

Research Items.

Pictographs on European Prehistoric Pottery.—We have received from Dr. L. A. Waddell a questionnaire on the Sumerian markings upon prehistoric pottery found in the Danube and associated valleys of Middle Europe. In an explanatory note Dr. Waddell appeals to archaeologists and historians in middle and south-eastern and northern Europe, and particularly to prehistorians in the British Isles, to examine all examples of prehistoric pottery from the area mentioned to which they have access for markings, apart from the decorative element, in the nature of owner's or maker's marks. The object of the search, it is explained, is to demonstrate that these markings are analogous to the 'owner's marks' inscribed on the pottery of the Predynastic and First Dynastic periods in ancient Egypt. The latter, Dr. Waddell maintains, can be shown to be Sumerian pictographic writing and presumably bear their phonetic values. By means of a comparative table of marks, Dr. Waddell seeks to demonstrate their identity in Sumerian, Egyptian, and Danubian pottery marks, giving their phonetic equivalent in each case. Dr. Waddell also holds that he has demonstrated that all the ancient civilisations of the world—Mesopotamian and Elamite, Egyptian, Minoan, Hittite, Græco-Roman, Indo-Persian, and presumably also Chinese, were derived from Sumeria. By a synchronism of ancient Egypt and Mesopotamia, Menes is identified as a son of Sargon of Akkad and his date fixed at about 2703 B.C., while for the Danubian pottery from the prehistoric strata at Vinča, a date of about 3300 to 2700 B.C. is suggested on palæographic grounds.

Sacred Trees in Egypt.—In *Man* for January, Mr. G. D. Hornblower describes with photographs a sacred grove at Nezlet Batrân in Egypt, which differs from most sacred groves in that country in that it is not connected with any holy personage. Sacred trees, mostly sycamore, are common in Egypt, normally in association with sheikhs or their tombs. On them rags from the clothing of their devotees are frequently hung. The Virgin's Tree at Matarieh, near Cairo, is a well-known example and has been the object of pious pilgrimage for Christians for centuries. Under it the Virgin is said to have rested with the Holy Babe, and here only was true balm grown, originating in water from the Infant's clothes which the Mother washed out in a neighbouring pool. The grove at Nezlet Batrân is known as *Dahr es-Sunt*, "The Back of the Acacias". The fact that it is not associated with a Moslem or Christian saint suggests that here the belief has survived from very early times in considerable purity. It is sacred to the *Sukkan es-Sunt*, "The Inhabitants of the Acacias"—supernatural beings who live underground. It is visited on Friday mornings, and its leaves dried and powdered are burned as incense for the healing of the sick. No man may use its wood for fuel under penalty that evil, such as fire, will strike his house or he may lose his cattle through sickness. It shares with other sacred trees two features. Lighted lanterns are hung on the branches, and iron nails are driven into the trunk as offerings for sick people. These must be fresh from the forge.

Biological Control of the Gipsy Moth.—In *Technical Bulletin* No. 86 of the United States Department of Agriculture (1929) Messrs. A. F. Burgess and S. S. Crossman discuss the results of twenty-four years of work with reference to this problem. Both the gipsy moth and the brown-tail moth are well known intro-

duced pests of the United States and the present report reviews the work done in controlling these insects by the introduction of their natural enemies from Europe. It is claimed that by introducing insect parasites against the gipsy moth, the forests of New England have been saved from destruction. From 1905 to 1916 defoliation showed no reduction in intensity, but, from 1920 to 1924, the acreage defoliated gradually decreased, until in the latter year few completely defoliated areas remained. The total percentage parasitism resulting from the activities of beneficial insects gradually increased until the maximum was attained in 1923. Since then, the parasitism has steadily declined until 1927, when some revival was noticed. The authors state that unless the parasites increase again more rapidly, the westward spread of the gipsy moth will have greatly reduced chances of being checked. During the decline of the parasitism the gipsy moth has greatly increased again and, in eastern Massachusetts, it regained its former severity. In forest areas, where artificial control methods, other than the elimination of favoured food plants, are not applicable, the sole chance of repression, without undue expense, lies in biological means. Much work still remains to be done on the latter procedure, and investigations being made in the native countries of the gipsy moth lend support to the possibility that improved methods and results will follow. In towns and cities, on the other hand, artificial control, although expensive, can be employed and yields good results. A combination of both methods of campaign, according to the type of country in question, requires continued rigorous prosecution.

Pliocene and Pleistocene Fossils from Sakhalin.—The northern half of the island of Karafto, or Sakhalin, has long been known to yield rock-oil in the regions bordering on its eastern coast. During the occupation of the island by the Japanese, regular surveys of these districts were made and fossils collected, many of which, however, were destroyed in the fire following the great Tokyo earthquake of 1923. The remainder, with some additional material and specimens collected farther south, where oil does not occur, have now been described by Prof. Matajiro Yokoyama (*Jour. Fac. Sci., Imp. Univ. Tokyo*, sect. 2, vol. 2). Forty-two species of marine mollusca are described and referred to the Pliocene, while a few from the southern locality are ascribed to the Pleistocene. From a study of these the author is led to infer that whereas in similar deposits in Japan proper and in Formosa the evidence, as pointed out in previous papers, indicates a colder climate then existed than at the present day, no such difference seems to have occurred in Sakhalin. Further studies on this point are nevertheless necessary.

