

# AREAL GEOLOGY

## OF THE

















### LOWER BRULE QUADRANGLE

STATE OF SOUTH DAKOTA  
G.T. MICKELSON, GOVERNOR  
99°45' W. R. 74 W.  
44°15' N.



STATE GEOLOGICAL SURVEY  
E.P. ROTHROCK, STATE GEOLOGIST  
99°30' W. R. 72 W.  
44°15' N.

#### EXPLANATION


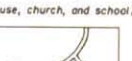
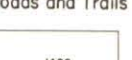
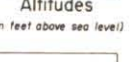

##### SEDIMENTARY ROCKS

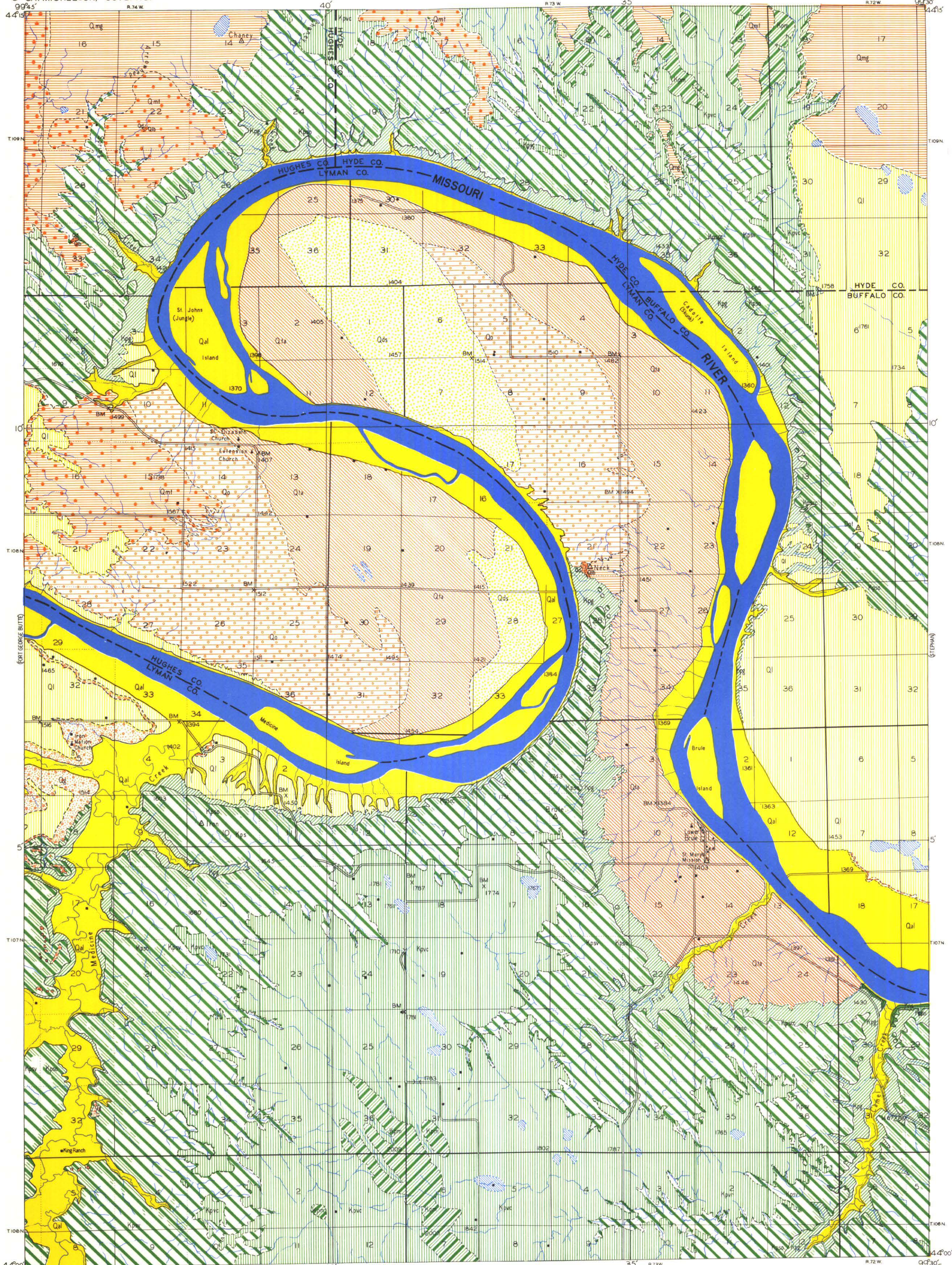
- |        |   |                  |
|--------|---|------------------|
| RECENT |  <b>Qal</b><br>Alluvium<br>(In flood plain of present streams, all sand and some gravel, more sandy where streams drain moraine areas)   | QUATERNARY       |
|        |  <b>Qds</b><br>Dune Sand<br>(Blow sand, deflation topography)  |                  |
|        |  <b>Ql</b><br>Loess<br>(Wind blown deposit)  |                  |
|        |  <b>Qla</b><br>Terrace Alluvium<br>(Sand and alluvium above present flood plain)   |                  |
|        |  <b>Qg</b><br>Gravel<br>(Fluvial and glacio-fluvial heterogeneous materials, sand and gravel sizes)  |                  |
|        |  <b>Qmg</b><br>Outwash<br>(Glacio-fluvial deposit, sand and gravel generally covered by loess or silt)   |                  |
|        |  <b>Qm</b><br>Ground Moraine<br>(Boulder clay, younger drift)  |                  |
|        |  <b>Qtm</b><br>Terminal Moraine<br>(Boulder clay, younger drift)   |                  |
|        |  <b>Qlb</b><br>Lake Beds<br>(Lacustrine silt)  |                  |
|        |  <b>Qd</b><br>Undifferentiated Drift<br>(Found beneath lake silt deposit)  |                  |
