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Conservation in Museums

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Perspectives in Conservation

During recent decades an evolution has gradually been taking place in our approach to the preservative treatment of antiquities and archaeological matter, and a definite pattern has begun to emerge, so that it is appropriate to try and assess the present position. The general use of the term *conservation* instead of *restoration* aptly emphasizes the change that has occurred. In the past the treatment of antiquities and archaeological material was largely confined to a process of restoration which would make the objects suitable for exhibition. The actual methods used were largely of an empirical nature and the materials employed were all of natural origin. However over the past 30 years or so there has been a change in approach as well as in actual method: this is designated by the term *conservation* and is largely the result of the establishment of museum laboratories. In these laboratories the chemist or physicist applies his specialized knowledge to the problems which arise and seeks to understand the causes of the depreciation of museum objects and thus to replace the empirical approach of the restorer of the past by a sound scientific evaluation of each specific problem. This embraces much more than the mere restoration or repair of an object. Instead we are concerned with a much wider concept which can best be described as "scientific conservation". Included in this concept are the following fundamental ideas.

1. *Preventive Treatment.* This aims at the control of the environmental conditions in museums so as to ensure that the objects on exhibition or in store are kept under such conditions that the influences liable to cause deterioration are reduced to a minimum. The need for this control has received ever-increasing recognition by those responsible for the care of museum objects. If these objects are of an organic nature, e.g. wood, textiles, ivory, etc., the single factor of paramount importance is control of the relative humidity of the atmosphere within prescribed limits. In general this means keeping the R.H. within the range 50-65%. Ideally complete air-conditioning is the answer to this problem, but this involves expensive outlay beyond the capacity of many museums. There is, however, now commercially available a range of equipment which can be used for controlling the R.H. in selected rooms or in exhibition cases. These function either as humidifiers or dehumidifiers depending upon the ambient conditions in the museum and the various types of apparatus are described in detail in a recent number of *Museum*.[1] It must also be emphasized

[1] *Museum* 13, No. 4 (1960).

that it is essential for adequate air-circulation to be maintained in order to guard against the formation of local air-pockets of high R.H.[2]

2. *Diagnosis.* This involves a clear realization of the fundamental factors responsible for the deterioration of an object. Once these factors have been correctly assessed as the result of scientific tests, it is usually possible to work out a successful method of treatment. As a simple example of this we may consider the case of "weeping" glass—a phenomenon which shows itself by the appearance of droplets of moisture on the surface of certain glass objects under normal museum conditions. When the fundamental cause leading to this condition of "weeping" had been correctly diagnosed by microanalysis of the droplets, it was possible to devise a satisfactory method for dealing with glass objects in this condition.[3] Similarly, a detailed chemical examination of the causes of so-called "bronze disease" showed that deep-seated cuprous chloride was the agent responsible for the development of the characteristic light green powdery spots. This fact suggested a new method of treatment which has proved most effective and simple to carry out.[4]

3. *Scientific Examination.* Many objects which come up for conservation are covered with layers of corrosive products. In such cases it is often advisable to carry out a detailed scientific examination in order to determine that the correct method of conservation will be used. Thus, for example, it may be advisable to X-ray the object to ascertain whether there is any inlay lying hidden in the layers of corrosion. The presence of such inlay may dictate the nature of the subsequent treatment which will have to be adopted in order to ensure the survival of the inlay. Many examples of this approach to problems of conservation of metallic objects have been described by Plenderleith.[5]

4. *Improved methods of Conservation.* One of the most important tasks which has to be dealt with in a museum laboratory is the evaluation of the numerous new synthetic materials which have become available as the result of developments in polymer chemistry. These new materials are not mere substitutes for natural materials; many of them possess a range of chemical and physical properties not found in any material of natural origin, and for this reason they offer not only the possibility of evolving improved methods of conservation but also, indeed, of devising new methods of conservation which would not be possible without the use of these synthetic materials. It must be realized, however, that the choice of the most suitable material for any particular job must be based on a sound chemical knowledge of the behaviour of the material. This is especially necessary in view of the fact that the number of synthetic materials available is very large—many of which are not suitable for the treatment of museum objects.

As examples of new synthetic materials which have been successfully used in the conservation of antiquities, the following may be cited:

(i) the polyethylene glycol waxes for the consolidation of waterlogged wood[6] and leather,[7]

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[2] Werner, A. E. *Museums Journal 53*, 159 (1957).
[3] Organ, R. M. *Museums Journal 56*, 265 (1957).
[4] Organ, R. M. *Museums Journal 61*, 54 (1961).
[5] Plenderleith, H. J. *The Conservation of Antiquities and Works of Art.* Oxford University Press 1961.
[6] Organ, R. M. *Studies in Conservation 4*, 96 (1959).
[7] Werner, A. E. *Museums Journal 53*, 3 (1957).

(ii) epoxy resins as adhesives and consolidants,[8]

(iii) a special poly-methocrylate known as Technovit originally used for the restoration of ancient glass objects[9] but which can also be used for the consolidation of fragile bronze objects,

(iv) a special modified soluble nylon suitable for the surface treatment of *ostraka* and limestone reliefs prior to washing and for the re-attachment of flaking paint on wall-paintings,[10] and

(v) an internally plasticized polyvinyl acetate emulsion adhesive used for sealing delicate textiles to a supporting fabric net of nylon orterylene.[11]

The examples outlined above will serve to illustrate the essential features of the concept of scientific conservation, which has emerged in recent years. A position has now been reached in which conservation is carried out at two levels. Scientifically trained personnel, working in well-equipped laboratories, carry out research work aimed at the development of improved reliable techniques for the examination and conservation of antiquities. The results of this work can then be adopted as routine procedures which the skilled and trained craftsman can carry out in the workshop or studio. If we consider the future of conservation in our provincial museums in the light of the above ideas, one would visualize the formation of a central scientifically-equipped centre which would deal with special problems, whereas the normal run of routine conservation work could be done in regional centres staffed with suitably trained craftsmen.

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[8] Ciba (A.R.L.) Ltd. *Technical Notes* 218; Organ, R. M. *Studies in Conservation* 4, 4 (1959).
[9] Wihr, R. *Deutsche Kunst und Denkmalpflege. 2*, 138 (1957).
[10] Werner, A. E. *Chronique d'Egypte. 33*, 273 (1958).
[11] Beecher, E. R. *Museums Journal 58*, 234 (1959).