adhesives—glue and the Plenderleith wax–resin mixture—although excellent in most respects, both suffer from the inherent disadvantage that their mode of application requires the use of heat. Hence an investigation is being carried out on the possible use of modern cold-setting adhesives, both of the high-polymer solvent type and the chemically setting urea and resorcinol–formaldehyde types. Similarly, the traditional materials used as protective surface coatings, namely, mastic or dammar resins dissolved in a suitable solvent, become in the course of time discoloured and brittle. Consequently a search for an improved surface-coating free from these disadvantages is being made among the synthetic film-forming materials; particular attention is being given to polybutylmethacrylate, which seems most promising because it gives a surface coating having an æsthetically pleasing appearance. As already mentioned, one of the most urgent problems awaiting a satisfactory solution is the provision of a suitable material, which may be applied to the backs of pictures to act as a moisture barrier, thus reducing those dimensional changes caused in supports by the intake and output of moisture due to variations in relative humidity. This item of research is being carried out with the collaboration of the Forest Products Research Laboratory at Princes Risborough. The actual materials under investigation include natural products such as waxes, and synthetics such as 'Saran' (polyvinylidene chloride) and polythene film.

The examples chosen so far have all dealt with those aspects of the general problem of picture conservation which are less appreciated by the general public, who are more conversant with the 'cleaning' process, that is, the actual removal of such accretions as dirt, discoloured varnish and possibly later repaints. There are many factors which govern the choice of solvent (or solvent mixture) to be used in the actual cleaning process, but the ideal solvent must be one which shows the maximum solvent differential between the varnish layer and the original paint layer, and yet is sufficiently active to remove the varnish layer without an undue amount of friction. In order to obtain more precise data, a systematic investigation is being conducted upon the degree and speed of swelling of aged linoxyn films by various solvents.

(*c*) The activities of the chemical laboratory have up to the present been so taken up with *ad hoc* problems that it has not yet been possible to progress beyond the formative stage, so far as fundamental research is concerned. One can but indicate the trend of such work by a brief reference to two problems which are of outstanding interest in this field. Although we know a very great deal about the various pigments used by the old masters, precise knowledge about the actual nature of the media used is sadly lacking. This state of affairs is primarily due to the absence of suitably precise methods of analysis; such information as we have at present is derived from simple qualitative solubility tests. It is hoped to develop the technique of partition chromatography to obtain precise information concerning the nature of the media—whether tempera, oil or oil–resin—used by the old masters. Secondly, information is also required about the composition of many of the resins, the use of which is recorded in certain of the old recipes. Any increase of our knowledge in these two fields would be of interest, not only to the scientific investigator but also to the art-historian; it might serve to narrow the gap that separates art and science.

Important as all its primary functions are, the Scientific Department of the National Gallery does not overlook the philosophical and methodological aspects of an objective approach to cultural matters. For the whole range of museum activities such an outlook is clearly significant.

[1] Rawlins, F. I. G., *Nature*, **151**, 123 (1943).
[2] Plenderleith, H. J., *Nature*, **160**, 523 (1947).
[3] Constable, W. G., *Nature*, **162**, 166 (1948).

OBITUARIES

Mr. A. H. Hall, C.B., C.B.E.

Mr. Arthur Henry Hall died at his home at Farnham, Surrey, on September 10, at the age of seventy-three. Mr. Hall, the son of H. S. Hall, was born at Clifton in 1876 and was educated at Clifton and at Trinity Hall, Cambridge, where he took a first in the Mechanical Science Tripos. On leaving Cambridge in 1898, he entered the famous firm of cross-Channel shipbuilders, Messrs. W. Denny Bros., of Dumbarton, and left them in 1905 to join the Ordnance Department of the War Office. The following year he became assistant mechanical engineer at the Royal Arsenal, Woolwich, and in 1914 he transferred to the Royal Small Arms Factory, Enfield. On the outbreak of the First World War he returned as assistant superintendent to Woolwich, where he remained until 1917. He joined the Admiralty staff in 1917 and for two years was director of torpedo and mine production. He was then lent to the Ministry of Munitions and later became controller of ferrous and non-ferrous metals and chemical disposals.

In 1926 Mr. Hall joined the Air Ministry to take charge of airship construction work at Cardington, and two years later he followed the late Mr. Sydney Smith as chief superintendent of the Royal Aircraft Establishment, Farnborough, a position he held until his retirement at the age of sixty-five in 1941.

The years 1928–41 were among the most eventful in the history of the Establishment, and indeed of aviation. At the beginning of this period the Royal Air Force was still very much a junior Service, civil aviation was struggling to its feet, and Great Britain was going through one of the worst economic blizzards the world has known. Although the future of aviation was in no doubt, few realized its importance to the country, and still fewer realized the vital part research and development were to play during these years and the war years that were to follow. To maintain our position in aviation meant conserving and carefully directing the small amount of effort available, and at the same time building up the knowledge and the essential resources on which the future would depend.

This was the task facing Mr. Hall when he took over at Farnborough in 1928; he quickly set about reorganising the shops and design offices, and was successful in getting rid of a large number of the temporary buildings that had sprung up ten to fifteen years before. At the same time, the opening of the seaplane tank in 1933 and the 24-ft. wind tunnel in 1935, and the start of the Bygrave building and the high-speed tunnel in 1939, are indications that the need for new equipment and laboratory buildings was

fully appreciated. During these years, and under Mr. Hall's leadership, the Establishment not only grew in size but also won the confidence of the aircraft industry and the Services, and its reputation as a centre for aeronautical research and development became world-wide.

