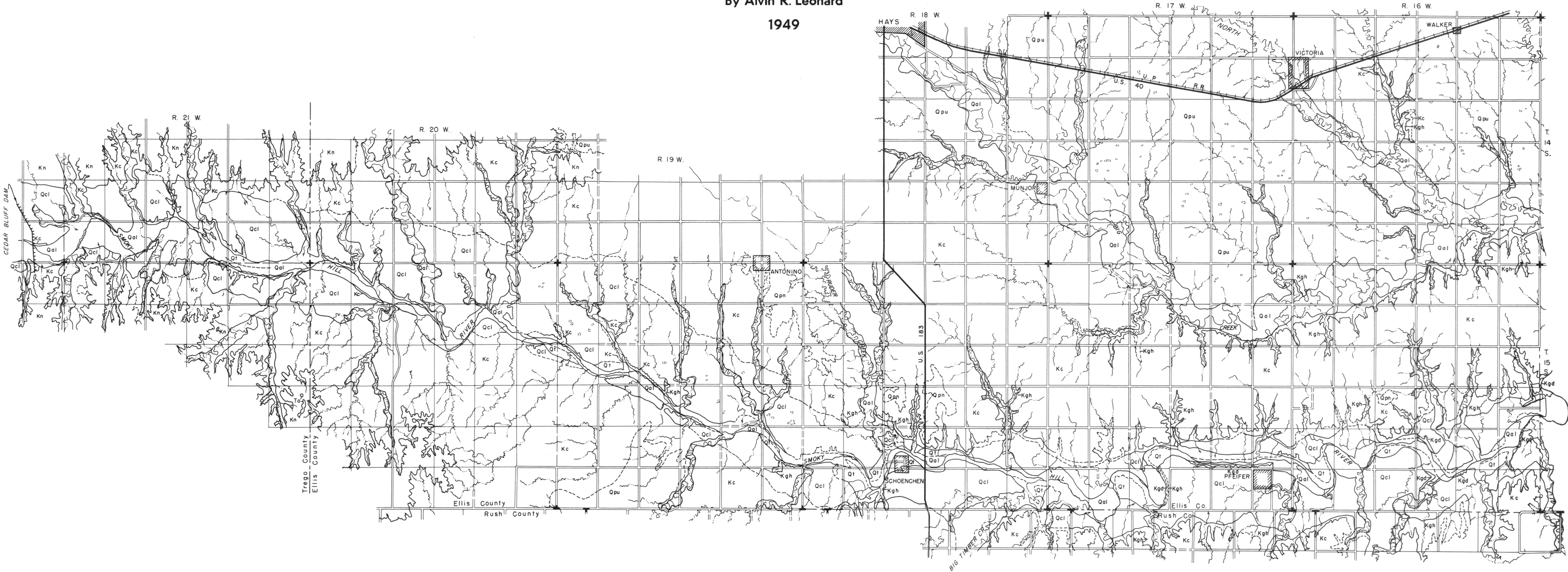


AREAL GEOLOGY OF SOUTHERN ELLIS COUNTY AND PARTS OF TREGO AND RUSH COUNTIES, KANSAS

Bulletin 149

By Alvin R. Leonard  
1949

Plate 1



EXPLANATION

- Recent alluvium and Late Wisconsinan terrace deposits**  
Silt and sandy silt overlying sand and gravel capable of yielding large quantities of water to wells. Dashed line denotes terrace scarp where it can be recognized.
- Crete and Loveland Formations**  
Buff silt and sandy silt underlain by arkosic sand, gravel, and cobbles. Locally includes underlying gray silt, sand, and volcanic ash of the Sappa Formation and arkosic sand and gravel and fragments and pebbles of chalk of the Grand Island Formation. Forms prominent terrace along Smoky Hill River. Yields water to domestic and stock wells in most of the outcrop area.
- Undifferentiated Pleistocene deposits**  
Silt, silty clay, sand, and gravel. Includes Nebraskan and Kansan age gravels and Crete, Loveland, and Peoria Formations underlying prominent terrace along Big Creek. Also includes silt and gravel of unknown age in south-western part of T. 15 S., R. 19 W., and in western part of T. 14 S., R. 19 W. Yields water to domestic and stock wells.
- Nebraskan (?) deposits**  
Silty sand and gravel composed of chalk pebbles, mortar-bed fragments, pebbles of "Algal limestone", and reworked crystalline material from the Ogallala Formation, loosely cemented with calcium carbonate. Locally, yields water to domestic and stock wells.
- Ogallala Formation**  
Sand, gravel, silt, and clay, loosely cemented to form "mortar beds". Lies above the water table and does not yield water to wells in this area.
- Niobrara Chalk (Fort Hays Limestone member)**  
Massive chalky limestone. Yields no water to wells in this area.
- Carlile Shale**  
Upper part is clayey and sandy shale containing concretions. Lower part consists of chalky shale alternating with thin chalky limestones. Where weathered, lower chalky part yields water locally to domestic and stock wells.
- Greenhorn Limestone**  
Calcareous shale, limestone, chalky limestone, and thin bentonite beds. Locally, yields water where the upper part of the limestone is weathered.
- Graneros Shale and Dakota Formation**  
Clay, shale, and sandstone. Sandstone where present generally yields mineralized water to domestic and stock wells.
- Legend:**  
Federal or state highway  
Graded road  
Ungraded road  
Section line (no road)  
Township line (no road)  
County line  
Railroad  
Perennial stream  
Intermittent stream  
Undrained depression