

on regulation of prokaryotic gene expression by  $\sigma$  in the stationary phase of the growth.

In retrospect, the review on prion proteins by Prusiner turned out to be a remarkable and ahead of its time contribution. The article journeys through the chronological developments of how from total denial, it became an established fact that the protein molecule alone is the infectious agent which causes scrapie of sheep, bovine spongiform encephalopathy (BSE) of cattle and Creutzfeldt-Jacob disease (CJD), fatal familial insomnia (FFI), etc. of humans. It is striking that a conformational change of some  $\alpha$ -helical regions of the prion protein to  $\beta$ -pleated sheets converts a normal protein into an infectious agent. With the recent outbreak of BSE in UK, this article will definitely be a thirst quencher to many curious biologists.

The book also includes reviews on many other infectious organisms such as mycoplasmas and their role as cofactors during HIV infection. Several articles have been devoted on the aspects of microbial physiology as well as on industrial production of economically important products. Overall, the editors – L. Nicholas Ornston, Albert Belows and E. Peter Greenberg – have put together a good collection of articles worthy of appreciation. Most certainly, one cannot go wrong in acquiring this book for a personal collection.

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**Dyke Swarms of Peninsular India.**  
T. C. Devaraju ed. Geological Society of India, Bangalore. Memoir 33. 1995. 451 pp. Price: Rs 500, \$ 50.

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Dyke swarms constitute an important feature of the earth's crust. These intrusive bodies represent major thermal and deformational events of the earth's long history and thus provide useful constraints to monitor the evolutionary processes leading to the development of crust and mantle. Like other shields of the world the Indian shield has also received voluminous amount of magmatic

material in the form of dykes and other shallow level intrusions at distinct time intervals. However, unlike other geological features, the dyke rocks of Indian Peninsula have not received due attention from geoscientists. Even details on their geological occurrence and distribution in time and space are lacking in the literature. The Geological Society of India, which has the reputation of bringing out monographs on such topics, has fulfilled a long-felt need of researchers working particularly in the field of petrology, geochemistry and tectonics which can provide up-to-date information on dyke rocks of peninsular India. Although a considerable amount of data in terms of geological occurrence, and major, trace and rare earth elements and also the isotopes are now available on their eruptive counterparts, the dyke rocks have generally been neglected. This monograph is an attempt to fill this gap for the benefit of researchers engaged in determination of chronology of geological events in peninsular India. The book covers not only some of the more significant features of dyke swarms of peninsular India, but also deals with some more important general aspects of dyke rocks.

The first three papers in the monograph are concerned with the review of research work done on general aspects of dyke rocks. These papers provide a good insight into some important features of dyke suites like flow and crystallization (by I. M. Platten), palaeomagnetism (by M. E. Evans) and clouding of feldspars (by H. C. Halls and Boaxing Zhang).

The next two papers deal with some general aspects of Precambrian dyke swarms of South Indian shield. On the basis of occurrence, distribution and age data, N. G. K. Murthy has identified five episodes of dyke activity ranging in age from 2240 m.y. to 75 m.y. A review of palaeomagnetic data on some dyke rocks of Indian shield is presented and discussed by V. Damodara Reddy *et al.*

The next three papers present case histories of some important Precambrian dyke swarms of southern Peninsula. Amitabha Sarkar and A. K. Mallik have discussed the isotopic and geochemical data to draw interpretations regarding age and petrogenesis of dykes of Kolar Gold Field. Two episodes of Proterozoic dyke activity are identified which the authors have tried to correlate with general dyke-forming events of Indian shield. T. Radhakrishna and J. Mathew have

presented a paper on mafic dyke swarm occurring in high-grade terrain of south India. Isotopic and geochemical data of advance nature are adequately used to interpret some important conclusions regarding evolution of Indian lithosphere. A detailed account of geochemical data on mineral phases of a dyke from Karnataka is presented by T. C. Devaraju and others for an understanding of differentiation processes.

A. B. Roy and others who have been authors/co-authors of some of the most informative papers on the Aravalli belt in the past, have contributed a paper on the dyke rocks of this region. The paper reveals seven dyke-forming events in Aravalli history. The occurrence of felsic dykes is of special significance. Another paper on dyke rocks of western Indian shield is by N. Kochhar and co-workers. These authors have presented the petrology and the geochemistry of acid and mafic dykes of Trans-Aravalli region associated with Jalor magmatic activity. This activity is considered to have been manifested in response to an abortive attempt of rifting in the Trans-Aravalli part of Indian lithosphere at about 750 m.y. ago.

The mafic dyke swarms of central Indian shield are dealt with in the paper by H. M. Ramachandra *et al.* The paper describes the occurrence of many dyke swarms in the region and provides details of Bhanupratappur–Keskal mafic dyke swarms. On the basis of field occurrence and geochemistry, the authors have discussed their petrogenesis and tectonic setting and find a close affinity of these dyke swarms with the famous Labrador and scourie dyke swarms.

An interesting case history pertaining to dyke swarms of southern Karnataka is given by T. C. Devaraju and others in two papers. The authors have contributed 66 pages on these dyke swarms covering field characteristics, petrography, mineral chemistry, whole rock geochemistry and isotopic compositions. The data are adequately used to evaluate the relative significance of petrogenetic processes in the magmatic evolution of these dyke swarms and to interpret their tectonic setting.

