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Preservation and Restoration.

ONE of the most important services which science can render to mankind is in the discovery of the precise origin of corrosion and decay brought about by natural causes and of methods of counteracting the destructive agencies. It becomes increasingly important to man to preserve, during such times as he may desire, the material fruits of his labour in their original form. Foodstuffs must be preserved during periods of plenty and during transportation to lands where they are scarce; structures of wood, metal and stone must be safeguarded from the destruction caused by living organisms, water, frost, and the atmosphere; fabrics must be protected from the deterioration brought about by light and bacteria. The annual monetary loss due to our lack of knowledge of the mechanism and counteraction of the phenomena involved is enormous and, in fact, incalculable.

For evidence of our ignorance in such matters it is only necessary to look at the stonework of almost any ancient building; a cursory examination of some of our modern buildings will indeed suffice. Is it impossible completely to protect and preserve stone from decay and destruction? Is the vast annual sum spent in protective paints for iron and steel structures really essential expenditure? Such questions as these are at present unanswerable, but they are unlikely to remain so if adequate scientific research be directed to the problems so obvious to every one. Brearley's discovery of stainless steel, important as it is, is but a minor success in such a wide field, for the use of this material is greatly restricted by its price. Nevertheless, the discovery encourages the belief that, so far as metals are concerned, the broader problems are not insoluble.

Individually, the problems of corrosion and decay are not very attractive to the independent research worker of the present day; the lure of more recondite fields of research is generally too powerful. But viewed collectively these problems are so important economically, and so far-reaching, as to call for co-ordinated investigation on a wide scale. In such investigations Government can and should play a valuable part as an organising and directing agency, and it is satisfactory to note the steps already taken in this country to initiate and to subsidise the necessary research. Perusal of the last Report of the Advisory Council for Scientific and Industrial Research (see NATURE, February 3, p. 165) shows that in addition to the assistance given to two professional bodies in aid of researches on special types of corrosion, the Department is carrying out several kindred inquiries under its own direction. Grants have been made to the Institute of Metals for

the investigation of the corrosion of condenser tubes and of aluminium, and to the Institution of Civil Engineers for a research upon the deterioration of structures in sea-water. In direct association with the Department is the Food Investigation Board, which is dealing with the fundamental problems of food preservation. The Fabrics Research Committee and the Forest Products Research Board are interested in the protection of fabrics and woods respectively from decay, and we understand that a committee has recently been formed to inquire into methods of preserving stonework. Finally, by means of the laboratory which has been set up at the British Museum, the Department has provided for research into the causes and prevention of corrosion and decay occurring in museum specimens. Though each of these organisations has its own specific ends in view, judicious co-ordination of their efforts and intercommunication of the results they obtain will doubtless be of great assistance to the general progress.

A second report[1] on the investigations in progress at the British Museum has recently been published, and its appearance could scarcely be more opportune. The information it gives will be of great value to the curators of museums of antiquities and, we imagine, will be specially welcome to those who are engaged in the responsible and delicate task of recovering the archæological treasures of King Tutankhamen's tomb.

Little scientific research directly bearing upon the preservation and restoration of museum specimens has been undertaken in the past. Too often have the attempts at restoration been left in the hands of museum workmen whose empirical efforts have in some cases ended admirably, in others disastrously. Successful methods so devised have sometimes jealously been guarded as "trade secrets" guaranteeing continuity of employment. Such an unsatisfactory state of affairs cannot continue; if it is our duty—and indubitably it is—to preserve for future generations the evidences of past phases in the life of mankind, then it is essential that knowledge of trustworthy preservative processes should be communicated freely to all concerned. It is gratifying that Great Britain should take the lead in instituting scientific research of a very high order in this direction, and in publishing the results for the general benefit of all who are possessors or curators of valuable antiquities.

The Department has admittedly been very fortunate in enlisting Dr. Alexander Scott as director of the investigations which are being conducted at the British Museum laboratory. His second report, like its predecessor, shows abundant evidence of the high degree of experimental resource required in work of this kind, and of the very fragile character of many of the objects which he has successfully restored and protected from further deterioration. But in Dr. Scott the fears and caution of the antiquary are tempered by the confidence born of scientific knowledge; as a result of this happy combination we have on record the solutions to a number of problems which have long been a source of anxiety to museum curators. Prints and pictures, and objects of stone, silver, iron, lead, copper, bronze, and wood have all been brought to Dr. Scott for treatment, and subsequently have been returned to their places in the museum restored and insured against further attack.

The work at the British Museum laboratory has hitherto, naturally, been chiefly of a chemical character. But many museum problems have a microbiological aspect. The cellulose-destroying moulds and bacteria, for example, must play an important part in the decay of fabrics, paper, and other materials in museums; in time, doubtless, the laboratory will be able to turn its attention to these problems. Reference to such a development suggests the interesting possibilities which would be involved in a microbiological examination of the fabrics and cellulosic débris found in King Tutankhamen's tomb. Even though the examination proved negative so far as the discovery of spores of bacteria and moulds is concerned, valuable information would be yielded by the decayed material itself, for it is now known that cellulose fibres which have been attacked by such organisms show characteristic markings. We strongly hope that facilities will be given for such an examination to be made before the material has become infected with present-day organisms.

Attention should be directed to a feature of Dr. Scott's report unusual in Government publications, the excellent collotype illustrations; these supply striking visual confirmation of the successes he describes.

[1] "The Cleaning and Restoration of Museum Exhibits." Second Report upon investigations conducted at the British Museum. Published by H.M. Stationery Office, 1923. Price 2s. net.

Physiology in Medicine.

The Heart as a Power-Chamber: a Contribution to Cardio-Dynamics. By Dr. Harrington Sainsbury. (Oxford Medical Publications.) Pp. xii+248. (London: Henry Frowde and Hodder and Stoughton, 1922.) 12s. 6d. net.

IF we compare the text-books of physiology of to-day with those of twenty years ago, we cannot fail to be impressed, not only with the vast strides that have been made by the subject within this short time, but also with the fact that a large majority of the latest discoveries, which have an intimate bearing on the understanding and control of disease, could not figure