

ART. XIII.—*Some Fossil Beetles from the Sangamon Peat*;
by H. F. WICKHAM.

ALTHOUGH the insect life of the North American Tertiaries has received considerable attention, that of our Pleistocene is relatively little known. Our ignorance of the exact distribution of insects in this latter period is due in part to the apparent scarcity of deposits containing reasonably well-preserved remains and, in almost equal degree, to the disinclination among entomologists to give the more or less fragmentary material the close study necessary for determination.

Most of the known North American Pleistocene fossil insects are from the clays, peats and asphalts. Nearly all of them, so far as recognized, are beetles, the hard exoskeleton of this group resisting destructive agencies much better than the comparatively delicate integuments of other orders. It is also evident, from the nature of the remains, that ground beetles and water beetles are much more likely to be preserved than those living upon plants, the result being that collections made in different sections of the country may have a similar physiognomy. While this renders the identification of new finds more difficult, it really gives a much better basis for comparative work than if the same number of species were scattered through many families. We are able, for example, to compare the Carabidæ, Dytiscidæ and Staphylinidæ of one location with species of the same families from other places.

During the past two years, I have received from Professor T. E. Savage sendings of Coleopterous remains which he collected in an exposed peat seam on the north bank of the Sangamon River near Mahomet, Champaign County, Illinois. This peat lies above the Illinoisan and below the Wisconsin drift. There is a slight development of loess or loess-like silt above the peat and below the Wisconsin, and Professor Savage considers that the reference of the bed to the Sangamon stage is rather definitely proven.

This collection allows us to make a comparison of two fairly widely separated North American faunæ which have been assigned to the same interglacial stage, since Doctor S. H. Scudder has reported quite fully upon a series of Coleoptera from the Scarborough beds near Toronto, Canada,* considered as belonging to the Sangamon interval. He recognized 76 species of 33 genera and 8 families. From these he reached the conclusion that the climate of Ontario, at the time of their deposition, was very similar to that of to-day or perhaps slightly

* Contributions to Canadian Palæontology, vol. ii, part II, Ottawa, 1900.

colder, a considerable number of the recent allies of the fossils being known from a more northern habitat. On the whole, the fauna had a boreal aspect though by no means so decidedly boreal as one would anticipate under the circumstances.

Examination of the Illinois collection indicates the presence therein of ten determinable species belonging to seven genera and four families, the Carabidæ, Dytiscidæ, Staphylinidæ and Chrysomelidæ. These families contain, as well, the bulk of Scudder's Scarborough species, in the proportion of 36, 8, 19 and 2 respectively—that is, 65 out of the 76 which he has described. Five of the genera are common to both collections but all of the species appear to be quite certainly different. The basis for deductions as to climate is not very broad but, judging from the presence of *Carabus mæander sangamon* and *Chlænium plicatipennis*, the general northern flavor of the remaining species and the entire absence of any without fairly close recent boreal allies, I think we are quite justified in assuming that conditions were, at any rate, more rigorous than in southern Illinois at present. Probably they were at least as severe as in Ontario at the date of formation of the Scarborough beds. It is true that all of the genera are now living in Illinois but they also occur very far to the north, extending in part to the shores of the Arctic Ocean and we must take into account the entire absence of anything characteristically southern. A glance at the notes following the descriptions will show that the near relatives of all the fossils in this collection are of northern range.

One might hope that the beetles would throw some light upon the identification of beds containing their remains and allow us to decide with some certainty whether or no the Scarborough deposit and the one now under investigation really belong to the same interval. The matter is complicated, however, by our ignorance of Pleistocene insects. Aside from the two collections noted above, we are acquainted, in this country, only with the probably more ancient Port Kennedy fauna, that of the widely distant Rancho la Brea asphalt deposit and an occasional scattering species from some other point. It has already been brought out that the species of the Scudder report are all different from those of the present paper, though in general closely allied. The differences are not great enough to indicate any wide dissimilarity in ecological conditions nor separation by a long period of time. On the other hand, the likenesses do not prove the deposits to be synchronous. It is apparently recognized that the Sangamon interval was of long duration (20,000 to 100,000 years*) and even if both Scarborough and Mahomet beds were laid down

* Osborn, *The Age of Mammals*, p. 447, 1910.

during this stage their formation may be sufficiently remote in time to allow of some specific differentiation. We must take into account also the rather wide separation in space of the two places—but I very strongly question if ten species of the Carabidæ, Dytiscidæ, Staphylinidæ and Chrysomelidæ taken at random in a recent Illinois bog would all be different from 65 species of the same families collected during the same year and in similar surroundings at Toronto. I doubt if season has much to do with the divergence in character of the fossils since peat deposits would continue forming all through the warmer parts of the year and insect remains might readily be preserved at any time. The fact that there is no evidence of intrusion of southern types in the Mahomet collection would suggest that the deposit was perhaps formed when the Illinoisan glacial movement was well advanced on its southward route or at any rate previous to a far northward recession.

