

BOOK REVIEW

PAMELA B. VANDIVER, JAMES DRUZIK and GEORGE SEGAN WHEELER (editors), *Materials Issues in Art and Archaeology II*, Materials Research Society Symposium Proceedings Volume 185, Pittsburgh, PA (1991) xxviii + 844pp, illus., price in the USA \$52.00, outside the USA \$58.00. ISBN 1-55899-074-7.

A book review may be associated with the homely atmosphere of long winter evenings, a fireplace, a pot of tea, a warm sweater and a nicely laid out and illustrated book that grips the reviewer from the first page to the last. The reviewing of *Materials Issues in Art and Archaeology II* was in sharp contrast with this scenario, because its perusal began in a copy shop. Here the reviewer tried to enlarge individual articles whose deciphered titles showed promise. Without this, the tiny print of most parts of the book would have made reading a real torture. First point: I do not think that a copy shop is the right introduction to a book.

Browsing through the thick volume, all sorts of fonts, font sizes, formatting and lay-outs can be found, as well as handwritten alterations and even subsequent editorial changes in fonts other than that of the original paper. This may reflect the colourful variety of our world or the simple fact that many different printers are on the market and the editors have given no guidelines to establish uniformity. Second point: Nothing has been done to make *Materials Issues in Art and Archaeology II* easy to read. This is not a new observation: these technical drawbacks were reported by Hisao Mabuchi in respect of the first volume of *Materials Issues in Art and Archaeology* [*Studies in Conservation* 36 (1991) 122-124].

An introductory note by Pamela Vandiver and George Wheeler presents the goals of the symposium, held on 17-21 April 1990 in San Francisco. The symposium asked for contributions related to ancient technology, materials degradation and conservation science, characterization through compositional and structural analysis, and physical properties of art materials. The note mentions 'communication' problems between people around the world and

among the disciplines involved in the investigation, preservation and conservation of works of art. The object is seen to be surrounded by archaeologists, art historians, materials and conservation scientists and conservators. They all speak different languages, their mother-tongues as well as the languages of their disciplines, and unfortunately only a few of them have received an interdisciplinary education. Therefore they all have different ways of approaching the object. This is not a new observation, and has led in the past to the staking of various claims such as 'archaeometry' and 'conservation science'. Both areas have their own journals, symposia, heroes, gurus and fan clubs, as well as their characteristic topics with, unfortunately, little overlap. Third point: It is a good thing to overcome this division between our curiosity about ancient materials on the one hand and our task of preserving or conserving objects of cultural importance on the other. Symposia and publications such as *Materials Issues in Art and Archaeology II* aim to bring these two artificially separated areas together again. Unfortunately a number of authors did not follow this wise philosophy. They have produced papers with (sometimes) good scientific results which have lost any relationship they may once have had to the objects under consideration. Fourth point: It is arguable whether papers obviously written by scientists for scientists in the field should be excluded, or should be left as possible seeds for future fruitful feedback.

To review symposia proceedings of this kind is unpleasant because of the wide range of topics, including those with which the reviewer is unfamiliar. Thus this review cannot hope to cover all the more than 800 pages. In practice, the enlarged and deciphered contributions were skimmed through and some were finally studied in detail. In other words, I decided to skip many, many pages and I now have to live with the knowledge that most authors who contributed to this volume may say that I skipped the wrong pages. Sorry for this! The decision will be more comprehensible if one recognizes that *Materials Issues in Art and Archaeology II*

covers New Methods and New Applications of Technical Analyses; Painting, A Problem in Composite Materials: Substrates, Binding Media and Pigments; New Approaches from the Mechanics of Materials; New Methods of Non-Destructive Analysis Compared with Analyses of Microsamples; Stone, Adobe and Architectural Glass: Monitoring and Stabilization; Characterization of Stone Sculpture and Stone Tools; The Role of Technical Studies in Establishing Cultural Functions of Ceramics; The Cultural Uses of Ceramics; Ceramics as Cultural Indicators which Reveal Exchange Patterns of Goods and Technologies; Reconstruction of Ceramic Technology; Alteration during Use, Burial and Testing of Treatment in the Field; Refractories and Glasses: Materials Choices, Workshops and Industrial Debris; Metals: The Unnatural Indicators of Cultural Differences; Innovation, Cultural Differentiation and Properties; Theoretical and Practical Approaches to the Study of Metals; Textiles, Paper and Polymers; Characterization, Technology, Conservation and Maintenance of Fragile Materials; a summary, an author index and (very useful) a subject index. Phew! Each of the parts is introduced by a short and well-written overview of the papers within the section. This is particularly useful because it guides one through the jungle of these thousands of papers and it allows the editors (mainly Pamela Vandiver) to explain their philosophy: to link areas so far separated, such as conservation science, ancient materials science and engineering. Luckily, the unfortunate term 'archaeometry' is exorcized!

In Part I on new methods and new applications of technical analysis F.H. Séguin gives an excellent introduction to the disadvantages and benefits of classic and digital X-ray imaging techniques. The paper is followed by a short section on applications. One would have enjoyed seeing more relevant applications to works of art, which would have forced a critical evaluation of image processing techniques applied in the field of X-ray techniques.

