

Where Gods Come Alive: A Monograph of Bronze Icons of South India. Baldev Raj, C. Rajagopalan and C. V. Sundaram. Vigyan Prasar, New Delhi. 2000. Hard bound, xxiii + 155 pp. Price Rs 350.

The book under review is only the second one of a series of monographs, being published by Vigyan Prasar, aiming at 'establishing unequivocally India's Scientific heritage'. As the blurb of the book points out, references and mentions in ancient texts have a 'need to be examined for their scientific basis and content using rigorous criterion and established methodologies of modern science'. The monographs are to cover art, artistic objects and the like, tested against a touchstone of scientific assessment. Three well-known scientists, associated with Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam, have co-authored this nicely produced small monograph on Bronze Icons of South India. This book differs from other publications, emphasizing metallographic techniques, *Cire Perdue* (lost wax) process and 'finger printing'. The printing and the get-up of the book are good with a lovely cover depicting an icon (there is no description of the cover photograph though).

The book opens with a tribute to Dr S. Paramasivan, a well-known Conservation Scientist. After several achievements related to restoration and conservation of paintings at several archaeological sites, he took upon himself, after his retirement from Archaeological Survey of India, finger printing of ancient South Indian bronze icons, with zeal and dedication. By finger printing he meant, 'collecting relevant data about various characteristics of the icons through the use of latest available scientific techniques'. The authors of this book were 'stimulated to pursue this work' during his visit to IGCAR in 1984.

The bronze icons and idols of South India have had their beginnings in the third century A.D. The *Sthapatis* (traditional metal craftsmen) of Tamilnadu flourished under the patronage of Pallava, Chola, Pandyan and Nayak Kings. The metal art and craft, established over this long period is alive even now at Swamimalai, Tanjavur and to some extent at other places. By interacting with Sri Devasenapathi Sthapati of Swamimalai,

the authors have provided us an authentic version of the current practice of *Cire Perdue* process.

The chapter on 'Historical Background', deals with the *Cire Perdue* process given in *Shilpashastra* presenting the steps involved, in original Sanskrit form, followed by their translation. The authors state that 'the Tamil and Malayalam version of this (extract) from *Manasara* is presently being used as the guide book'.

Although the book covers the icons of Tamilnadu, there are some references to prevalence of this technology in other parts of South India (This to some extent justifies the byline of the title of the book!). There are references to bronze images found in Kolhapur, fragments of images of Buddha excavated at Amravati and also to a literary work called *Manasollasa* by the Chalukyan king Someswara Bhulokamalla. Extensive quotes from this last work and their translation relating to metal casting is also given (pp. 24–26). Chalukya, Rashtrakuta, Hoysala and Vijaynagar kings patronized temple sculptures in styles different from those of Tamilnadu. The temples at Belur, Halebid and Somanathpur stand testimony to this cultural past glory of Karnataka. It is not clear from the book whether such patronage extended to metal castings and icons also and if so to what extent.

Chapter 4 is devoted to the current practices of Swamimalai *Sthapatis*. It is stated that idols are repaired, if need be, on the basis of a criterion like 'if the same defect were to be present in a human being whether he/she would live or not' (sic). 'Finishing the face' and 'coloring the icon' are covered in this chapter. The technique of coloring the icons in green, black or copper-red colours to make them 'look like old antiques' is a recent 'phenomenon'.

Chapters 5 and 6 deal with techniques used (for fingerprinting some 100 icons) under a DST project at IGCAR. Although a large number of techniques are listed in chapter 6, only X-ray diffraction and radiography, metallography, optical and scanning electron microscopy, secondary ion mass spectroscopy, hardness measurement and ICPMS have been used on (single?) specimens from five icons. Some data, micrographs, radiographs, etc. are given of these studies along with broad generalizations (in chapter 5) and a

summary (in chapter 6). Much more was expected by this reviewer. The investigations cannot be considered extensive. Reproducibility of results, adequacy of statistical sampling and most importantly how far these data serve to uniquely 'fingerprint' a specific icon have still to be addressed. The last aspect is critical, as there does not seem to be much variation in the results from the five icons.

Taking into account some complementary advantages like easy penetrability of neutrons, different cross-sections of different elements for neutrons and the like and most importantly in view of the Kamini reactor at IGCAR (useful for neutron radiography and activation analysis) the book could have covered neutron radiography, activation analysis and tomographic aspects also.

The last two chapters give some idea of the process of degeneration of icons due to corrosion and other processes, status of conservation methods and an overall status summary.

