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1977

## Sarpy County, Gretna State Fish Hatchery Area

R. K. Pabian

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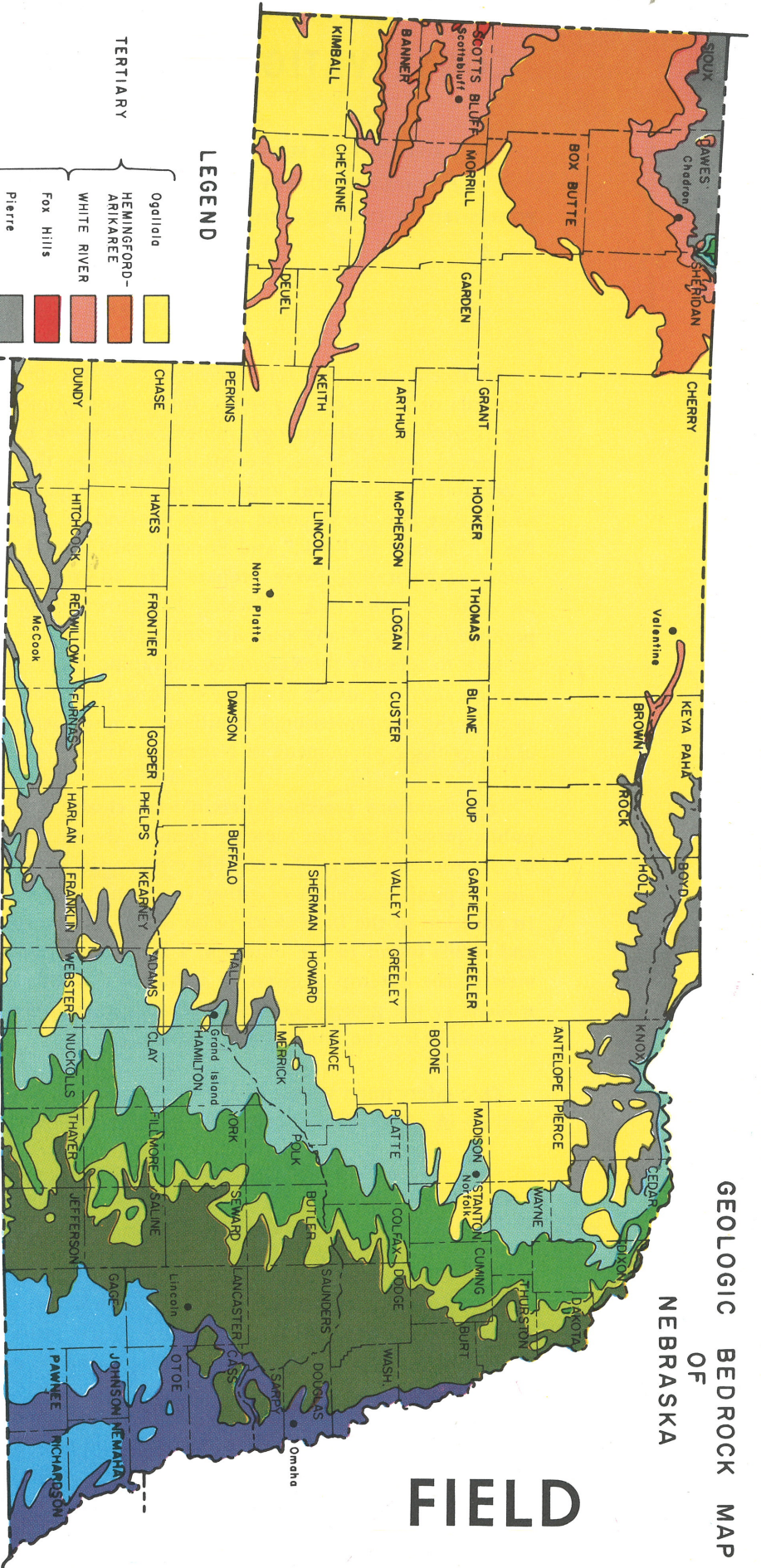
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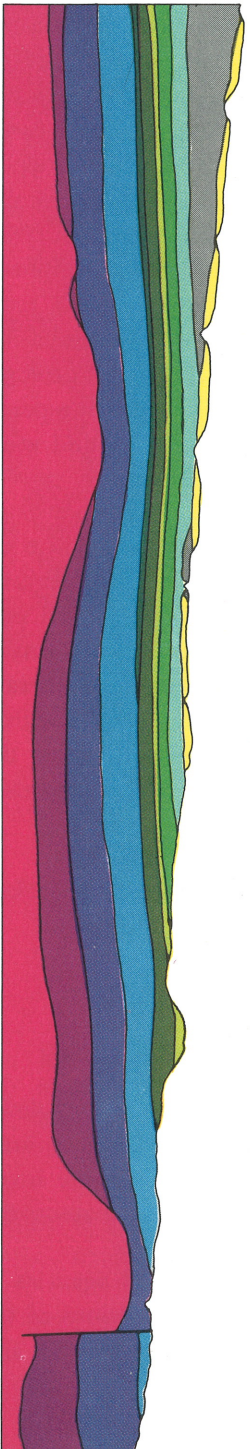
GEOLOGIC BEDROCK MAP  
OF  
NEBRASKA

