

latter spread fairly uniformly over the volume. The energy of agitation tends to stir the material and 'melt' the crystal, but the crystalline state is a fair approximation to the actual condition. The gaseous character of the material would be manifested chiefly in its mechanical properties of expansion and compressibility, while the crystalline structure would appear chiefly in the optical properties.

A discussion of Cepheid variables regarded as pulsating stars occupied a considerable portion of the lecture. Although the difficulties of the conception

have not been completely overcome, Prof. Eddington regards them as by no means serious. The problems set by such stars have led him to the view that the influence of temperature and density on the rate of liberation of sub-atomic energy must be an indirect one. "The energy is released from certain active substances formed inside the star; the rate of formation of these substances increases with temperature and density, but they break up and liberate the energy at a rate unaffected by temperature and density."

Museums and Education.

SIR HENRY A. MIERS accomplished a great work for the museums of Great Britain when he wrote his report for the Carnegie Trustees, but that report was designed more particularly for museum committees and museum curators, and its appeal was for the specialist rather than the public. Now Sir Henry adds a second to his former accomplishment, for he has gone out into the wilderness to preach the gospel of museums to the people. This is as it should be, for it is to the apathy of the public and the dislike of intellectual effort, observable even where first-rate museums offer no excuse for it, that much of the inefficiency of museums can be traced.

On Jan. 23, Sir Henry Miers delivered an address on "Museums and Education" to the Royal Society of Arts, when the Right Hon. The Earl of Crawford and Balcarres, himself known for his wide interests in museums, was in the chair. Readers familiar with the strictures of the report will be prepared to learn that his address was not a gospel out and out, but underlying the very just criticisms which he made of certain types of museums, of curators, and of the public, lay a deep current of optimism in the educational possibilities of museums, and in a rejuvenated future in which they would take their due place in the development of the nation's outlook and thought. His address fell into two broad sections: in the first, he displayed the weaknesses and inefficiencies of many museums as they now exist, and showed how these had a direct and unfavourable repercussion upon the people's museum outlook. In the second, he pointed the way in which steady improvement might be made, by a reorganisation of museums towards special ends.

Sir Henry Miers' general criticisms of local museums as they are familiar to readers of NATURE. He summed them up in the course of his lecture: "There are many signs of improvement in

the general situation, but, when all is said, it must be confessed that the large majority suffer from over-exhibition, lack of policy, and the fatal habit of accepting miscellaneous gifts, so that of the service which they might render throughout the country a very small part is actually fulfilled by them."

Perhaps it is more profitable to dwell on Sir Henry's constructive suggestions. He founded his proposals on the proper assumption that museums are designed for the use of four distinct categories of visitors: the ordinary, more or less casual, visitor; the local student, whether he be of ripe years or an elementary scholar; the definite and purposeful collector and inquirer; and the scientific research worker. Not every museum can cater for each of these groups, but the principle of appeal for any group ought to be similar wherever it has a place. Thus it is most fitting that for the ordinary visitor the nature and resources of the town or district should be displayed, the labelling should be thorough yet simple in word, and easy transitions should lead from one collection to another of different kind.

For school children and older scholars, summary collections or introductory series are desirable, and Sir Henry said a true word when he stated that the writing of lucid, accurate, and short labels is a very difficult task, requiring much care and thought, and, we would add, experience. For the collector, the introductory series must be supplemented by systematic collections, and for the research worker, to these must be added great stores of classified and authenticated material.

A strong appeal was made for the strengthening of the Museums Association, as a correlating body, for the extension of interaction and inter-lending between the national and local museums, and for the creation of a type of museum new to Great Britain, the 'folk museum,' which would depict in complete units the life of English (why not British?) people through the ages.

Culture Sequence in the Swiss Lake Dwellings.

OWING to lack of supervision and organisation in the earlier explorations of the Swiss lake dwellings, chronological data relating to the finds are scant. As, however, investigations were for the most part of a superficial character, many sites were left undisturbed except for the topmost layer. Some of these have now been explored by M. Vouga under the auspices of the Neuchâtel Committee for Archaeological Research. A summary of the results is given in *Antiquity* for December.

The civilisation of the Swiss lake dwellings up to and including the Copper Age is represented by two phases. The older appears in a single stratum, while the second consists of two or three superimposed. These are distinguished as lower, middle, and upper Neolithic and Eneolithic ages. They are separated each from each by a barren layer of a certain thickness. It is to be noted that in the deposit of the first occupation, which always rests on the lacustrine bed,

the objects found are for the most part of a much more advanced technique than those found in the upper layers. This is particularly true of the pottery, which reaches a high grade of excellence. Here, too, the flint is dark brown, semi-transparent at the edges, and not the opaque white, dusky, or black local product. The spindle-whorl seems unknown.

The middle Neolithic has been called the *bel âge de la pierre*, but that appellation must now be abandoned in view of the finds in the hitherto neglected lower Neolithic. It is, however, still the most important settlement, its deposit sometimes being a metre thick. The remains of the habitations have generally been destroyed by fire. Its flint work is richer and more varied than in the early stratum, the 'type-fossil' being the arrow-head. The pottery has degenerated, and gives the impression of an art in its infancy.

The upper Neolithic is a normal evolution of the middle, of which it represents merely an advanced

phase, though separated from it by a barren deposit. As a rule it forms the base of the archaeological deposit of the Copper Age, which is found inland, proving that the waters stood at a higher level in the late Neolithic period.

