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A FOSSIL MYRIAPOD OF THE GENUS *PARAJULUS* FROM FLORISSANT, COLORADO

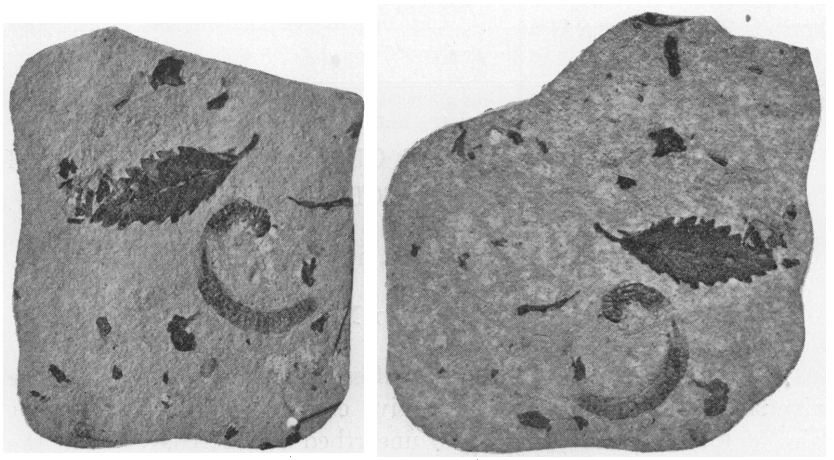
(*Parajulus cockerelli*, new species)

BY ROY WALDO MINER

In 1906 and succeeding years, Professor T. D. A. Cockerell of the University of Colorado made extensive explorations of the Miocene shales of Florissant, Colorado, and unearthed a large collection of the fossil remains of insects and plants with scattered examples of Arachnida and Crustacea. Included in the finds were two species of myriapod, *Julus florissantellus* (A. M. 22563), described by Professor Cockerell in a former number of the Bulletin of the American Museum of Natural History,[1] and another which is the subject of this paper. This specimen, revealed by a clean cleavage of the shale matrix, is represented by an excellent fossil impression on either side of the split. The animal lies on its side in a semicircular curve, as shown in figures 1 to 4. For the most part the specimen is indicated by an excellent impression or mold in duplicate on the two slabs formed by splitting the shale. Portions of the fossilized chitin cling to the interior of the molds. Part of the fossil is on one slab (A. M. 22564) and part on the other (A. M. 22565). In this article, the slab containing the mold of the right side will be referred to, for the sake of brevity, as the right slab, and the corresponding one as the left slab. The actual fossilized chitin of the head is present, for the most part, including portions of the antennæ and the mouth parts. The first segment is in fairly good condition, while the left appendage is almost perfect. Excellent impressions of most of the remaining segments are preserved with fragments of fossilized chitin clinging here and there. The legs, in general, are represented partly by fossil remnants and partly by their molds in the shale. A remarkable feature is the preservation of a large proportion of the fossilized gonopod on the seventh segment exposed from the left side and slightly broken at the surface, giving a partially dissected appearance. The

[1] Bull. Amer. Mus. Nat. Hist., 1907, XXIII, Art. 24.

A.M.22564 A.M.22565

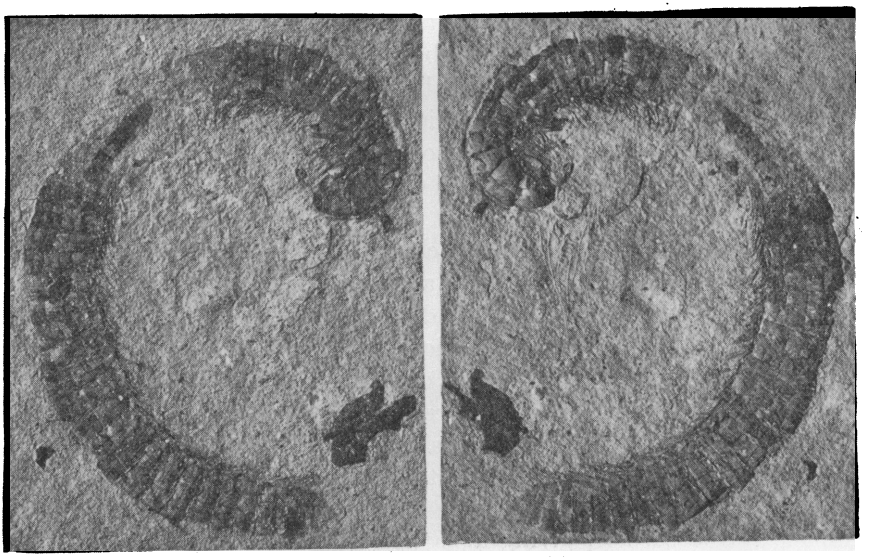


1 2

Fig. 1. Left slab of shale (A. M. 22564) showing *Parajulus cockerelli*, new species, as fossilized specimen and mold. Photograph natural size.