FIELD  
GUIDE

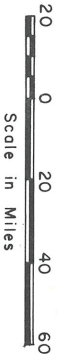


LEGEND

- TERTIARY
  - Ogallala
  - HEMINGFORD-ARIKAREE
  - WHITE RIVER
  - Fox Hills
  - Pierre
  - Niobrara
  - Carlile
- CRETACEOUS
  - Greenhorn-Graneros
  - DAKOTA
- JURASSIC
- PERMIAN
- PENNSYLVANIAN
- MISSISSIPPIAN
- DEVONIAN
- SILURIAN
- ORDOVICIAN
- CAMBRIAN
- PRECAMBRIAN



Cross Section Along Southern Nebraska Border



NOTE: Unconsolidated sediments of Pleistocene age cover the bedrock throughout much of the State and are not shown.

# THE UNIVERSITY OF NEBRASKA CONSERVATION AND SURVEY DIVISION

GEOLOGICAL SURVEY

WATER SURVEY

PUBLISHED IN COOPERATION WITH:

SOIL SURVEY

INFORMATION SURVEY

NEBRASKA GEOLOGICAL SOCIETY  
LINCOLN GEM & MINERAL CLUB

## PREFACE

In recent years the earth sciences have become an important part of the curricula of many school systems. In the past, pupils were given only a smattering of geology, paleontology, mineralogy, etc. to help them better understand the world around them. Recent emphasis on the earth sciences has created a demand from teachers and students for geologic information in the area in which they live. In response to this demand in Nebraska, Educational Circular No. 1, "Record in Rock," and Educational Circular No. 2, "Minerals and Gemstones of Nebraska," were prepared. In addition to the educational emphasis on earth sciences, rock collecting has grown to be one of the nation's most popular hobbies. Many students and hobbyists are now requesting information on how to identify the various stratigraphic horizons (rock layers) and geologic features they encounter in the field. Thus, these field guides have been prepared to help the nonprofessional familiarize himself with the stratigraphy and some of the geologic phenomena of Nebraska.

The locations presented herein were chosen for several reasons. All are on public property so that viewing them is always possible. All are easily reached by car and are generally accessible even to the elderly or handicapped. All provide "typical" examples of either common Nebraska rocks, minerals, or fossils. In addition to the brief description of the stratigraphy and the rocks, minerals, and fossils found in the outcrops, a brief description of the land forms within view of the outcrop is given. It is hoped that this information will orient the student to the geology of Nebraska and help him to understand the processes responsible for the landscape about him.

