

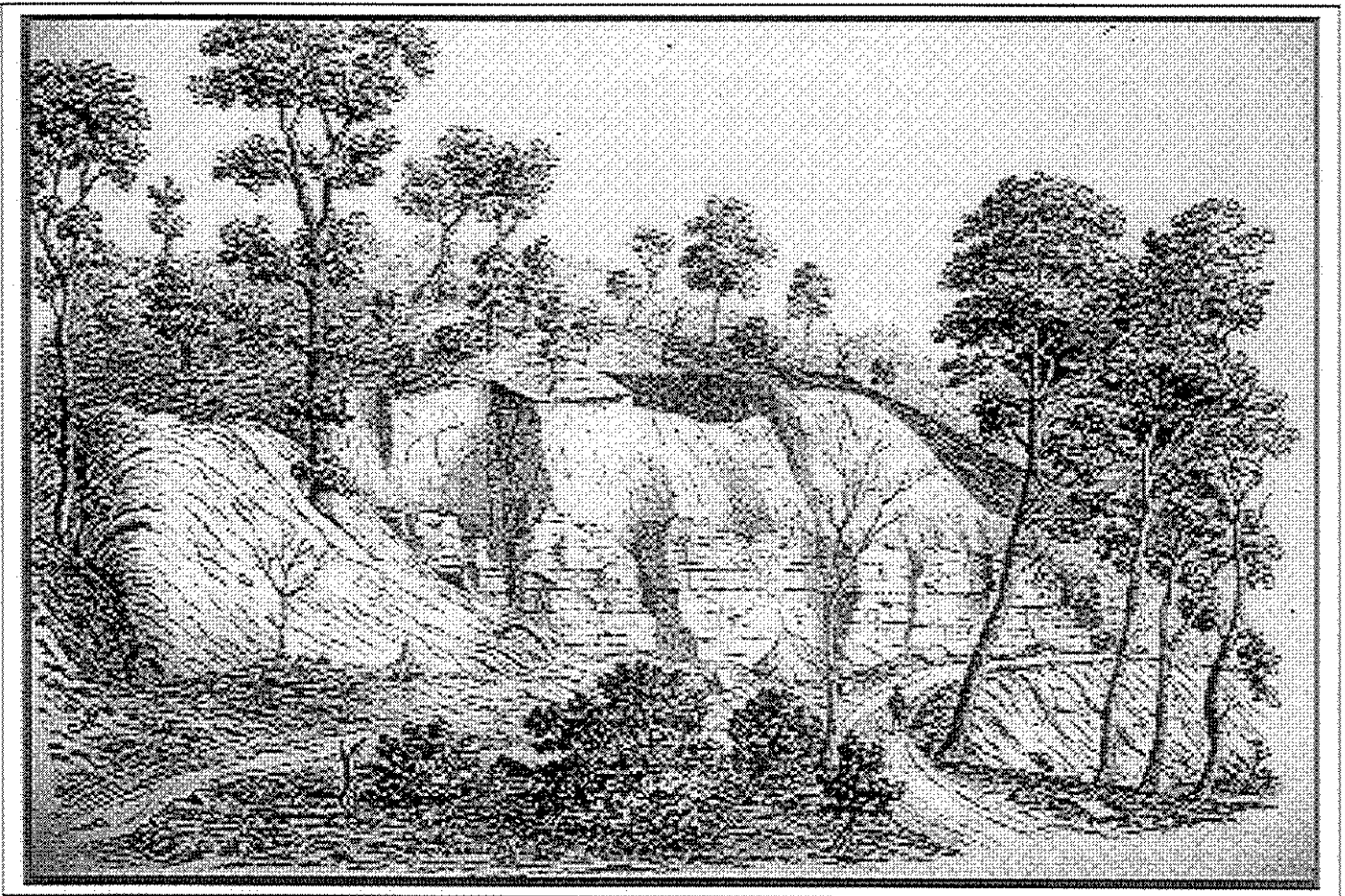
GEOLOGIC POINTS OF INTEREST IN THE FORT DODGE AREA

Trip Leaders

IOWA GEOLOGICAL SURVEY STAFF

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GEOLOGICAL SOCIETY OF IOWA

September 11, 1976

Guidebook 28

Cover: Artist/geologist Orestes St. John produced this lithograph of the Cummins Quarry as it appeared in 1868. The illustration was originally published in *Geology of Iowa* by White (1870, p. 297). The Cummins Quarry was the first recorded gypsum quarry in the Fort Dodge area and was utilized to extract dimension stone.

