

the range of soundings by free balloons to that height, and beyond. By the proper choice of balloons that should be possible.

Another line of attack is also open. We are familiar with the fact that, during the War, gunfire was heard regularly at distances exceeding 100 miles. Why should not similar observations be made systematically in peace time? I should like to inquire whether gun practice at Portland is heard in South Wales. If there is any quiet spot in that region where the sounds are heard frequently, observations should be timed and, with a little organisation, valuable information would

be obtained. The advantage of frequent observations of this kind as compared with the occasional 'big bang' is obvious.

Since this article was written I have had an opportunity of testing the possibility of timing the passage of the sound of gunfire. Listening at Grantham on June 28 for the discharge of guns at Shoeburyness, 115 miles away, I found that the time of passage increased gradually from 10¾ to 11¼ minutes and then began to decrease. Details have been published in the *Meteorological Magazine* for August.

Obituary.

DR. J. F. HALL-EDWARDS.

WE regret to record the death on August 15, at the age of sixty-seven years, after many years of suffering due to extensive X-ray injuries, of Dr. J. F. Hall-Edwards. He was educated at King Edward's School and at Queen's College, Birmingham, and after qualifying in medicine he went into practice. Soon after the discovery of X-rays, Dr. Hall-Edwards took up their application in medical work and was one of the earliest authors in radiography. He served in the South African War as surgical expert in X-ray work to the Imperial Yeomanry Hospitals at Deelfontein and Pretoria, receiving the Queen's medal with four clasps. In spite of disabilities which might well have deterred him from any further executive work, he applied for and received a commission as temporary Major in the R.A.M.C. at the outbreak of war in 1914, and served in a radiological capacity to such effect that official recognition of his services was made on two occasions. He was an honorary member of the Röntgen Society and the author of several original papers in the journals of this Society and of the

Electro-therapeutic Section of the Royal Society of Medicine.

Dr. Hall-Edwards made a great fight for many years against the insidious damage which he had suffered when using X-rays in his medical work. Like other pioneers he suffered because protective methods were unknown. His services in the public cause which so unhappily affected him, were recognised by the award of a Civil List pension in 1908, and later, in 1922, he received the Carnegie Hero Trust Medallion with an annuity.

S. Russ.

WE regret to announce the following deaths:—

Dr. Charles W. Eliot, for forty years president, and since 1909, president emeritus of Harvard University, who was largely responsible for raising Harvard to its present high position among the universities of the world, on August 22, aged ninety-two years.

Dr. D. E. Flinn, formerly medical inspector of the Local Government Board, Ireland, editor of the *Health Record* and author of works on public health and hygiene in Ireland, on August 18, aged seventy-six years.

News and Views.

SIR ARTHUR EVANS'S paper on "The Shaft Graves of Mycenæ and their Contents in Relation to the Beehive Tombs," which was read before the Anthropological Section of the British Association at Oxford, was something in the nature of a bomb-shell, of which the effects will be far-reaching. The relation of the great beehive tombs at Mycenæ, which were found empty of their sepulchral contents, to the shaft-graves, so rich in sepulchral relics, found by Schlieman within an extension of the Acropolis wall, has always been a puzzle to archaeologists. Sir Arthur's paper revived a theory, first put forward by Prof. Gardner and arrived at independently by himself, that at a time of danger the royal burials had been transferred from the mausolea outside the walls to a site which could be included within the enceinte. This theory has not found favour among archaeologists, and the view generally held is that the two classes of tombs correspond to earlier and later dynasties at Mycenæ. Mr. Wace recently has carried the matter further and suggested that the two finest shaft-graves, the "Treasury of Atreus" and the "Tomb of

Clytemnestra," belong to the latest groups, making them contemporary with a time when the Palace of Knossos was in ruins and the civilisation of Crete on the downward path. Sir Arthur Evans's latest discoveries render this theory untenable. He has found decorative sculptures, not later in date than the end of the Third Middle Minoan period and in vogue about 1700 B.C., which run parallel with those of the façade of the "Atreus" tomb. Vases characteristic of the same epoch were found in the "Tomb of Clytemnestra." He was able to demonstrate archaeologically that the finest of the beehive tombs belong to the same date as the earliest elements in the shaft graves, and that both are equally Minoan. On this view their culture, with the exception of certain intrusive barbaric elements, can no longer be regarded as a 'mainland' culture and, as Sir Arthur pointed out, the term 'Helladic' as applied to it becomes a misnomer.

