the idea of preparing a comprehensive work on the comparative embryology of Angiosperms and to commemorate his first death anniversary, the Delhi University organized a symposium in 1967 on this subject, the proceedings of which were published by the Indian National Science Academy in 1970. This was the forerunner for the present publication under review, which, as already stated, is in two volumes and is organized in the following format: The Introductory Part (pp. 1–112) gives the background, diagnositc characters, developmental aspects covering the embryological criteria, viz. anther, microsporogenesis, male gametophyte, mature embryo sac, pollination, double fertilization, endosperm, embryo, polyembryony, apomixis, seed and nutrition of anther, ovule with an account of the significance of comparative studies. This part is suitably illustrated with line diagrams, schematic representations and SEM micrographs. The present authors have followed the broader definition of 'embryology' to include all the criteria mentioned above as envisaged by Schnarf, Maheshwari and others. The introductory part is followed by a detailed account of the embryology of the orders of Angiosperms arranged according to the Engler's System of Classification (H. Melchior 1964). 65 orders and 317 families are covered. The first volume covers the Archichlamydeae under the Dicotyledons (pp. 113–614) with the orders Casurinales to Umbelliferae. The second volume deals with the Sympetalae (pp. 615–830) with orders Diapensiales to Campanulatae and the Monocotyledons (pp. 831–1012) with the orders Helobiae to Microspermae and concluding remarks. Under each order, the general features, the main embryological characters of the constituent families and for each family, the relevant bibliography are given. Families which have not been investigated so far are indicated. These family accounts are adequately illustrated and there are some excellent SEM micrographs (F. Bouman). At the end of each order, taxonomic considerations are discussed with reference to the position of the order as viewed by different authors in their systems of classification. An exhaustive 'references' running to 160 pages and a Plant Index complete the second volume.

Prof. B. M. Johri and his associate authors have accomplished a stupendous task in bringing out these two volumes which document the most significant contributions in angiosperm embryology coming out of laboratories all over the world as outlined earlier in this review. India has made a distinguished contribution. The transformation from the early phase of descriptive studies using light microscopy and rotary-microtomed sections to the present diversified and sophisticated methodologies involving scanning electron microscopy, ultrastructural and biochemical/histochemical observations, DNA sequencing, advanced photographic techniques, etc., have revolutionized research in this discipline. In regard to taxonomic assessments, the traditional criteria thus far employed are giving way to complicated computerized projections. As an illustration, one may refer to the project just launched at the Missouri Botanical Garden in St. Louis, USA for a *Flora of North America north of Mexico and Canada* which will have an electronic data base that will contain 'so much diversified information that scientists will be able to conduct original research in evolutionary biology, ecology, plant taxonomy and other fields simply by using computers to win now and correlate the data'. With all these developments and with the availability of advanced laboratory and photographic equipment and the latest computer technology, the day may not be far off when one can watch 'live' the drama taking place within an angiosperm ovule! and with the press of a button unravel the structure and taxonomic relationships of any angiosperm. This is the scenario for the twentyfirst century.

The book under review is excellently produced and printed (type-setting done by Macmillan, India) maintaining the high standards of Springer-Verlag publications. Considering the cost of printing in Europe, the high price of the book is perhaps inevitable but it should not deter any library from acquiring it. It will be an investment that will benefit generations of research scholars, students and others interested in plants and flowers.

Prof. Johri has just completed another monumental, multiauthored book, *Botany in India: Modern Period* which is in the press and is due for release in the summer of 1994. At an age when much younger people 'hang up their boots', Prof. Johri, who is 84 years old, continues to 'wear his', treading the weary path of botanical writing and documentation. The botanical community salutes you, Prof. Johri.

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The Golem: What Everyone Should Know About Science by Harry Collins and Trevor Pinch. Cambridge University Press, Cambridge, UK. 1993. pp. xii + 164. Price £10.95 (hardback). [ISBN: 0 521 356016].

After quickly going through this book one would think that the authors have said nothing profound and that they have merely described what is observable in the process of doing science. On the contrary, these two sociologists of science have attempted, in a lucid style, to demystify science and to dispel the widely prevalent notions that science is a model of objectivity and rationality and that the scientific method can lead to infallible truths about nature.

The authors want to show that 'there is no logic of scientific discovery or, rather, if there is such a logic, it is the logic of everyday life'. They want the readers to understand that scientists are neither Gods nor charlatans but are merely experts, as human as any other set of experts, and that science is one kind of 'expertise' and not 'certain knowledge'. They aim to demonstrate that science and technology are inherently risky and fallible, although every failure is attributed by the science establishment to 'human error'. They would like the lay public to know more *about* science than more science, more of the methods than of the content. According to Collins and Pinch, the proper metaphor for science is neither a chivalrous knight nor a pitiless juggernaut but a golem driven by truth, but not really understanding the truth – a lumbering giant who knows neither his own strength nor the extent of his clumsiness and ignorance.

