condition in certain caves and mines) it is possible to obtain the required humidity by raising the temperature to a fixed degree, and under favourable conditions this temperature may also approximate to requirements. Such a scheme has been applied successfully in certain disused underground workings. It involves the building of suitable chambers as repositories in the caverns underground, and these are each equipped with batteries of heaters and fans which pass the conditioned air into plenum systems within the repositories. This scheme lends itself particularly to the storage of paintings because of the area of dry wall space that the chambers afford, and the most striking example is no doubt to be found in the main National Gallery repository recently described by Mr. F. I. G. Rawlins[10].

When it is a case of storing valuable furniture, carpets, textiles, large quantities of irreplaceable books and manuscripts, antiquities and ethnographical objects of all kinds, the first essential is one of floor space, and to satisfy this requirement on an adequate scale, building and excavation are alike out of the question. For the cream of the collections of the British Museum and Victoria and Albert Museum, there was no option but to find sufficiently extensive underground workings in rock which could be waterproofed and in which the air could be fully conditioned as to temperature, humidity and ventilation. Nothing short of an undertaking of this magnitude could satisfy what had become, by the spring of 1941, an urgent requirement of great national importance. Before any valuables could be stored it would have to be demonstrated that conditions of 60° F. 60 per cent R.H. could be continuously maintained, and that there was adequate provision in the plant-room against the possibility of breakdowns. It was a question of perfection or nothing.

The choice of site presented many difficulties, as did the preparation of accommodation, but thanks to the Ministry of Works and Planning the ideal repository was brought into being within the remarkably short space of time of one year, and has since been used to capacity (Figs. 1 and 2).

The full value of the work which had been already accomplished in devising standard forms of package and racking was now apparent; uniform series of boxes made for economy in storage space, and distribution is such that it is possible to have immediate access to any specimen by consulting the location inventory. Carpets are tightly rolled and sealed up in paper and they are stored on staging covered with chicken-netting; most of the smaller textiles are suspended on coat-hangers on avenues of horizontal rods, the more fragile under 'Cellophane' envelopes. Fluorescent lighting is available in the inspection rooms and compressed air is laid on to facilitate insecticidal spraying, should moth be discovered.

A feature of the plant room, which is separated from the main repository by strong-room walls, is the arrangement made for the remote observation of conditions in the repository and for the remote control of machinery connected with the conditioning of the air. The engineer-in-charge has before him Cambridge recorders which show at a glance the conditions of temperature and relative humidity at various selected points in the store, and by operating the remote controls he can adjust the setting of the automatic switch gear, if for any reason it should be necessary to vary the air supply in quality or in volume.

It is no exaggeration to state that in every detail of storage there is indication of forethought and skilful planning, and that the directors of the British Museum and Victoria and Albert Museum, with the support of their respective staffs and the Ministry of Works and Planning, have jointly been able to contrive and bring into actuality a museum in the bowels of the earth, which, from the point of view of conservation, is as fine as anything known above ground, either in Great Britain or elsewhere. Much valuable experience has been gained and it is a comforting reflexion that this knowledge will be applied in the remodelling of our museums after the War, so that the national treasures can be adequately housed and suitably displayed.

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OBITUARIES

Sir Thomas Middleton, K.C.I.E., K.B.E., C.B., F.R.S.

SIR THOMAS HUDSON MIDDLETON, chairman of the Agricultural Research Council and formerly professor of agriculture in the University of Cambridge, died at his home, Whyte House, Strawberry Vale, Twickenham, on May 14 at the age of eighty.

Sir Thomas was educated at Merchiston Castle School, Edinburgh, and at the Universities of Glasgow and Edinburgh. His first post (1889) was the professorship of agriculture at Baroda College, India. He held this until 1896, when he became lecturer in agriculture in the University College of Wales, Aberystwyth. Then, in 1899, he was appointed to the professorship of agriculture at Durham College of Science, and, in 1902, to the professorship of agriculture in the University of Cambridge. The Department of Agriculture, as it was then described, was a young one, inadequately staffed and housed, and struggling to find its place in a University which at that time looked upon applied science with almost as much suspicion as the farmers of the Eastern Counties of England. Agriculture in Britain had drifted into a pitiably depressed condition, and large areas of land were passing out of cultivation. To check the prevalent 'tumbling down' of good arable land to grass, he set in train a series of demonstrations in Cambridgeshire and the surrounding counties on the technique of laying down land to grass with appropriate seeds mixtures. He also instituted trials to determine which were the best varieties of potatoes for growing in the Eastern Counties and to demonstrate, among other things, the value of a 'change of seed'. This was particularly congenial work to him, for his home training on Rose Farm in the Black Isle, Cromarty, had provided him with an exceptionally thorough knowledge of the crop. These demonstrations soon proved to be of great value to the farmers of the Eastern Counties and went far to dispel their mistrust of everything connected with laboratories and experimental farms.

Middleton's stay in Cambridge was a short one, for in 1906 he accepted the post of assistant secretary of the Board of Agriculture. It is no secret that he had misgivings about the advisability of doing so, and his friends, realizing how much his interests were bound up with an open-air life, did their best to dissuade him from taking this step by pointing out that the Board, at this time, had only a somewhat tenuous interest in education, and no vision whatever of the part research work could play in the development of agriculture; but the view that he could do more for agriculture as a Government official than as a university professor won the day.

