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pike and bream, around the hearths. Many pottery fragments occurred in the hearths and at the bottom of the ditches. Pots with cordons round their necks, and dishes, were the most common forms. Thin-walled vessels ornamented with grooves and tassel-like motifs, characteristic of cemeteries of the period, were rare. Several small irregularly shaped implements (most of which were scrapers), two cores, several flint flakes, and one antler chisel were found. A plain bronze pin with a thickened upper part was discovered in one of the hearths.

In the plan (PLATE XVI, *c*) the area embraced by the ditches (about 3,900 sq. m.) was roughly oval, about 90 m. long and 35–50 m. wide. The flat top covered about 900 sq. m.; the western slope 1,200 sq. m., and the eastern slope 1,900 sq. m. The greatest difference between the levels within the area was 2.5 m. The main ditch had two 15 m. wide causeways (gates). The shallow, outer ditch consisted of three parts, several metres long. Two of them run parallel to the southern part of the chief ditch for a distance of 1.5–3 m. The third part was situated opposite to the chief southern entrance (gate) for a distance of several metres.

The ditches must have belonged to a kraal for animals, chiefly cattle. It is situated near the lake and the low-lying meadow land. Owing to the continuous winds there were probably no gad-flies on the hill. For this reason a great quantity of cattle could be kept in the kraal, in spite of the near vicinity of swamps. The steepness of the kraal probably did not create difficulties, as some of the profiles suggest that a low earth rampart was made from the soil dug out from the ditch. The rampart would perhaps have been strengthened with a hedge or fence of blackthorn. Cattle and other animals herded here together all night long must have completely denuded the kraal of vegetation. In consequence the upper layers of the hill and a part of the ditches were washed away. Shepherds seem to have lived in sheds built probably directly above the ditch over the hearths. The causeways were probably closed with a fence of wattle-work. About 500–800 head of cattle could be kept in the kraal. The works having been repaired several times, it is possible that the breeders returned to their base settlement each autumn. Their food consisted of the meat of domestic animals, with pond-mussels, fish, and probably also corn.

The Early Bronze Age kraal of Biskupin is the first of its kind in Europe to be examined almost completely. The finds enable it to be dated to the end of the first period of the Bronze Age (according to Montelius). They belong to the local West Polish-Kuyavian culture of Iwno which was contemporary with the Unětician culture.

ALEXANDER GARDAWSKI

## ARCHAEOLOGY IN OXFORD UNIVERSITY: TWO RECENT DEVELOPMENTS

### 1. *The Research Laboratory for Archaeology and the History of Art*

The project of a Research Laboratory to work on the archaeological applications of physical science was first put forward in Oxford in 1950, and was finally realized in the early part of 1955, when, after receiving grants from the Wenner-Gren Foundation and the Nuffield Foundation, the University created the Laboratory by statute and installed it in its premises, 6 Keble Road. A chief part in its creation was taken by the late Viscount Cherwell, who was then still the professorial head of the Clarendon Laboratory, and had long seen what archaeology and art-history would stand to gain from analytical treatment of their materials by the techniques of physics. The new laboratory's governing committee includes the present holder of Lord Cherwell's post (Prof. B. Bleaney) and the Professor of Geology and Mineralogy (L. R. Wager), while its chairman is the Keeper of the Depart-

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ment of Antiquities in the Ashmolean Museum (at first D. B. Harden, and from the end of 1956 R. W. Hamilton), and its other members are the Keeper of the Department of Fine Art in the Ashmolean (K. T. Parker), the Curator of the Pitt-Rivers Museum (T. K. Penniman), and the Professor of European Archaeology (its secretary, and writer of these lines); Mr Peter Swann of the Museum of Eastern Art is also a member, and the work of the Laboratory has the co-operation equally of the scientific and of the archaeological and museum sides of the University. It is indebted likewise to a number of university and other institutions and museums outside Oxford, and for benefactions to the generosity of Major H. W. Hall and of several grant-giving funds and foundations, as well as of the two above-mentioned and of the University itself. The staff consists now of two Senior Scientific Officers, two Research Assistants, three technicians, a secretary and two part-time workers (optical spectrometrists and statistician). The first of the two officers, Dr E. T. Hall, is the executive director; the second is Dr M. J. Aitken, who succeeded in 1957 to Dr S. A. Young.

