

STRATIGRAPHIC OIL — THE PROMISE OF THE FUTURE

GROVER E. MURRAY

BOYD PROFESSOR OF GEOLOGY; VICE PRESIDENT AND
DEAN OF ACADEMIC AFFAIRS
LOUISIANA STATE UNIVERSITY, BATON ROUGE, LA.

ABSTRACT

For approximately 100 years the anticlinal theory of oil accumulation has dominated most exploratory thinking. Within the last quarter of a century, however, the realization has developed that oil is indigenously stratigraphic and is an integral part of many sedimentary rocks. Accumulated data now permits refutation of the old adage that "oil is where you find it." Instead, oil normally occurs where it should—in sedimentary rocks reflecting deposition under paleoenvironmental and paleoecological conditions of such nature that favorable relationships of source rocks and reservoir rocks resulted. Subsequent migration into other geological situations may, of course, occur.

Genetically, oil is intimately related to position in depositional basin, to distance from source area, to the form of the basin, to the lithic and biologic facies and to the gathering system which existed in the basin during the time of origin and migration. Productivity is a function of porosity and permeability, parameters which may be primary or secondary in origin, and of basinal hydrodynamics.

Structural accumulation of oil involves development of a suitable trap, a satisfactory gathering system, basinal hydrodynamics and proper tectonic timing. The inter-relationships of sedimentary facies and structural activity are such that many of the so-called structural accumulations are controlled by lithofacies than by structure.

Structures geometrically suitable for entrapment of oil exist in every known sedimentary basin in the world. Many of these are "dry" because of the vagaries of tectonic timing, position in the basin, lithofacies, and so on. Structure is, then, obviously not the complete answer to oil entrapment. Furthermore, as the supply of drillable structural traps is exhausted, stratigraphic aspects of oil accumulation assume ever increasing importance.

If, as it appears, oil is an inherent part of certain sedimentary sequences, then paleoenvironmental, paleoecological and paleotectonic studies will pave the way to the location of a virtually unlimited number of situations where stratigraphic entrapments may exist.

The serimentary theory of oil accumulation is the key to exploration for stratigraphic oil—the promise of the future.