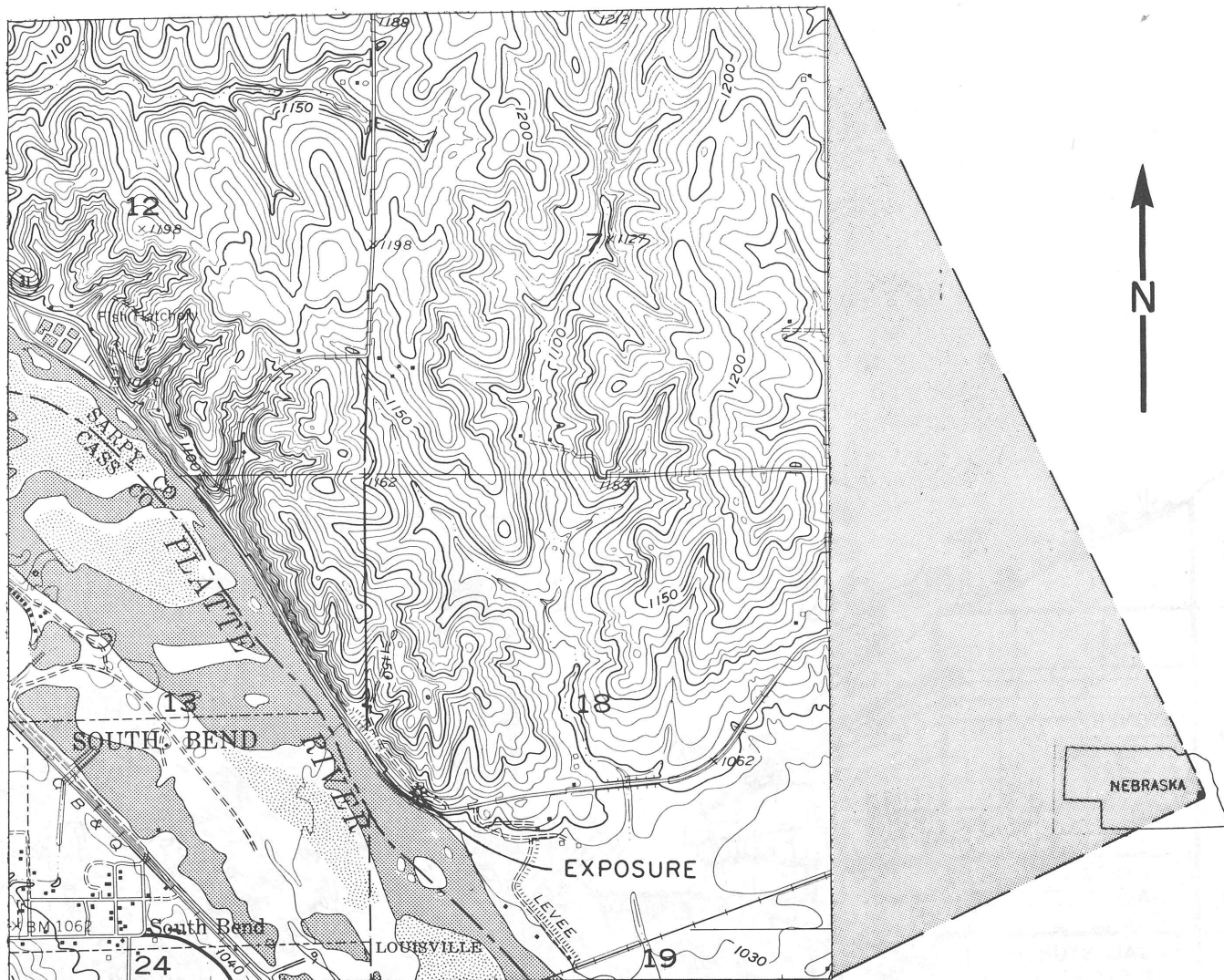
**One safety note:** when visiting these outcrops, be sure that your car is parked well off of the road—if your car is equipped with safety blinkers, use them.

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The Conservation and Survey Division of the University is the agency designated by statute to investigate and interpret the geologically related natural resources of the state, to make available to the public the results of these investigations, and to assist in the development and conservation of these resources.

The Division is authorized to enter into agreements with federal agencies to engage in cooperative surveys and investigations in the state. Publications of the Division and the cooperating agencies are available from the Conservation and Survey Division, University of Nebraska, Lincoln 68508.

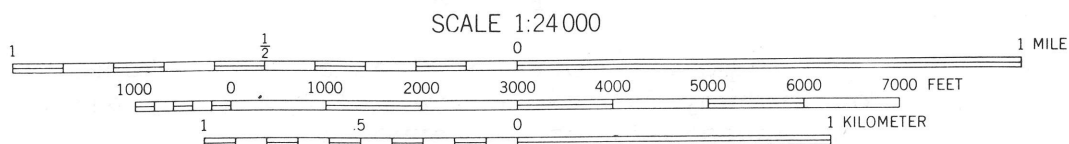
Publication and price lists are furnished upon request.