The work that is being carried out includes, in the first place, X-ray Spectrometry, which, being non-destructive, is particularly suited to the analysis of specimens of precious metals, notably coins, and of glass and glazes, as was demonstrated in the Laboratory's first published paper, on the chronological determination of Chinese Blue-and-White ceramic with reference to the manganese content of its cobalt blue. (See Stuart Young in *Oriental Art*, II, 2, Summer 1956, pp. 43-7, 'An Analysis of Chinese Blue and White', together with Sir Harry Garner, pp. 48-50, 'The Use of Imported and Native Cobalt in Chinese Blue and White'.) Two X-ray Fluorescent Spectrometers, scanning under automatic control, have been built successively to Dr Hall's designs. In Optical Spectrometry, a programme of analysis of prehistoric European bronzes of the Middle and Late Bronze Ages is being carried out, with the co-operation of the Ashmolean, Pitt-Rivers, and British Museums, the Museum of Archaeology and Ethnology at Cambridge and several other museums; and also one on early Chinese bronzes. Magnetic dating of ceramic and other clay products is being conducted on an Induction Magnetometer, of a highly sensitive design elaborated with the co-operation of the Institut de Physique du Globe, Paris, and the Cambridge University Department of Geodesy and Geophysics; Dr Aitken has been especially engaged on the application of this method of dating (by measurement of the thermoremanent magnetism in the clay) to Chinese Yüeh ware. Neutron Activation Analysis, a new technique, equally non-destructive, of analysing archaeological specimens by measurement of concentrations of trace-elements, is proceeding with use of one of the Harwell nuclear reactors for the neutron irradiation of the samples; the decay-curves of the gamma-ray activity so induced are identical for samples of identical composition, and the characteristics of the trace-elements present are detected by a special Gamma-ray Spectrometer. The method is applicable, for example, to pottery and also to coins, on which work is now in progress. A further non-destructive technique is that of Optical Spectrophotometry, for which an instrument designed by Dr Hall has been built to analyse the inks and pigments of written documents and paintings by evaluation of their reflected light. Lastly, in the field, work has been done not only in earth-resistivity surveying of sub-surface features, but also in their magnetic detection, using a Proton Resonance Magnetometer, which appears well suited to ascertaining the outline of such buried structures especially as kilns.

The purpose of these notes is simply to make the Laboratory's existence more fully known among the readers of ANTIQUITY, and to illustrate the range and variety of the field—the application of physics to archaeological and art-historical problems—in which it has accomplished still only its first three years of work. But arrangements are now being

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made for making known specific results attained from time to time. Dr Hall and his team are getting well into their stride, and the news of their progress at intervals should rouse interest in many quarters.

### 2. *The Diploma in European Archaeology*

On 11 March this year the University enacted a statute establishing a Diploma Course in European Archaeology, side by side with the existing one in Classical Archaeology, and replacing the existing Committee for Classical Archaeology by a new 'Committee for Archaeology', to cover the whole European as well as the Classical field and to administer both the courses. Its chairman (strictly, as deputy for the Vice-Chancellor) will be the Lincoln Professor of Classical Archaeology and Art (B. Ashmole), and its secretary the Reader in the same subject (W. Llewellyn Brown). Its members are the professors of European Archaeology, of Ancient History, and of Celtic, representatives of the Faculties concerned (Literae Humaniores, Modern History, English, and Anthropology and Geography), some co-opted members, and the Keeper of the Department of Antiquities in the Ashmolean Museum (R. W. Hamilton).

The general field of study for the new Diploma is Europe from the Neolithic onwards, outside the higher Mediterranean civilizations, but with concern for all connections with them; further, a candidate must specially study some one European area, and one of four periods, running in succession (with slight overlaps) from the Neolithic and Early Bronze Age to the Early and the later Iron Age (to A.D. 700). The special period to be prescribed initially is the second of these, running from the 13th to the 5th century B.C. Some capacity for reading Continental literature in the original is expected; in particular, a reading knowledge of archaeological German, which is really not very difficult to acquire. Candidates have to be, or to become, members of the University; the statute comes into effect on 1 October, and the first examination (if there are entries) will be in June 1959. The Professor of European Archaeology and his Assistant (Miss M. A. Smith) now have official quarters at 35 Beaumont Street, together with the Professors of the Archaeology of the Roman Empire (I. A. Richmond), of Chinese (Homer Dubs), and of the History of Art (Edgar Wind). This is very close to the Ashmolean Museum, and the collaboration of the Museum staff is promised in making the collections to a greater extent available for teaching. (Of prehistoric European antiquities, the Senior Assistant Keeper in charge is H. J. Case.)