It is worth drawing attention at this stage to one of the proposals made in Europe to address issues such as conservation, historical manufacturing (ancient technology), painting techniques, provenance, dating, and deterioration processes, etc. of their cultural heritage. More than a dozen techniques, which can help solve questions in these fields, are identified. This list can be expanded, according to the needs of the problems to be solved to include many other techniques. 'Nuclear diagnostic techniques find many applications in dating archaeological objects, authenticating objects of art. Radiocarbon dating, has become an indispensable tool of archaeology. Another important technique used for determining the concentration of rare isotopes in samples of archaeological interest is based upon neutron activation at reactors. The Louvre Art Museum in Paris uses a 2 MV tandem-accelerator to authenticate art objects, largely by in-air PIXE. In recent years, accelerator mass spectrometry (AMS) has created a revolution in archaeology almost as great as that of the original development of radiocarbon dating'. These non-destructive techniques offer the possibility of obtaining more information on one specific sample as complementary techniques may be applied.

However two problems arise: 'First, museums are not always aware of the

existence of these techniques while natural scientists (physicists, chemists and material scientists) are not necessarily familiar with the needs that concern the study, preservation and conservation of museum objects. Second, many of the research instruments and analytical facilities are located in specialized research institutes, as they require very specific expertise'. Therefore, the intention of Europeans is to create: '(i) an environment that enables the co-operation and interaction between museums and natural scientists; and (ii) to achieve a better preservation and conservation of European cultural heritage by increasing the knowledge in museum objects through non-destructive analysis and testing by improving the synergy between art historians, archaeologists, conservators and natural scientists'. The expected benefit is first, the capability of answering questions (related to museum objects), which

cannot be readily solved now, will be enhanced. In addition museums and similar institutes, art historians, archaeologists and conservators will get easy access to universities and research facilities that provide such techniques. The natural scientists can exchange knowledge relevant for the study, preservation and conservation of museum objects.

Getting back to our book, one finds that this book can serve a very useful purpose to the community at large (including the scientific community) if a broader view is taken by including other techniques that are available in India in *IGCAR and elsewhere* and discuss as to how they can be of help in finger printing icons of India. The European approach is adaptable to India as a number of institutions exist across the country.

A general observation is that there is much variation in style from chapter to chapter giving an impression that the

book needs to be referred as an edited book rather than as a co-authored one. The authors must have been conscious of this, as it is also explicitly indicated in the book. Uniformity in style is desirable. There is no need for having the boxed items; contents of these could have formed parts of running text.

By taking care of grammatical, syntactic, type-setting and other errors and by augmenting and updating the text with more technical information, a future edition can fulfil the needs of a good reference text, to be of greater use to museum curators, archaeologists, etc. in the Indian context.

K. R. RAO

'Gokula', 29/2, 11th Cross,
3rd Main Road,
Malleswaram,
Bangalore 560 003, India

**INDIAN SOCIETY OF MYCOLOGY
AND PLANT PATHOLOGY**

announces

publication of a new Journal

Annual Review of Plant Pathology

Review articles on thrust areas of Plant Pathology are invited for publication in the first volume to be released by November–December 2001. Authors are requested to follow the pattern of *Annual Reviews* and send the MS on floppy diskette (3.5" MS Word format) along with one hard copy to the undersigned not later than 30 June 2001. Inquiries for more information are welcome.

Tel: (0278) 519824; 521545 (0); 430657 (R)
Fax: (0278) 519824
Email: hcdube@hotmail.com

Prof. H. C. Dube
Editor-in-Chief
C/o Department of Life Sciences
Bhavnagar University
Bhavnagar 364 002
Gujarat, India

**POSTDOCTORAL POSITION IN
BIO-MOLECULAR NMR**

Postdoctoral position is available to study the structure and function of pheromone binding proteins (PBP) using high resolution multidimensional solution NMR methods. PBPs are involved in the G-protein coupled signal transduction process in olfaction. Experience in heteronuclear multidimensional NMR spectroscopy and related computational applications towards protein resonance assignment and structure calculation and experience with protein expression, purification and characterization is very desirable. NMR Facility includes Avance 700 MHz spectrometer (Bruker), 600 MHz Varian Inova and 500 MHz Varian Inova. There are several Silicon Graphics workstations (Indigo and Octane) various programs for NMR data processing and structure calculations. We also have on going collaborations with Dr Angela Gronenborn at National Institute of Health (NIH, Bethesda, MD) and have access to the NMR facility at NIH. Applications by e-mail is preferred. Please send CV and three reference letters at: smohanty@notes.cc.sunysb.edu Contact: **Smita Mohanty, Ph.D. Department of Biochemistry and Cell Biology, State University of New York, Stony Brook, New York 11794-5215, USA.**