J. Mallikarjuna Rao and others have discussed the field occurrence and K–Ar and Ar–Ar ages and geochemistry of dyke swarms related to Cuddapah basin and draw interpretations regarding their petrogenesis and tectonics. These



authors find an episodicity in Cuddapah magmatism between a period from 1850 to 1000 m.y., with a peak at about 1400–1100 m.y. However in another paper Y. J. Bhaskara Rao *et al.* have discussed their Rb–Sr age data on Pulivendla sill of Cuddapah basin. These authors have placed an 1800 m.y. age limit of a single major episode of mantle magmatism and Cuddapah basin formation.

The rest of the papers deal with various aspects of dykes and dyke swarms occurring along the western coast of India and Narmada rift, related with Deccan volcanism. K. B. Powar and S. V. Vadetwar discuss the geological occurrence, mineral chemistry and whole rock chemistry of dykes and plugs occurring in Revas–Murud area of Konkan coastal belt. The compositional variation from basaltic dolerite to gabbro-diorite is considered to be a consequence of fractional crystallization of a common magma. The status of these intrusives as feeders is rejected. S. F. Sethna and M. Mousavi present the major and trace element data on dykes and associated intrusions of Deccan basalts occurring on the western coast. These authors find influence of differentiation and crustal contamination on the chemistry of these rocks. Their derivation is interpreted in terms of batch partial melting of a heterogeneous mantle source. Another paper on the dyke rocks of western coast is by A. G. Desai and A. A. A. Viegas. The authors have identified four generations of dyke swarms which are related with tectonic evolution of western Indian continental margin.

A detailed account of field characteristics, structural setting, petrography and geochemistry of alkaline–tholeiite dykes associated with Amba Dongar and Phenai Mata complexes of lower Narmada valley is presented by L. G. Gwalani and others. R. V. Karanth and D. A. Sant have contributed on dyke swarms of southern Saurashtra. They have identified seven generations of dyke swarms which were emplaced along deep seated fractures related to Narmada rift zone.

Although the monograph covers almost all parts of Indian shield where current research is being carried out, there are certain important areas which are not represented. A glaring omission is Proterozoic dyke swarms of eastern Indian shield, i.e. the Newer Dolerites. It would have been better if a paper had

been included on these dyke rocks. The editor has done an admirable job by giving a summary in the beginning of the book with specific mention of the importance of dyke swarms in the studies of evolutionary history of crust and mantle, which is a real help to the reader. However, the absence of author and subject indices may be felt by the readers. The printing and get-up are good, size of letters is large enough but in some of the papers the size of diagrams particularly those of maps showing distribution of dykes is small.

Overall, the monograph is a welcome addition to the literature on Indian shield. The book, which contains a wealth of basic scientific data on dyke rocks of Indian shield, is worth possessing by any geoscientist.

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**Annual Review of Astronomy and Astrophysics 1994.** Vol. 32. Geoffrey Burbidge, ed. Annual Reviews Inc., 4139 El Camino Way, Palo Alto, California, USA. Price: USA \$ 60, elsewhere \$ 65. 662 pp.

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This volume of *Annual Review of Astronomy and Astrophysics* contains fourteen articles covering a wide range of subjects from The Goldilocks problem: climatic evolution and long-term habitability of terrestrial planets to Baryonic dark matter and Recycled pulsars. All the topics are of great current interest and quite a few of them are relatively new areas of research. For example, the article by Brown and Gilliland on 'Astroseismology' is a first in the Annual Review series, although Deubner and Gough wrote on 'Helioseismology' more than a decade ago. During the last decade astroseismology has come of age and is providing a new way of looking at the interiors of stars. Brown and Gilliland's review is a very timely account of the progress in the field and of the promise it holds for the future. Similarly, the article 'Anisotropies in the Cosmic Microwave Background' could not have been written

much earlier as the observational breakthrough came only in 1992 with the first detection of large angular scale anisotropies of cosmological origin in CMB.

Much of the exciting progress in astronomy in the recent times has come about through advancements in technology, launch of new missions in space, commissioning of large ground-based optical telescopes (of aperture greater than 6 m), etc. Much of what has been reviewed in the volume carries the stamp of these developments. Infrared observations have revealed the existence of large quantities of very hot gas in clusters of galaxies. Refinements in radioastronomical techniques have led to accurate determination of isotopic and elemental abundances in the interstellar medium. Space missions have breathed new life into the studies of cosmic dusty plasmas. All of these subjects have been reviewed by respective experts in these fields. The references at the end of each of these articles with hardly any citations earlier than 1980 reveal how current the work reported on is.

While stellar physics absorbed the attention of the astronomers in the immediate post-war decades of this century, it is galaxies and their evolution which command the maximum interest in the current period. We now have the capability of routinely observing stars in other galaxies and more importantly we can observe them in the ultraviolet, the optical and the infrared. Comprehensive studies of stellar populations in other galaxies are now possible. Global properties of galaxies as a function of their morphological types are better understood. Deeper questions regarding the formation and evolution of stellar populations in galaxies can be addressed. Massive stars provide most of the light of the galaxies and the cooler stars most of the mass. The massive stellar population is best studied in the ultraviolet, the cooler red population in the near infrared. Panchromatic studies are therefore of great importance. The Hubble Space Telescope (HST) is providing spectacular pictures of external galaxies, starburst nuclei, quasars and their environment, distant clusters, etc. For the distant galaxies the light from the massive stars is redshifted and infrared observations (e.g. K band photometry) reveal many of the details that are usually seen in the optical observations of the nearby galaxies.