between the scientific worker and the world's heritage of material culture[17]. A study of antiquities and ancient monuments by laboratory methods not only helps field archæologists by correlating the condition of finds with their environment, but also leads to better preservation and a fuller understanding and appreciation of objects by presenting them as nearly as possible in their original forms, as they were conceived by their makers. The benefits of such collaboration may, moreover, be mutual, for men of science working in some fields, such as corrosion studies, may gain a new insight into their own problems. Such work requires properly staffed laboratories which are specially intended for the problems involved[18].

Numerous illustrations of the results of such work, some with excellent coloured slides, were then given by Mr. Biek. Much new knowledge of early craftsmen's techniques comes from the detailed laboratory examination of their handiwork. Thus, the use of mercury in gilding sixth-century Merovingian brooches has been established, the mercury still being traceable microchemically. X-ray shadowgraphs have been invaluable in the study of antiquities, showing up even before cleaning, and without in any way altering the object, many details of their structure and decoration.

Recent studies in the Ancient Monuments Laboratory have shown that many of the rings used in making chain-mail of Roman times, found at Richborough, were punched out of cast sheet bronze. From a purely scientific point of view, the extreme fragility of similar rings, which must on internal evidence be taken to have been cold-worked, suggests that some ageing factor, as distinct from corrosion, may be operative under certain conditions. The survival on such rings of traces of suspension fibres (bast fibres, probably flax[20]) may possibly have been aided by the presence of corrosion products. But the most definite pointer of scientific interest provided by archæological finds was given by some excellently preserved iron objects of Roman and Saxon origin recently found at Hungate, York. Here research[21] showed that corrosion had been inhibited by phosphate and tannate, and the latter's suppression of sulphate-reducing bacteria was demonstrated for the first time. Such work is of potential value in the protection of present-day buried pipelines, for it has been estimated that the cost to England and Wales is £5 million a year due to corrosion losses in water mains alone.

Mr. Biek discussed the detailed collaboration of the laboratory staff with the archæologists in the field, not only on excavations but also in the study and preservation of buildings. Preservation of stonework has been much discussed in the past, and the study of masonry and brickwork in relation to their environment and the mortars used remains of greatest importance. It is also possible to learn something about early timberwork in buildings, and evidence of 'soft rot', a condition only recently recognized[22], has now been detected in the cavities left by bonding-timbers in the medieval masonry at Framlingham Castle, Suffolk. Apart from one very small piece of wood carrying this information, no trace of woody material was found in any of the several cavities, which originally contained timbers 15 ft. long by 1 ft. in diameter. In more modern buildings, the copper roof at Lancaster House and the century-old cast-iron tiles on the Houses of Parliament have recently been studied.

It is in the nature of things that references to such work should be widely scattered among many journals over a number of years, and only if there is direct systematic contact between archæologists and other scientists can the difficulties arising from such a state of affairs be reduced.

These three papers demonstrated selected aspects of collaboration between the natural sciences and archæology, and emphasized how the whole scope of inquiry into the past is being widened by this approach to the material. More laboratory facilities are required, such as are already operating at the British Museum, the Courtauld Institute, the Ministry of Works Ancient Monuments Branch, or Dr. H. Godwin's Sub-Department of Palæobotany at Cambridge, and in them workers are needed who by inclination are interested in archæological and historical problems as well as in those of the natural sciences. Neither are surely unreasonable requirements. It was encouraging to see that all three speakers at this session ranged widely in time, treating the study of material remains in both prehistoric and historic times as a continuum, and emphasizing what is generally accepted in classical studies, that in the Middle Ages, and even in more recent periods, a complete historical picture is not to be derived from written sources alone.

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OBITUARIES

Prof. H. E. Roaf

WE regret to record the death of Herbert Eldon Roaf, professor emeritus in the University of Liverpool, on September 21 at the age of seventy-one.

Roaf was a Canadian who graduated at the University of Toronto and went to Liverpool to work under the direction of Benjamin Moore as Johnston Colonial Research Fellow. This early association with the famous biochemist is probably responsible for the interest in the chemical and physical aspects of physiology which Roaf sustained throughout his life, and which showed itself particularly in his earlier papers and in the work on biological chemistry which he published in 1921.

