this day, we run USGS and NRC Canada standards. What a shame!

Exposure of teachers to other environments. There is much inbreeding in our Universities. A research fellow completes his Ph D and is usually absorbed as a teacher in the same University; so there is no exposure to other researchers, other lines of thought or other approaches to problems and data interpretation. A policy has to be drafted and implemented at the national level that bans recruitment of research fellows from the same department, unless he has spent a minimum of three years outside the parent University after Ph D.

Keeping in mind the needs. Perhaps it is a good idea to estimate at the national level how many M Scs and Ph Ds we need to turn out depending on the plans, programmes and needs of the country, rather than mass-producing geology post-graduates and Ph Ds.

R. SHANKAR

Department of Marine Geology
Mangalore University
Mangalagangotri 574 199, India

ISI and IBM join hands to develop an electronic library system

The Institute for Scientific Information (ISI) and International Business Machines (IBM) Corporation have launched a joint study to develop a prototype electronic document storage management and distribution system for ISI's Electronic Library project. The agreement between ISI and IBM's Almaden Research Centre (ARC) was signed in July.

The Electronic Library is a critical component of ISI's Information Gateway – a link that will connect users everywhere with the world's most important scholarly research literature, says Ms Bonnie Lawlor, ISI's Executive Vice President and Head of the Database Publishing Division.

According to Ms Lawlor, ISI's ultimate objective 'is to be able to provide our customers with ease of access to and retrieval of relevant bibliographic and full-text/full image information in the format, medium, and time-frame desired and delivered to the location of their choice – library, laboratory, home or office'.

The objective of the ISI–IBM joint project is to allow publishers and users of scholarly information to test the many variables relating to the electronic distribution of information. Initially, the prototype will provide users with desktop access from their own local-area-network (LAN) environment to the bibliographic data, abstracts, table of contents, full text, and full images of the 1,350 scientific journals contained in the Life Sciences edition of ISI's *Current Contents*. This collaborative project will also serve to evaluate new technologies for use in future digital library systems.

Using IBM's modular, client/server solution, ISI's subscribers would have direct local access to customized selections of information. Network connections between local 'library servers' and ISI's 'enterprise server' would permit subscribers to easily order copies of information not contained in their local collections and enable ISI to deliver updates to local collections and provide for account control and customer usage information.

'This electronic project has been developed in response to the demands from the marketplace,' says William Schlegel, Chief Executive Officer, ISI. 'We have been working on this project for almost two years, and have been in ongoing discussions with key players in the publishing industry, including primary publishers and representatives from both corporate and academic libraries'. ISI chose IBM as a technology partner, and Schlegal hopes that IBM's expertise in systems development will enable ISI to launch the electronic library prototype within a year. 'This venture is very much a cooperative effort among all of the participants. Meetings will continue to be held this year with the primary publishers, members of the library community, and IBM in order to finalize the project specifications,' says Schlegal.

Other key areas that will be explored in the project include: Practical applications of the electronic journals (data access, retrieval, and usage) from the perspectives of publishers and users, including issues related to copy-right and intellectual property rights; Systems required to facilitate use of the electronic libraries, including billing, accounting, and business management reporting; Pricing scenarios to determine how to meet the diverse needs of both the publishing and user communities; Usage patterns to determine if, and how, the electronic journal will change traditional information purchasing and usage.

IBM's client/server design will provide ISI with the means to manage a very large database and allow its customers to view the information on personal computers that run the most popular operating systems (such as OS/2, DOS/Windows, Macintosh and Unix) and are connected by commercially available LAN software (such as Lan Server, Novell, Appletalk, and TCP/IP). IBM's solution is based on many technologies pioneered at its Alamaden Research Center (ARC), the birthplace of the relational database, in San Jose, California. The design incorporates products of IBM's PC Server organization (servers), Storage Systems Division (magnetic and optical disk drives and libraries and data storage management software) and Software Solutions Division (the DB2 relational database family). New technologies from ARC include those that provide advanced database functions, integrated text and image applications, and address copyright security issues.

'This study offers us the opportunity to test our integrated client/server

concept of information storage and retrieval for distributed environments in a real customer situation,' says Paul Horn, IBM Research Division Vice President, Storage, and Director of the Almaden Research Centre. 'We were especially attracted to ISI because its business needs for the Electronic Library project are very clear, due to its close relationships with its customers and publishers'.

'We also expect that this study will give us valuable insights into providing effective and innovative solution to the wide variety of data-intensive tasks that will surely arise with the future growth of the information superhighway and related activities,' Horn adds.

The Institute of Scientific Information, founded by the maveric genius Eugene Garfield, has been creating innovative research and information tools for the scientific and science policy communities for more than thirty-five years. Its extensive line of advanced research products, available in diverse media, provides fast, effective ways to search the world's journal literature. Included in ISI's publishing line is *Current Contents* and the *Science Citation Index*. ISI also provides a document delivery service, The Genuine Article.

Subbiah Arunachalam, CECRI, Karaikudi.