SIR FREDERICK KEEBLE, Sherardian professor of botany in the University of Oxford, has accepted an

appointment with the Synthetic Ammonia and Nitrate Co., which is associated with Messrs. Brunner, Mond and Co., for the promotion of research in the application of synthetic nitrogen compounds to agricultural purposes. He will probably be released from his chair at Oxford at the end of next term, and start upon his new duties in January. This appointment marks a further step in the movement towards a closer association of fundamental scientific research with commercial enterprises in connexion with agriculture. The growing use of artificial fertilisers renders it imperative that possible fresh sources of supply should be investigated and the value of the products thoroughly tested. As a measure of economy and as a means of protecting agriculturists from loss that might be incurred by using new and comparatively untried fertilisers, research with regard to their economic application is essential, and it is this that Sir Frederick Keeble will endeavour to foster. His wide and varied experience has already brought him into contact with certain aspects of the problem, for on the practical side he has served as controller of horticulture to the Food Production Department of the Board of Agriculture, as assistant secretary to the Board of Agriculture, and as director of the Royal Horticultural Society's Gardens at Wisley, and on the scientific side as professor of botany at Reading and at Oxford. The possibilities in connexion with the use of synthetic nitrogen compounds as fertilisers are of great importance to agriculture, as was pointed out by Sir Daniel Hall in his presidential address at Oxford to Section M (Agriculture) of the British Association, which appears elsewhere in this issue, and the development of this line of work will be followed with much interest.

FURTHER records of the British earthquake of August 15 show that the disturbed area is much larger than was at first supposed, for it was felt at King's Lynn, Gainsborough and Harrogate, so that the total area shaken may amount to 60,000 square miles. This is a high estimate, but it must be remembered that the shock was felt chiefly in upstairs rooms and at a time when there were few disturbances to hinder its observation. The position of the epicentre is still uncertain, but it is probably nearer Ludlow than Hereford. That the depth of the focus was considerable is clear from the slow decrease outwards in the strength of the shock in the central district, and from the large area shaken. The shock seems to have been registered at most British stations. The interesting record obtained at Kew is reproduced in the *Daily Express* for August 17. At Stonyhurst, according to the Rev. J. P. Rowland, S.J. (*Times* for August 20), the first preliminary tremors began at 3h. 58m. 46s. A.M. (G.M.T.), and the second at 3h. 59m. 5s., implying that the origin was 103 miles from the observatory or close to Ludlow. "The chief element of uncertainty," he adds, "lies in the determination of the time of commencement of the preliminary tremors, which are very small and difficult to read."

WHAT was probably the first important geological discovery from the air was made in 1920 by Dr. P.

Chalmers Mitchell in the course of *The Times* African aeroplane flight. Between Khartum and Wady Halfa the Nile follows an S-shaped course. Flying over the unexplored country within the southern loop of the S, Dr. Mitchell observed a great plain of lava diversified with a number of craters and resembling, as he said, "an enlarged view of the moon." Part of this previously unvisited volcanic field has now been explored by motor car by Mr. H. C. Jackson (*The Times*, August 18). South-west of Sani Wells two conspicuous extinct volcanoes were found; one of the somma type, and the other, graphically called "the Place of Gloom," with an apparently complete crater "of awe-inspiring dimensions." Dr. Mitchell thinks that these craters lie to one side of those over which he passed, and states that Dr. Grabham, the Government geologist of the Sudan, hopes soon to make a survey of the area. Geologists will await with interest the petrological and tectonic description of the field, for its situation is in a line with the western branch of the Rift Valley system, though far to the north of any hitherto suspected continuation of that branch. It is clear from this example alone that many parts of the world may still hold surprises, even for geographical explorers.

