Proceedings of the Iowa Academy of Science

Volume 45 | Annual Issue Article 29

1938

Pennsylvanian Section at Crescent, and Logan, Iowa

Lyman W. Wood
Iowa State Highway Commission

PENNSYLVANIAN SECTION AT CRESCENT, AND LOGAN, IOWA

LYMAN W. WOOD

Scarcity of road material supplies in southwestern Iowa has led the State Highway Commission to make careful scrutiny of all rock outcrops and to investigate thoroughly any which show promise. One such exposure, in SE¼ SE¼ Section 27, Crescent Township, Pottawattamie County, was test pitted in 1935. The complete section, including test pits, was referred by Wood and Reed [1] to the Westerville, Cherryvale and Winterset members of the Kansas City Stage of the Missouri Series. Another, at Logan (SE¼ NW¼ Section 19, Jefferson Township, Harrison County) was test pitted in 1934, the section being assigned by Wood [2] to the Pennsylvanian without attempting a closer correlation. Core drilling at each of these locations in 1937 has extended the section downward and afforded a basis for more positive correlation.

The section at Crescent is more extensive and will be considered first. Following is the log of the drill hole starting at Elevation 991.0:

No.	Description	Feet
	Clay loess, weathered limestone below.	5.9
4	Limestone, yellowish, granular, the lowermost portion of Number 4 of the writer's section (see above [1]).	1.6
5a	Shale, gray, calcareous to argillaceous, sparingly fossiliferous, with *Ambocoelia.*	1.6
b	Shale, black, carbonaceous, hard, fissile, with thin laminae of gray shale, a few conodonts.	2.2
c-d	Shale, gray, partly calcareous, silty, with frequent fossil fragments not identified.	11.2
6a	Limestone, gray, finely crystalline, hard.	2.9
b	Shale, gray, soft.	0.3
c-d	Limestone, gray, hard, finely crystalline, with shaly partings of darker color totaling about 5 per cent. At the bottom is a dark gray chert with *Osagia.* *Note*: In Numbers 6a to 6d are found *Composita, Ammodiscus* (?), some *Osagia,* and fragments of unidentified crinoid joints and brachiopod shells.	6.4

1 Wood, L. W., Pennsylvanian Section at Crescent, Iowa, Proceedings, Iowa Academy of Science, Vol. 43, p. 237, 1936.
2 Wood, L. W., Road and Concrete Materials of Southern Iowa, Iowa Geological Survey, Vol. 36, p. 115, 1933.

e	Limestone, gray, fine-grained, granular to subcrystalline, hard, with shaly partings totaling about 8 per cent.	2.5
f	Shale, gray, calcareous, fossiliferous.	0.2
g	Limestone, gray to brownish, coarse-grained except at top, hard, bedded with shaly partings totaling about 6 per cent. *Note*: In Numbers 6e to 6g are found pyritized sponge spicules (*Rhakistella*, et al.) and silicified fragments of unidentified brachiopod shells.	9.9
7a	Shale, gray, soft, clayey.	0.7
b	Shale, black, hard, fissile, carbonaceous, Upper portion is dark gray in color, with *Derbya* and spines.	3.6
c	Limestone, gray, argillaceous.	0.5
d	Shale, black, soft.	0.4
8a	Limestone, gray, hard.	1.2
b	Shale, gray, soft, clayey	0.2
c	Limestone, gray, partly argillaceous, granular to finely crystalline, with shaly partings in middle portion totaling about 15 per cent, *Osagia* in upper portion.	6.5
d	Shale, gray, calcareous.	0.5
e	Limestone, gray, argillaceous, granular, with crinoid joints and other fossils.	1.0
f	Limestone, light gray, fine-grained, granular to crystalline, sparingly fossiliferous, scattered masses of gray chert in middle portion totaling about 15 per cent of the whole.	4.0
g	Limestone, light gray, finely crystalline, fossiliferous, with *Marginifera* recognized.	1.6
9a	Limestone, gray, argillaceous, grading down to a calcareous shale.	0.4
b	Shale, dark gray to black, partly subfissile, hard above, softer below, with *Orbiculoidea, Lingula, Derbya*, chonetids, etc.	1.8
c	Shale, light gray, argillaceous, no fossils noted.	2.9
d	Shale, light greenish-gray, calcareous, grading down to a nodular shaly limestone, with *Ambocoelia, Wellerella, Marginifera*, chonetids, *Rhombopora*, and spines.	1.7
10a	Limestone, light gray, finely granular to crystalline, argillaceous at top, lower half laced with shale veinlets, a few small areas of tan chert.	9.1
b	Limestone, light gray, argillaceous, includes areas of shale, with *Linoproductus* and other brachiopods.	1.5
11a	Shale, greenish-gray, silty to finely sandy, micaceous, with calcareous nodules in lower portion.	5.4
b	Shale, brownish-red mottled with gray, hard, silty to finely sandy.	2.6
c	Limestone, light gray, nodular, partly argillaceous, grading down to a greenish to bluish-gray silty shale with some maroon mottlings.	2.7

Many of the details of lithology and all fossil identifications have been furnished by E. C. Reed of the Nebraska Geological Survey, to whom the writer is greatly indebted for examination of specimens from the core.

