statement that 'The book of nature which we have to read, is written by the finger of God'. Bence Jones in his biography *The Life and Letters of Faraday* has written 'His standard of duty was supernatural. It was formed entirely on what he held to be the revelation of the will of God in the written word, and throughout his life his faith led him to act up to the very letter of it'. There was a simplicity and unselfconsciousness about Faraday, a great and simple man, kindly, entirely free from pride and undue self-assertion. Although he enriched the world as few others have been privileged to do, he remained a poor man to the end of his life. Many consider him the greatest experimentalist who ever lived. Several concepts that he derived directly from experiments, such as lines of magnetic force, have become common ideas in modern physics.

Faraday was twice offered the Presidency of the Royal Institution which he returned. He was also offered a knighthood, but he refused commenting, 'I must remain plain Michael Faraday to the very last'. He accepted with grace a house awarded by Queen Victoria, on Hampton Court Green, where he spent his last years – a devout and caring man and perhaps England's greatest scientist, chemist, electrician, philosopher, member of the Sandemanian Church of Christ, and an inspiration to future generations.

Helmholtz said of Faraday 'It is indeed remarkable in the highest degree to observe how, by a kind of intuition, without using a single formula, he found out a number of comprehensive theorems which can only be proved by the highest powers of mathematical analysis'.

Faraday discontinued research in 1855 because of declining mental powers, but he continued as a lecturer until 1861. A series of six children's lectures published in 1860 as *The Chemical History of a Candle*, has become a classic in science literature. In 1865, Faraday ended his connection with the Royal Institution after over 50 years of service. He died at his house at Hampton Court on 25 August 1867.

A large number of other eminent scientists have worked at the Royal Institution. Research at the Royal Institution has been taking place in the Davy–Faraday Research Laboratory at the original site in Albemarle Street. As a distinguished centre of excellence, it has had to its credit as many as fifteen Nobel Laureates.

John Tyndall made important contributions to the science of crystals and also studied the nature of glaciers. In addition, he acted as a public spokesman for science during the Victorian period. Lord Rayleigh discovered argon. He also carried out important work in the fields of optics, electro-dynamics, electromagnetism, hydrodynamics, viscosity, and of course, light-scattering for which he won the Nobel Prize in 1904 while he was Professor of Natural Philosophy at the Royal Institution. James Dewar invented the vacuum flask, more familiar as the thermos flask. William Henry Bragg and William Lawrence Bragg were pioneers of X-ray crystallography. Another Nobel Prize winner, Lord Porter, is a world leader in the field of high speed chemical reactions. Porter founded the extremely successful Mathematics Masterclasses in 1979.

Scientific research carried out in the laboratories of the Royal Institution currently covers areas such as superconductivity, catalysis, magnetism and surface science. There are three research groups led by Peter Day, Richard Catlow and John Meurig Thomas, with nearly 40 graduate students, postdoctoral students, research fellows and visiting scientists working in various aspects of solid state chemistry. Currently, Susan Greenfield is the Director of the Royal Institution; she is the first woman to be appointed as Director.

To celebrate the Bicentennial Year, the Royal Institution is presenting a number of extra Lectures and Events this year. A series of monthly lectures will be held, all presented by young scientists under 40 years of age and well-known in their fields. The Royal Institution Centre for the History of Science and Technology, as part of the celebrations, will devote 9 evenings to topics relating to the history of the Royal Institution and those who worked in it. In a series of four sessions, scientists will discuss some of the most prominent and interesting issues today including 'Drugs', 'Women in Science', 'Science and Religion', and 'Consciousness'.

NIH plans global electronic biomedical database

The much needed global electronic biomedical library may soon become a reality. The National Institutes of Health (NIH), Bethesda has just unveiled a draft plan that would create an unprecedented global electronic publishing venture covering all the biomedical sciences. This ambitious web-based publishing initiative is expected to radically change the way biomedical scientists interact for disseminating new information, share knowledge and retrieve available data.

Christened 'E-Biomed', this worldwide online preprint publishing proposal was presented by Harold Varmus, the director of the NIH before the US House Subcommittee for Education, Labour and Health and Human Services during the NIH budget review. The draft 'E-Biomed: A proposal for electronic publishing in the biomedical sciences' was prepared by Varmus himself. This facility is expected to provide readers free access to clinical research, medically-related behavioural research, cell and molecular biology, bioengineering, and other disciplines allied with biology and medicine. The proposal concludes: 'The rise of the Internet offers an unprecedented opportunity to change the scientific publishing in ways that could impose on virtually all aspects of the current system'.