(SPRINGFIELD QUADRANGLE)

LOCATION AND ELEVATION OF EXPOSURE  
Figure 1

The exposure is situated in the S 1/2, NW 1/4, SW 1/4, Sec. 18, T-12-N, R-11-E, Sarpy County. The elevation at the adjacent road grade is 1050 feet above sea level.



CONTOUR INTERVAL 10 FEET  
DOTTED LINES REPRESENT 5-FOOT CONTOURS  
DATUM IS MEAN SEA LEVEL

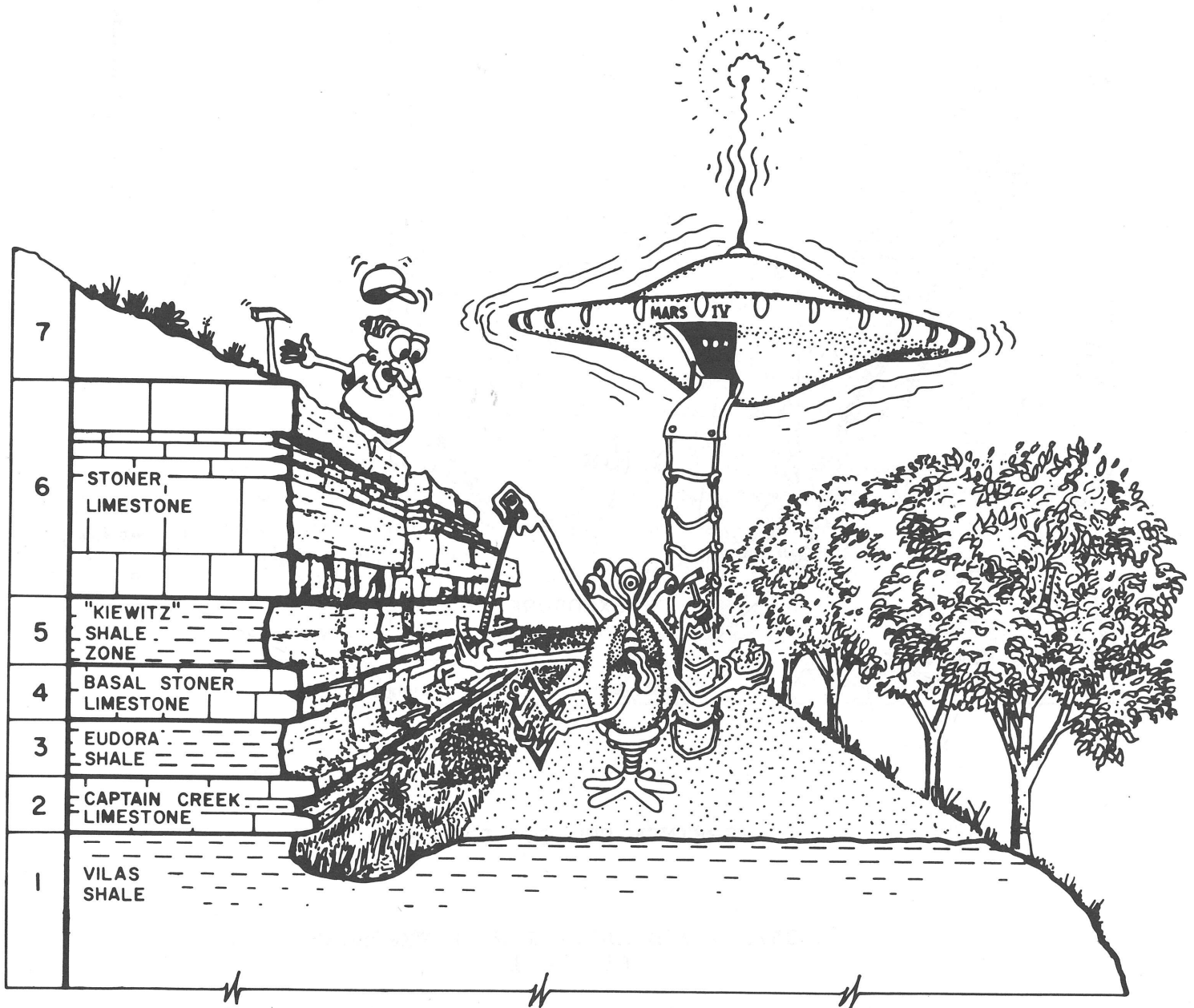


Figure 2

Exposure south of Gretna Fish Hatchery on Highway 31. Note that slumping may alter the appearance of the exposure.