Number 5 of the foregoing section has previously been correlated as Cherryvale, and Number 6 as Winterset. The present drilling shows the full 22.2 feet thickness of the Winterset, and discloses the chert which had been expected but not found in the previous test pitting. Reed [3] gives further correlation on lower beds in the present drilling, as follows:

Number 7, thickness 5.2 feet, Galesburg shale.
Number 8, thickness 15.0 feet, Bethany Falls limestone.
Number 9, thickness 6.8 feet, Ladore shale.
Number 10, thickness 10.6 feet, Hertha limestone.
Number 11, thickness 10.7 feet, Bourbon-Marmaton shales.

In the writer's opinion, there can be little question of this correlation, unless in the case of Number 11, at the top of the Des Moines series. A nodular limestone, the upper portion of Number 11c may be equivalent to the "Fragmental" limestone which has been widely recognized in south-central Iowa at about this distance below the Hertha. The shale members of the section, especially the Galesburg, are thinner than might be expected.

The lower members of the Crescent section are readily recognized in the following, a composite of a small quarry exposure and the core drilling below at Logan (bottom of Bed Number 6 at Elevation 1019):

No.	Description	Feet
6	Limestone, gray, fine-grained, very hard, sound, fossiliferous, (*Composita*, crinoid joints and indeterminate brachiopods) in even beds from a few inches to a foot thick, separated by thin fossiliferous shaly partings totaling about 5 per cent. A 2-inch band of black chert is 2 feet above the bottom. The top surface is strongly eroded, the exposed thickness being	8.2 to 11.4
7a	Shale, greenish-gray, soft, sparingly fossiliferous with *Ambocoelia* and casts of pectinoids.	1.6
b	Shale, black, carbonaceous and almost a coal at the top, more calcareous and harder below, the lower foot becoming a dark gray shaly limestone.	4.6
8a	Limestone, gray, fine-grained, hard, with few fossils.	0.9
b	Limestone, argillaceous, light bluish-gray.	0.7
c	Limestone, gray, hard, fine-grained, 0.1 foot of brown chert at top.	0.7

[3] Reed, E. C., private correspondence, 1938.

d	Limestone, argillaceous, gray, soft. *Note*: 8-b, c, d show a few crinoid joints, *Osagia,* and unidentified brachiopods.	0.3
e	Limestone, light gray, finely crystalline and hard, with *Composita* and indeterminate brachiopods, several layers separated by darker-colored shaly seams totaling about 10 per cent.	9.5
f	Limestone as above, grading down to a gray calcareous shale, with *Marginifera* and crinoid joints.	2.4
9a	Shale, calcareous, light gray above, darker below.	1.0
b	Shale, black, carbonaceous.	0.2
c	Shale, gray, hard at the top, soft to medium hard below, very fossiliferous, with *Chonetina, Ambocoelia, Linoproductus, Wellerella*, and *Rhombopora*-like bryozoa.	5.7
d	Limestone and shale, interbedded.	0.3
10a	Limestone, light gray, hard, granular to finely crystalline texture, irregular fracture, with very thin shale veinlets as if partly conglomeratic or brecciated.	3.0
b	Limestone, gray, argillaceous, softer below.	1.0
11a	Shale, calcareous above, argillaceous below, brownish-red, finely micaceous.	0.7
b	Shale, maroon mottled with gray, silty.	3.5

Many of the lithologic details and all fossil identifications have been furnished by E. C. Reed of the Nebraska Geological Survey, to whom the writer is greatly indebted for examination of specimens from the core.

The correlation of this section with the lower part of the one at Crescent seems plain. At Logan, we have:

Number 6, Winterset limestone, 11.4 feet.
Number 7, Galesburg shale, 6.2 feet.
Number 8, Bethany Falls limestone, 14.5 feet.
Number 9, Ladore shale, 7.2 feet.
Number 10, Hertha limestone, 4.0 feet.
Number 11, Bourbon group, 4.2 feet.

Here also the Galesburg and Ladore members are thin. The Hertha is only 4.0 feet, as compared with 10.6 feet at Crescent. Both the Winterset and Bethany Falls contain chert, as at Crescent.

Physical tests run at the State Highway Commission laboratory at Ames on samples from both Crescent and Logan indicate that the Winterset can probably be worked for concrete aggregate or any other purpose where a strong and durable stone is required. The Bethany Falls includes a higher proportion of shaly material and is questionable for that purpose, though satisfactory as a

source of road metal or for work of similar nature. The same is true of the Hertha.

It is of interest to note that the elevation of the bottom of the Winterset at Logan is 1019 and at Crescent is 946. The Crescent elevation is taken at the south end of the exposure, beds a short distance north being about 10 feet lower. An average southward dip of about 4 feet to the mile is thus indicated. There is no evidence to show eastward dip, but such may be assumed from the probable position of both sections on the east flank of the structural high extending northward from Nehawka, Nebraska.

Iowa State Highway Commission,
Ames, Iowa.