ROAD LOG

Assemble at Cross Roads Mall (Hwy 20 E.) south of Sears store. Mileage 0. Leave mall and turn left on Hwy 20. Continue E. on 20 1.7 miles to county blacktop P-59. Gypsum quarry of Georgia Pacific Co. east side P-59. Turn south (right) on P-59.

3.5 R.R. Xing.

3.7 "T" road to right. Continue south on P-59.

3.8 R.R. Xing.

4.4 National Gypsum Co. quarry on both sides of road.

Turn right and follow leader on haul road. All vehicles drive on left side of haul road. Give industrial vehicles R.O.W.

Stop 1. Gypsum quarry and overburden. Return to P-59 via haul road and reset odometer.

4.4 Leave National Gypsum and turn left (north) on P-59.

5.1 Turn left at "T" road (west). Stop sign.

5.6 Entrance to Geo. Pacific Plant. Turn right (north) on black top.

5.9 R.R. Xing.

6.0 Turn left. (west)

6.2 R.R. Xing.

6.5 Turn right (north). U.S. Gypsum Co. quarry on left.

7.0 Turn left (west)

7.5 R.R. Xing. Enter Ft. Dodge. (15th Ave. S.).

8.0 Stop sign. Turn left on S. 22nd St. National Gypsum Co. Gold Bond Plant on right.

- 8.3 R.R. Xing. Old gypsum working on left.
- 9.4 Webster Co. Sanitary Landfill on left. This is in an old gypsum quarry and is operating on a temporary permit.
- 10.0 Enter area of Stop 2. Turn left onto old haul road. This leads into the pit of the old Vincent Clay Products Co.

Leave pit and retrace route back to Ft. Dodge. Because of construction Ft. Dodge is a little difficult to drive through. Suggest going north on S. 22nd ST. to about 10th ave. S, turn left (west) to 17th St., then right to cross 5th Ave. S. (under construction), turn left on 1 way street (3rd or 4th ave.) and continue west to 12th St. Turn north (right) on 12th st. to 2nd Ave. S., then left on 2nd Ave. S. Follow this across Des Moines River Bridge to junction with highway 169 (Country Club golf course on the right); turn right (north) on 7 and 169 Cross Lizard Creek bridge. Note Ft. Dodge Limestone Co. mine at left. Continue to junction of 169 (north) and 7 (west). Note odometer reading at this junction and continue north on 169.

10.0 Odometer at jnc. 169 and 7.

12.7 Turn right into farm and follow convoy to gravel pit and limestone quarry. Stop 3. N.W. Limestone Co. gravel pit and quarry. See discussion p.

Return to Jnc. 169 and 7 (Starlight Motel on left.).

Turn left and follow street down hill and across the Des Moines River. Turn left at east end of bridge into Loomis Park. Lunch stop.

Return to jnc. 169 and 7. Reset odometer for afternoon trip.

- 0.0 Jnc. 169 and 7. Turn left (south) on 169.
- 2.4 Stop lights. Jnc 169 and 20. Continue south on 169. Road curves. Pass Holiday Inn and outdoor theater.
- 5.4 Leave 169 and turn left on blacktop
- 7.9 Stop 4. Pull off (left) blacktop and park cars along gravel road or into flat area by river. Will go south when we leave here.
- 7.9 Leave stop 4 and continue southeasterly on blacktop.
- 8.9 Do not stop; observe Des Moines Series shale with "coal" high on bluff.
- 9.2 Stop sign. Join county P-59. Turn right (south-uphill) on P-59.
- 9.8 Turn left on gravel road. This road winds around a bit.
- 12.4 Turn left into field. Stop 5. Hudson gravel pit. Leave pit and return over gravel road to P-59.
- 15.7 Turn left (south) on P-59
- 16.0 "T" intersection. Turn left (east) on D-33. Follow curvy D-33.
- 19.2 Enter Dolliver Park.
- 19.7 Pass Bone Yard Hollow follow park road, ford creek and turn right to group camp area. Stop 6. Copperas beds (Melanterite; $\text{FeSo}_4 \cdot 7\text{H}_2\text{O}$.)

End of trip

Hope you had a good time. Have a safe trip home.

