I retired from Geology Department, Jammu University, Jammu, as Curator-cum-Lecturer in March, 1996. After a period of one month, I joined Jammu public school, as science and math teacher. I got a strong inspiration for starting Geology subject in my school especially after going through the editorial by S.V. Srikantia. To start with I gave a lecture to all the students about what Geology is and I made it clear to them that geographical knowledge without geology was incomplete. The lecture invoked great interest among the students about the subject. Consequent upon this, I informed the students that they would be taken on a Geological excursion. Eleven students from different classes volunteered themselves for going on geological excursion, the field being within 14 km distance from Jammu.

The first batch of eleven students was taken to the Siwalik terrain, where they were shown different type of rocks, landforms and their structures, soils and their erosion and such other geomorphoric features. It was a great success when all the students in the field showed positive response to what they were taught in the class room. Thereafter, more and more students got enrolled as members of our newly started “Geological Club”. In one trip, the students collected about 30 rock specimens from the field. These excursions will continue to be a regular feature of my school. We hope to construct a geological museum with the help of the Geology Department, University of Jammu. We are also arranging to purchase clinometer compass, hand lens, field kits, geological hammers, chisels etc. for the students.

In Jammu and Kashmir, many of the teachers know geology, but have been recruited as general line teachers. It is a challenging task for them to popularize geology in their schools. They also need to take students to field and explain geological topics to them. This will definitely widen their outlook and general knowledge outside the class rooms. In my opinion, this procedure, if followed in all the Indian schools would pave the way for popularizing geology. When such an infrastructure gets built up in schools, the government of all the States would welcome it and introduce geology as one of the compulsory subjects in school education.

Jammu

B.K. Fotedar

REGIONAL APPROACH TO GEOLOGY EDUCATION

In an editorial in this Journal, S.V. Srikantia has discussed the importance of including geology in school education. His comments and suggestions were supported by several readers whose letters have been printed in the September and October 1996 issues of the Journal. While fully agreeing with their views, the present communication attempts to convey some thoughts about the “how” of geology education and proposes an alternative method.

The crux of my thesis is that geology as a “regional science” has been ignored and that a “regional approach” is probably a better way of teaching and learning geology than what is practiced today.
Approaches to Geology

Geological research usually adopts one of the following three "orientations" or "approaches": (i) Functional (mechanistic) approach dealing with fundamental processes, systems, and their material products; (ii) Historical (evolutionary) approach concerning changes through time and their causes and consequences; and (iii) Utilitarian (applied) approach attempting to explore and develop material and energy sources for human use.

Regional approach embodies all of these approaches on a common ground manifested in a region. Of the three approaches mentioned above, the first has become very fashionable in recent years. "Process-oriented" works are glorified at the expense of historical geology or regional geology. "Computer simulations" and "physical models" give an impression of more sophistication than actual field observations even though at times the simulations and models may misrepresent Nature and exist only in the researcher's mind or on the computer screen. No doubt numerical solutions and small-scale simulations contribute to our understanding of fundamental processes but the models should conform to factual data, not vice versa. An over-emphasis on the so-called "process-oriented" research has hampered the incentives for graduate students to review and thoroughly appreciate what has been done, concluded, postulated in the past in their fields of research. The section "Previous Works", which was once a part of scientific papers and reports, has now disappeared from research literature.

Regional approach does not deny the importance of "process-oriented" research but rather places it in its true context. The dichotomy between "geological processes" and "regional geology" is a false one because processes do not operate in vacuum; they take place in a region and over geological time. Regional approach is an attempt to integrate the three approaches mentioned above and to stimulate multi-disciplinary research. Historically, cross-fertilization of research studies has proved to be very fruitful not only because it paints a bigger and more clear picture of Nature but also because cross-fertilization advances scientific concepts. A very important consequence of regional approach to geology is that it provides a platform for cross-fertilization among disciplines.

Regional Approach

Most of the existing geology textbooks follow the three-fold classification mentioned above in the form of separate books on Physical Geology, Historical Geology, and Applied Geology. Even in single-volume geology textbooks, these divisions are adopted with the idea that the student should learn the "basics" (geologic concepts and terminology) in an orderly manner. While this traditional method of geology education has the advantage of giving the student a bird's-eye view of the whole earth and of geology, it has the effect of making geology more abstract, less intimate and divided.

The Earth, however, is not divided into various departments and disciplines; it functions as an entity and has evolved through interactive systems. Geology is not an abstract science either. What attracts students to geology is the fact that this science can be observed in operation in the immediate neighbourhood. It is futile to expect students to memorize chemical formulae or crystal symmetries of numerous minerals in order to understand geology. The traditional method is to teach "basics" and then (hopefully) see them in the 'field'. An alternative is that the necessary "basics" should be taught right from the very beginning. Principles and techniques of geology, especially for the novice, should be taught and learned through the study of a region. Then
geology education will be more fun, and students will appreciate the interactive processes that have shaped the Earth.

A regional approach to geology education helps students and researchers relate their field of study and research to industry and environment. Regional approach also stimulates field-based research, even at the lower levels of geology education, where students can map rock types, geological structures and geomorphic features.

**Regional Topics of Geology in India**

Fortunately in India a regional approach to geology can be very successful because the Indian subcontinent integrates a diverse array of geological features, from the Archaean gneisses of Karnataka to the Holocene desert of Rajasthan or the Indo-Gangetic alluvial plains in front of the rising Himalayas. Specifically, eight topics may be identified in India: (i) the Precambrian Indian craton with crystalline rocks, platform sediments and associated mineral resources; (ii) the Tethys and its fossiliferous sediments spanning the Paleozoic and Mesozoic Eras; (iii) the Gondwana formations, Gondwana times and Gondwanaland; (iv) the Deccan Traps; (v) the Himalayan orogeny and its active tectonics; (vi) Quaternary deposits and rivers; (vii) the Monsoon meteorology and late Cenozoic climatic changes; (viii) the Indian Ocean and its coast.

What is needed is the production of geology textbooks using a regional approach for various levels of education. These textbooks should not be the same as the existing books on Geology of India, but specially written to teach geology through regional examples from India. K. S. Valdiya’s “Aspect of Tectonics: Focus on South-central Asia” and “Environmental Geology: Indian Context” are some good examples of this approach, although both these textbooks are for postgraduate and higher levels of education. Simpler textbooks using a regional approach for high school and college students are necessary.

Regular sessions on geology education are usually held at the International Geologic Congresses and the annual meetings of the Geological Society of America. In the USA, the National Association of Geology Teachers publishes a quarterly magazine, Journal of Geoscience; this journal can also be very good source of information. Srikania’s suggestion is well worth further consideration because it stimulates discussion not only on introducing geology in high schools but also on upgrading the standards and methods of geology education at universities. One way of “brain-storming” on this important subject is to hold regular sessions on geology education in the annual meetings of the Geological Society of India.

**ANNOUNCEMENT**

**A DST SPONSORED CONTACT COURSE IN ISOTOPE GEOLOGY AND GEO-CHRONOLOGY, 14-22 JULY, 1997:** Organised by the Physical Research Laboratory, Navarangpura, Ahmedabad 380 009: The course curriculum is designed to suite University/College teachers, research scholars and young scientists in the field of earth sciences. Please send your application alongwith bio-data, a write-up about your present research activities and a brief statement on how this course would benefit. The last date for receipt of application is May 30, 1997. For details write to: Dr. Kanchan Pande, Course Co-ordinator, Earth Sciences Division, Physical Research Laboratory, Navarangpura, Ahmedabad-380 009. Tel:079-462129; Fax:079-6560502; e-mail:kanchan@prl.ernet.in.