RESEARCH NEWS

The ubiquitous phase grating

K. A. Suresh

The beautiful iridescent colours of opal, potassium chlorate and some colloidal crystals are due to Bragg diffraction. These materials have a periodic structure with a period in the visible region of the electromagnetic spectrum. There are also other examples for optical iridescence. A cholesteric liquid crystal (cholesteric) is one such material. It has a locally birefringent structure that twists uniformly about a particular direction. The twist axis happens to be a 2-fold screw axis. Cholesterics exhibit Bragg reflection of light over a narrow band of wavelengths giving rise to iridescence. Cholesterics also show a different diffraction phenomenon in another geometry. Here, a beam of natural light undergoes diffraction with the central order being unpolarized and the other orders being completely linearly polarized perpendicular to the twist axis[1]. A related effect is also seen in polycrystals[2] which exhibit strongly polarized diffraction halos. These features are the manifestations of the phase modulations suffered by a plane wavefront as it travels through the heterogeneous medium. In short, the medium acts as a phase grating[3].

A systematic study of phase gratings started with the experiments of Debye and Sears[4] on the ultrasonic diffraction of light in liquids. A longitudinal ultrasonic wave propagating in a liquid leads to a periodic modulation of the

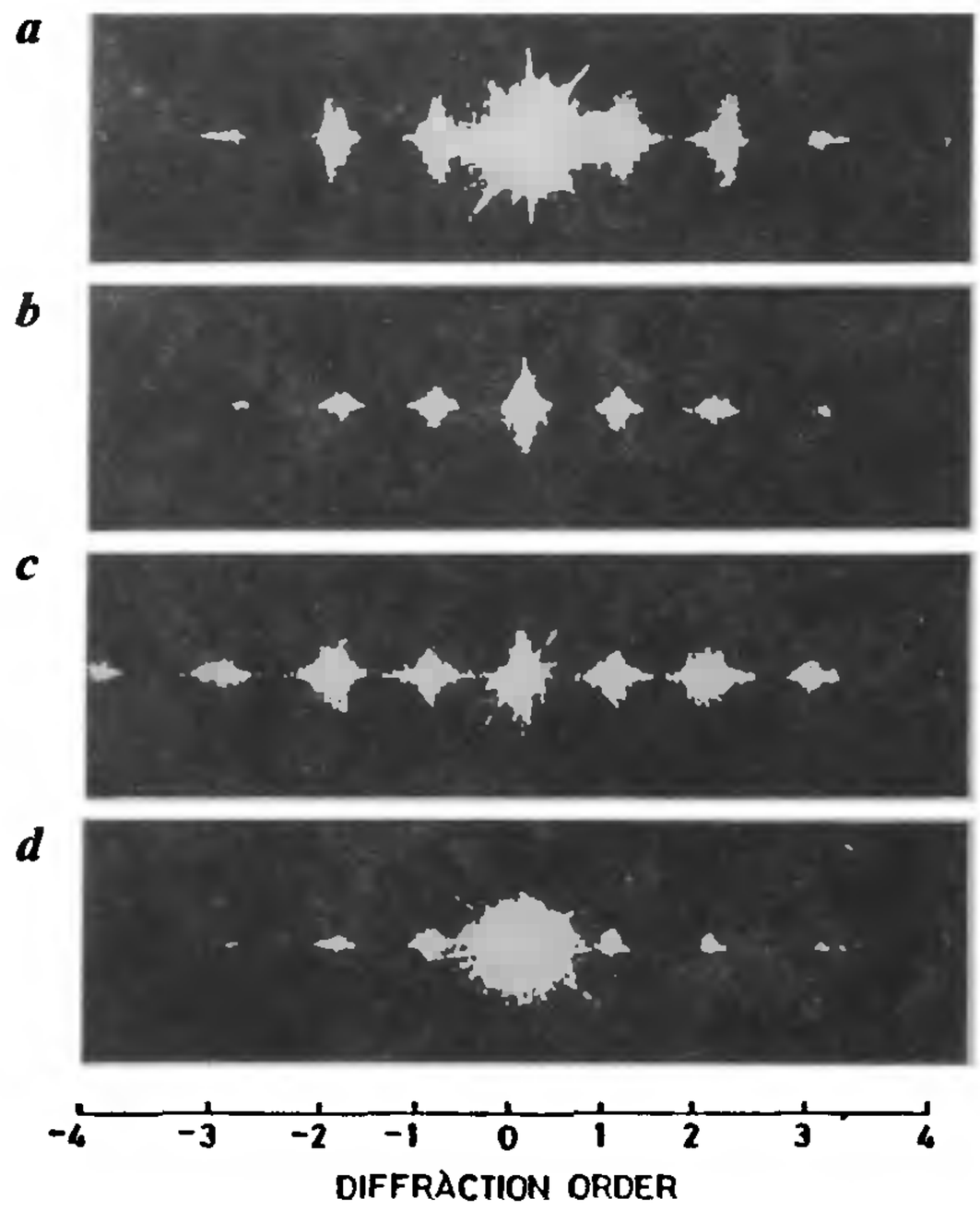

Figure 1. The diffraction patterns for a 50 μm thick BDH SCE-6 sample in the S_c phase at room temperature. ***a***, The sample is between parallel polaroids and the polariser is parallel to the twist axis; ***b***, The sample is between crossed polaroids and the polariser is parallel to the twist axis; ***c***, The sample is between crossed polaroids and the polariser is perpendicular to the twist axis. Here the second order is more intense than the first order. Such effects are characteristic of phase gratings; ***d***, The sample is between parallel polaroids and the polariser is perpendicular to the twist axis (after Suresh *et al.*[5]).