

**STATE OF ARKANSAS**  
**ARKANSAS GEOLOGICAL COMMISSION**  
**Norman F. Williams, Director**

**A GUIDEBOOK TO SOUTHWESTERN ARKANSAS**

by  
**B. F. Clardy**



**Little Rock, Arkansas**  
**Revised December, 1982**  
**Reprinted December, 1999**

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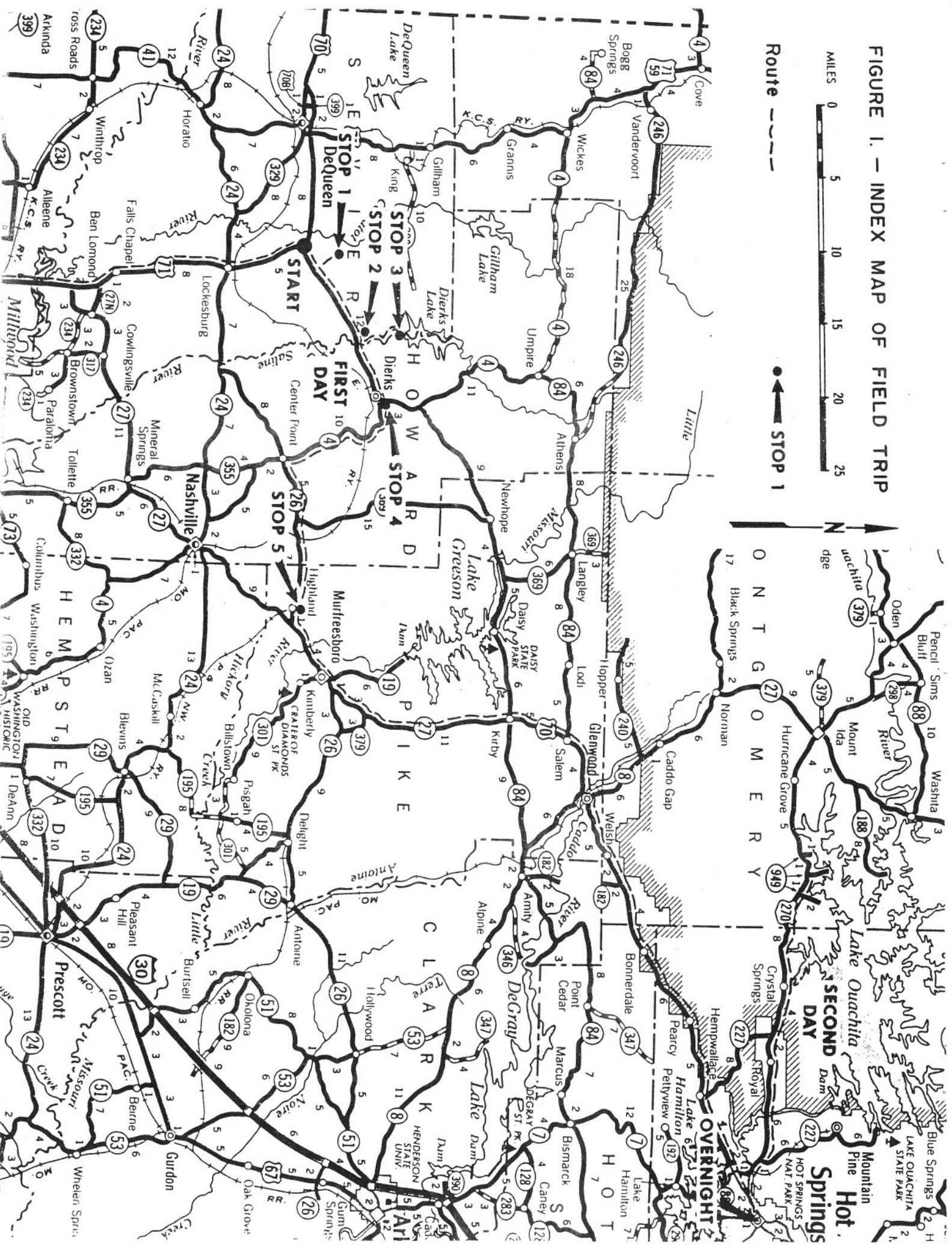
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FIGURE 1. — INDEX MAP OF FIELD TRIP



