Overlapping marine Jurassic rocks cover most of the state, with clastics and sandstones in the west and relatively more limestone and evaporites in the east.

Marine Cretaceous rocks cover most of the state, and more than 4,000 feet were deposited in western North Dakota. Shallow Lower Cretaceous sandstones tentatively correlated with the Newcastle of the Black Hills offer interesting possibilities where they pinch out to the east and north in the central and southeastern part of the state.

Non-marine Tertiary sediments cover most of western North Dakota.

The stratigraphy of North Dakota is inadequately known. No great tectonism or facies variations are expected to be found, but further knowledge of the details of the offlap and onlap relations of the sediments and the gentle folding during the Paleozoic may lead to further oil exploration based on stratigraphic information.

17. JOHN PAUL GRIES, South Dakota School of Mines, Rapid City, South Dakota
Stratigraphic Traps on the South Edge of the Williston Basin

The entire Ordovician, Silurian, Devonian, and upper Mississippian sections pinch out around the southern margin of the Williston basin. On the southeastern edge, the Pennsylvanian, Permian and Triassic also pinch out beneath the pre-Sundance unconformity.

Upper Cretaceous sands, whose source is to the east, pinch out on the west flank of the basin.

Variations in quality, quantity and artesian pressure within the Pahasapa, Minnelusa, and Sundance formations also suggest effective barriers to circulation of fluids within these formations.

18. WILLARD PYE, North Dakota Agricultural College, Fargo, North Dakota
Relationship of Oil Accumulation to Paleogeology and Structure in Manitoba, Eastern North and South Dakota

The eastern side of the Williston basin is bounded by the pre-Cambrian rocks of the Canadian shield. These pre-Cambrian rocks gradually slope westward toward the center of the basin. Paleogeological maps show the successive eastward overlapping of the seas upon this shelf in Cambrian and Ordovician times and the successive off-lapping during each period from Silurian throughout the remainder of the Paleozoic era. The Mesozoic era again saw a general increasing eastward overlap of sediments in each new period. A study of the lithology and isopach relationships indicates that the center of the basin has not always been located along its present axis and that the seas had a variety of generally westward connections.

Structures in the pre-Cambrian in Manitoba, North and South Dakota can be traced into the sedimentary basin and can be followed in the sediments both through structural and lithological studies. Where these structures, as well as structures originating in the sedimentary basin, cross lithological changes as shown on isopach and paleogeological maps, there is considerable promise of oil accumulation. That such accumulation may be present in certain areas is indicated in some cases by surface evidence.

19. E. H. STEVENS, South Dakota School of Mines, Rapid City, South Dakota
Surficial Faults Along the Missouri River

A fault system is described that is located in Armstrong County in central South Dakota. Superficially it is similar to the system described by Hollinger in the Ironstone district in England. The fault spacing is fairly close, the displacement usually small and the individual faults are commonly upthrown toward the Missouri River. The Ironstone faults were ascribed to the tilting of vertically jointed blocks toward the valleys under the influence of gravity. As some of the faults in the South Dakota area are fifteen miles from the major stream valley the force developed by gravity would not seem adequate. If these faults are surficial the writer suggests that a tangential stress may have been stored in the rocks since the folding of the Lemmon syncline and that the cutting of the rivers relieved these stresses permitting the adjacent rocks to move toward the valleys. Because relief would be easier near the surface there would be a tilting of joint blocks toward the river with a small fault displacement at each joint. A weak point in this mechanism is that there is some evidence suggesting that the faults extend below the bed of the Missouri River.

20. W. L. HERSHELMAN, Ohio Oil Company, Sidney, Nebraska
Developments in the Julesburg Basin During 1951

The year 1951 represented the current peak of activity in the structural basin, located in western Nebraska, northeastern Colorado, southeastern Wyoming, northwestern Kansas, and known as the Julesburg basin. Three of the four phases of finding and development reached all-time peaks during 1951. The leasing phase reached its peak in 1950 but extended into 1951 at a high level. Exploration drilling, exploitation drilling, and geophysical programming resulted in the drilling of 453 wells. 187 wells were drilled in the Nebraska part of the basin, 260 wells were drilled in the Colorado part, and Wyoming and Kansas were represented with four and two wells, respectively.

111 wildcats were drilled in the Nebraska part of the basin and resulted in the discovery of 15 new