The species and varieties described in this paper are all new to science and are arranged by families as follows:

CARABIDÆ	DYTISCIDÆ
Carabus mæander sangamon	Agabus savagei
Patrobus henshawi	prælugens
Platynus pleistocenicus	STAPHYLINIDÆ
subgelidus	Olophrum interglaciale
calvini	CHRYSOMELIDÆ
Chlænienus plicatipennis	Donacia styrioides

All of the types are to be found in the Museum of the University of Illinois.

CARABUS MÆANDER Fisch., var. SANGAMON new variety (fig. 1).

Represented by part of a wing cover, evidently the inner basal area of the left elytron, about 6.90^{mm} in length by 2.35^{mm} in width, more or less damaged on all margins. The sutural bead is like that of recent specimens; immediately exterior to it is a very fine, scarcely visible carina which corresponds to a similar line (of great variability in distinctness) on the living insect. The first row of tubercles has the basal one elongate, as usual in modern individuals, while in the second row those near the base are short as in most of the specimens in my cabinet. The third row is not well preserved. The carina between the first and second series of tubercles is interrupted instead of being entire and this carina, as well as the tubercles, is more irregular and less smooth than in any of my recent examples. The carina between the next two rows of eleva-

tions is finer. Between all these raised sculpturings, the surface is roughened similarly to that of recent specimens but a little more coarsely.

The separation of this variety is based upon the rougher surface and particularly upon the breaking up of the carina. This character, in itself, is of small importance and does not indicate any radical change since the fossil was laid down in the Sangamon stage. To-day, *Carabus maeander* occurs in the north, from Maine and Labrador to Manitoba, south through the Rocky Mountains to Colorado and, probably as a relict from one of the interglacial stages, in the Chicago district of Illinois. Specimens from all of these places have been compared directly with the fossil. Several species of *Carabus*, part of them presumed to be identical with recent forms, others believed to represent extinct varieties or species, have been described from the Pleistocene deposits of Switzerland, Belgium and Galicia, one of which, *C. maeandroides* Lomnicki, from the last named locality, probably closely resembles the one above characterized.

FIG. 1.



PATROBUS HENSHAWI new species.

A single piece of peat carries the head, prothoracic episternum, pronotum and elytron, the last broken off behind the middle. Color black, shining. Head minutely punctulate (as viewed under a 9x hand lens), posterior transverse impression deep, roughened a little at bottom, frontal grooves strong, rugose and punctulate, the intervening convexity somewhat wrinkled transversely. Pronotum not very well preserved, the front portion being broken off. The disk is apparently very finely and sparsely punctulate, the median groove strong, wide and deep behind (as in the recent *P. septentrionis*), but fine at middle, a trifle stronger again anteriorly, basal foveae moderately deep (less so than in *P. septentrionis*), strongly, closely and confluent punctured, connected by a punctate flattened area across the pronotal base. Prothoracic episternum quite strongly and closely but irregularly punctured anteriorly and posteriorly, the smoother submedian area less marked than in any of the four modern species of this genus (*P. aterrimus*, *P. longicornis*, *P. septentrionis* and *P. californicus*), with which I have been able to compare it. In general, the punctuation of this sclerite is rougher in appearance than in the recent form

cited. Elytra moderately deeply striate anteriorly, about as in *P. septentrionis*, the striæ distinctly but not strongly punctate, both striæ and punctures becoming finer posteriorly, scutellar stria short and very oblique, interspaces convex near elytral base, flatter on the disk, finely wrinkled and minutely sparsely punctulate, these characters of intimate sculpture being possibly due to accidents of preservation. Length of elytral fragment, 5.00^{mm}. Width (entire), 2.25^{mm}.

Probably this species is most nearly allied to the recent *P. septentrionis* which it approaches in size and general sculpture, differing in the points brought out in the preceding diagnosis. It is not referable to any of the three species described by Scudder from the Scarbrough clays, being larger than *P. decesus* and with short scutellar stria; having a different prothoracic median line and basal foveæ from *P. gelatus*; and with unspotted elytra in place of the profusion of pallid dots seen in *P. frigidus*.

I take pleasure in naming this insect after Samuel Henshaw, Director of the Museum of Comparative Zoology at Cambridge, in recognition of his numerous and varied services to recent and fossil entomology.

PLATYNUS PLEISTOCENICUS new species.