Route - - - -

● STOP 1



## First Day

### Summary

In traveling this field trip route Lower Cretaceous and Pennsylvanian age sediments are encountered. Special emphasis has been placed on the pre-Cretaceous weathering of the Jackfork Sandstone (Pennsylvanian age) and consequent secondary porosity developed within it. Steeply dipping Jackfork Sandstone is unconformably overlain by essentially horizontal beds of the Trinity Formation (Lower Cretaceous age). This unconformity represents a one-hundred-fifty million year hiatus. Viscous asphaltic oils are found both in the porous Jackfork Sandstone and in sands of the Trinity Formation below the Dierks Limestone member. The age of these viscous oils has not been determined.

## STOP 1. JACKFORK QUARRY (HOLLOWAY QUARRY)

Steeply dipping beds of Jackfork Sandstone (Pennsylvanian age) are being quarried for crushed stone by HMB Construction Company. Some friable sandstone beds in this quarry contain irregularly shaped accumulation of pyrite and viscous oil. This oil may have migrated up these porous sandstones in the Jackfork to its present position, or it may have migrated down into these porous sandstones from the Trinity Formation (Lower Cretaceous) which has been removed by erosion. H. D. Miser (USGS Bulletin 808) reported asphaltic sand in the lower Trinity one-fourth mile south of this quarry near the center of Section 11, T. 8 S., R. 30 W. The age of the oil has not been determined.

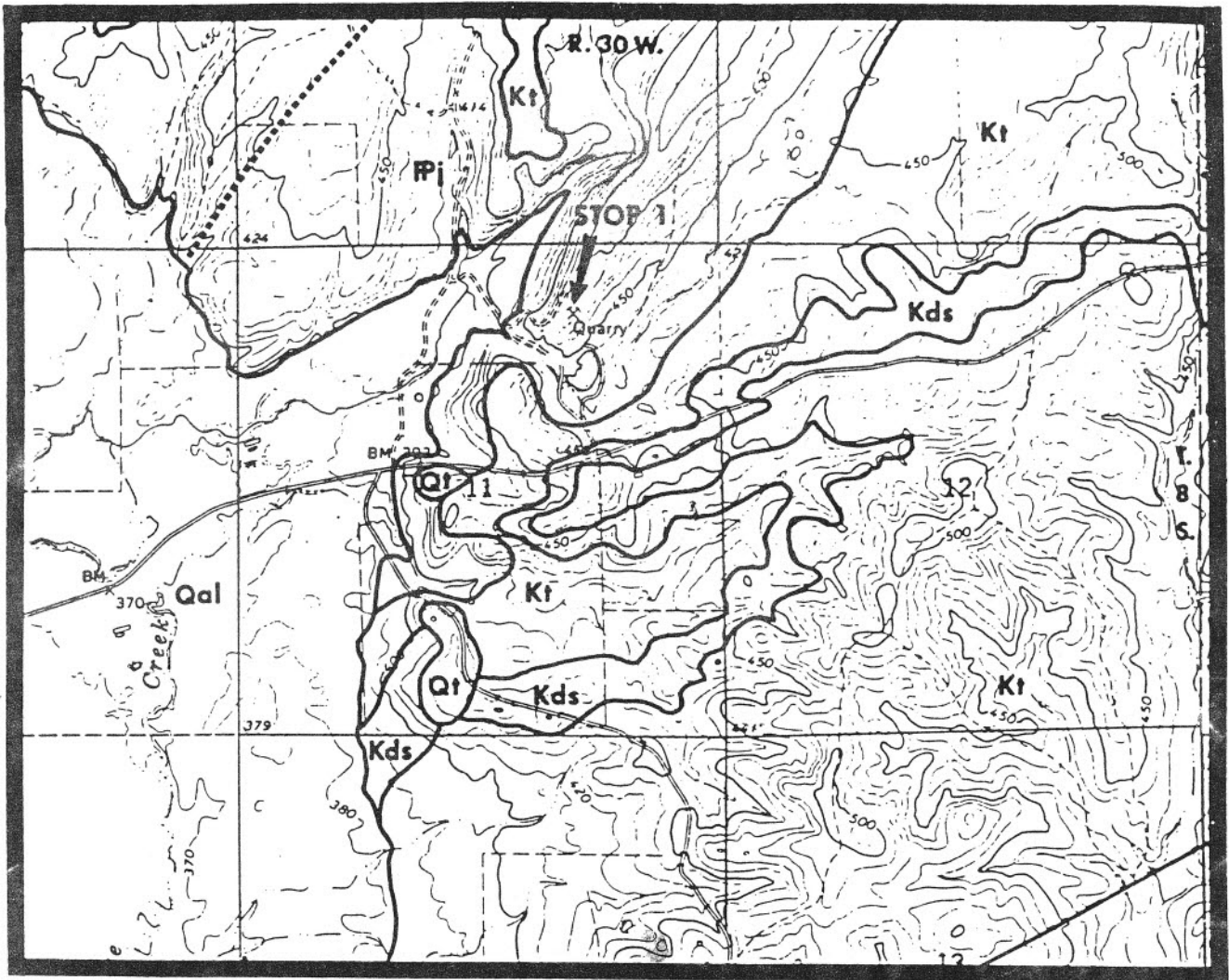
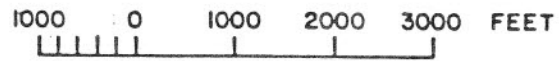


