and oceanic platforms as compared to the geosynclinal regions. This difference not only brings about differences in the nature of the geological processes within the crusts of these respective domains but also causes horizontal displacement of lithospheric plates.

In place of several existing theories each accounting for a magmatic rock of particular petrological composition, a single physico-chemical model is presented to solve the problem of origin of diverse suites. While discounting the possibility of occurrence of extensive silicate melts, a mantle origin is favoured for the entire range of rocks from the ultrabasic to the acidic. Some serious objections are also raised against the current theory of plate tectonics.

The chief value of the book lies in its concise presentation of the basic physics of certain geological processes like phase transformation and mineral separation, chemical reactions, formation of silicate melts, convection and tectonics. The geological reader can benefit *most* provided that he commands some knowledge of thermodynamics, physical chemistry and partial differential equations. This is by no means to deter the less equipped enthusiasts who can conveniently overlook mathematical sections and still be informed greatly. The book is surely of value for advanced students in geology, for the researcher and the teacher. It also ought to stimulate more vigorous application to experimental petrology which is barely pursued in our country.

The book is a translation from a Russian original. There are some 'printers devils' and mis-spelt names that should be avoidable in the next edition.

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SEISMIC COAL EXPLORATION, PART B: IN-SEAM SEISMICS. By Dresen, L. and Ruter, H. Pergamon Press, 1994. 433 p.

Coal has generally low seismic velocity and density with respect to the country rock in which it is embedded, and as such a coal seam acts as a waveguide for seismic waves which propagate in such a channel with much less attenuation than normal body waves. The authors of the book use the term 'seam wave' to describe this guided channel wave. The seam wave has much higher frequencies than body waves used in normal surface seismic and hence, is very suitable for mapping fine geologic disturbances caused by faulting, pinching, splitting etc in a coal seam. The use of artificially generated seam waves to locate geologic disturbances within coal seams constitutes in-seam seismic. The survey is conducted underground in a mine, with seismic source and receivers planted on a coal face, along the same or different roadways, depending on whether it is a reflection or transmission survey. The range of exploration can be a few hundreds of meter and the measurable fault throw as small as a few decimeters.

The authors of the book are two leading senior scientists of the world in this field of in-seam seismic. Prof. Dresen of the University of Rurh in Bochum has been, in particular, long engaged in pioneering work on analogue and numerical modeling of seam waves. Dr. Ruter, who was long associated with WBK, Bochum, is well known for his many valuable contributions in both basic and applied research in coal seismic. The book written by them, therefore, contains a wealth of information on this very specialized field of seismic prospecting and is welcome by geophysical practitioners who have been feeling the need of such a book for a long time.

The book maintains a good balance between theory and practice. The Chapters 2 and 4 help a practitioner learn enough about the propagation of seam waves, to understand the

theory behind data acquisition and processing described in Chapters 6 and 3, respectively. The key aspect of the seam wave propagation is its dispersive character. The concepts of phase and group velocities, and their dependance on frequency in accordance with the seam structure and other parameters of the model are very well explained in Chapters 2 and 4, taking help of enough mathematics wherever required. A clear understanding of what is written in these two chapters is necessary for an intelligent reading of the chapter 3 on data processing. And unless the theory of data processing as explained in the Chapter 3 is well understood, the Chapters 5, 6 and 7 on instrumentation, data acquisition and case histories will not be appreciated.

The complexity of seam wave propagation is what makes in-seam seismic data processing significantly different from the processing of normal surface seismic data. The component rotation, polarization analysis and filtering, dispersion analysis, envelope calculation and stacking, and finally, migration using different lag-sum methods are all new concepts specially formulated for the in-seam seismic data processing and lucidly explained in Chapter 3. A specialised instrument system is needed for conducting an in-seam seismic survey and not many such systems are currently available in the world. Three such systems have been described in Chapter 5 on instrumentation. A geophysical practitioner will love to read Chapter 6 on data acquisition, with many useful suggestions given for acquisition of good data, and the Chapter 7 will help increase his confidence in the method, with several impressive examples of in-seam surveys collected from three important countries where such surveys have been done and well documented viz., Australia, U.K. and Germany.

There are two very pleasing and useful features of the book, which I would like to mention viz., 1) the introduction to each chapter contains a brief description of what the following sections contain and 2) the book has a comprehensive list of references which are liberally and effectively used in the text. However, there is disappointment for an English-knowing reader in that a considerable percentage of the references is in German. I have noted a few typographical errors.

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M. PODDAR

Goal of Science

Purely observational science would be nothing but data gathering, were it not directed and integrated by a continual striving to understand what it all means. A considerable portion of our scientific effort is therefore, theoretical recognizing that a healthy science is characterised by an active interplay between theory, observation and experience.

G.W. WETHERILL.

True son of Science

But if any human being earnestly desire to push on to new discoveries instead of just retaining and using the old; to win victories over Nature as a worker rather than over hostile critics as a disputant; to attain, in fact, clear and demonstrative knowledge instead of attractive and probable theory; we invite him as a True son of Science to join our ranks.

BACON, *Novum Organum, Prefatio,* 1620.