tors of paleoslopes than current-induced structures such as cross-stratification.

Underflows, acquiring energy through flow down the trough margin, probably debouched from submarine canyons; many flows were ephemeral but others deposited relatively continuously for longer periods. Most underflows possessed sufficient energy to move a tractional load, and the stronger ones vigorously eroded and disturbed the sea floor. Complexity in form and genesis of the sedimentary structures dictates a comparable complexity in the depositing current.

DAVIS, RICHARD A., JR., Department of Geology, University of Illinois, Urbana, Illinois

UNDERWATER STUDY OF RIPPLES IN EASTERN LAKE MICHIGAN

Underwater study of oscillation ripples in nearshore sediments of Lake Michigan indicates grain size and subaqueous topography to be dominant controlling factors in ripple magnitude and development. Depth of water is not a primary factor in the formation of ripples in this environment.

With the use of self-contained underwater breathing apparatus (SCUBA), ripples were measured at 389 stations in eastern and southeastern Lake Michigan. Measurements of water depth, distance from shore, and of amplitude, wave length, and orientation of the ripples were made at each station. The ripples range in size from 2.5 to 38 inches from crest to crest. Those larger than 9 inches are found only in very coarse sand in the topographic lows. The smaller ripples are always present on highs and may also be found in deeper water.

Although only the nearshore shallow environment (up to 20 feet of water) was investigated, ripples are present in 36 feet of water more than one mile from the shore.

Ripple crests are normal to the general wind direction, although variation of as much as 60° in wind direction does not have noticeable effect on their trend. Great change in wind direction causes formation of interference ripples and subsequent change in ripple orientation. The trend of ripple crests approaches that of the shoreline as the strand line is approached.

Heavy-mineral concentrations are common on ripple crests, generally on the landward side of the crests.

Flat-topped ripples, heretofore described as being formed by planing off during falling tides or water level, are present in 8.6 feet of water. Incomplete ripples are common where till crops out on the lake bottom. Secondary ripples are common in many ripple troughs, particularly in the large ripples.

DE MILLE, GEORGE, Imperial Oil Limited, 300—9th Avenue S.W., Calgary, Alberta.

PEACE RIVER ARCH OF WESTERN CANADA

The Peace River arch is a pre-Devonian structure 250 miles long which was modified by post-Devonian tectonic events. It is situated in the west-central part of the Alberta basin in Western Canada.

The structure consists of Precambrian and Cambrian rocks which were tectonically elevated and formed an island in the Devonian seas. The island was enveloped in sedimentary rock by the close of Devonian time or very soon thereafter.

The arched area became slightly negative during Mississippian time and failure in the crestal part resulted in a horst and graben complex. The configurations oi deeply buried horizons were altered by these tectonic movements which depressed the pre-Devonian surface· A very moderate negative condition prevailed fn the area of the arch until about Middle Cretaceous time, after which the rate of subsidence was common to most of the Alberta basin.

The Laramide orogeny resulted in uplift and differential warping. The Alberta basin tilted westward and the arch formed a westward-plunging nose on the basement surface.

The present westward dip results in a number of large stratigraphic and structural traps along the east (updip) side of the arch. Major hydrocarbon accumulations were anticipated but only small pools have been found despite intensive search. The lack of major accumulations may be due to one of three factors or combinations of them: (1) a lack of source rocks surrounding the most important reservoir systems; (2) a loss of hydrocarbons up the slope of the island during a lengthy period of nondeposition, and (3) a lateral and vertical dispersal of hydrocarbons into numerous small pools in many reservoir systems and structural complexes.

DILLON, EDWARD L., Shell Oil Company, Midland, Texas

ELECTRONIC STORAGE, RETRIEVAL, AND PROCESSING OF WELL DATA

The storage, retrieval, and processing of geologic and engineering data by modern electronic computers present the geologist with a powerful tool in the solving of technical problems, but at the same time imposes upon him a requirement that he better organize his thoughts concerning the method of problem solution.

A major factor in the economics of processing data by computer is the cost of transcribing the basic information into a machinable form. In order to reduce this cost factor, an increasing number of oil and gas companies are entering into agreements with service agencies who transcribe the information from well bores onto punch cards or magnetic tape. The machinable data prepared by any one of these groups is generally referred to as a "well-data system." The various "well-data systems" which have begun in the past several years may by the end of this decade incorporate much of the drilling information from wells in the United States and Canada.

Proper use of a machinable well-data file can reduce the time and (or) cost of a particular study. The improper use of such a file, however, can have the opposite effect. Several uses of a machinable file are presented to illustrate the merits of the machine handling of data in different types of geologic and statistical studies.

DUGAS, J., and LATULIPPE, M., Quebec Department of Natural Resources, Quebec, Canada

RELATIONSHIP OF MINERALIZATION TO PRECAMBRIAN STRATIGRAPHY IN THE NORANDA-MATTAGAMI LAKE-VAL D'OR DISTRICTS, QUEBEC

Most of the rocks are of Archean age and consist of volcanic-sedimentary complexes containing abundant intrusive rocks of ultrabasic to acidic types. Almost all rock types contain some economic or potentially economic mineral deposits.

Base metal deposits, mainly massive sulphides, generally occur at contacts within a particular group of lavas. The rocks beneath the sulphide deposits are rhyolite breccia in most areas and are overlain by andesite or porphyritic rhyodacite. The sulphides and the enclosing rocks appear to exhibit a close relationship in time and space.

Ore bodies containing gold are related to dioritic and granitic intrusive rocks. The loci of deposition tend to be near the contacts of major groups of sedimentary and