PLATE I. JACKFORK QUARRY - STOP I.



- Qal River Alluvium
- Qt Terrace Deposits
- Kt Trinity Formation
- Kds Dierks Limestone
- Pi Jackfork Sandstone





STOP 2. GREENS CHAPEL

Asphaltic sand of the lower part of the Trinity formation (Lower Cretaceous age) is present in the road cut. H. D. Miser (USGS Bulletin 808) described this occurrence in 1929 as follows:

“Asphaltic sand is exposed by the roadside on a low hill adjoining the Saline River bottom half a mile southeast of Lebanon, in the De Queen quadrangle. It occurs in lenticular layers, the thickest of which is only a foot thick. It is much weathered in the exposures, being dark brown and falling to a powder when struck with a hammer, but it becomes viscous when heated with a match. The asphalt impregnates sand which is below the Dierks limestone exposed to the southwest south of Woolsey School and which, as shown in the following section at this locality, overlies the Pike gravel:

*Partial section of Trinity formation half a mile southeast of Lebanon*

	Feet
Yellow sand partly concealed by surficial gravel extends to the top of the hill. A 2 or 3-inch layer of asphaltic sand is 3 or 4 feet above the base of this bed of sand .....	12-25
Yellow sand, lenticular layers of which are impregnated with asphalt. The thickest layer is 12 inches thick .....	2-3
Gray and yellow sand, some of which is indurated .....	5
Gravel with pebbly sand in its upper part. The exposure extends down to the edge of the second bottom of Saline River (Pike gravel) .....	16”

This part of the Trinity is correlative with the Hosston-Sligo sediments in the subsurface of south Arkansas and north Louisiana.