In 1906 Roaf was appointed assistant lecturer in the Department of Physiology under Sir Charles Sherrington, with whom he collaborated in research on the central nervous system. In 1911 he left Liverpool to become a lecturer in physiology at St. Mary's Hospital Medical School, London, and in 1920 was appointed to the chair of physiology at the London Hospital Medical College. He returned to Liverpool in 1932 as George Holt professor of physiology—a post which he held until his retirement in 1944. His chief interest in physiological research was colour vision, in which field he made many important contributions; but he was a man of wide and deep learning in his subject, and his "Text-book of Physiology" showed this clearly. He was a gentle, modest man, well loved by his colleagues and students, to whom he was devoted. During the War he undertook research on vision for the Admiralty, besides bearing a heavy burden of teaching and administrative work, in a department considerably denuded of staff.

He married Beatrice Sophie, daughter of Sir William Herdman, who survives him with two sons and two daughters.

Dr. William Brown

Dr. William Brown, founder of the Institute of Experimental Psychology in the University of Oxford, died in the early spring. Educated at Collyer's School, Horsham, at Christ Church, Oxford, and in Germany, he had a wide preparation for psychological work, having taken Mathematical Moderations, final honours in physiology, and Greats. He was John Locke Scholar in mental philosophy in 1906 and received his M.D. in 1918. In 1930 he was made a Fellow of the Royal College of Physicians. His first psychological work was done with Spearman at the University of London. This association produced what is now known as the Spearman–Brown formula, widely used in assessing the reliability of mental tests. In 1914 he was appointed reader in psychology at the University of London, which post he held until 1921. From 1921 until 1946 he was Wilde reader of mental philosophy at the University of Oxford, and during 1925–31 psychotherapist at King's College Hospital. In 1936 he became director of the Institute of Experimental Psychology at Oxford, which was founded with the assistance of a friend and patient of his.

Apart from his early work on the statistical treatment of mental measurement, which was of a high order, Dr. Brown's main achievement was, on one hand, to have brought about the recognition of experimental psychology at Oxford; on the other hand, his clinical work was unusually successful in that he obtained within the medical profession the reputation for meticulous care in excluding all physical causes before making a psychiatric diagnosis.

William Brown was very much interested in scientific societies. He was a member of the Mind Association, of the Royal Medico-Psychological Association and of the Royal Institute of Philosophy, and was president of Section J (Psychology) of the British Association for the Advancement of Science in 1927. He was president of the Society for the Study of Addiction, and associate foreign member of the Société Française de Psychologie. He had been a major in the R.A.M.C. during the First World War. Barely three months before his death, at the age of seventy-one, he delivered an astonishingly vigorous presidential address to the British Psychological Society.

NEWS and VIEWS

Nobel Prize for Physics, 1952

The Nobel Prize for Physics for 1952 has been awarded jointly to Prof. E. M. Purcell, of Harvard University, and Prof. Felix Bloch, of Stanford University, California.

Prof. E. M. Purcell

Prof. E. M. Purcell, who was born in 1912, graduated from Purdue University with a B.Sc. in 1933 and spent the succeeding year at the Technische Hochschule, Karlsruhe. In 1935 he went to Harvard, where he obtained his Ph.D., and joined the teaching staff as instructor in physics. During the Second World War he was associated with microwave work at the Massachusetts Institute of Technology. In 1945 he returned to the Lyman Laboratory of Physics at Harvard, and it was there that he made his discovery on magnetic absorption effects. Many physicists had been looking for dispersion or absorption effects of the magnetic properties of matter similar to those observed in the case of dielectrics, but it remained to Prof. Purcell to find the right conditions under which they manifest themselves. The first experiment was performed by putting a lump of paraffin wax contained in a resonant cavity into a magnetic field and observing the change of the Q-value when the magnetic field, H, passed through the resonance point ($h\nu = 2\mu H$). This absorption effect is very intimately connected with the mechanism by which the spin system transfers energy to the crystal lattice, a point which is very clearly emphasized in his first paper. The method is also of great sensitivity and has been used for measuring the proton magnetic moment of hydrogen gas. Since the first observation, many papers have been published by Prof. Purcell and others on details of great importance, such as line shapes and the use of the method for structural studies of crystals.

Prof. Felix Bloch

Prof. F. Bloch, who is professor of theoretical physics in Stanford University, was born in 1905 in Zurich, Switzerland, where he obtained his training (1924–27) in theoretical physics at the Federal Institute of Technology. He was awarded his doctor's degree in Leipzig (1928), where Prof. W. Heisenberg was pursuing his fundamental studies on quantum mechanics, and the following years were spent in Holland and in Copenhagen with Prof. Niels Bohr. In 1933 Bloch became *Privatdozent* under Heisenberg and was awarded, in the same period, a Rockefeller Fellowship which led him to Prof. E. Fermi in Rome.