Prehistory in the 'primary' sense, beginning with the Palaeolithic, not geographically confined, and maintaining its traditional conjunction with Ethnology and Social and Physical Anthropology, continues meanwhile to have its Oxford home in what is now styled the Department of Ethnology and Prehistory, with its quarters and collections in the Pitt-Rivers Museum. Under the Curator (T. K. Penniman), archaeological matters there are mainly the concern of J. S. P. Bradford, while an Honorary Lecturership in Prehistoric Archaeology is held by D. F. W. Baden-Powell, covering the Palaeolithic and Mesolithic periods and Quaternary studies in general. The graduate course in Prehistory in this sense is taken as one of the three options for the Diploma in Anthropology; for Europe, in and after the Neolithic, its wider field meets that of the new Diploma course. Lastly, while the origins of civilization in the Near East lie within it too, the archaeology of civilization as developed there, and in the East at large, belongs to the Faculty of Oriental Studies.

Side by side with this and with Classical Archaeology, and forward from primary Prehistory, the new course sets the archaeology that is specifically European, continuing what Gordon Childe named the Dawn of European Civilization from the 2nd to the 1st

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millennium B.C., and onwards, alongside Greece and Rome, to the brightening dark of its medieval morning. What remains to be seen is whether anyone will take it. But we shall be ready for those that will; and indeed we have not lacked time for preparation. The need for something of this kind in Oxford began first to be pointed out (as Dr Joan Evans has reminded me) by Arthur Evans in 1888—just seventy years ago. Yet the tortoise, in the end, did win the race; and we shall try.

C. F. C. HAWKES

### THE SOCIETY FOR MEDIEVAL ARCHAEOLOGY

In the summer of 1957, at a meeting held at Burlington House under the chairmanship of Sir Mortimer Wheeler, a new national archaeological society was founded. This, the Society for Medieval Archaeology, exists to further the study of Britain's post-Roman history by encouraging research into the surviving material evidence. The Society's activities will encompass the archaeology of the Anglo-Saxon period in Britain, in all its aspects. The period after the Norman conquest will be treated within more strictly archaeological terms of reference, so that attention will be focussed on fieldwork and excavated material rather than on those studies of art and architecture to which other societies and journals are already devoted.

The Society was founded in the belief that a centralized medium of publication would stimulate and unify contributions from the various disciplines involved. Thus, its chief purpose is to publish a journal in which the problems and results of archaeological, historical, numismatic and linguistic studies of the medieval period in Britain will for the first time be stated and discussed together. The archaeology of the European mainland will be treated in so far as it bears on the British problems and material. In short, this publication, which is to be called the *Journal of Medieval Archaeology*, is intended to be truly national in scope and international in significance.

The Society will arrange an annual week-end conference. The first of the series was held in March 1958 at Sheffield, its subject being the relationship of history and archaeology in the study of the Middle Ages.

There will be an annual general meeting in London. In December 1957 a paper entitled *Some Comments on the Miniatures and Ornaments of the Lindisfarne Gospels* was read to the first of these meetings, by the President, Mr R. L. S. Bruce-Mitford, Keeper of British and Medieval Antiquities in the British Museum.

The other officers of the Society are : Secretary, Mr D. M. Wilson, of the Department of British and Medieval Antiquities in the British Museum; Editor, Dr D. B. Harden, Director of the London Museum; Treasurer, Mr J. G. Hurst of the Inspectorate of Ancient Monuments of the Ministry of Works. Sir Cyril Fox, Sir Thomas Kendrick, Sir Frank Stenton and Sir Mortimer Wheeler are Honorary Vice-Presidents.

Membership is open to all who are interested. The subscription to the Society, including the *Journal*, for ordinary and institutional members is £2 2s. od.; for *bona fide* students under the age of twenty-five £1 1s. od.; and for two members of the same household £3 3s. od. (entitling them to full privileges of membership and one copy of the *Journal* jointly). Further particulars can be obtained from the Secretary, at the British Museum, W.C.1.

### ARCHAEOLOGY IN WALES

There is good news for those who practise archaeology in Wales or who want to know about the ancient history of western Britain. At long last, the University of Wales has established a Professorship of Archaeology, and we welcome Mr R. J. C. Atkinson, at