THE president of the Board of Trade has appointed a standing committee to consider and advise on questions connected with the economic use of fuels and their conversion into various forms of energy, having regard to national and industrial requirements and in the light of technical developments. The members of the committee are: Sir Alfred Mond, M.P. (chairman), Mr. J. Baker, M.P., Mr. Mark Brand, Sir John Cadman, Sir Arthur Duckham, Sir William Hart, Mr. Frank Hodges, Prof. F. A. Lindemann, Sir David Llewellyn, Mr. M. Mannaberg, Mr. C. H. Merz, Sir Alexander Walker, and Mr. D. Milne Watson. The secretary of the committee is Mr. W. Palmer, and the assistant secretary Mr. R. J. Moffatt. All communications should be addressed to the secretary, National Fuel and Power Committee, Board of Trade, Great George Street, S.W.1.

PROF. ELLIOT SMITH, in the *Morning Post* for August 23, again raises the question of the origin of American culture, apropos of the articles by Dr. T. W. Gann on his discoveries on ancient Maya sites in Central America, which appeared in that journal in the early part of the year. Prof. Elliot Smith now offers the interesting suggestion that the remarkable stone causeways of the Maya found by Dr. Gann are distinctive of work of that period in Indo-China and Java, where there were definite reasons for their construction, and that they were introduced "from those countries into Central America, where, however, the reasons for their construction no longer existing, they continued to be constructed from force of habit. He goes on to refer to the arguments recently advanced by Dr. C. Handy that the Maya temple and the Polynesian oracle-house were both copies of the Cambodian temple. A third class of evidence to

which Prof. Elliot Smith directs attention is connected with the cultivation of the sweet potato. The methods of cultivation employed are identical not only in New Zealand by the Maoris and in America, but also throughout Oceania, Cambodia, China, and Japan. Further, it is held that *Kumara*, the Maori word for the sweet potato, also occurs in Ecuador and Peru as *Kumar*, but in addition, F. W. Christian has recently suggested that the word itself is to be derived from the Sanskrit word for the white lotus.

MAJOR FRANCO and Capt. Ruiz de Alda have published a book "de Palos al Plata" giving an interesting record of their adventurous voyage in a seaplane across the South Atlantic from Palos in Spain to Buenos Ayres. They make it clear that an important factor in their success was due to the Marconi direction finder and the radio telegraphic apparatus they carried. On several occasions the direction finder prevented them from making unnecessary detours. There was a fog when approaching Las Palmas. They signalled the radio station there to send continuous signals so as to ensure a good descent. This was immediately done, the signals increasing in loudness until they were directly over Las Palmas, and a good descent was made. They experienced bad visibility again when approaching San Vicente, and again the direction finder proved to be of the greatest value. During their flight they were frequently in communication with passing ships, which sent them their bearings and sometimes sent radio messages announcing their progress to their next stopping place. The authors conclude that the direction finder enabled them to navigate with a maximum inaccuracy of about 3°. This is equivalent to efficient dead reckoning navigation and even to very fair astronomical navigation. They consider that radio telegraphy is indispensable for flights over the sea or sparsely populated countries.

RESULTS of meteorological observations made at the Radcliffe Observatory, Oxford, in the five years 1921-1925, prepared under the direction of Mr. H. Knox-Shaw, Radcliffe Observer, have recently been published by order of the Radcliffe Trustees. The work consists of five annual parts which deal with the observations for the several years. Commencing with 1925, changes in the routine of observation have been introduced; the numbers of eye-readings have been reduced from three to one each day, and the photographic barograph and thermographs which have been in use since 1881 have been superseded. Various other alterations of smaller detail have been introduced, but they are clearly stated. Now that observations have been recorded for seventy-five years or thereabouts, the mean results of barometer, temperature, and rain are as accurate as they will ever be. The mean of the maximum or day temperatures is 70°·8 F. in July, which is the warmest month of the year, and the mean of the day readings in January, the coldest month of the year, is 43°·7 F. The mean of the