STOP - 1

NATIONAL GYPSUM CO. QUARRY
SW¼ sec. 4, T. 88N., R. 28 W.

This quarry is located on the Des Moines Lobe of the Wisconsin Drift. The overburden consists of glacial drift of the Cary substage of the Wisconsin and older drift (Tazwell?).

The underlying gypsum is stratigraphically placed in the Jurassic. In older literature it has been called Permian and Cretaceous. About 1965 Aureal T. Cross and Bernard Schaffer studied samples of the Ft. Dodge beds. The flora is earlier than Cretaceous, not like Permian, and strongly suggest Upper Jurassic or possibly even mid-Jurassic. "The abundance of Classopolis (a gymnosperm) is typical of the Jurassic." (A.T. Cross private communication, Feb. 8, 1966). This correlation places the Ft. Dodge beds as Kimmeridgian, essentially equivalent to the "Red Beds" of Michigan or the Morrison of the west. Again quoting the letter from Cross, "we believe the Fort Dodge beds.... may have been deposited in a playa lake on a desert-like coastal plain."

On the basis of this work I.G.S. has placed the Ft. Dodge beds in the Jurassic on their 1969 geologic map.

The gypsum industry in Ft. Dodge is over 100 years old. This area has kept Iowa among the top four gypsum producing states for about 75 years. For those not familiar with gypsum, it is used in the manufacture of plaster, wall board, cement, paint, and as a soil conditioner and as a medium for carving and modeling in art. Medical and dental arts use it to make casts. Its composition is $\text{CaSO}_4 \cdot 2 \text{H}_2\text{O}$.

STOP - 2

VINCENT CLAY PRODUCTS PIT
SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 6, T. 88N., R. 28 W.

At this site the uppermost bedrock is gypsum. In years past, the clay company removed the gypsum and sold it to one of the gypsum companies. The underlying clay (shale) belongs to the Des Moines Series of Pennsylvanian age. Once the clay was uncovered, the upper 25 to 30 feet was used in the manufacture of brick and tile. Vincent Clay Products opened this pit and plant in the late teens or early twenties and continued operation until the late sixties or early seventies. They produced a good quality product but quit because the plant was too old and obsolete to bring up to OSHAS standards. Recently the pit has been leased or purchased by Dickey Clay Products and the material will be hauled to Lehigh where it will be used in the manufacture of sewer pipe.

STOP - 3

NORTHWEST LIMESTONE CO.
S $\frac{1}{2}$ Sec. 1, T. 89N., R. 29W

At this stop we will first view a sand and gravel operation. This pit is operated in a broad low terrace along the west side of the Des Moines River. The gravel is obtained by dredging; pumping the material from the pit to the plant where it is washed, sized by screening, and sorted and mixed to obtain specification grading. Do not get too close to the edge. It caves easily and the water is deep. Check the stock-piles to see the material.

The second part of this stop is at a limestone quarry on this same property. This quarry is in the St. Louis Limestone (Mississippian-Meramec). The quarry has not been operated in recent years and is in bad shape. Only recently has it been reopened and the effort now is to shape it up for operation. There are about 15 or 20 feet of St. Louis Limestone exposed in the present face. From cores they know there are about 25 feet of sandstone (still St. Louis) below the floor. They anticipate, when the quarry is large enough, putting an incline through this sandstone and then going into the Gilmore City with an underground mine. In this area the Gilmore City will provide a mine face in excess of 50 foot thickness and will provide an aggregate source that will meet portland cement aggregate specifications.

Stop - 4

Kalo Site

Near Center, Section 8, T88N. R28W

The section exposed at this stop is entirely of the Pennsylvanian System, Des Moines Series, and Cherokee Group. Section A is on the south side of the road and is described from the railroad tracks to just beyond the first major slump area west of the tracks. Section B is on the south side of the road and the base of the section corresponds with the railroad crossing marker painted on the road. Section C is located on the north side of the road across from section B. It is described from below the slumped coal section to the top of the beds in the abandoned clay pit. Great lateral variations are apparent in the Pennsylvanian section in this area as can be observed from the described sections.