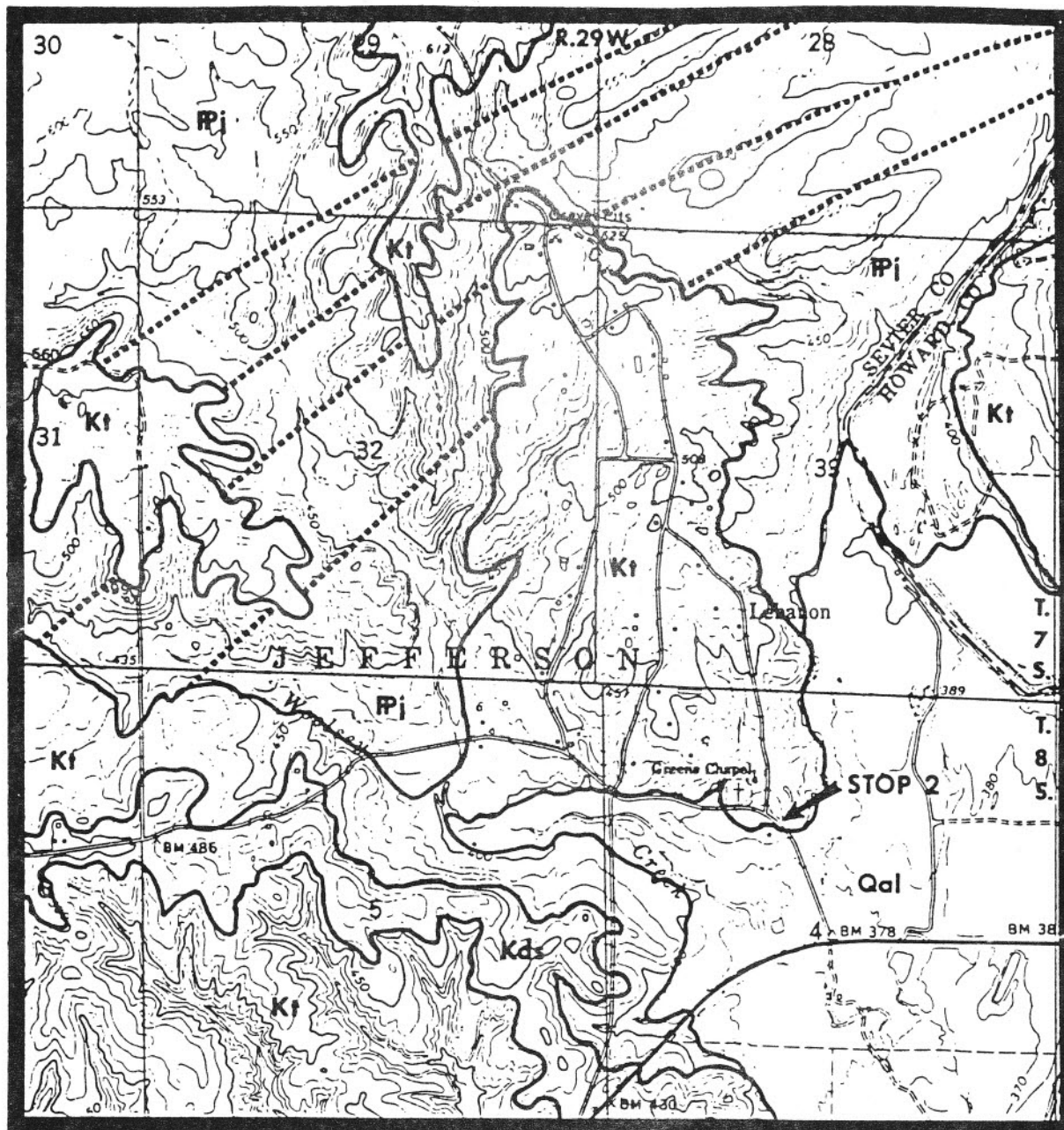
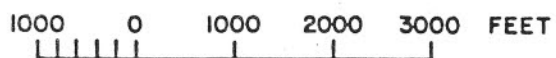


PLATE 2. GREENS CHAPEL - STOP 2.



- Qal River Alluvium
- Kt Trinity Formation
- Kds Dierks Limestone
- Pi Jackfork Sandstone



### STOP 3. LUNCH STOP

#### STOP 3a. DIERKS DAM EMERGENCY SPILLWAY

Steeply dipping sandstones and shales of the lower Jackfork Sandstone (Pennsylvanian age). These sequences of sandstones and shales are interpreted and described by C. G. Stone (Arkansas Geological Commission) as follows:

“This approximate 1,000 foot interval of alternating sandstones and shales of lower Jackfork Sandstone represents deep water turbidite deposition in the mid to outer submarine fan depositional environment. There are at least seven large and distinct channels (thinning and fining upwards) and three lobe (thickening and coarsening upwards) sequences. Most of the paleocurrent data suggests a westward oriented flow of the sediments. Several relative small Late Paleozoic thrust and tear faults dissect the section and have associated small ‘drag’ folds, slickensides, small hydrothermal quartz veins and the white clay mineral dickite.”