Fig. 2. Right slab of shale (A. M. 22565) showing fossil fragments and mold of same specimen as shown in Fig. 1.

A.M.22564 A.M.22565



3 4

Figs. 3 and 4. Enlarged photographs of fossil and impressions shown in Figs. 1 and 2. ×4.

preservation of this apparatus, together with the smaller mandibular apparatus and first pair of legs, clearly places the specimen in the genus *Parajulus*.

This is the first fossil record of this genus and is the first instance in which the generic characters of a fossil myriapod are so well preserved as to clearly locate the specimen in a modern genus.

Parajulus cockerelli, new species

HEAD.—The fossil fragments in the left slab show the fossilized head preserved in a more or less crushed condition, including the right side and frontal plate as far as the vertex.

The specimen on the right slab is an excellent impression, showing the mold of the right side and top of the head; most of the right antenna and the impression of the left antenna. Part of the right mandible and nearly all of the left mandible are torn from the fossil and imbedded in the mold of the right side.

The right slab of the shale shows a triangular patch containing the ocelli of the right eye, and also the articulation of the right antenna, torn from the fossil specimen and shown adhering to the mold in their proper positions.

Fragments of four joints of the right antenna are shown. The ultimate joint being absent, the penultimate joint is short and represented as bent double upon the longer antepenultimate joint. The fourth from the last joint is well represented, and is slightly shorter than the antepenultimate joint. The distal end only of the next proximal joint remains in the fossil.

The left antenna is represented by light impressions of the second, third, fourth, fifth, and possibly sixth joints, counting from the distal end of the antenna. As above stated, the base of the socket of articulation, torn from the side of the head, is preserved in a fossil state on the left slab, and exhibited in its proper position on the inner side of the mold of the head on the right slab, immediately anterior to the triangular eye-patch, which is preserved in the same way and also in its proper position.

MANDIBLES.—Immediately ventral to the eye may be seen a fragment of the proximal portion of the right stipes mandibulare, and the clear mold of its distal portion. Somewhat ventral to this, due to the position of the head when crushed and partially overlying it, is the well preserved left mandible separated from the main fossil fragment of the left slab, and also here imbedded in its proper position. Practically all of the stipes is preserved, as well as the premandible. The hypostoma is hidden.

The outline of the head in the mold is very clear, showing the curvature of the vertex and frontal plate, the lateral margin adjoining the right mandible, and the posterior margin and articulation with the collum of the succeeding first segment.

FIRST SEGMENT.—The right dorso-lateral surface of the collum is shown as a fossil slightly crushed and exposed for its whole width on the left slab, and an almost perfect mold in the right slab. The collum is broad above and narrows laterally to a truncate ventral margin which is two thirds the width of the mid-dorsal portion. The left appendage of the first pair of legs is retained entire on the right slab, articulated with reference to the mold of the collum in its normal position, and embracing for the greater part of its extent the ventral margin of the left mandible. As is characteristic of the male of the genus *Parajulus*, this leg is much enlarged. The femur, tibia and

tarsus are clearly exposed and apparently the pretarsus, though this is somewhat crushed. The right leg of this segment does not show and is doubtless hidden behind the exposed left leg.

SECOND SEGMENT.—Almost two thirds of the dorsal plate of the second segment is shown as a fossil fragment on the left slab, and a very clear impression of its entire right dorso-lateral surface and anterior, right-lateral, and posterior margins, on the right slab. This is about two thirds as wide as the collum and like it is extended dorsally and narrowed laterally. The suture joining the fragments with the