The stated goal of this project is to short circuit the existing print-on-paper journal system and centralize most of world's biomedical literature at a single website. This repository would thus accept all papers in every area of biomedicine, and more importantly, provide free access to the full text to all readers. It is expected to overcome many existing drawbacks of the scholarly communication system, especially the high costs of maintaining a plethora of high-cost, low circulation journals which are forcing librarians to cut back on subscriptions, starving the researchers of current information. In addition, this global archive is expected to seamlessly integrate, the highly fragmented and compartmentalized knowledge-bases. The E-biomed has been conceptualized by a small group of researchers and database experts who have been trying hard to

galvanize the biomedical researchers to come out of the rapidly outdating, print journals or even the web journals which continue to be under the stranglehold of commercial publishers. The key players behind the concept are Patrick Brown, a genetics researcher from Stanford University School of Medicine and David Lipmann, director of the NIH's National Centre for Biotechnology Information (NCBI) which operates the PubMed and GenBank databases. Brown and Lipmann have long been advocating for such an electronic preprint or 'e-preprint' repository for biology papers modelled loosely on the e-print archives of the Las Almos National Laboratory in New Mexico. They provided crucial inputs to Varmus's proposal.

The Physics Reprint Archive, brainchild of Paul Ginsparg, is supported by the US National Science Foundation and the Department of Energy. Ginsparg single-handedly set up this world's largest physical sciences database in August 1991. The number of new papers being deposited at this site (xxx.lani.gov) is now over 100 per weekday. What is more, over 65,000 readers access this site everyday. More than the numbers, what is significant is the radical way this system changed the very way physicists the world-over access and share information and new knowledge. Not surprisingly, mathematics, computer science and cognitive science are all set to join the disciplines served by xxx. The most prestigious publisher of physics literature – the American Physical Society (APS) has agreed to collaborate with the xxx which is already the *de facto* focus for physics literature. The result is that manuscripts can be submitted to APS journals through xxx for refereeing. The final refereed and edited version can also appear on xxx, of course with APS certification. The most significant factor for success in this venture is the total support of the scientific community, backing by the major supporting arms of the US Government and finally the tacit admission by the major international physics publishers to go along with this venture as it is in the interest of the scientific community.

But it would take a lot for E-Biomed to succeed as, unlike physicists, biomedical scientists are traditionally very conservative in information sharing. In addition, many biomedical journals have rather rigid rules about pre-publication disclosure in view of the potential commercial value of the data. (The aspirin and cardiovascular diseases study in the *New England Journal of Medicine* and its row with the news agency *Reuters* for flouting their rigid embargo policy is an example.) Other journals may not be as rigid but yet insist on not sharing unpublished data without explicit editorial approval. Contrast this with the physicists who mail their pre-prints all over the world.

Another major roadblock could well be from the journal editors and publishers who simply see E-Biomed as a threat. Many biomedical journals run both by societies and commercial publishers are just too lucrative to be turned into free-access. One such *Cell*, a high impact journal (IF for 1996 = 40.997) run by scientist-entrepreneur Benjamin Lewin, has reportedly been sold for an excess of US $ 100 million to Elsevier Science. Then, there are young scientists who would like to see their papers in *Nature*, *Science*, *The Lancet* or *NEJM* rather than the faceless E-Biomed. It would take some time and persuasion for the conservative biomedical community to publish in an as yet untested international, free access database. But the promise of an independent Governing Board with scientists (authors and referees), editors, computer specialists and funding agency representatives to run this project should be reassuring for the skeptics.

To that end, scientists like Brown and Lipmann have been taking small but significant steps with some electronic publishing – by publishing results on their web pages and sharing new data over the Internet. Ginsparg visited Cold Spring Harbor Laboratory last December when biologists and database experts gathered at the invitation of Lipmann and Brown to discuss and conceptualize this global electronic biomedical repository. Lipmann and Brown have conceived this database to be made available on the Las Almos server which will accept papers from all sources,, categorize them and make them available freely over the Internet. This proposal will have at least one significant difference from the physics database. Ginsparg does not review, edit or correct the submissions. E-Biomed is likely to have at least one quality 'filter'. A board of editors is likely to help sort papers according to subject, significance and quality. There could be two reviewers and their signed comments posted alongside the original paper. The NIH wisely intends taking the journals along with an offer to the editors to place their stamp of approval on electronic papers deemed worthy of publication. Besides providing crucial biomedical information free to the global community (on the lines of free MEDLARS databases over the Internet) this plan could save the NIH millions of dollars spent on the ever-increasing journal subscription charges.

There are skeptics who ask why threaten a well established (though terribly inefficient) scholarly communication system with an untested global electronic venture? Some pertinent issues raised include modalities of rigorous peer review, close monitoring as done in journals, abuse of freedom to publish half-baked stuff which can be potentially dangerous in biomedical sciences (serious efforts are now on to check publication of invalidated claims for cures over the Internet). Most important of all, as Varmus admitted, the success of this venture would essentially depend upon the willingness of the biomedical community to support this 'low cost, barrier-free access by scientists to all of the contributions of their fellow scientists in a conveniently displayed format'.

What does E-Biomed hold for countries like India? It surely would augment the information flow from the North to South. With just about 10 per cent of Indian biomedical literature getting into the international databases, E-Biomed should prove useful. It is time the biomedical journal editors wake up to the reality of the pace at which information sharing is done globally and set up the computer-readable versions of their journals accessible over the Net which could then form part of this global biomedical network. There is also an urgent need for policy makers in the Government to promote and support the use of Internet at the University level to enable Indian researchers to address their major drawback – laggard in citing current literature. E-Biomed should help bridge that gap.

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