SECTION ON HIGHWAY 31, SOUTH OF  
GRETNA STATE FISH HATCHERY

This exposure shows a very good example of the changing conditions which occurred during Upper Pennsylvanian time. Non-marine deposits are seen in the lower part of the section and marine deposits in the upper portion.

HOW TO GET THERE

Use a Nebraska highway map to proceed to the Gretna State Fish Hatchery. (The beautiful view overlooking the Platte River makes this an ideal spot to have a picnic lunch.) Proceed 1.1 miles on State Highway 31 in a southeasterly direction from the Fish Hatchery. The exposure is on the left (north) side of the road (figure 1).

STRATIGRAPHIC SECTION  
Figure 2

PLEISTOCENE LOESS AND GLACIAL TILL AT TOP OF EXPOSURE

PENNSYLVANIAN SYSTEM: MISSOURI SERIES: LANSING GROUP

STANTON FORMATION

STONER LIMESTONE MEMBER

Horizon 6. Light tannish-gray, crystalline, thin- to thick-bedded limestone. Contains fusulinids, crinoids, and brachiopods. Up to 16.0 feet.

Horizon 5. Extremely fossiliferous gray shale. This unit is often referred to as the "Kiewitz" Shale zone. About 2.5 feet.

Horizon 4. Bluish-gray, impure, fossiliferous limestone. This unit is sometimes referred to as the "Dyson Hollow Limestone."

EUDORA SHALE MEMBER

Horizon 3. Gray shale above (1.5 feet) and black, fissile (platy) shale below. (0.5 foot).

CAPTAIN CREEK LIMESTONE MEMBER

Horizon 2. Dark gray, impure limestone with crinoids. About 0.4 foot.

VILAS SHALE FORMATION

Horizon 1. Greenish-gray shale with two thin limestones in upper portion. Up to 8.4 feet.

GEOLOGIC HISTORY

The Vilas Shale is in part a non-marine unit; these silts and clays appear to have been rapidly deposited in near-shore shallow water. A change to deeper marine conditions is shown by the Captain Creek Limestone. The black zone at the base of the Eudora Shale suggests that silts and clays containing much organic material were deposited in an area of restricted water circulation. A return to deeper, quiet marine conditions is suggested by the thin limestone at the base of the Stoner Member. The overlying shales suggest more active water movement with silt and clay being brought into the area. A quiet marine environment for a considerable length of time is shown again by the thick limestone of the upper Stoner.