The Eneolithic age evolves normally from the preceding Neolithic. The fact that the upper strata of this period were disturbed at a very early date points to the cultivation of the ground by the succeeding people of the Bronze Age. The occurrence of the Bronze Age dwellings at a greater distance than the Neolithic from the present shore points to a period of drought rather than to greater technical skill.

University and Educational Intelligence.

BIRMINGHAM.—The report of the Vice-Chancellor to the Council for the year 1927–28, which will be presented to the Court of Governors at the annual meeting on Feb. 21, has been issued. The number of students for the session showed an increase on that for the preceding year, and a further increase appears in the present session. Pleas are advanced for the extension of the residential accommodation for women students, for an increase in expenditure on the library, and for more scholarships with which maintenance grants must be associated. The appointment of some senior members of the non-professional staff to Grade I. is urged on the ground that, if retirement at the age of sixty is compulsory, those who have not held for some ten years a post with a salary of not less than £600 are entitled only to a pension which is quite inadequate to services rendered. The Vice-Chancellor reports that the voluntary medical examination of women students on entering the University, which was instituted two years ago, has met with complete success, and it is hoped that similar facilities may be offered to men students. The report of the Joint Standing Committee for Research records a substantial output of research during the session.

CAMBRIDGE.—A syndicate consisting of the Vice-Chancellor; Sir J. J. Thomson, Master of Trinity; Prof. Seward, Master of Downing College; Dr. Willis, Dr. A. W. Hill, Dr. H. Hamshaw Thomas, Prof. A. G. Tansley, Sherardian professor of botany in the University of Oxford; A. Amos, R. A. Hayes, and F. L. Engledow has been appointed to consider the organisation and finance of the Botanic Garden and the relations between the Garden and the Department of Botany and other scientific departments, and to report to the University by the end of the ensuing term.

EDINBURGH.—At a meeting of the University Court on Jan. 28, Principal Sir J. Alfred Ewing intimated his intention to retire from the principalship of the University on Sept. 30 next.

ST. ANDREWS.—The Prime Minister, the Right Honourable Stanley Baldwin, has been elected Chancellor of the University and has written to Principal Sir James Irvine accepting the appointment.

RECENTLY Mr. Paul F. Williams, a well-known engineer and business executive of Chicago, Illinois, established the Paul F. Williams Research Foundation Fund for the promotion of scientific research at Purdue University, West Lafayette, Indiana. This fund provides for several one thousand dollar annual research fellowships. At least two of these will be available for physical research in the Graduate School of the School of Science. This is but one of the many evidences of the business man's interest in the building of a research centre at Purdue University, where knowledge may be created through fundamental research and applied through industrial research.

Calendar of Patent Records.

February 9, 1832.—During the steam-carriage boom that started about 1821 and lasted some years, several companies were formed and projected to run lines of coaches. The London and Birmingham Steam Carriage Company built in 1833 a coach of the type invented by Dr. William Church of Birmingham, and patented by him on Feb. 9, 1832. The coach had a single front wheel and was carried on air springs; its driving wheels were 8 ft. 6 in. in diameter, and had elastic rims and spokes; they were mounted on separate axles and geared by chains to the engine shaft. The carriage did not prove very successful and was not used after a few short trials.

February 10, 1801.—Green-houses for vines and other plants came into general use during the eighteenth century. The first patent for a hothouse was granted on Feb. 10, 1801, to James Anderson, the editor of the rare periodical *The Bee; or Literary Weekly Intelligencer*, 1791–94, and the author of several agricultural works.

On the same day, Feb. 10, 1801, the first patent for a fire-resisting safe was granted to Richard Scott, a colonel in the employ of the East India Company. The safe consisted of an outer casing with double walls of metal and a filling of charred wood soaked in an alkaline solution, and an inner metal box supported on all sides by pins.

February 10, 1825.—A great improvement was made in the candle by the invention of the plaited wick, which became untwisted and consumed as the candle burnt. The invention was patented in France by Cambacérés on Feb. 10, 1825, but it does not appear to have reached England until some years later.

February 12, 1849.—During the first half of last century, especially after the invention of photography, the forgery of Bank of England notes was very common, and many inventors applied themselves to the problem of devising means to circumvent the forgers and safeguard the public. The new issue of notes which was made from the Bank in 1855 was printed on paper manufactured according to a process patented by William Brewer and John Smith on Feb. 12, 1849, in which the design for the watermark is engraved on steel dies and transferred by stamping to brass plates fitted within the paper-making moulds.

February 14, 1780.—The well-known letter-copying press was patented by James Watt on Feb. 14, 1780. The patent specification describes, in addition to the usual screw-press, a rolling-press, which is the form that Watt himself preferred to use.

February 14, 1876.—Several claimants, notably Reis in Germany and the Italians Manzetti and Meucci, dispute with Alexander Graham Bell the right to be called the inventor of the telephone, but it was undoubtedly on Bell's experimental work and his United States patent of 1876 that the commercial development of the telephone is based, and from which its use as a practical instrument dates. Bell's application for his original patent and a caveat from Elisha Gray for a similar invention at which he had arrived independently were filed in the U.S. Patent Office on the same day, Feb. 14, 1876, within an hour or two of each other, but the actual times of filing were sufficiently well authenticated to enable the Patent Office authorities to pronounce definitely in favour of the priority of Bell, and his patent was duly sealed. Applications from Gray, Edison, Dolbear, Berliner, and others, followed in quick succession, and heavy litigation was only settled by the Bell Company buying up the whole series of inventions.