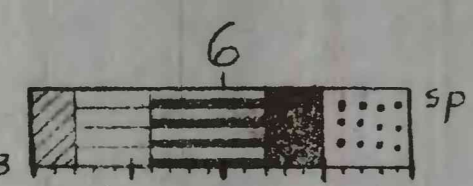
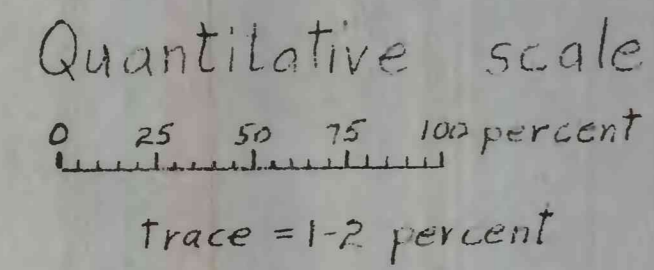


Open file - 1961
This report is preliminary and has not been reviewed for conformity with Geological Survey standards

Example



Sample number 3, locality number 6 contains 10 percent kaolinite, 20 percent illite, 30 percent mixed-layer clay, 15 percent montmorillonite, 25 percent quartz, and a trace of feldspar.



| Major amount | Trace amounts | Symbol | Mineral |
|--------------------|---------------|--------|------------------|
| [diagonal lines] | | k | Kaolinite |
| [cross-hatch] | | cl | Chlorite |
| [horizontal lines] | | i | Illite |
| [vertical lines] | | | Mixed-layer clay |
| [stippled] | | | Montmorillonite |
| [dots] | | | Quartz |
| [x's] | | | Cristobalite |
| [circles] | sp | sp | Feldspar |
| [c's] | c | c | Calcite |
| [d's] | d | d | Dolomite |
| [z's] | z | z | Clinoptilolite |
| [wavy lines] | | | Analcite |
| [square] | | | Glass |
| [g's] | g | g | Goethite |



| Period | Series and Formation | Member | Geological Unit |
|------------|----------------------|--------------------|---|
| Tertiary | Oligocene | Arikaree formation | White River group (Includes Brule and Chadron formations) |
| | | White River group | |
| Cretaceous | Upper Cretaceous | Pierre shale | Niobrara formation (Impure chalk and limy shale) |
| | | Niobrara formation | |
| | | Carlisle shale | |

Figure 1a. Geologic Map and Sample localities on the Pine Ridge Indian Reservation
Geology after Darton (1951), modified southwest of Pine Ridge after R.J. Durham (1961)

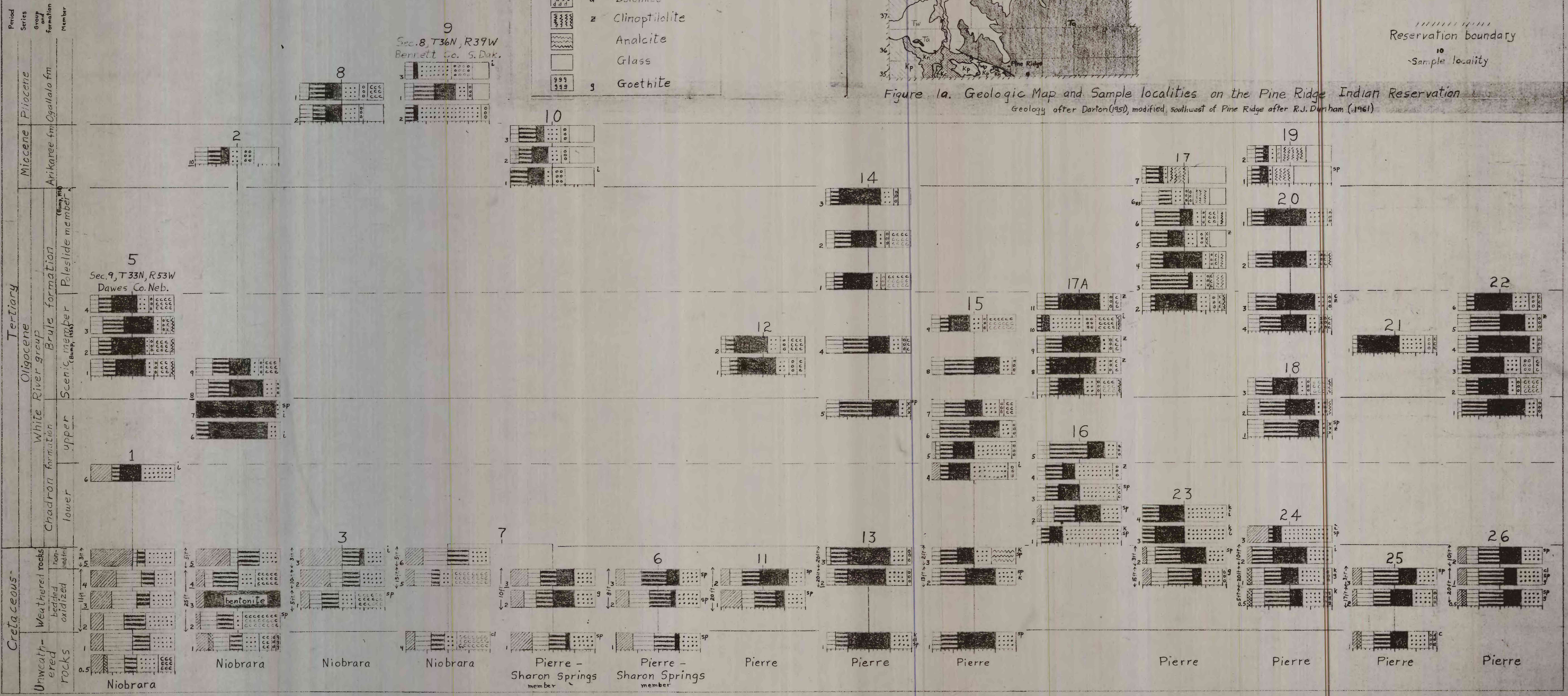


Figure 1b. Mineralogy of rocks on the Pine Ridge Indian Reservation