The bone coal is associated with the Coalville coal basin described in Vol. 12 of the Iowa Geological Survey Annual Reports. The Coalville basin includes approximately five square miles in Pleasant Valley and other townships. Most of the coals associated with the basin are not of any great lateral extent. The basin has been described as being part of the trough of an ancient river, with coals being found in the stream channels and bottom lands. Various companies and organizations have recently initiated new exploration for coal in the Coalville basin. A map showing previously mined areas in Webster County is included with the guidebook. Descriptions of the sections at the Kalo site follow:

Section A

Pennsylvanian System

Bed

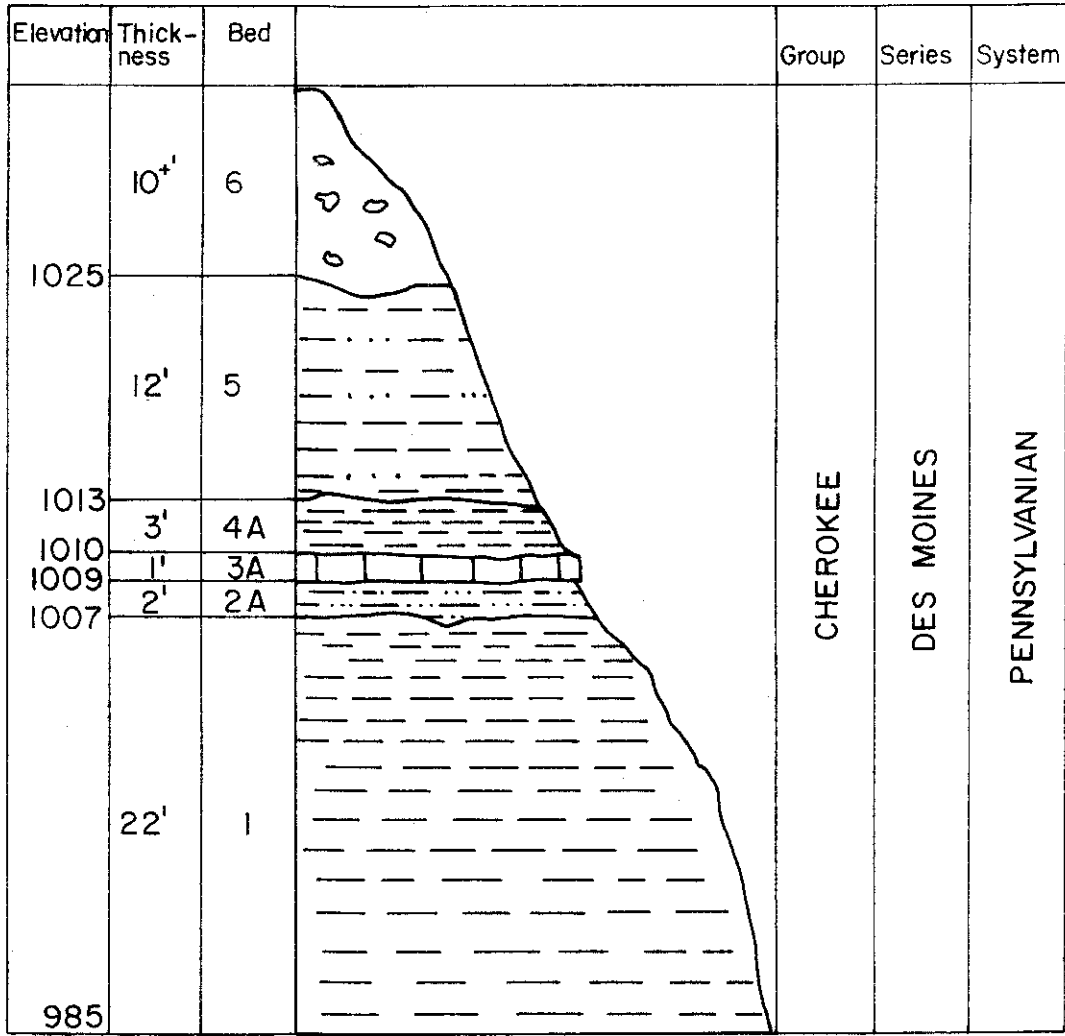
