

COATED GRAINS: Edited by Tadeusz M. Peryt, 655 p., hard cover bound with 359 Figures, Published by Springer-Verlag, Berlin-Heidelberg-New York-Tokyo, 1983.

The book consists of fifty-two professional papers written by well known specialists from different countries and is competently edited by T. M. Peryt who has dedicated himself to studies of coated grains since 1978. Under the term 'coated grains' the whole family of concentrically formed materials ranging from common ooids to accretionary lapilli of volcanic origin, is included. These grains whose morphology and fabric may be similar to oolite, may differ in their genesis. The purpose of this book is, therefore, to classify such coated grains and present several case histories to illustrate the occurrences of coated grains in varying environment and facies.

Coated grains have attracted attention of geologists due to their significance in facies interpretation and sedimentology, and to their relevance to accumulations of hydrocarbons and other mineral deposits.

Fourteen general papers discuss the problems of classification, composition, occurrence, ecology and diagenesis of coated grains and provide comprehensive accounts of recent research in the field. Other papers are well-illustrated and give documented case histories of the formations containing various types of coated grains ranging in age from Precambrian to Cenozoic, from various parts of the world. These papers, written by 'internationally recognized' specialists, describe in detail cortical fabrics, depositional environments (observed in the case of recent sediments or inferred in the case of ancient occurrences), environmental significance, and diagenesis of carbonate coated grains and related crusts-stromatolites, travertines, and calcrete. Ferriferous ooids, phosphate-rich oncoids, ferruginous vadoids, accretionary lapilli, and other spheroidal rocks are also considered.

The book is divided into six parts: I) Approaches, II) Ooids, III) Rhodoids, IV) Oncoids, V) Vadoids and VI) Contrasted Occurrences. The first part introduces the topic by presenting the classification and general origin of the coated grains. The next four parts comprise contribution of papers which discuss the structure and genesis of various types of coated grains as classified, their environmental significance and case histories of such coated grains from Recent and ancient rock types. The last part deals with the contrasted occurrences of coated grains—coated grains of different origin occurring together.

Peryt (I.1) opens the topic with classification of coated grains into Microid. (2 mm grain size), Pisoid (2-10 mm grain size) and Macroid (10 mm grain size). Genetic classification presents two major groups i.e. (1) Chemical precipitated and (2) Biogenically encrusted grains. Chemical precipitates include 'Oolites' deposited in phreatic environment, while 'Vadolites' belong to vadose environment. On the other hand, in biogenically encrusted grains 'Rhodolites' have coating of red algae and 'Oncolites' have green and blue-green algal and bacterial coating. All subsequent papers in this book follow more or less this classification. However, Richter (I.2) suggests only two divisions i.e. ooids and oncoids, because according to him vadoids include cave pearls, hot spring ooids which actually belong to phreatic environment.

Brand and Veizer (I.3) discuss trace element constraints of coated grains, Magaritz (I.4) discusses carbon and oxygen isotope composition of Recent and ancient

coated grains and Hottinger (I.5) presents ecological aspects of marine macroid grains. Reimer (I.6) includes accretionary lapilli in volcanic ash falls as coated grains with due limitations.

Second part encompasses the detailed aspects of ooids. There are total twelve papers. Richter (II.1) gives a comprehensive account of calcareous ooids. Kimberley (II.2) describes ferriferous ooids noted in the Jurassic Marlstone Rock Bed, Jurassic Green River Formation, and in Andros Island, Bahamas. Medwedeff and Wilkinson (II.3) describe cortical fabrics and their relation with cortical composition. Hine (II.4) demonstrates the extent and variability of relict and semi-relict features of sands from northern Bahamas and relates them to the late Holocene sea-level flooding history of the banks. The Joulters Ooid shoal on Great Bahama Bank has been described by Harris (II.5) to represent a variety of subenvironments in which ooids can accumulate. Popp and Wilkinson (II.6) present descriptions of Holocene lacustrine ooids—an example of non-marine ooids from Pyramid Lake, Nevada. Petrographic details of Subrecent High-Sr Aragonitic ooids from Hot-springs near Tekke Ilica (Turkey), are discussed by Richter and Besenecker (II.7). An unusual occurrence of coated grains having radial fabric form and representing hypersaline environment along the Dead Sea Shore, is noted by Garber and Friedman (II.8).