## WHILE YOU ARE THERE

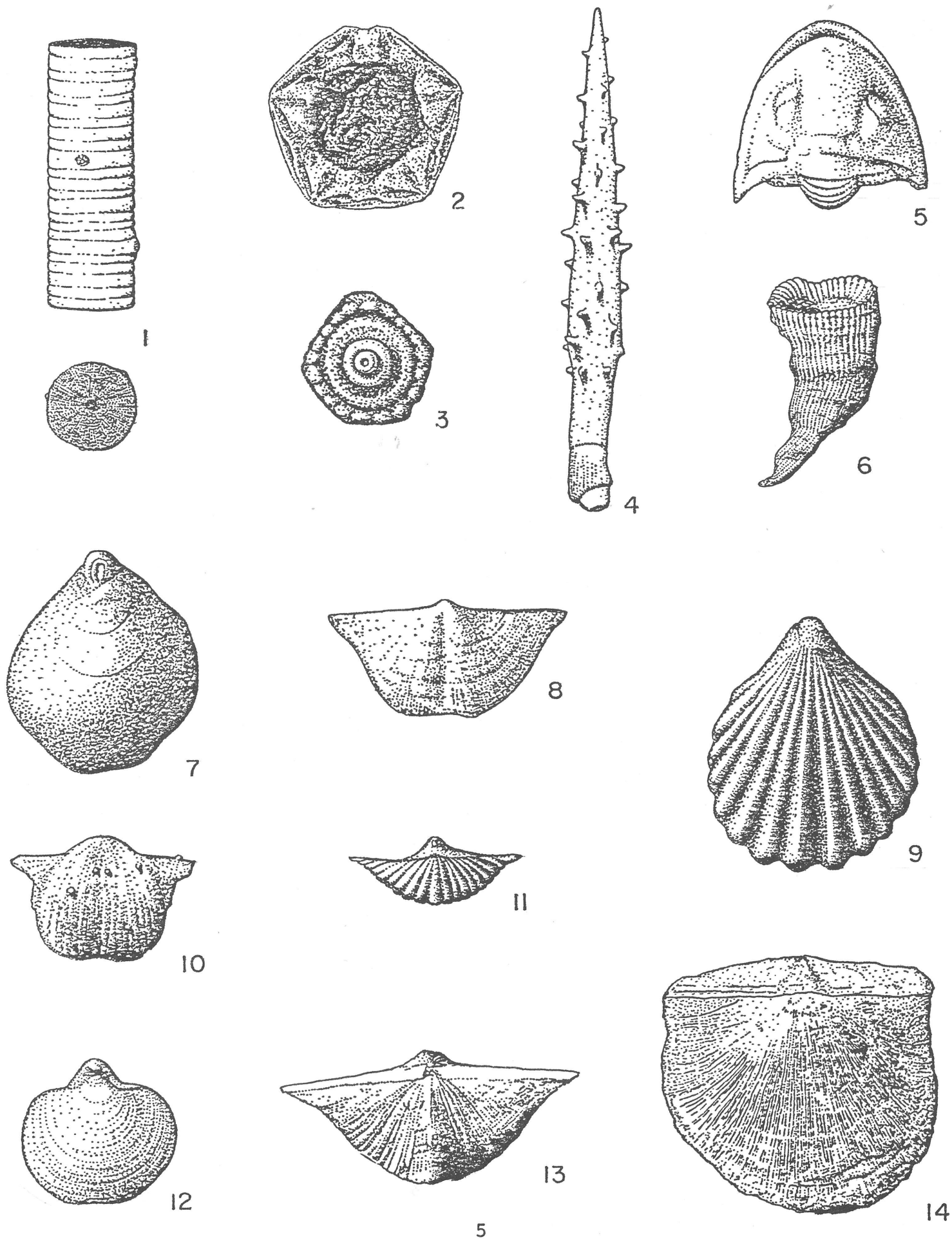
Observe the Platte River valley. Notice that in this location its width is only about one mile. The next time you are traveling through central Nebraska from Grand Island westward, notice the width of the Platte valley. It may approach 20 miles. In central Nebraska, the unconsolidated sediments of Pleistocene and Tertiary ages offered little resistance to the erosive powers of the Platte. In eastern Nebraska the Platte cuts through very old, resistant bedrock of Upper Pennsylvanian age; thus, the difference in width of the Platte valley tells us something about the geology and rock types.

### SOME COMMON FOSSILS YOU MAY FIND DURING YOUR TRIP (Figure 3)

- 1, 2. - Crinoids. 1. Stems, side and end views, X2. 2. Dorsal cup, Delocrinus, X2.
- 3, 4. - Echinoids. 3. Plate, Archeocidaris, X2. 4. Spine, Archeocidaris, X2.
5. - Trilobite, Ditomopyge, X4.
6. - Horn coral, Lophophyllum, X1.
7. - 14. - Brachiopods. 7. Composita, X2. 8. Neochonetes, X2. 9. Hustedia, X5. 10. Hystrinulina, X2. 11. Punctospirifer, X2. 12. Phricodothyris, X2. 13. Neospirifer, X1, and 14. Derbyia, X2.

More information about these, and other fossils is available in the Conservation and Survey Division's Educational Circular No. 1, "Record in Rock."

Figure 3





NOTES

# NOTES

*Some Additional Publications Available  
from the Conservation and Survey Division*

RECORD IN ROCK, A Handbook of the Invertebrate Fossils of Nebraska:  
*Roger K. Pabian*, Educational Circular No. 1 (1970).