Des Moines Series

Cherokee Group

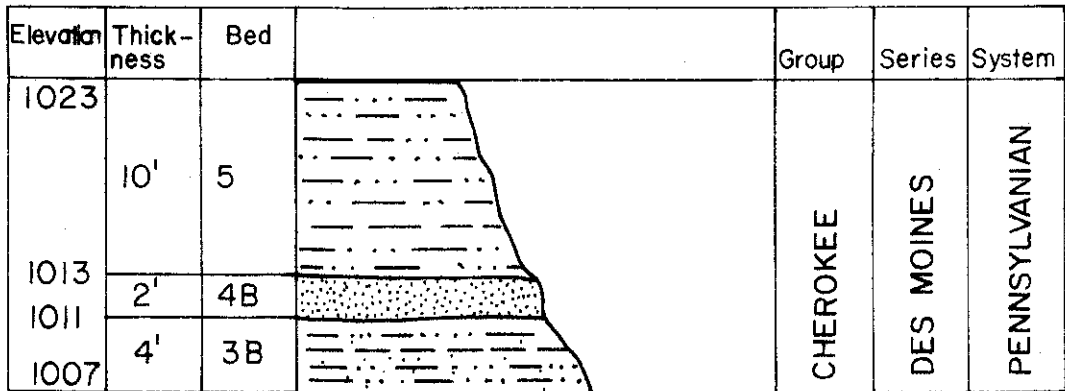
5. Shale, gray to buff, very silty grading to siltstone in areas.
4. Shale, black, mottled with medium brown, clay ironstone concretions, pyrite
3. Limestone, dark gray, very fine grained sub-lithographic, slightly argillaceous, carbonaceous.
2. Siltstone, medium gray, argillaceous trace of Mica.
1. Shale, black, laminated, fissile, medium hard, pyrite.

Section B

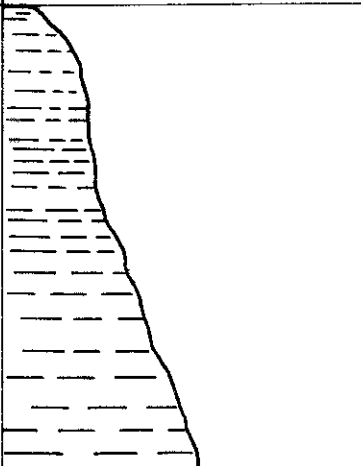


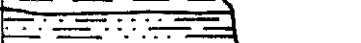
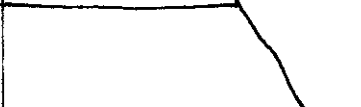



5. Shale, gray to buff, very silty.
- 4B Sandstone, light gray-yellow very silty.
- 3B Siltstone, med. gray with light gray bands, sandy in zones, shaley partings.