Represented by a single practically complete elytron of shining black color without metallic luster. Striæ fairly deep and strong but not punctured, all attaining the raised basal elytral margin, the scutellar slightly interfering with the course of the first discal, throwing its base over towards the origin of the second. The scutellar and first discal are practically confluent at the apex of the former. The ocellate punctures of the outer edge are indicated towards the apical third but are not strong. None of the dorsal serial punctures can be made out with certainty, probably on account of the peculiar transverse, fine, apparently adventitious, wrinkling of the integument which gives the interstitial spaces the appearance of minute corrugation and, in places, of punctulation. The fifth and sixth striæ unite much farther from the elytral tip than in *P. subgelidus*. Length of elytron, 5.60^{mm}.

None of Scudder's descriptions and figures agree with this insect, but it would probably go nearest his *P. interitus* by the form of the scutellar and adjacent striæ, which, however, do not reach the elytral base in that species. The color is also different and the present insect is somewhat larger. Compared with recent North American species, the arrangement of the striæ in the neighborhood of the scutellum is very similar to that seen in some Colorado specimens standing in my collection

under the name *P. propinquus* G. & H., but the surface gloss is entirely different.

According to Scudder's identifications, the genus *Platynus* was very abundant in the Scarborough beds, whence he has described eleven species. Six others, under the generic names of *Platynus*, *Agonum* and *Anchomenus*, have been characterized from the Pleistocene deposits of France, Germany, Schleswig-Holstein and Galicia.

PLATYNUS SUBGELIDUS new species.

Represented by a single practically entire elytron which is of a deep shining black color, the outer margin rather strongly curved, apparently much as in the recent *P. ovipennis*, extreme edge sharply and narrowly reflexed, humeral angle not fully exposed and, judging from the outline of the side, probably not very prominent. Striæ moderately deep and coarse basally and discally, finer apically, their punctures strong but of medium size, rounded or very little transverse and extremely close together. These punctures become much finer towards the apex, following the reduction of the striæ. Interstitial areas not visibly punctate but in some lights appearing very minutely transversely corrugate, this wrinkling becoming very strong apically (through folding of the integument in fossilization) so as to obscure the tips of the striæ. In consequence, it is not possible to say just where the fifth and sixth are joined, but this point is not far from the elytral apex. The scutellar stria is short, strongly punctured and not interfering with the first discal. The ocellate punctures of the outer margin, if present, are obscured by wrinkling. Length of elytron as exposed, 6.00^{mm}, in life possibly a trifle longer; greatest width, a very little over 2.00^{mm}.

A very careful comparison of this specimen with descriptions and figures of all of Scudder's species of *Platynus* from the Scarborough beds has convinced me that it is not referable to any of them though approaching (but exceeding) his *P. desuetus* in size. If reliance is to be placed upon the figure, *P. subgelidus* has much more closely punctate striæ. In comparison with recent species, *P. subgelidus* has elytral sculpture a good deal like that of *P. crenistriatus* Lec., but is larger. I do not venture to express an opinion as to which group it should enter.

PLATYNUS CALVINI new species.

Represented by a pair of partly overlapping elytra, shining black and moderately heavy in texture, the striæ impunctate, strongly impressed but not coarse, reaching the raised elytral

basal margin. Scutellar stria a little less than half as long as the elytral breadth, free at apex. First discal strongly inflexed to base and almost joining the second at that point. Fifth and sixth confluent not far from the apical fifth of the elytra. Ocellate punctures outside of the eighth stria strong behind the middle of the elytral length but not reaching the apex. On the third stria, about one fifth from the base, is a strong puncture, while between the second and third striæ are two others, one a little antemedian, the other only a short distance from the apex. Interstitial areas flat or nearly so, extremely minutely punctulate and alutaceous. Length of elytron, 5.00^{mm}.

Very closely related in size and arrangement of striæ in the scutellar region to *P. interglacialis* Scudd., from the Scarborough beds, but evidently differs in color and texture. The closest resemblance that I can find among the modern species seems to lie with the *melanarius* group of Platynus, but here I do not find an exact duplication of the arrangement of the dorsal punctures. In giving the specific name, I have in mind my late friend and preceptor, Professor Samuel Calvin, who did so much to advance our knowledge of the Pleistocene formations in Iowa.

CHLÆNIUS PLICATIPENNIS new species.

Represented by a considerable portion of one elytron, of full width but with the base and apex broken off. Color black, surface moderately shining, no signs of pubescence remaining. The striæ are pretty deep but irregular, being composed of short, longitudinal, impressed dashes, much as in the recent *C. interruptus*. The intervals are alternating in height, as described for the modern *C. alternatus*, the punctures fairly deep, strong, so generally confluent as to form transverse irregular rugæ, occasionally broken up into granules. Length of fragment, 6.00^{mm}, greatest width, 3.00^{mm}.

Apparently this elytron represents the remains of a *Chlænius* allied to the modern *C. interruptus* Horn, occurring in Oregon, Manitoba and the Rocky Mountains of Colorado, and *C. alternatus* Horn, from the Saskatchewan district. It will be noted that both of these recent forms are decidedly northern types.