MINERALS AND GEMSTONES OF NEBRASKA, A Handbook for Students and  
Collectors: *Roger K. Pabian*, Educational Circular No. 2 (1971).

SOILS OF NEBRASKA: *J. A. Elder*, Resource Report No. 2 (1969).

DIRECTORY OF NEBRASKA QUARRIES, PITS, AND MINES: *R. R. Burchett*,  
Resource Report No. 5 (1971).

CENTENNIAL GUIDEBOOK TO THE GEOLOGY OF NEBRASKA: *R. R. Burchett  
and E. C. Reed* (1967).

GUIDEBOOK TO THE GEOLOGY ALONG THE MISSOURI RIVER BLUFFS OF  
SOUTHEASTERN NEBRASKA AND ADJACENT AREAS: *R. R. Burchett*  
(1970).


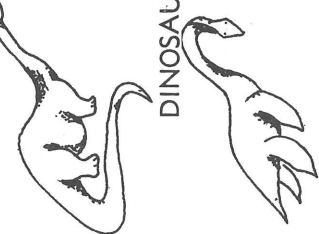


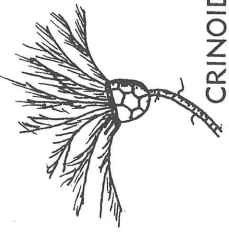

GUIDEBOOK TO THE GEOLOGY ALONG PORTIONS OF THE LOWER PLATTE  
RIVER VALLEY AND WEEPING WATER VALLEY OF EASTERN NEBRASKA:  
*R. R. Burchett* (1971).

THE GEOLOGICAL SECTION OF NEBRASKA: *G. E. Condra and E. C. Reed*,  
Nebraska Geological Survey Bulletin No. 14A (1943, revised 1959).

REVISION OF THE CLASSIFICATION OF THE PLEISTOCENE DEPOSITS OF NE-  
BRASKA: *E. C. Reed and V. H. Dreeszen*, Nebraska Geological Sur-  
vey Bulletin No. 23 (1965).

GEOLOGICAL MAP OF NEBRASKA: Compiled by *R. R. Burchett*,  
1:1,000,000 Scale (1969).

TOPOGRAPHIC MAPS: Topographic Map Division, U.S. Geological Sur-  
vey.

AGE	GEOLOGIC TIME UNITS		ROCK TYPES	MINERAL RESOURCES AND PRODUCTS	TYPICAL FOSSILS	
2	CENOZOIC (RECENT LIFE)	PLEISTOCENE	Glacial till, silt, clay, sand, gravel, volcanic ash.	Agricultural soil, water, sand & gravel, volcanic ash.	 MAMMOTH	
70		TERTIARY	Sandstone, siltstone, clay, gravel, marl, volcanic ash.	Agricultural soil, water, sand & gravel, volcanic ash, riprap.		
135	MESOZOIC (MIDDLE LIFE)	CRETACEOUS	Chalk, chalky shale, dark shale, varicolored clay, sandstone, conglomerate	Water, oil & gas, cement, brick, agricultural lime, & other construction materials.	 DINOSAUR	
180		JURASSIC	Subsurface only. Sandstones and shales			
225		TRIASSIC				
280	PALEOZOIC (ANCIENT LIFE)	PERMIAN	Shale, limestone, dolomite, gypsum, anhydrite, sandstone, siltstone, chert.	Water, agricultural lime, oil, road rock, riprap.	 PLESIOSAUR	
310		PENNSYLVANIAN	Limestone, shale, sandstone, coal.	Oil, cement, brick, concrete aggregate, lightweight aggregate, road rock, agricultural lime, rip rap, water.		 BRACHIOPOD
350		MISSISSIPPIAN	Subsurface only. Limestone, dolomite.	Oil, water.	 CORALS	
400		DEVONIAN	Subsurface only. Dolomite, gray shale.			
440		SILURIAN	Subsurface only. Dolomite.			
500		ORDOVICIAN	Subsurface only. Dolomite, sandstone, shale.	 CRINOID		
600			CAMBRIAN		Subsurface only. Dolomite, sandstone.	
? 5,000		CRYPTOZOIC (HIDDEN LIFE)	PRECAMBRIAN	Subsurface only. Granite, other igneous rocks, and metamorphic rocks.		?

MILLIONS OF YEARS AGO