Two of the most fascinating papers deal with the use of environmental electron microscopy, a new technique presented by D. Stulik *et al.* and applied to actual conservation problems such as dissolution and crystallization processes in stone and other porous materials; this technique is also applied by E. Doehne *et al.* to humidity

cycling in adobe and dynamic lead corrosion. The outstanding advantage over conventional SEM is that wet or outgassing samples can be observed directly under very high magnification, without the limiting sample preparation procedure necessary for SEM where such samples cannot be investigated at all. However, the method is limited to liquids with low volatility because there is still a partial vacuum. The new technique opens the large 'dark' area of liquid-solid or gaseous-solid interactions for future 'close' observation by conservation scientists. Congratulations!

It is not easy to see why a paper on cation-selective reagents is included in Part I. These molecules are indeed a fascinating topic and it can certainly be expected that some of these compounds will one day serve in conservation campaigns. Thus far one fully agrees with the author, who gives a review of the former use of chelating agents (such as EDTA) as well as an introduction to so far unused types of ion-selective reagent. However, after a long introduction (or rather, a compendium of facts which can be found in any university textbook), the paper lacks any practical case histories of cleaning or solid experimental results (what about residues left on the surface?). The paper simply seeps away. This type of preliminary contribution can have disastrous results when used by fascinated but inexperienced readers. Fifth point: Today, why do we read more preliminary than final papers?

Another maddening example: in a paper on 'Ion beam analysis of pigments' conducted with proton-induced X-ray emission (PIXE), one might expect results based on the investigation of at least two pigments. One might even expect a few critical comments about the benefits or disadvantages of the method, based on applications to real works of art. Something like 'there are not too many sites where you may find PIXE but, in any case, you have to bring your object to the equipment'. No, the paper reports the investigation of a single pigment, cadmium red, 'mixed with lithopone (BaSO_4)'. Do the authors mean baryte (BaSO_4) or lithopone ($\text{BaSO}_4 + \text{ZnS}$)? Sixth point: this type of limited paper based on a dummy sample or samples considerably inflates the number of pages in the volume and suggests the timid question whether everything written is worth printing.

Book review

In Part II the valuable input from materials science to all the dynamic processes to be observed on paintings is obvious. This is true of the work of Gustav A. Berger, well known to readers of this journal, as well as the contribution of Marion F. Mecklenburg. Mecklenburg's computer-aided application of engineering principles to paintings yields surprising results which contribute definitive new aspects to the problem of art transit. One of the conclusions is that 'vibration may not be a serious problem for stretched canvas paintings' and vibration is therefore not seen to be a major cause of cracking. This solid paper, with its language of materials science and its cool objectivity, does not, however, banish my personal concern that scientific approaches like this will one day be abused to increase the number of paintings and objects that go whoring around the world from one exhibition to another.

The luminescence of painting materials, most of them used as media, has again attracted the scientist's attention. With the kind of laser spectroscopy presented by Londa J. Larson *et al.*, very small samples can be investigated. The authors describe the method as being 'non-destructive for the sample', which is not what we mean by non-destructive testing in our field. It is, however, an advantage to have a method that is non-destructive of the sample since the sample may then be reused for further investigations. The emission spectra shown do not fully convince me that laser spectroscopy may serve one day to identify, or even differentiate, organic mixtures of varying composition which, in addition, are altered by aging. Any of the very sensitive separation techniques available nowadays will finally yield more reliable results. As long as the study includes only a few samples, as in this case, the conclusion that the 'emission peak maxima and shape can be used to differentiate between samples' may be correct. But as soon as more and aged samples of this complexity are investigated, or simply those (mis)treated by several cleaning cycles, reliable differentiation will become extremely difficult. A second paper, by A. Larson and I. Zink, has obviously been submitted to the wrong publica-

tion. This contribution does not show the slightest effort on the part of the authors to make a connection between their work on the 'Luminescence of alizarin and its metal complexes' and *Materials Issues in Art and Archaeology II*. One can only hope that this paper will one day serve as one of the seeds mentioned above (my fourth point).

The paper by D. Scott on two silver plates in the collection of the J. Paul Getty Museum impressed by the way in which the analytical work is integrated into the information about other Byzantine silver objects so far investigated (and by the choice of a readable font size). The discussion shows how valuable scientific results can be, but also that they can never provide absolute proof of the authenticity of an object.

H. G. Wiedemann *et al.* journey into the world of forgotten weights and money, and make the reader feel like one small part in an endless series of human generations. The authors point out that they are using thermo-analysis as an important experimental technique. However, it is not made at all clear what this technique has been used for or what the experimental results have been. The only application described is the identification of PbCO_3 as a corrosion product on a Roman lead ounce. X-ray diffraction has also been used, and this, in fact, is the only method of choice.

Prudent closing remarks by Pamela Vandiver and George Wheeler summarize *Materials Issues in Art and Archaeology II*. To learn from the past and to prevent a further loss of cultural heritage and technological knowledge is a key task for scientists. It is unimportant whether they are materials or conservation scientists. In their neglect of traditional boundaries, books like *Materials Issues in Art and Archaeology II*, which are based on very recent results and on the philosophy expressed by the editors throughout this thick volume, are valuable tools for the fulfilment of our daily obligations. Bearing this in mind, the very heterogeneous quality of the papers and the maddening make-up of the book are of minor relevance.

A. BURMESTER