minimum or night readings for the corresponding months are respectively 53°·3 F. and 34°·5 F. The rainfall for seventy-five years gives the annual average 25·99 in. The wettest month is October, with an average fall of 2·84 in., and the second wettest month is July, with 2·58 in. The driest month is February, with 1·65 in., and the next driest March, with 1·73 in.; but making allowance for the different lengths of the two months, less rain falls on a March day when the average daily fall is 0·056 in., while in February it is 0·058 in. The sunshine records cover forty-five years; the sunniest months are May and June, each with average sunshine for 194·5 hours; the least sunny month is December, with the average sunshine 43·8 hours.

ACCORDING to a despatch of the Cairo correspondent of the *Times*, which appears in the issue of August 16, Mr. Alan Rowe, field director of the Palestine Expedition of the University Museum, Philadelphia, has succeeded in identifying the two temples of the Philistines mentioned in the First Book of Chronicles, x. 10. Of the four temples at Beisan (Beth-shan) built during the Egyptian occupation, two belong to the reign of Rameses II., and of these the southern is identified with the 'Temple of Dagon,' which was dedicated to the warrior god Resheph; the northern, which was dedicated to the warrior goddess Antit-Ashtoreth, was the 'House of Ashtoreth.' It is conjectured that a sanctuary was established in one or other of these temples by David after he had destroyed and partially reconstructed them. A consideration of the results of the season of 1925, and the examination of the archaeological objects then obtained, has afforded material for suggestion as to the relation subsisting between Crete, Anatolia, and Philistia before the driving out of the Philistines by King David. The Egyptian mercenary troops who occupied Beth-shan appear to have included an Ægean-Anatolian element before the coming of the Philistines. The walls of the temples of Seti I. and Rameses II. apparently were built by the mercenaries themselves. Some bricks bear signs identical with certain Minoan signs, and not only are the cylindrical cult objects and ring flower-stands Minoan, but also they do not appear on the site before the time of Seti I. The presence of Cretans among the mercenaries had not previously been recognised.

IN the July issue of the *Quarterly Review* Mr. Robert Steele has an illuminating article on the early days of chemistry. He points out that in the Dark Ages of Europe there were two great civilisations, still at the height of their powers, with a foothold in Europe, namely, the Byzantine and the Arab. Byzantium was, however, cut off from Atlantic Europe, whereas the Arab civilisation seems from the first moment of reviving curiosity as to science to have been that to which all eyes turned, in spite of the difference of religion and language. By the middle of the twelfth century a learned world had come into being in Europe, but this renaissance was literary: it knew nothing of science. A century later, however, science

was beginning to come into its own, through the efforts of such translators as Adelard of Bath, Gérard of Cremona, Robert of Chester, and Plato of Tivoli. Among the other Greek sciences which thus came to Latin Christianity by way of the East was alchemy, which had been studied widely and enthusiastically by the Muslims. Mr. Steele's sketch of alchemy in Islam is brief but clear, and by basing it upon recent investigations into this subject he has avoided the errors and misconceptions which are commonly met with. His unrivalled knowledge of medieval Latin alchemy has enabled him to present the salient features of an interesting period in a way which the general reader will find easy to follow and the specialist extremely suggestive.