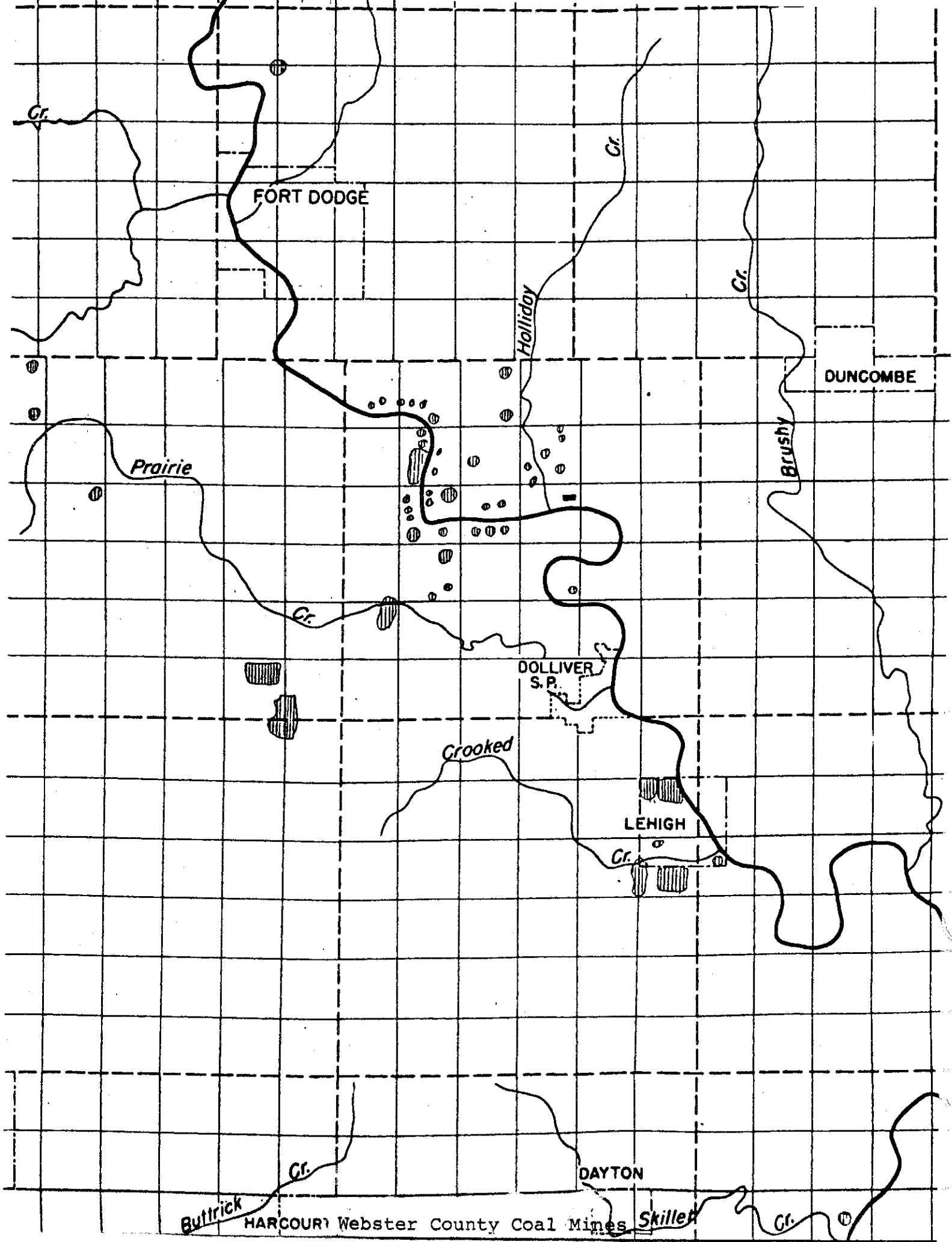
SECTION A
South side of road



SECTION B
South side of road

Elevation	Thick-ness	Bed		Group	Series	System
1050	24.5'	6		CHEROKEE	DES MOINES	PENNSYLVANIAN
1025	0.5'	5C8				
1023	2'	5C5				
1021	2'	5C4				
	6'	5C3				
1015	1'	5C2				
1014	2'	5C1				
1012						
1008	4'	4C				

SECTION C
North side of road



Section C

- 6. Shale, gray-orange-green-maroon, laminated
- 5C6. Siltstone interbedded with shale
- 5C5. Shale, gray-Himaroon, fairly soft.
- 5C4. Siltstone, yellow orange, sandy, interbedded with maroon & gray-orange shales. Clay pit floor--
- 5C3. Covered area
- 5C2. Bone Coal--slumped section
- 5C1. Clay, medium gray, slumped section
- 4C. Sandstone, light gray--yellow gray, fine to fine texture, very silty, sulfurous coating on sandstone surface in this are. Slumped section.

STOP - 5

Hudson Gravel Pit

W $\frac{1}{4}$ cor. sec. 14, T. 88N., R. 28W.

This pit, operated by Webster County, is situated on a high terrace south of the Des Moines River. Walk down (north from the pit to observe a second terrace. On this terrace note the effect on the crop both where colluvium covers the gravel at the toe of the upper slope and where the gravel has been covered by silty clay along the river side of the second terrace.)

The gravel pit on the high terrace is used for road metal on the local roads.

STOP - 6

Dolliver Park

In sec. 34 & 35 T. 88N. R. 28W.

and

In sec. 2, T. 87N., R. 28 W.

Dolliver Park is situated in a gorge cut through a Pennsylvanian sandstone in the Pennsylvanian. Cross-bedding is a conspicuous feature of the sandstone. Our main stop in the park is at the south end, near the group camping area, down the path to the "copperas beds." "Copperas" is a name applied to the mineral Melanterite, a hydrous sulphate of iron ($\text{Fe SO}_4 \cdot 7\text{H}_2\text{O}$). As far as I can find out, the name "copperas" apparently came because at times the iron is sometimes replaced by copper in the above formula. At Dolliver park the iron and sulphur are apparently picked up from the pyrite (FeS_2) and sulphur in the adjacent coal beds and are precipitated as Melanterite as the water is evaporated on the sandstone face. At this exposure, note the carbonized plant remains and the iron-rich concretions.