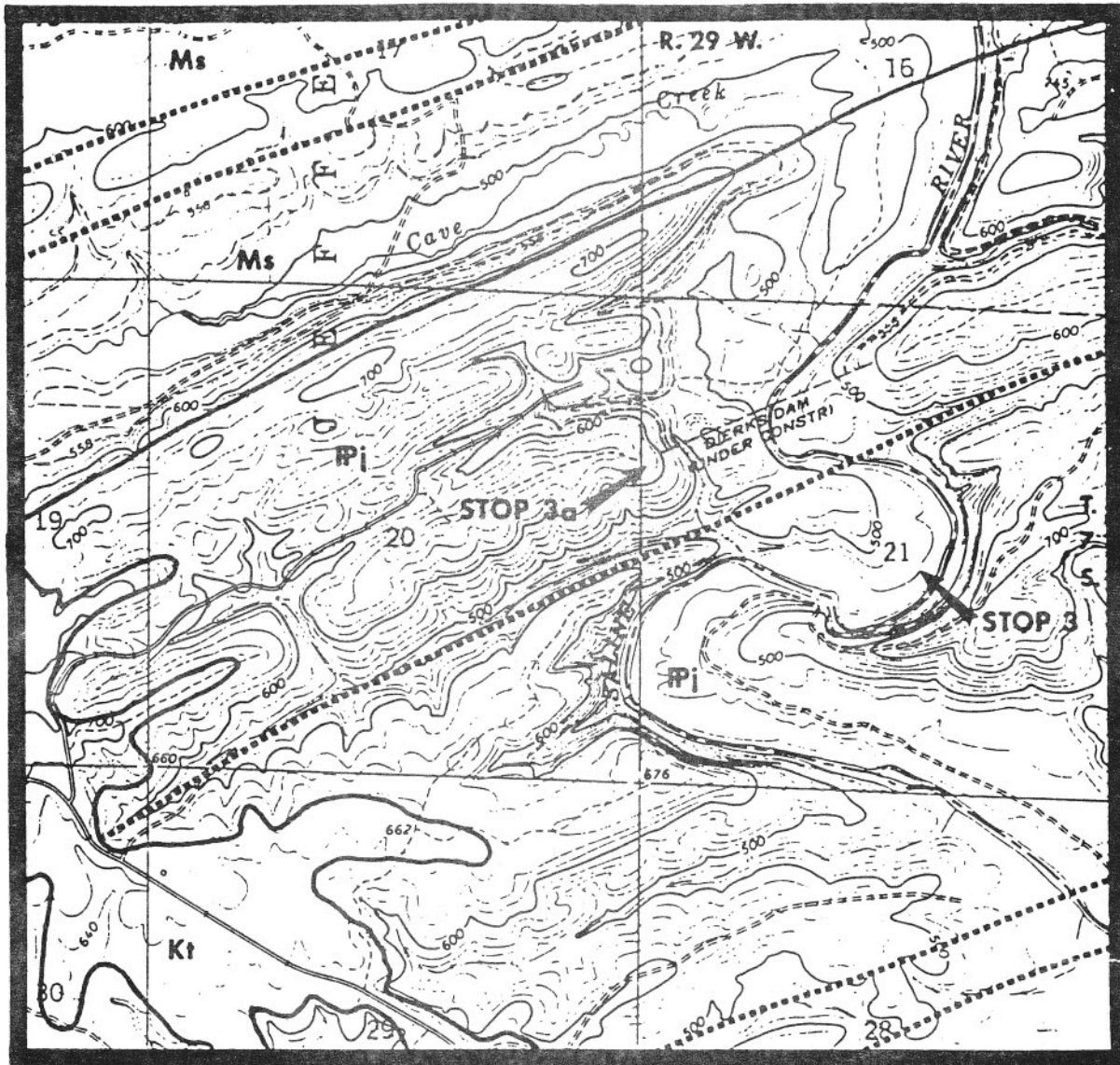
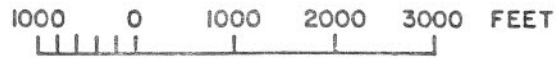


PLATE 3. LUNCH STOP AND DIERKS DAM - STOPS 3 AND 3a.



- Kt Trinity Formation
- Pi Jackfork Sandstone
- Ms Stanley Shale



#### STOP 4. DIERKS

Steeply dipping sandstones and shales of the Jackfork Sandstones (Pennsylvanian age) are capped by essentially horizontal beds of the Pike Gravel member of the Trinity Formation (Lower Cretaceous). The sandstone beds are friable and porous due to weathering and leaching prior to the deposition of the Pike Gravel. At places this secondary porosity is developed in the Jackfork Sandstone to a depth of 50 feet. This unconformity between the Jackfork Sandstone and the Pike Gravel represents a period of approximately 150 million years.

