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Early Ordovician conodonts from the Bane dome,
Giles County, Virginia

by

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Early Ordovician conodonts were found in dolostones in two outcrop areas interpreted here as windows through a thrust fault under the Bane dome in southern Giles County, southwestern Virginia. These conodonts again confirm the existence of the Knox Group beneath the dome (Perry and others, 1979), and they add more detailed information on the age of these rocks.

The location of one of the windows, named Pleasant Hill, is shown in Perry and others (1979, fig. 1). The other window, named Rye Valley, is approximately 2 km to the northeast. Detailed collection localities are given in the appendix.

This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards or nomenclature.

Eight samples of dolostone from the two small structural windows near Bane were processed for conodonts. Standard processing techniques were employed except that formic acid, rather than acetic, was used, necessitating sample sieving every 24 to 48 hours to avoid etching and dissolution of the conodonts. Two other precautions should be noted: (1) a 200-mesh sieve is necessary because of the extremely small size of many of these conodont elements, and (2) because of the abundance of disaggregated dolomite rhombs in the sieved residue, tetrabromoethane is recommended for heavy-liquid separation of the residue. The eight samples totalled 40.1 kg of rock processed. Six of the samples yielded 171 specimens identifiable as conodonts (Table 1), giving an average yield for all samples of 4.3 conodont elements per kilogram. Most of the conodonts are preserved well enough to be identified to genus level. The elements commonly are fractured, their surfaces are etched somewhat, and many have a whitish "silky" patina. This patina probably is the result of the formic acid treatment, or, less likely, it may be an artifact of slight surface etching by apatite-corrosive diagenetic fluids. Most of the elements have epitaxial overgrowths of dolomite. Surface effects notwithstanding, the specimens are very dark brown to nearly black, indicating a color alteration index (CAI; see Epstein and others, 1977) of 4 to 4 1/2. These CAI values show that the host rock reached temperatures of at least 190° to 230° C.

We collected an additional sample from a limestone within the Mascot Dolomite from the allochthonous plate above the windows for comparison with faunas from the windows. This sample is from approximately 2 1/2 miles northwest of the Pleasant Hill window. The CAI of the well-preserved conodont specimens in this sample is also 4 to 4 1/2.

REFERENCES CITED

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Plate 1

Conodonts from Rye Valley window. Figures 1, 3, 6, 7, 9, 12, and 13 are from USGS (U.S. Geological Survey) loc. 9095-CO; others are from USGS loc. 9094-CO. All figures are stereo-pair (8° separation) SEM photomicrographs. Illustrated specimens are in the collections of the U.S. National Museum (USNM), Washington, D.C.

Figures

1. cf. Loxodus bransoni Furnish. Inner lateral view, x90. USNM 304387.
- 2,10,11. Chosonodina herfurthi Müller. Posterior views of three specimens. 2) USNM 304388, x100. 10) USNM 304389, x125. 11) USNM 304390, x100.
3. Ulrichodina sp. s.f. Anterolateral view, x125. USNM 304391.
- 4,6. New Genus A, n. sp. A of Repetski (in press). Anterolateral and posterolateral views, respectively, of coniform elements USNM 304392, x100, and USNM 304393, x150.
- 5,7. Acontiodus iowensis Furnish s.f. Posterior views of USNM 304394, x100, and USNM 304395, x125, respectively.
8. Loxodus bransoni Furnish. Inner lateral view, x100. USNM 304396.
9. Paltodus bassleri Furnish. Inner lateral view, x130. USNM 304397.

- 12,16. Clavohamulus densus Furnish. Posterior views of USNM 304398, x125, and USNM 304399, x125, respectively.
13. cf. Acodus oneotensis Furnish s.f. Posterior view, x150. USNM 304400.
14. Drepanodus n. sp. s.f. Inner lateral view, x50. USNM 304401.
15. Juanognathus? n. sp. Posterior view, x100. USNM 304402.