Four remaining papers of this part include case histories of Oolitic Limestones from ancient sediments. Baccelle (II.9) studied structural and geochemical aspects of Jurassic Oolitic Limestones in the Veneto Region (NE Italy). Chinese geologists Zeng, Lee and Huang (II.10) bring out the significance of oolitic carbonates from Jialing-Jiang Formation (Lower Triassic), south Sichuan Basin, China, in terms of reservoir facies for hydrocarbons. Reijers and Have (II.11) describe ooid zonation indicating environmental conditions in a Givetian-Frasnian Portilla Limestone Formation from Cantabrian Mountains in NW Spain. Beukes (II.12) describes ooids and oolites of the Proterophytic Boomplass Formation, Transvaal Supergroup, South Africa.

Third part covers Rhodoid nodules coated with red algae. Bosence (III. 1 and 2) present description and classification of Rhodolites (Rhodoliths) based on shape, size and structure (laminar, branching and columnar) and the occurrence and ecology of Recent rhodolites.

Oncoid-grains coated with green and blue-green algal and bacterial material are presented in Part IV.

In part V, there are eight papers devoted to vadoids. Peryt (V.1) defined vadoids as coated grains which have originated in a vadose environment. Vadoids include cave pearls, fluvial pisoids, vadose pisoids etc. Vadoids are commonly of pisoid size but microid size vadoids are also noted frequently. Vadoids represent processes ranging from freshwater streams to hypersaline sabkha environments from 'under the sky to under the rock roof or in soil'.

The last part (VI) presents the crux of the problems related to coated grains. This part deals with those occurrences where more than one type of coated grains occur in one formation, i.e. contrasting varieties like oncoids and vadoids, ooids and vadoids, rhodoids and vadoids and so on.

The book presents a new concept in the study of oolites and other concentrically formed materials like vadoids, rhodoids and oncoids all grouped under a common name, coated grains. It brings out the message that concentrically formed grains

should be studied for their coatings and categorised accordingly. In that sense, this book is quite interesting and very useful. The chapters are well organised and each paper is well illustrated. A chapter at the end reviewing the different classifications and terminologies of the coated grains and different views and concepts of the genesis of these grains, would have made this book more useful for the students. The book, however, is meant for the use of advanced researchers who will, no doubt, find it quite useful. The book is also useful for the professional petroleum geologists engaged in the study of reservoir petrography.

*Malaviya Institute of Petroleum  
Exploration, Dehra Dun*

S. K. BISWAS

PRINCIPLES OF NUCLEAR GEOLOGY. By U. Aswathanarayana, Oxonian Press Pvt. Ltd., New Delhi, 1985, pp. 397, Price Rs. 59/-

There is a growing interest in the application of nuclear techniques in understanding geological processes and evolution. In this book Aswathanarayana attempts (with success) to cover the main facts of Nuclear Geology from the geologists' view point. Contrary to the author's desire, however, the contents, style and emphasis of the volume are unlikely to make it either a 'reference book' or a 'hand book'.

There are 10 Chapters and 6 Appendices. Chapters 1 and 2 treat fundamentals of nuclear physics and techniques relevant to nuclear geology. Semantic purists may be dismayed by the title of the 3rd Chapter, 'Mineralogy of Nuclear Metals'. Chapters 4 and 5 are devoted to the geochemistry and distribution of U and Th. The next Chapter on 'Radiogenic heat' is short and precise. Chapter 7 on 'Radiometric prospecting and assaying' is disproportionately long, 61 pages. Some of the sub-headings are out of place. I much regret seeing all methods of isotopic age determination being crowded in Chapter 8. It is impossible to do justice to so vast a topic. Students will find this difficult to follow. Chapters 9 and 10 deal with stable isotopes and cosmic ray produced radioactivity. Both cover a number of topics but the development has been abrupt. Lack of general theoretical framework to link up separate and disconnected subjects is an obvious drawback.

Geochronology of India has been covered in less than 2 pages! This does not reflect the present state of our knowledge. Many important references have been omitted. The promised focus on 'Geological Processes' (cf. Preface) has remained unfulfilled. Problems are given at the end of each Chapter. These will be helpful for understanding the subject.

The volume is well indexed with both author and subject index. Each chapter is followed by a list of references (about 350 in all). The book is free from serious typographical errors; the printing is tolerable but the quality of paper and diagrams are poor.

In summary, the book covers a number of topics in a straightforward manner and contains useful information. This can be recommended as an introductory text to geology students. It will encourage interested readers to consult books devoted exclusively to specialised topics. Publication of this volume with the sponsorship of the University Grants Commission should encourage teaching of Nuclear Geology in Indian Universities.

The price is attractive for libraries and individual possession as well.

*Geological Survey of India  
Calcutta*

D. K. PAUL