This post he held until 1919, acting during the last two years of his tenure as deputy director general of the Food Production Department. The campaign he then became responsible for, hurriedly planned as it inevitably was, added the produce of approximately an extra three million acres to the national food supply in spite of a great shortage of labour, fertilizers and machinery. The full story of it is told in his book "Food Production in War" (Oxford, 1923).

With the coming of peace in 1918, Middleton was appointed a commissioner under the Development and Road Improvements Funds Acts of 1909–10. He continued to serve the Development Commission until 1941, becoming its vice-chairman in 1929. His tenure of office was broken into in 1926–28, when his wide experience of agricultural administrative work and his knowledge of agriculture in India was put at the disposal of the Royal Commission on Agriculture in India.

In 1938 Middleton was appointed chairman of the Agricultural Research Council by a committee of the Privy Council for the Organization and Development of Agricultural Research, after consultation with the Royal Society. He was ideally fitted for guiding a Council consisting of scientific men with no special knowledge of agriculture, and agriculturists with an equally limited outlook so far as scientific matters were concerned, for his work had brought him into contact with the research staffs of practically all of the agricultural institutions in Great Britain, and he never missed an opportunity of discussing with them, no matter what the subject, the investigations they were engaged upon. A wide general knowledge of the more important of the sciences bearing on agriculture made this possible and put him in a position to see most of the problems of agricultural development, as the directors of research institutes have to, from both the scientific and practical points of view.

Of the honours which fell to Middleton, two were especially valued. One of these was the fellowship of the Royal Society, awarded in 1936; the other was the Gold Medal of the Royal Agricultural Society, given for distinguished services to agriculture. He was, fittingly, its first recipient. The Universities of Aberdeen, Edinburgh and Wales conferred the LL.D. and Reading the D.Sc. upon him. In 1913 he was made C.B.; the honour of K.B.E. came in 1918, and K.C.I.E. in 1929.

Endowed almost to the end of his life with the best of health and a fine physique, Middleton was capable of tiring out his staff and the visitors to his demonstration plots, and then returning to a strenuous evening's work in the laboratory or his home. But though he never seemed to allow himself any leisure, he found time for two hobbies: one was photography, and wherever his work or his holidays took him he carried a camera; the other was gardening. In Cambridge, in somewhat difficult conditions, he maintained a first-rate collection of roses chosen, as they flowered in a local nursery, with the keen discrimination of an old-time florist and grown with the aid of combinations of the various artificial manures used in his farm demonstration plots.

He married Lydia Miller, daughter of the late Prof. Davidson of Adelaide; she died in 1934, leaving a son and a daughter. ROWLAND H. BIFFEN.

Dr. Karl Landsteiner, For.Mem.R.S.

THE death of Dr. Karl Landsteiner on June 26 in New York has closed a career of singular eminence in the realm of medical research. He was born in Vienna on June 14, 1868; graduated in medicine in 1891 at the University there; and from 1909 until 1919 held the post of professor of pathological anatomy in the University. After the War of 1914–18 he left Vienna to work in a hospital in The Hague, and from 1922 until his death he carried out his researches as a member of the staff of the Rockefeller Institute in New York.

As a young investigator, Landsteiner was deeply interested in the problems of serology and immunology. Together with Donath he made observations on the substance in organ extracts which lyses the strictly homologous red cells, and which he and his co-worker identified as Metchnikoff's macrocytase. With Halban he studied the differences of fœtal and maternal blood sera from the point of view of their lytic, agglutinating and bactericidal properties. Donath and Landsteiner in 1904 and 1905 made a notable contribution to knowledge of the role of intravascular lysis in the pathogenesis of paroxysmal hæmoglobinuria. But the chief work of Landsteiner at this early stage was the recognition of differences in human red blood corpuscles when obtained from different individuals, and the separation of the red cells into four well-defined groups characterized by their behaviour when exposed to the action of the two main types of agglutinins that are met with in human sera. A statement foreshadowing this work was made in a footnote to a paper on the anti-enzymic, lytic and agglutinating action of blood serum and lymph, which is dated February 10, 1900. He was an assistant in the Institute of Pathology in the University of Vienna when, in 1901, he published his work on iso-agglutination and the blood groups. Even at this early date he was aware of the probable significance of his results for medico-legal purposes and in the practice of blood transfusion. The value of his pioneer researches on the subject was attested when, in 1930, he was awarded the Nobel Prize in Medicine.

The importance of this work has been abundantly proved during the present War in the avoidance of undesirable reactions by ensuring that the donor's blood is compatible with that of the recipient. In spite of every care, inexplicable reactions have occasionally occurred, and it was Landsteiner and Wiener who threw light on these accidents when, in 1940, they discovered a hitherto unsuspected antigen, the *Rh* factor, a symbol chosen because a similar antigen exists in the blood of rhesus monkeys. This antigen is present in the red blood cells of 85 per cent of human subjects, and an important extension of knowledge arising from its study has