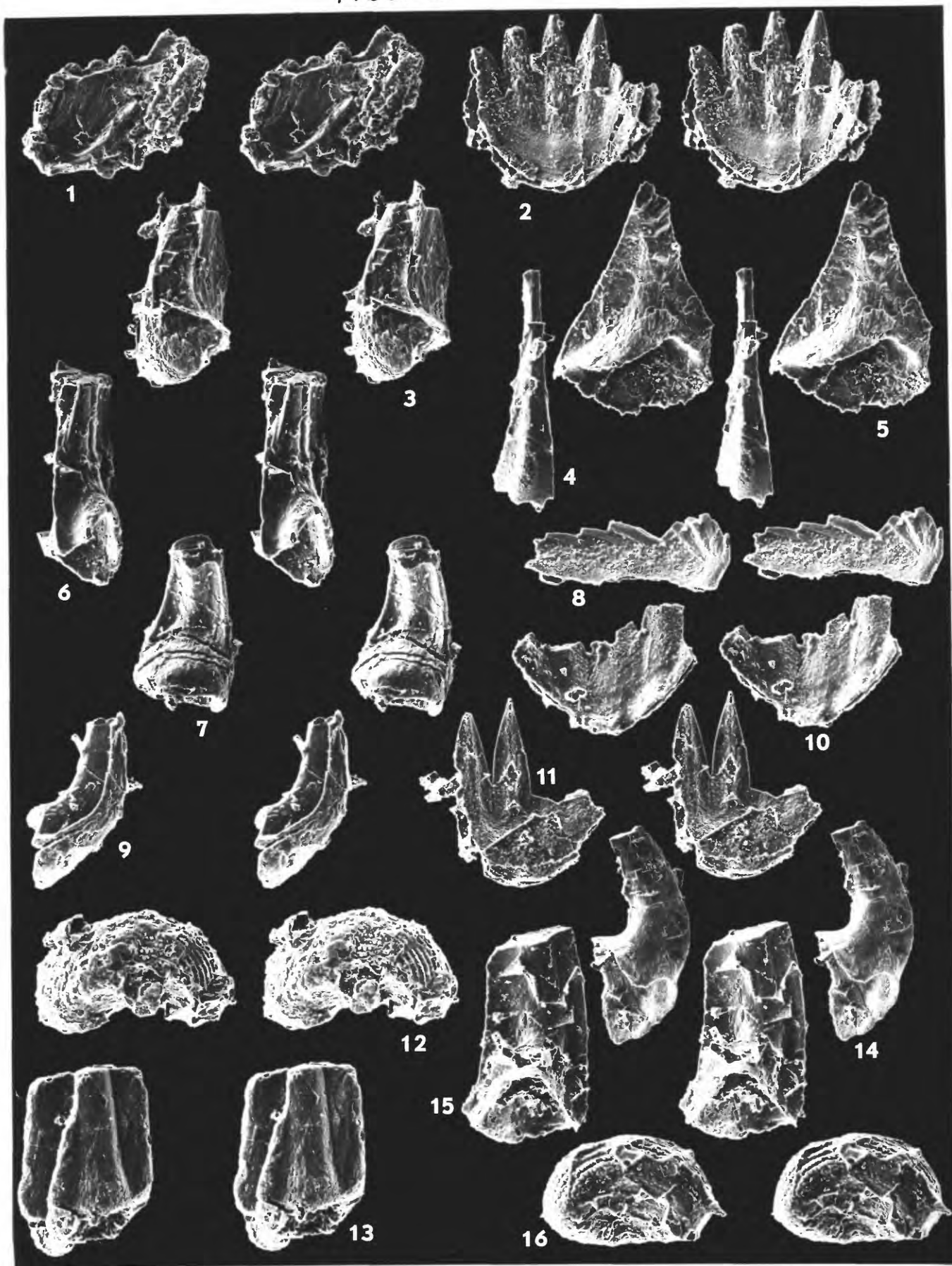


Plate 2

Conodonts from Pleasant Hill window and from Mascot Dolomite outcrop approximately 2 1/2 miles northwest of Pleasant Hill window. Figures 1,2,5,6,8, and 9 are from USGS loc. 9096-CO; figures 3,4,7, 10-12, and 16 are from USGS loc. 9092-CO; figures 13-15 and 17 are from USGS loc. 9093-CO.