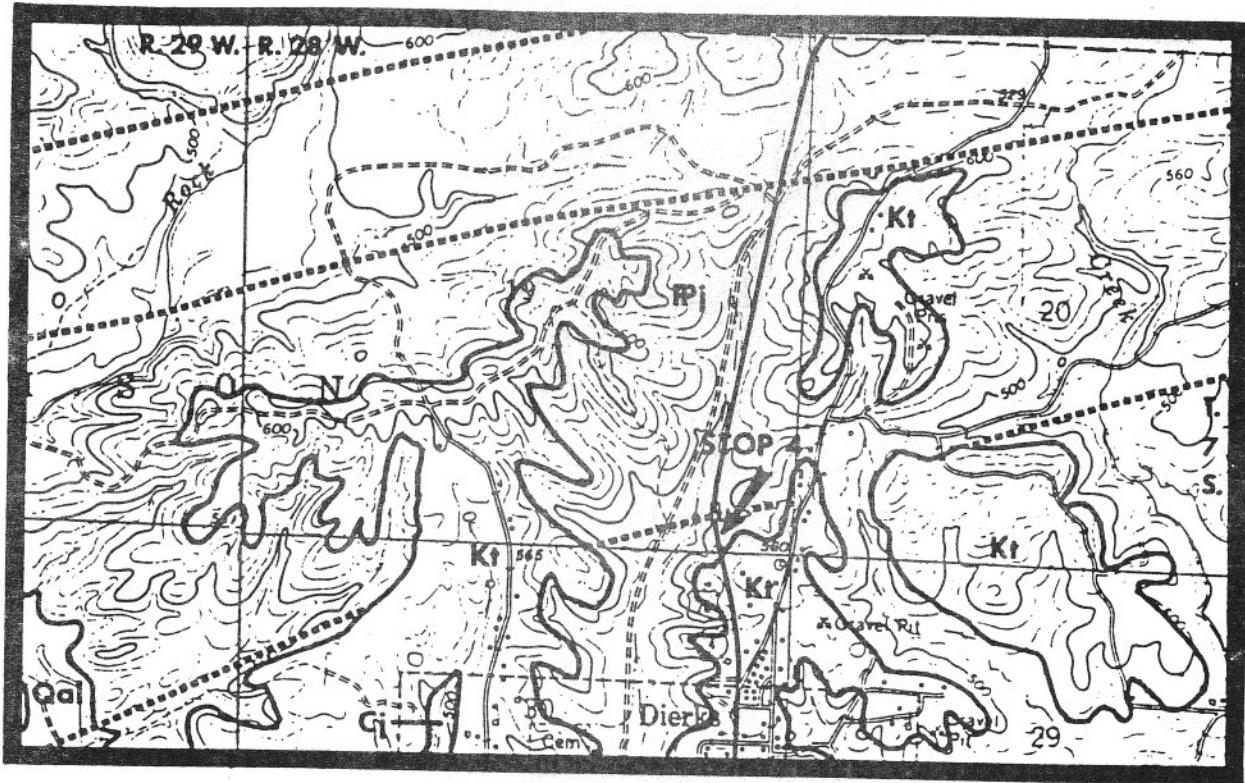
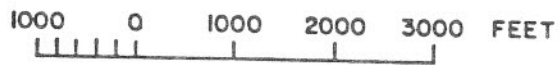


PLATE 4. DIERKS, ARKANSAS - STOP 4.



- Qal River Alluvium
- Kt Trinity Formation
- Fpi Jackfork Sandstone



## STOP 5. HIGHLAND

The DeQueen Limestone member of the Trinity Formation (Lower Cretaceous age) is exposed in the walls of this abandoned gypsum mine. The DeQueen Limestone is correlative with the Mooringsport-Ferry Lake Anhydrite section in the subsurface of south Arkansas and north Louisiana. These outcrops are shallow marine sediments and evaporite deposits. Minerals of interest are gypsum, celestite, calcite, pyrite, and marcasite. Salt casts and ripple marks are common features of some thin limestone beds. A brackish marine fauna which consists predominantly of gastropods and pelecypods is abundant in some beds.



