

the oil which was formed in that vicinity in ancient times (probably from decaying animal and plant matter).

It was finally learned that the underground carbonate reservoir of the Leduc oil field was only one of several such reservoirs in Alberta and western Saskatchewan. Numerous very profitable oil fields are now in production in several parts of these provinces. Further studies of the drilling cores which were obtained greatly enhanced the discovery of the new fields.

Reefs in the Oil Fields

Two of the outstanding facts which soon came to be known from the petroleum geologists' studies were that (a) numerous ancient, fossilized reefs are present in the carbonate, oil-bearing layers, and (b) the oil-bearing layers are, in many areas, covered over with layers of marine evaporites which have served to prevent the oil from escaping from the porous carbonate rock body. The term "evaporite" is used for any of the kinds of salts which precipitate out of sea water when it is evaporated. These include mainly common salt (sodium chloride), anhydrite (calcium sulfate), and gypsum (calcium sulfate with water molecules bound to the sulfate). These salts form layers which can not be penetrated by the oil. A large percentage of the oil and gas reserves of the world are found in large carbonate bodies of porous limestone and dolostone, beneath evaporite strata which retain the petroleum.²

The reality of the fossilized reefs in Canada can be more readily visualized when we consider their use in the discovery of oil. In Alberta especially, one of the main guiding principles in oil prospecting has been the locating and following of ancient buried shorelines. One of the most prominent distinguishing features of these shorelines was found to be the presence of several long series of ancient reefs. The drilling of test wells, and the careful use of the drilling records from earlier producing wells, enabled petroleum geologists to construct reliable maps of the underground coasts, reef trends, and basins. The search for oil in Alberta became successful through the use of these maps, combined with a knowledge of the fossils and sediment types seen in the drilling samples. Thus geologists were able to reconstruct an accurate picture of the ancient environments of that geographic area, and to plan for the drilling of wells in the particular areas which once had an environmental history conducive to the formation and storage of petroleum. A large part of this remarkable success in understanding the ancient environments of that area has of course been due to the fact that we now know a great deal about the natural requirements for the growth of coral and algal reefs. So, the western part of Canada is a geographic area where the process of comparing modern reefs and other modern carbonate deposits with the ancient has yielded spectacular results in predicting the best drilling sites.

The facts which have been learned concerning the buried masses of carbonate rock, with their ancient reefs and evaporite coverings,