In recognition of his services, Mr. Hall was created C.B.E. in 1918 and C.B. in 1937. He was a member of the Institution of Mechanical Engineers, a fellow of the Royal Aeronautical Society, and during the years 1928–41 he served as a member of the Aeronautical Research Committee.

He had a wide and, indeed, intimate knowledge of large numbers of his staff, was a keen observer of men, and his judgment of individuals was seldom wrong. It was fitting, therefore, on his retirement in 1941, that he was retained as a consultant by the Ministry of Aircraft Production, and played a large part in recruiting the technical and scientific staffs required by the various Ministries.

Mr. Hall was a man of very wide interests; he loved fishing, was an enthusiastic bird-watcher, and a very active gardener. He was also a keen photographer. For many years he had interested himself in educational matters, and had been chairman of the board of governors of the Farnborough Grammar School since 1937, and was a member of the Aldershot and Farnborough Divisional Education Executive.

Mr. Hall's death will come as a shock to the large circle who came to know him through his work, and those who were privileged to know him well will realize they have lost one of the most likeable and staunchest of friends. W. G. A. PERRING

Prof. W. B. Morton

WILLIAM BLAIR MORTON died in Belfast on August 12 at the age of eighty-one. He was born in Belfast, and went to school at the Belfast Royal Academy. After matriculating in 1886 into Queen's College, Belfast, then associated with the Royal University of Ireland, he took the B.A. degree with honours in mathematics in 1889 and proceeded to St. John's College, Cambridge, where he became eighth wrangler in the Mathematical Tripos of 1892. He had intended to stay in Cambridge for research, but was asked by Everett to return to Belfast as his assistant in the Department of Natural Philosophy. He accepted the invitation and succeeded to the chair in 1897, occupying it until he retired on reaching the age limit in 1933, with a change in title to professor of physics in 1909 after Queen's College had become the Queen's University of Belfast.

Morton was above all an inspiring teacher. He undertook personally the greater part of the undergraduate lecturing in both mathematical and experimental physics, besides giving postgraduate courses on theoretical subjects and much appreciated public lectures. In spite of the demand this made on his time, he read widely in the history of science and in current mathematical and physical literature, and published some forty papers, mostly on the theory of electricity and hydrodynamics. His staff were usually left to develop their own lines of research, in which they received every encouragement, not least through the generosity with which he made available his large private library. His departmental duties left him little time to take part in the general administration of the University. After his retirement, however, he rendered great services as a member of the governing body and its main committees.

An appointment as a junior fellow of the Royal University of Ireland in 1894 had been followed by a fellowship in 1897, which was continued until the dissolution of the Royal University in 1909. The connexion with colleagues in the south of Ireland was maintained after the institution of the National University of Ireland by frequent appointments until 1934 as external examiner. The visits these necessitated to Dublin, Cork, Galway and Maynooth were a source of great pleasure to him.

After the death of his wife in 1945, Morton moved from the house in which they had lived for forty years and made a long succession of colleagues and students welcome at their informal week-end gatherings. He broke up his library at the same time, giving the greater part to the Queen's University, and most of the remainder to friends. Failing health gradually restricted his activities, but until a few months before his death he continued to visit the University regularly, and to take an interest in its affairs. K. G. EMELEUS

NEWS and VIEWS

Prof. Frank Debenham, O.B.E.

PROF. FRANK DEBENHAM, who has just retired from the chair of geography at Cambridge which he was the first to hold, is a descendant of an old Suffolk family. He took his first degree at Sydney, and it was as geologist, cartographer and surveyor that he went with Scott to the Antarctic. Of him it may truly be said that he has done a great work in keeping alive the magnificent exploratory and scientific ideals with which Scott and his colleagues and contemporaries faced the grim Ross Barrier in 1910; ideals which have indeed proved an inspiration to the succeeding generations. Thirty years have passed since Debenham was elected to a fellowship of Caius College, Cambridge, fresh from the war service which followed immediately his return from the Antarctic. Tripos examinations in geography were first held in 1920, and he was soon busy in the new Department. In 1928 he succeeded the late Philip Lake as reader and head, in the year when the International Congress of Geography met at Cambridge. His vigorous creative powers found full scope; and by 1930, in the year of his appointment to the newly-established chair, he was planning the erection of the new building, to which his cherished project of a physiographical laboratory was added in 1938. The Cambridge school, to which Prof. J. A. Steers has just succeeded (see *Nature*, April 10, p. 670), may now fairly claim to have attained an international reputation; and its productivity, characteristic liveliness and happy diversity of aims undoubtedly owe much to the brisk exploratory activities and the very human sympathies of its first professor.

As teacher and expositor, Prof. Debenham's enthusiasm was infectious; and his writings reveal a much appreciated facility and clarity of expression. His recent surveys of African water problems for the Colonial Office, still in progress, have with his other work been recognized by awards of the Victoria Medal of the Royal Geographical Society, and the Livingstone Medal of the American Geographical Society; he has also received the honorary D.Sc. of