feels the incompleteness in respect of other volcanoes from Africa, Hawaii, Central and South America, but this has been offset by the total thematic coverage. Valuable illustrations including coloured thermal maps are an important feature of this volume. On the whole, this valuable book is essential for every earth science library.

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MAFIC AND ULTRAMAFIC XENOLITHS FROM VOLCANIC ROCKS OF THE WESTERN UNITED STATES. by H. G. Wilshire, C. E. Meyer, J. K. Nakata, L. C. Calk, J. W. Shervais, J. E. Nielson and E. C. Schwarzman. U. S. Geological Survey, Professional Paper 1443 (1988), 179 pp.

This comprehensive scientific report deals with xenoliths from 68 localities in the Western United States from the Coastal Ranges of California to Western Texas, covering various geological environments from Cretaceous to Quaternary. From the early discovery of xenoliths in 1927, there has been a continuous addition to the list of new finds, which attests to importance of xenolith studies. The host rocks for xenoliths range from dacite to nepheline basanite, limburgite and minette. Xenoliths have been classified into eight types which include the accidental inclusions of crustal origin, gabbroids, metagabbroids, spinel peridotites, pyroxenites, amphibole- and mica-rich glimmerites (all variably enriched in Cr-diopside, Al-augite, bottle-green clinopyroxene), and feldspathic to garnetiferous ultramafics. A comprehensive account of their petrology, mineralogy, geochemistry (including REE) and Sm, Nd and oxygen isotopic data is systematically presented in the paper with profuse illustrations. Fundamental problems addressed through these studies are cognate *vs* accidental origin of the xenoliths and its implications for stratified mantle, mantle metasomatism and alkaline magma genesis.

The study of mafic-ultramafic xenoliths in India is still in its infancy and is confined to kimberlites of Vajrakarur and alkaline basalts (Deccan Trap) from Kutch. This exhaustive professional paper, it is hoped, will give new impetus to such fundamental studies in India to enable us to catch up with recent advancements.

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EXPLORATION AND RESEARCH FOR ATOMIC MINERALS. Vol. I. Atomic Minerals Division, Government of India (1988). pp. 167 Price not indicated.

The Atomic Minerals Division is the oldest unit of the Department of Atomic Energy, having come into existence as far back as the year 1949, with D. N. Wadia, that doyen of Indian geology, at its head. The unit has just completed forty years of useful service and to mark this event in its history, the Department has brought out, for the first time, a volume entitled 'Exploration and Research for Atomic Minerals'. The volume, running to 167 pages of double column printing, contains twelve articles covering different aspects of uranium exploration, geology of few

selected deposits, geochemical and geophysical surveys. The last article deals with heap leaching of uranium ores. A. C. Saraswat, the present Director of the Atomic Minerals Division, in the first article has provided a review of uranium exploration in India. Substantial reserves (73,000 tonnes of U_3O_8 and 4,05,000 tonnes of Th O_3) are stated to have been established for sustaining a modest nuclear power programme. Detailed description of uranium mineralisations at Bodal of Madhya Pradesh, at Jublatola of Singhbhum district, Bihar, are presented in two other papers. The geochemistry of ultrapotassic syenites from Sikkim Himalaya should prove interesting to students of petrology. There is a useful review paper on carbonatites of India. Three papers covering geophysical aspects and one on geochemical soil survey make up the rest of the volume.

The book represents a well-balanced account of the different exploration techniques adapted for the location of economically important atomic minerals in India.

B. P. RADHAKRISHNA

RECORDS OF THE GEOLOGICAL SURVEY OF INDIA. Vol. 122, Pts. 2 to 8, Govt. of India, 1989.

We welcome the series of eight volumes released by the Geological Survey of India bringing together the extended abstracts of the Reports of Investigations pertaining to the Annual Programme for 1987–88 in respect of the following regions:

Pt. 2	Investigations in respect of Central Laboratories, Airborne Mineral survey, Coal Wing, Marine Geology Wing, Antarctic Division and Bhutan Unit	213 p.
Pt. 3	Progress Report in respect of the Eastern Region	113 p.
Pt. 4	–do– Northeastern Region	97 p.
Pt. 5	–do– Southern Region	455 p.
Pt. 6	–do– Central Region	223 p.
Pt. 7	–do– Western Region	78 p.
Pt. 8	–do– Northern Region	358 p.

While the prompt publication of the results of investigations is commendable, the effort has resulted in a sort of progress report useful perhaps to official evaluation of the work of the Survey. Their scientific impact and value, however, are considerably raduced. What is desirable is a summary of the activities of the great organisation, summarized by the Director General, *highlighting the main advances* in our knowledge of the geology and mineral resources of the country as a whole. We do trust such a refinement would be attempted in the subsequent publications in this series.

B. P. RADHAKRISHNA