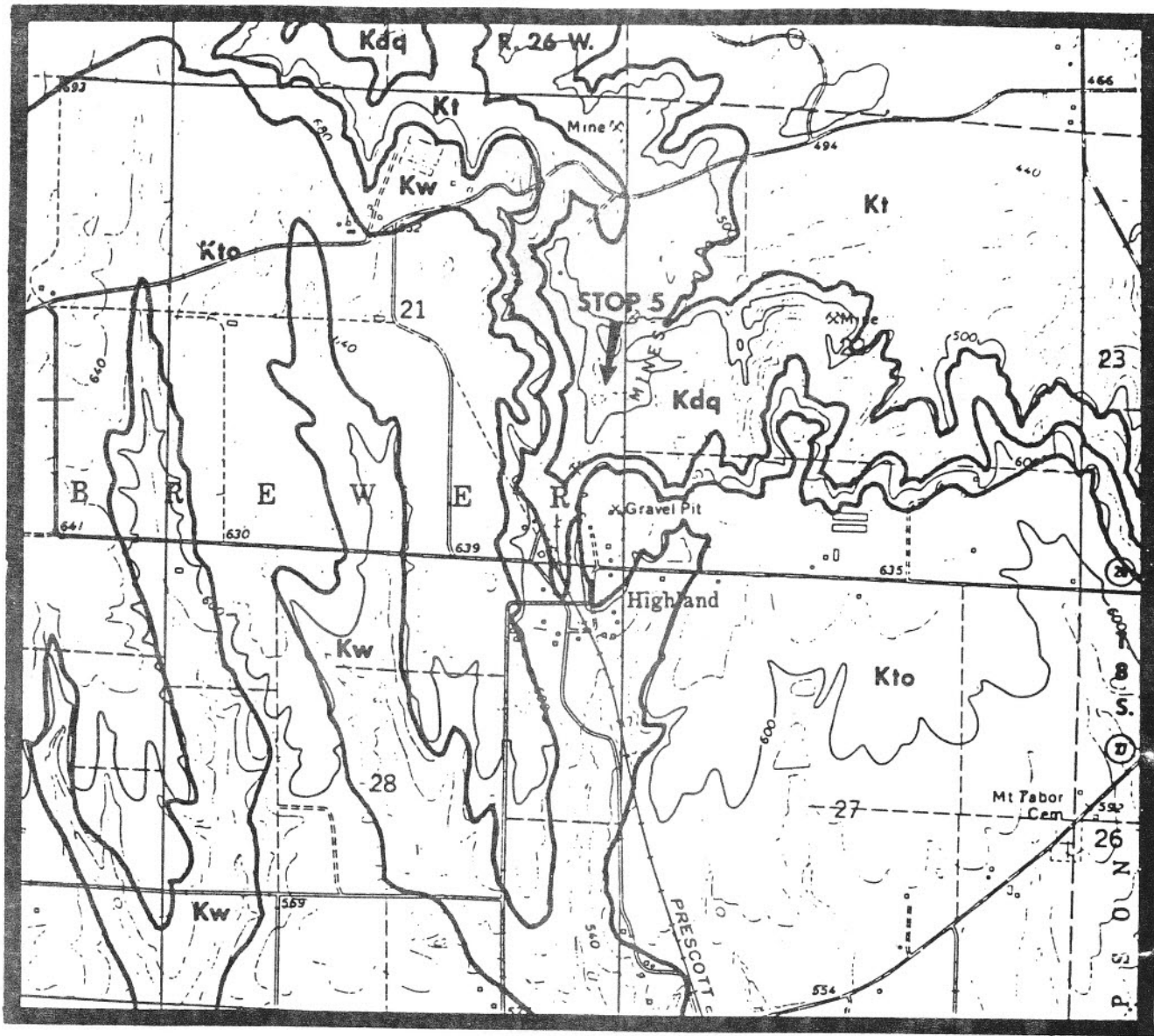
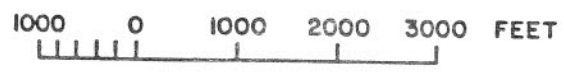


PLATE 5. HIGHLAND, ARKANSAS - STOP 5.



- Kto Tokio Formation
- Kw Woodbine Formation
- Kt Trinity Formation
- Kdq De Queen Limestone