Collins and Pinch try to achieve their goals elegantly by describing the inner workings of science through seven case histories covering past and present as well as physical and biological sciences – the idea of chemical transfer of memory propounded by McConnell

and Ungar, the two celebrated experiments that 'proved' Einstein's theory of relativity (Michaelson – Morley experiment to show that light travelled at the same speed in all directions, and Sir Arthur Eddington's observation of deflection of a light beam due to a strong gravitational field), the recent well-publicised story of cold fusion research, the Pasteur-Pouchet debate on the doctrine of 'spontaneous generation of life' in 19th century France, Joseph Weber's idea of gravitational radiation, David Crews' claims on the sexual behaviour of the whiptail lizard and the solar neutrino problem. To understand how science works we must understand science which fails as well as science which succeeds. By placing these stories in their historical and sociological contexts, Collins and Pinch convert each one of these encounters with the natural world into a self-contained sociological experiment in its own right. It is almost like a conducted tour and the authors make you see what they want you to see!

In short, their message is simple and clear. Knowledge is not all cognitive, there is much social construction.

Some of the profound 'truths' of science, Collins and Pinch would have us believe, are not truths forced on us by the inexorable logic of a set of crucial experiments but were brought about by agreements to agree about new things – a kind of concensus as in politics. 'What people are prepared to believe is not just a function of what a scientist discovers but of the image of the work that he or she presents'. The manner of presentation is just as important as the content in the competition between conflicting claims in science.

Often, in scientific controversies proponents and critics question not only one another's 'content' but also one another's quality of work, skill and competence. This struggle for credibility leads to the experimenter's regress – for fear of revealing one's own experimental incompetence researchers refrain from reporting their results in a controversial area, point out Collins and Pinch.

The authors admit that the most important purpose of the book is to change the public understanding of the political role of science and technology. This they have achieved in ample measure.

This book should be read widely in India. The point of view presented here is rarely debated by Indian scholars. It is a pity that despite so much science being done in this country there is not a single school of science studies worth the name.

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Research Directions in Computer Science: An MIT Perspective. Albert R. Meyer, John V. Guttag, Ronald L. Rivest and Peter Szolovits, eds. The MIT Press, Massachusetts Institute of Technology, Cambridge, Massachusetts 02142, USA. 491 pp. $40.00. 1991.

'Could computers really be made to work?' an important question which worried computer scientists during the late 1940s and early 1950s. The answer suggested at that time was 'barely' since most of the vacuum tube machines, while showing tantalizing potential, had failure intervals of a few minutes.

MIT was fortunate to have one of those pioneering machines, 'WHIRLWIND I', which had failure intervals of about 20 minutes on a good working day. Out of the experience and work done on Whirlwind I, emerged what we now accept as giant corporations such as Digital Equipment Corporation and labs such as Lincoln Laboratories, the Sage Air Defense System and the Mitre Corporation.

As time went by and computers showed a little more reliability, there came a stage when programing was thought to be very difficult and highly specialized. The alternative then was to make programing easier and the solution offered was a flurry of programing languages. Literally hundreds of languages surfaced but FORTRAN became the most famous.

In the late 1950s a major shift in computer evolution was suggested by John McCarthy (then at MIT). He proposed 'time sharing' where, instead of processing user jobs serially, they were to be handled in parallel under the online control of each user. A similar proposal was independently suggested by Christopher Strachey in England. The idea of time sharing led Herb Teager at the MIT Computation Center to begin work on IBM 709, which was to involve the completely new development of all software tools and languages. In 1961, CTSS (compatible time sharing system) was able to meet the initial goal of a 4-terminal demonstration.

During the heat of this 'time sharing' concept occurred an outstanding MIT proposal – Project MAC (multi-access computer). This book celebrates the 25th Anniversary of the founding of MIT's Project MAC. It covers the full range of the ongoing computer science research at the MIT Laboratory for Computer Science and the MIT Artificial Intelligence Laboratory, both of which grew out of the original Project MAC.

Each chapter is an excellent contribution of MIT's faculty and staff of laboratories and highlights current research and future trends in multiprocessor and parallel computer architecture in languages and systems for distributed computing, in intelligent systems and robotics, in complexity and learning theory, in software methodology, in programing language theory, in software for engineering research and education and in the relation between computers and economic productivity.

This book will certainly prove to be extremely insightful and inspiring to students and computer scientists at every stage of research.

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