies in connection with detailed surveys in southeastern Pennsylvania by the writers and Eleanor Bliss Knopf for the Federal Geological Survey and the Pennsylvania State Geological Survey. A brief preliminary statement of the Paleozoic section that has been worked out and the formation names that have been applied are given in this paper.

Twelve miles east of Lancaster, Pa., the Cambrian quartzites of Welsh Mountain plunge southwestward beneath the limestones of the Lancaster Valley and rise again a few miles west of Lancaster in the Hellam-Chickies Hills.

¹ Published with the permission of the Director of the U. S. Geological Survey and the State Geologist of Pennsylvania. Received August 5, 1922.

1922. "Two new Aphids from Baltic Amber." *Journal of the Washington Academy of Sciences* 12, 353–358. <https://doi.org/10.5962/bhl.part.2940>.

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