Figures

- 1,2. Scolopodus gracilis Ethington and Clark.
Lateral views of graciliform elements
USNM 304403, x75, and USNM 304404,
x60, respectively.
- 3,17. Paltodus bassleri Furnish. Inner
lateral views of USNM 304405, x150,
and USNM 304406, x80, respectively.
4. Clavohamulus? sp. (sensu Ethington
and Clark, 1971). Posterolateral view,
x100, USNM 304407.
5. Ulrichodina sp. s.f. Posterolateral view,
x60. USNM 304408.
6. Ulrichodina deflexa Furnish s.f.
Posterolateral view, x70. USNM
304409.
- 7,10. Clavohamulus densus Furnish. Posterior
and basal views of USNM 304410 and
USNM 304411, x150.

8. Scolopodus quadruplicatus Branson and Mehl s.f. Posterolateral view of USNM 304412, x60.
9. Paroistodus? sp. Inner lateral view of oistodontiform element, USNM 304413, x50.
- 11,12,15. New Genus A, n. sp. A of Repetski (in press) Figures 11 and 15, posterior and posterolateral views of coniform elements USNM 304414, x88, and USNM 304415, x80, respectively. Figure 12, inner lateral view of oistodontiform element USNM 304416, x100.
13. Juanognathus? n. sp. Posterolateral view of USNM 304417, x40.
14. Acanthodus lineatus (Furnish). Lateral view of USNM 304418, x75.
16. Scolopodus sulcatus Furnish s.f. Lateral view of USNM 304419, x40.



APPENDIX

Conodont collection localities in southwestern part
of Pearisburg, 7 1/2-minute quadrangle,
Giles County, VA.

1. USGS loc. no. 8811-CO. Pale-olive-gray (5Y 7/2)¹ to light-olive-gray (5Y 6/1) fine to medium crystalline dolostone containing very closely spaced hairline fractures. Along north side of State Road 663, 400 to 500 feet northeast of Pleasant Hill Church, north side of Walker Creek.
2. USGS loc. 9092-CO. Dolostone; from north side of Walker Creek. Sample from approximately 8 feet below chert stringers, and about 950 feet east of junction of State Road 663 with State Highway 100. Near USGS loc. 8811-CO.
3. USGS loc. 8812-CO. Pale-gray (5Y 7/2) to medium-light-gray (N-6) fine crystalline dolostone. Along north side of State Road 663, approximately 1250 feet northeast of Pleasant Hill Church; north side of Walker Creek.
4. USGS loc. 9093-CO. Dolostone; from outcrop on north side of State Road 663, immediately north of gaging station on Walker Creek. Approximately 850 feet east of USGS loc. 9092-CO, and about 175 ft. east of USGS loc. 8812-CO.

¹ Color designation per "Rock-color chart" of Goddard and others (1948).

5. USGS loc. 9094-C0. Dolostone; on east bank of Walker Creek and below (west of) State Road 623. Massive pale-gray dolostone topographically below Rome-Honaker contact that is above road level. About 50 feet north of USGS loc. 9085-C0. Approximately 750 feet south-southwest of sharp bend where State Road 623 turns east into Rye Valley.
6. USGS loc. 9095-C0. Dolostone; from small tributary to Walker Creek at mouth of Rye Valley. Immediately downstream (about 25 to 40 ft.) from bridge carrying State Road 623 over this tributary. Approximately 775 feet north-northeast of USGS loc. 9094-C0. Near house (just outside fence). Dolostone has some burrow-mottling and a small amount of quartz sand.
7. USGS loc. 9085-C0. Dolostone, light-gray, fine-grained. Outcrop on east side of Walker Creek and below (west of) State Road 623 at approximately 790 feet south-southwest of sharp bend where Road 623 turns east into Rye Valley. About 1.4 mile east-northeast of intersection of State Highway 100 and State Road 663 at village of Bane.
8. Sample WP-79-4 (no. USGS loc. no. assigned). Dolostone; light-gray, fine-grained. Outcrop on west bank of Walker Creek; altitude approximately 1700 feet. Approximately 720 feet southwest of bend where State Road 623 turns into Rye Valley and about 1.37 mile east-northeast of road intersection at village of Bane.

9. USGS loc. 9096-CO. Intraclastic, bioclastic lime wackestone. On west side of northbound lane of State Highway 100, about 720 to 780 feet south of intersection with State Road 622; approximately 1.33 mile north of Prospectdale. Lowest limestone in roadcut of mostly coarse dolostone. Reconnaissance sample from the Mascot Dolomite.