EXPLORATION AND RESEARCH FOR ATOMIC MINERALS: SPECIAL ISSUE ON BEACH AND INLAND HEAVY MINERAL SAND DEPOSITS OF INDIA, Editors: R. Dhana Raju, Mir Azam Ali and S. Krishnan, Atomic Minerals Directorate for Exploration and Research, Hyderabad, 2001, 159p. Price: Inland Rs.1000; Foreign US $50.

Concentration of heavy minerals and ore placers on beaches and in estuaries are locally mined for metals such as titanium, gold, platinum, thorium, zirconium and valuable minerals like diamond. Seventy percent of the world production of zirconium is known to be extracted from placer deposits of E. Australia. Diamonds are found in beach deposits of SW Africa. In USA, gold has been mined from beach deposits near Nome, Alaska. Beaches of W. Oregon yield chromite and other heavy metals as well as gold and platinum. River deposits also contain heavy mineral concentrations such as cassiterite in Thailand, Malaysia and Indonesia. These are not exhaustive but only illustrative examples of the importance of beach placers which bear the latent advantage of being loose sands with fairly good concentration of the minerals, thereby enabling easy excavation.

India's coastline extends over 7500 km making it the seventh longest coastline in the world. Discovery of monazite within the beach sands of SW coast of India in 1909 by Herr Schomberg triggered interest in exploration of these deposits initially for monazite and later for their ilmenite content. Occurrence of heavy mineral placers are now well known in the beaches of East and West coasts of India. They contain economically important minerals like ilmenite, rutile, zircon, monazite, sillimanite and garnet in States like Orissa, Andhra Pradesh, Tamil Nadu, Kerala and Maharashtra. These beach deposits have been explored in detail by the Atomic Minerals Directorate (AMD) for Exploration and Research for the last 50 years and the book under review is a compilation of data in the form of a collection of five papers with an overview. While appreciating their sense of responsibility towards the earth scientists and industries in bringing out this excellent book, the authorities of AMD and the editors deserve congratulation for the good job done in exhaustively dealing with this important subject of various beach sand placer deposits.

The overview by Mir Azam Ali, S. Krishnan and D.C. Banerjee covers a wide spectrum of information on placer minerals, like their economic geology, petrography, types of deposits, factors controlling their formation, techniques of exploration and evaluation etc. Important coastal placer deposits of India have been highlighted with vital data on their economic mineral content, details of which have figured in subsequent chapters. Inclusion of reference to world coastal placer deposit scenario in the overview would have placed the status of India in the mineral-sand market in the global perspective.

The detailed papers, relating to the beaches of Orissa, Andhra Pradesh, Tamil Nadu, Kerala and Maharashtra, cover almost all aspects of the deposits, including the hinterland geology, geomorphology, exploration details, resource/ reserve position with grade and potential. These papers encompass salient scientific information hitherto published on the subject which are listed in the bibliography. Special mention can be made about the paper "Heavy Mineral Sand Deposits of Kerala" by S. Krishnan, G. Viswanathan and K. Balachandran for the lucid style and the exhaustive technical content. A reference to the coastal erosion during the period of a century and more makes very interesting reading.

While giving details of the important beach-workings such as the Chavara, Manavalakurichi and Chatrapur deposits, the book also brings out the importance of several other prospects and their potential for commercially viable mining. In this category are the Paradip and Gahirmatha sectors of Orissa which have very high Total Heavy Mineral content up to 60% and 100% respectively. Such sectors of high potential also exist in the other four States as well, which can be brought to the stage of exploration with some more exploratory exercise. The Kalbadevi-Newre beach sands of high grade ilmenite (52%) in Maharashtra are believed to be untenable for exploitation owing to the fine size of the minerals (75 microns). But the recent metallurgical innovations permit use of such fine size material as well. Thus, the day is not far off when these ilmenite sands could be exploited profitably.

India's recent liberalization of its economy in now well known. In 1991 major changes were effected in the industrial and trade policies of the Government giving impetus to private participation in industries and mining. With the availability of such a vast resource of good quality and grade beach sands (348 m tones of ilmenite alone), it should be the endeavour of the authorities to encourage mining the beach sands with due care for the protection of the environment and to export value added products. To this end, the book will instill interest in the entrepreneurs. Earth science researchers and students should be grateful to AMD for bringing out this book, which will serve as a reference volume for many years to come.

A customary 'contents' page in the beginning of the book could have been useful. A few place names (e.g. in Fig.3) and a few words in the text have erroneous spelling which could have been avoided.

Offshore placers constitute an important sector with abundant promise for future exploitation. This is an area in which a lot of data is available with the Geological Survey of India and a book on similar lines will be a welcome addition to complete the resource database on placers in the contiguous beach and offshore sectors of India.

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