

ELEMENTS OF PETROLEUM GEOLOGY by Richard C. Selley, Published by Academic Press, 525 B street, Suite 1900, San Diego, CA-92101, USA, 1998, 470p.

Recent advances in petroleum geology have been in the form of new technologies, concepts and integrative interpretation methods aided by computers. In this context R.C. Selley has adopted a new approach in the second edition of his popular book compared to the classical adopted style of his first edition (1982).

The book begins with an introduction to petroleum from Noah and traces its journey to OPEC followed by a discussion on the relation of petroleum geology with pure sciences in a lucid manner. The next chapter deals with the physical and chemical properties of oil, natural gas and gas hydrates. In chapter three, the author explains the techniques of formation, evaluation and the methods of exploration in an easily understandable style with suitable figures, photographs and coloured graphics. Value of this book is enhanced by the inclusion of latest techniques like 3D and 4D seismic interpretation and borehole imaging techniques of the 1990s, which make direct detection of oil and gas possible. The next chapter on subsurface environment deals with the chemistry and genesis of subsurface waters and explains the basic principles behind the variations in the subsurface temperatures and pressures. It also discusses their effects on the fluid dynamics with the help of schematic diagrams.

Problems of generation and migration of petroleum are reviewed in chapter five in an absorbing style. Beginning with the theories of origin of petroleum, modern organic processes and preservation of foreign matter in recent and ancient sediments are discussed in the light of latest findings. Diagenesis of organic matter as well as formation, chemistry and maturation of kerogen find special mention. The section on petroleum migration is thought-provoking as the author examines different theories and concludes with a crisp discussion on the new concept of petroleum system.

Sixth chapter deals with the characteristics of petroleum reservoirs and factors that influence a reservoir. It examines in some detail the interrelationships between porosity, permeability, texture, depositional processes and effects of diagenesis on reservoir rocks. The author emphasises the importance of reservoir characterization and mentions briefly some methods of reserve calculation and production.

In the seventh chapter various types of traps are illustrated with well known examples. Structural and stratigraphic traps are discussed in detail with a brief account of diapiric, combination and hydrodynamic traps. The author in his favourite topic, sedimentary basins, discusses the concepts and mechanisms of basin formation in an interesting style and delves into various types of basins and concludes with a note on distribution of hydrocarbons in the basins. Throughout the preceding chapters no mention is made of the petroleum province of the erstwhile USSR which appears to be a significant omission.

The last chapter discusses non-conventional resources like gas hydrates, tar sands, oil shales, shale gas and coal bed methane. Their composition, origin, global distribution and some aspects of production are also discussed. Finally the author concludes with a few remarks on the prospects of finding petroleum resources and reviews the global distribution of reserves and their future supply and demand. Each chapter has a selected bibliography for further reading and a number of useful references. This book is an outstanding addition to the literature on geosciences and can serve as a companion for non-geologists and young professionals in petroleum exploration.

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