A.M.22565

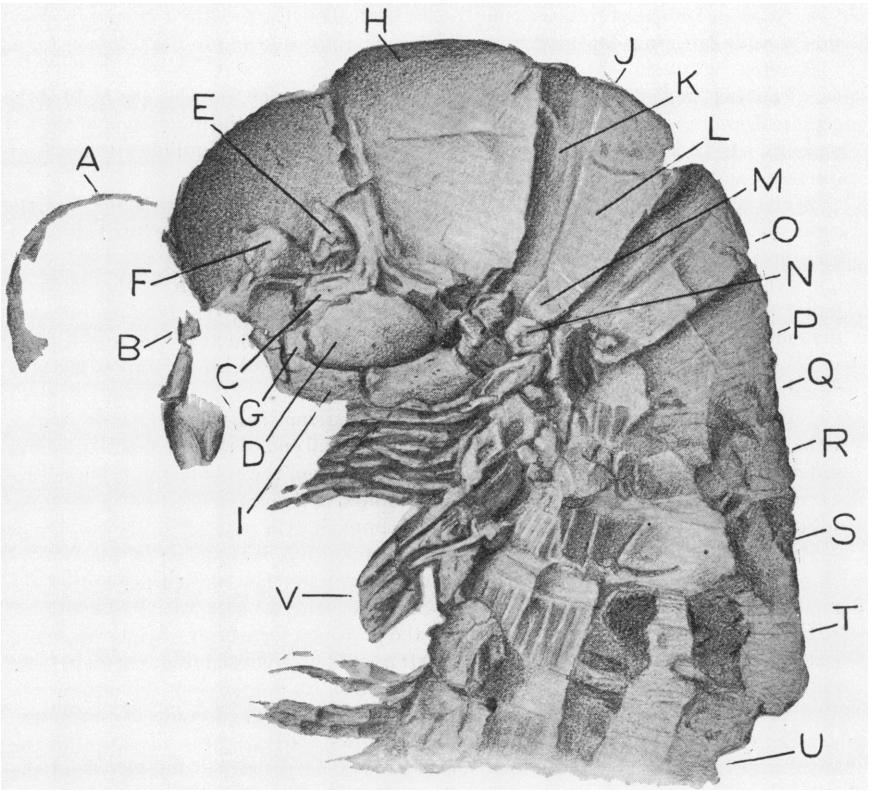


Fig. 5. Drawing of anterior portion of *Parajulus cockerelli*, new species, showing head and segments 1–9 inclusive.

Enlarged from fragments and impression on right slab, as illustrated in Figs. 2 and 4. ×32.

A Left antenna.
B Right antenna.
C Right mandible.
D Left mandible.
E Right eye patch.
F Articulation of right antenna.
G Premandible.
H Collum.
I Left appendage of first pair of legs.
J Second dorsal plate.
K Prezonite.
L Metazonite.
M Entozonite.
N Sternite.
O 3d segment.
P 4th segment.
Q 5th segment.
R 6th segment.
S 7th segment.
T 8th segment.
U 9th segment.
V Copulatory feet.

metazonite is very clearly imprinted, as well as the suture between the entozonite and the corresponding part of the sternite. The single pair of reduced legs characteristic of this segment in the male *Parajulus*, does not show, but there is exposed on the right slab a portion of a thin lamina which appears to be the expanded right basal portion of this appendage.

THIRD SEGMENT.—The dorsal plate is represented only by molds on both right and left slabs, being the impressions of the right and left sides of this plate. In both cases it is clearly shown as somewhat less in width dorsally than in the second segment, but of about the same width laterally. The suture joining prezonite and metazonite is clear and there are two parallel but fainter sutures showing on the prezonite. As this segment is apodous in *Parajulus* as in the rest of the Julidæ, appendages are not to be expected here.

FOURTH SEGMENT.—This segment is clearly imprinted and exhibits the usual suture between prezonite and metazonite and four striæ parallel to the suture on the prezonite as well as short transverse striæ on the ventro-lateral part of the metazonite. The single pair of legs characteristic of this segment in the family Julidæ are clearly impressed on the right slab, and are preserved in the left slab.

FIFTH SEGMENT.—The dorsal plate is clearly indicated by an impression, and is narrower than the preceding, with the prezonite and metazonite clearly distinguishable. The prezonite has clear impressions of its dorso-ventral striæ but the lateral striæ are confused. Two pairs of legs are indicated by impressions on the right slab and fossilized remains on the left slab.

SIXTH SEGMENT.—Like the preceding, this is clearly indicated, including the deep impressions of the lateral striæ of the metazonite, and with two pairs of legs.

SEVENTH SEGMENT.—This is the segment bearing the copulatory organs, in the male diplopod. The impression of the dorsal plate is clear, though somewhat crushed. The impressions of the lateral striæ of the metazonite are particularly clear. The copulatory feet are remarkably well preserved and by a happy accident were partially dissected in the cleavage of the slab, so as to show their structure clearly from a lateral viewpoint.

REMAINING SEGMENTS.—On the right slab, segments 8–14 inclusive are shown with reasonable clearness, and then there is a gap with little or no indications of the dorsal plates. The left slab also shows the 8th to the 14th segments, with fragmentary fossilized portions of the legs in place in several of the segments. After the 14th segment is a gap with little or no remains corresponding in extent and position to the similar gap of the right slab. This gap seems in both cases to account for segments 15–23. Following the gap there is a remarkably well preserved series of segments which, if the estimate of the gap is accurate, cover segments 24–44. These segments show remarkably clear impressions of the sculpture of the prezonites and metazonites. The legs are fairly well preserved. The fossil ends abruptly with segment 44, there being no indication of the terminal portion of the body which may have constituted about 50 or 60 segments altogether.

GENERAL MEASUREMENTS.—The dimensions of the fossil *in situ* are 17 3/10 mm. by 12 6/10 mm.; the width of the body at the center is 2 7/10 mm.; the length of the body is 30 mm. as preserved.

TYPE.—One specimen which has been split longitudinally and is now represented on two slabs, Cat. Nos. 22564 and 22565. Department of Geology and Invertebrate Palæontology, American Museum of Natural History.