AGABUS SAVAGEI new species.

The type shows the upper surface of the head and prothorax with the two elytra detached and lying a few millimeters distant. All of these fragments are black, feebly shining. The head is finely but distinctly alutaceous, with a few small, scattered punctures, the lines forming the posterior and inner

margins of the eye meeting nearly at right angles. Prosternum alutaceous, about like the head in minute sculpture, a narrow band of small punctures just behind the front margin becoming transverse rugosities in the angles, a similar but less pronounced band just in front of the prothoracic hind margin and a few scattered points on the disk. On the side which shows best, the lateral pronotal edge is beaded and very slightly reflexed. The pronotum as a whole is evidently rather strongly narrowed anteriorly, the margins nearly regularly but feebly arcuate. The front angles are sharp, strongly advanced, as shown by one which is nearly entire and the other which is somewhat more broken. The hind angles are not well uncovered but seem to be obtuse and perhaps a little rounded. Elytra alutaceous, with moderately strong punctures arranged in irregular longitudinal double series and a few inconspicuous scattered punctures in addition, marginal bead strong. Length of pronotum 1.45^{mm} ; of elytron (not quite entire at tip) 4.60^{mm} ; width of pronotum at broadest part, 3.45^{mm} ; of elytron, not determinable on account of curling.

Six specimens are referred to this species, which I have named after Professor T. E. Savage. In the features shown, *A. savagei* is very much like the recent *A. seriatus* Say, common in the northern United States and in Canada. However, comparison of the present species with specimens of *A. seriatus* from the White Mountains and Newfoundland shows the fossil to be smaller, more strongly alutaceous and with deeper elytral serial punctures. Scudder has described *A. perditus*, fossil in the Scarborough beds, but calls particular attention to the lack of serial punctuation. Species of this genus are known from the Tertiary deposits of both continents and seven have been recorded from the European Pleistocene in addition to one from the Cambridge Peat. Today, *Agabus* is found commonly in swamp land, often burrowing in damp spots outside of the pools themselves.

AGABUS PRÆLUGENS new species.

The type is an elytron very similar to that of Colorado specimens of the recent *A. lugens* Lec., in my collection. It is of a deep black color, moderately shining, finely but very distinctly alutaceous, the rows of serial punctures double, quite deep but not large. The extreme apex of the elytron is broken off, but the remaining fragment is 6.40^{mm} in length. It differs from modern *A. lugens* in the entire lack of brassy reflections and in the texture of the surface sculpture. Four specimens are assigned here, all poor except the type.

OLOPHRUM INTERGLACIALE new species.

Represented by several elytra, 2.25^{mm} long, 1.10^{mm} wide, black, rather shining, subtruncate apically with the outer angle rounded off, punctuation confused, strong, moderately coarse, much of it confluent so as to form poorly defined transverse rugæ, no striæ visible, but the sutural bead shows faintly in some specimens. The outer margin is deflexed as in *Olophrum*, the line of flexure with a sharp edge.

While the generic reference cannot be made with any certainty, these elytra are apparently staphylinidous, judging from their form, size and sculpture. In all these respects they approach more nearly to *Olophrum obtectum* than to any other insect known to me, but are darker in color and even more strongly and closely punctate. Scudder has described three species of this genus from the interglacial clays of Scarborough, Ontario, but *O. interglaciale* appears to differ, by descriptions and figures, in being more strongly and closely punctured than any of these. In general, *Olophrum* may be considered rather boreal than otherwise in distribution. I find *O. obtectum* chiefly under bits of wood in damp places and have met with *O. rotundicolle* in swamp land near Leadville, Colorado.

DONACIA STIRIODES new species.

An elytral fragment, belongs to *Donacia* and resembles in fine stria sculpture a recent specimen in my cabinet collected at Cœur d'Alene, Idaho, labelled *D. pusilla* Say, var. *cuprea* Kirby. The fossil is flattened, the striæ fine but quite sharp, punctures small, not very well defined, interstitial spaces much wider than the striæ, relatively coarsely transversely rugose. The color is metallic blue or purple. As exposed, the piece measures 3.85^{mm} in length by 1.50 in breadth.

Two other small fragments are associated with the foregoing but may perhaps not be specifically identical. I cannot refer this fossil to either of the species described by Scudder from the Scarborough beds since his *D. pompatica* has deep striæ with larger punctures and *D. stiria* is said to have an excessively fine transverse rugulation. In North America, *Donacia* is much more abundant northward and *D. pusilla*, with which the present species has been compared, is more particularly characteristic of the country from Hudson Bay to Vancouver Island, southward to Oregon, California, Idaho, Colorado, and the Lake Superior district. The genus frequents swamp land and the shores of lakes, breeding in the vegetation common to such localities.

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