MR. THOMAS SHEPPARD, director of the Hull Museum, has issued (*Hull Museum Publications*, No. 87) a catalogue of the various exhibits relating to shipping and fisheries which are permanently housed in a special building presented by the late Mr. C. Pickering and situated in Pickering Park, Hull. At one time the whaling trade at Hull was of immense importance, and from it has sprung the present fish and oil trades of that port, which have now grown to an enormous size. It is, therefore, a fitting centre for an exhibit of this kind, and much trouble has been taken to bring together all relics of the old whaling industry which was connected with Hull so early as 1598. The collections are of remarkable interest, embracing as they do an historical series of whaling implements and many valuable old prints and paintings representing the gradual growth of the shipping and fisheries industries. There are many other things in the museum, which is by no means confined to whaling, but all are connected with shipping, fisheries, or exploration in some way, and there is a nucleus of a good library on these subjects. We note that the Adélie penguin (No. 174), brought by the *Terra Nova* from Capt. Scott's last Expedition, is unfortunately described as coming from the Arctic, instead of the Antarctic. Mr. Sheppard is to be congratulated on the catalogue, which adds very much to the value of this interesting little museum.

THE Board of Education has issued a "Report on the Science Museum for the Year 1925." Our copy is marked "For Official Use"; at the same time it is said to be published by H.M. Stationery Office at 1s. net. The restriction of the report to 24 pages does not permit elaborate treatment, but enough is said to show that many objects of considerable interest were placed on exhibition during the year. The more important among them were mentioned in NATURE at the time. The value of this museum may be inferred from three classes of visitors. School children come in large numbers, both on their own account and under the guidance of their own teachers. Students make much use of the collections. Officers and technical experts have found here alone the evidence that enabled judgment to be passed on various claims arising out of the War. The space allotted to the exhibition galleries is therefore fully

justified. At the close of 1925 it amounted to 155,000 square feet, and the addition of galleries giving 22,000 square feet was authorised by the Government. Even this, however, will not suffice, and of it 45,000 square feet is in old buildings not considered sufficiently fire-proof. "The construction of the centre block, to provide about 100,000 square feet, is therefore an urgent need." The War, while retarding the building operations, gave a great impetus to invention, and thus, on both counts, enhanced the congestion. The Science Museum, it should be remembered, is only one of a number of rapidly expanding institutions in a limited area.

It is stated in *Science* that the gold medal of the American Geographical Society has been awarded to Dr. Erich von Drygalski, professor of geography in the University of Munich and leader of the German South Polar Expedition of 1900 to 1903.

THE following have been elected officers of the Röntgen Society for the session 1926-1927: *President*, Mr. N. S. Finzi; *Vice-Presidents*, Dr. Robert Knox, Prof. A. W. Porter, Prof. S. Russ; *Hon. Treasurer*, Mr. Geoffrey Pearce; *Hon. Editor*, Dr. G. W. C. Kaye; *Hon. Secretaries*, Mr. Russell J. Reynolds, Prof. F. L. Hopwood.

A QUANTITY of palæolithic implements, stated in the *Times* of August 17 to number more than 200, has been obtained from a gravel pit, at a depth of 12 feet, on the City of Norwich sewage farm at Whitlingham. The discovery is due to Messrs. H. H. Halls and J. E. Sainty, who, in examining the material thrown from the pit by workmen, found two well-made examples of the hand-axe. Mr. J. Reid Moir has examined the deposits and the implements. He has pronounced them to be of Acheulean type, and considers that the gravels in which they were found were laid down just before the third glacial epoch. The implements exhibit a brownish-yellow patination and some exceed 1 ft. in length.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—An assistant bacteriologist in the department of pathology and bacteriology of the University of Sheffield—The Registrar (September 11). A lecturer in mathematics at University College, Nottingham—The Registrar (September 14). A junior technical officer in the aerodynamics department of the Royal Aircraft Establishment—The Employment Department, R.A.E., Farnborough, Hants (September 18, quoting Reference A. 122). An engineer to take charge of the Wood Preservation Section of the Forest Products Research Laboratory of the Department of Scientific and Industrial Research—The Secretary of the Department, 16 Old Queen Street, S.W.1 (December 1). A teacher of biology at Gordon College, Khartoum—The Sudan Government London Office, Wellington House, Buckingham Gate, S.W.1. A part-time lecturer in mathematics at Birkbeck College—The Secretary, Birkbeck College, Breams Buildings, Fetter Lane, E.C.4.