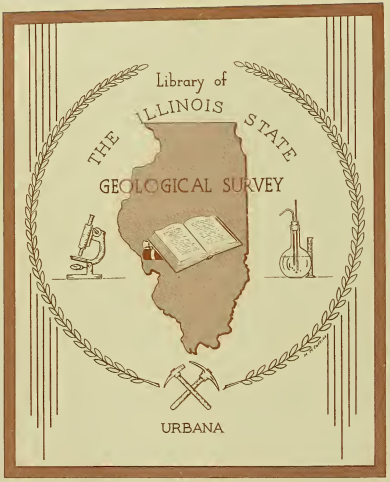

ILLINOIS STATE GEOLOGICAL SURVEY
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Henry Horner, Governor
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No. 22 INFORMATION CIRCULAR October 4, 1937

CORRELATION PROBLEMS IN THE NEW ILLINOIS BASIN FIELDS

In the present oil development in the Illinois Basin, the most important oil-producing horizon thus far discovered is the "McClosky sand." This is, in reality, any oolitic limestone occurring in the Fredonia limestone member of the Ste. Genevieve formation, where oil accumulation has taken place in the pores originally present in the rock.

As the "McClosky" is approached, the lower Chester deposits lying below the Cypress sandstone are quite variable in character so that there has been considerable difficulty in correlating these formations. Especially difficult is the determination of the location of the contact of Chester beds on Lower Mississippian beds. It is important to the industry that the various operators agree at once on criteria for the determination of this horizon so that the logs will be uniform, and structural and stratigraphic relationships can be recognized.

The Subsurface Division of the State Geological Survey has made a considerable study of cores running through this important zone and a preliminary report is in preparation for the use of the industry. Until the publication of this preliminary report, it may be well to offer some suggestions that may be helpful in guiding test drilling.

The standard geologic section between the Cypress in the lower part of the Chester and the "McClosky," based on extensive stratigraphic studies of outcrops, is as follows:

State of Illinois
Geological Survey Division
Department of Registration and Education
John C. Stevenson, Director

GEOLOGICAL SURVEY DIVISION
Urbana, Illinois

[illegible] Problems in the [illegible] Water Supply [illegible]

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Mississippian system
- Chester series (lower portion)
  - Cypress sandstone
  - Paint Creek shale and limestone
  - Bethel sandstone
  - Renault shale and limestone
  - Aux Vases sandstone
- Moramec series (upper portion)
  - Ste. Genevieve formation
    - Lower O'Hara limestone member
    - Rosiclarè sandstone member
    - Fredonia limestone member
      - (McClosky oil horizon at top)

The whole interval between the top of the Cypress and the top of the Fredonia is commonly about 225 feet. The beds vary so greatly in thickness from place to place that a statement of individual formation thicknesses is not attempted here. Usually all formations are recognizable by comparison with standard logs, but there are few criteria for recognizing individual beds or members.

The Lower O'Hara limestone member is commonly about 20 to 30 feet thick, but erosion at the base of the Chester is so conspicuous that warning should be given that it may be thin or absent altogether at some places. The formation itself shows up in the core to be typically very fine to very coarse limestone in which oolites are common. In some cores thin beds of oolitic rock resembling closely the "McClosky" have appeared.

The "McClosky" of the Fredonia limestone member is typically a light gray pure limestone made up of exceedingly well sorted oolites of fine to coarse size. Rock in which there is no interstitial material and in which secondary filling of pores has not taken place is the typical reservoir rock of the various oil fields.

Of great significance is the fact that the porous zones are found at various depths below the base of the Rosiclare sandstone member. This variability calls for the warning that a well should not be abandoned because it has not shown the "McClosky sand" within the depths below the Rosiclare generally observed. It is altogether possible that "the McClosky" is any porous zone in the formation, whether at 5 feet or 95 feet below the Rosiclare. To complete a test of the "McClosky," drilling should therefore continue until salt water is encountered or until the St. Louis formation is reached.

Core Studies

In furtherance of this important study the Survey wishes the opportunity to examine every core taken from the various wells being drilled in the basin. Efforts are being made to make arrangements for storage of all available cores. In view of the value of these services to the industry, operators should notify the Survey at once whenever cores are available for study or filing.

It is hoped that arrangements can be made in the near future to display several complete cores at the Survey and to call in the various geologists now working the Illinois oil field to discuss correlations and stratigraphic conditions thus far revealed. The Survey welcomes suggestions for making such a conference most effective and will appreciate the operators' cooperation in making cores available.

Porosity and Permeability Tests

The Survey has laboratory facilities for making tests of oil sand cores. Because of the high permeability of the productive "McClosky sand," much of the oil in the core is washed out during the coring, so that oil saturation tests are of little value. However, it is believed that tests of porosity and permeability of samples from representative cores in the new fields will provide valuable information. This work is a part of the Survey's program of investigations for which no charge is made.

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