|        |  <b>Kpmb</b><br>Moberge Member<br>(Bluish gray marl and chalk, foraminiferal, weathers buff)   | UPPER CRETACEOUS |
|        |  <b>Kpvc</b><br>Virgin Creek Member<br>(Upper: cone-yellowish gray clay which weathers to gumbo, lower: zone dark bluish gray bentonitic clay, numerous bentonite beds)  |                  |
|        |  <b>Kpsu</b><br>Sully Member<br>(Upper facies: variegated gray bentonitic clay, flat siltitic concretions. Lower facies: Olacoma(?) gray bentonitic clay, Mn-Fe concretions, numerous bentonite beds. Bottom facies: Cross Creek (fescoc) buff chalk, brown platy sandstone) |                  |
|        |  <b>Kpg</b><br>Gregory Member<br>(Brown-brownish gray clay, numerous brown fossiliferous concretions, impure light gray chalk)   |                  |
|        |  <b>Kps</b><br>Sharon Springs Member<br>(Black to luminous shale, oil shale) bentonites near base)   |                  |
|        |  <b>Kns</b><br>Smoky Hill Member<br>(Gray and black dense foraminiferal limestone (chalk))   | CRETACEOUS       |

##### DRAINAGE

- |   |                      |
|---|----------------------|
|  | Intermittent Streams |
|  | Intermittent Lakes   |

##### CULTURE

- |   |   |
|---|---|
|  | Buildings<br>(House, church, and school)  |
|  | Roads and Trails  |
|  | Altitudes<br>(In feet above sea level)  |
|  | Bench Marks<br>(Monument marking point of known altitude)                       |
|  | Triangulation Stations<br>(Monument marking point of exact geographic location) |



Geologists: B.C. Petch and R.E. Curtiss  
Assistants: C.J. Ziek and G.R. Waddell  
Surveyed in 1949

Based on maps by Corps of Engineers,  
U.S. Army, and Geodetic data from U.S.  
Coast and Geodetic Survey