After-Shocks of the Tango (Japan) Earthquake of Mar. 7, 1927.—Mr. N. Nasu, of the Tokyo Seismological Institute, has recently made an exhaustive study of the after-shocks of the Tango earthquake (*Jour. Fac. Sci., Tokyo Imp. Univ.*, vol. 3, pp. 29-129; 1929). These shocks were so numerous that at one station 1307 shocks were recorded up to the end of June 1928. Of these it was found possible to determine the surface-position and depth of focus of 482 shocks. The sites of the shocks changed from time to time within a limited area near the two new faults, the most active zones lying to the west of the Gomura fault, and to the south of the Yamada fault. From the distribution of the epicentres, it is inferred that the Gomura fault may extend under the Japan

Sea to a distance of 18 miles from the coast, so that its total length may be more than 30 miles, while that of the Yamada fault may be 18 miles. Plotting the positions of the foci on horizontal and vertical planes, Mr. Nasu shows that they lie on series of parallel planes from one to three miles apart, the sensible shocks being caused by the formation of large cracks, and the insensible shocks as a rule by the growth of small secondary cracks that were very numerous near the principal faults. A clinograph, erected near the central region of the earthquake, showed that the ground tilted for a few days before each after-shock of moderate strength, the tilting being towards or from the epicentre according as it lay in a region of subsidence or elevation during the principal earthquake.

Samarските from New Mexico.—A detailed study of the samarските from a mica-pegmatite near Petaca in the north-central part of New Mexico has been made by F. L. Hess and R. C. Wells, and their results are published in the January number of the *Amer. Jour. Sci.*, 1930. The mineral is shown to be composed of two parts: one approximating to $2Y_2O_3 \cdot 3Cb_2O_5$ and the other to $Y_2O_3 \cdot Cb_2O_3$. Detailed analyses are given from which the following data are quoted:

	I.	II.
U	10.66	4.85 per cent
Th	1.39	0.97 "
Pb	0.40	0.10 "
Pb		
$\frac{U + 0.38 Th}{Age}$	0.038	0.019
	280	140 millions of years.

Radiographs show that I is an older mineral which was partly replaced by II by later solutions flowing along cracks. The results indicate that the variable results in age calculations on minerals from the same pegmatite are due to successive periods of mineralisation. The evidence supports the thesis of Hess that many pegmatites are the product of successive replacements, and it further explains satisfactorily the puzzling fact already recognised by Holmes, Ellsworth, and Kirsch, that minerals from the same petrographic province may show very different ages as tested by their lead-ratios. It is suggested that the radial cracking of pegmatite around minerals may be due to the growth of new minerals being faster than the replacement of the older material.

The Behm Limno-Sounder.—A useful echo-sounding machine for use in shallow water from small craft, such as motor-boats and rowing-boats, is described in the *Hydrographic Review*, vol. 6, No. 2. The Behm Limno-Sounder is operated with 12 volts, and power is supplied from dry cells or a storage battery. It is made of light metal, and has a range up to 200 metres, and shows the depths in metres. When the vessel is stopped, the range is greater than when the vessel is under way. Soundings may be repeated at intervals of a little less than one second. The transmitter and receiver may be permanently fixed to the vessel's side or bottom, or, if more convenient, may be slung over the side by a rope when required. The depth is shown by the reflection of light. A point of light moves along the scale, and the length of the line of light is the measure of depth. The same apparatus mounted on a tripod is adaptable to soundings from an ice-covered sea or lake. Its operation is unimpeded by low temperatures. A special form of this sounder lowered by a cable and provided with floats could, it is claimed, be used from an airship.

Surface Tension and Temperature.—In the issue of the *Physikalische Zeitschrift* for Jan. 1, Dr. N. Barbolescu, of the Physical Chemistry Laboratory of the

University of Klausenburg, Rumania, sums up and extends his endeavours to express by a satisfactory formula the variation of the surface tension α of a liquid with temperature. He introduces the idea of a surface tension of the gas or vapour above the liquid and makes the observed surface tension the difference between the true surface tensions of liquid and gas or vapour. It is also assumed that it varies as $\exp. -a/(T_c - T)$ where a is a constant and T_c the critical temperature of the liquid. On these assumptions, he arrives at the relation $\alpha V^{2/3}$ proportional to $(T_c - T) \exp. -a/(T_c - T)$, which he shows fits the observed values very well for a number of normal liquids, except close to their critical points. For abnormal liquids he makes a a linear function of $T_c - T$ and states that a still more accurate expression $\alpha V^{2/3} = (A + BT + CT^2)(1 - p/P)$ where $A, B,$ and C are constants, p the saturation vapour pressure at T and P at T_c , may be used up to the critical point.

Range of Electromagnetic Waves.—Mr. V. T. Saunders has prepared a chart, based upon one exhibited by the Royal Society at the British Empire Exhibition at Wembley, showing the range of electromagnetic waves (size 6 ft. \times 1 ft. 10 in. (London: John Murray, 1930.) Unmounted, 4s. 6d. net; mounted on linen, 8s. 6d. net; mounted on linen, folded, 10s. 6d. net; mounted on linen, varnished, on rollers, 12s. 6d. net). The chart covers the whole range of the electromagnetic spectrum between the cosmic rays and the waves produced by mechanical movement of a coil in a magnetic field. Wavelengths are shown both in centimetres and in Ångström units, together with the corresponding frequencies, and summaries are given of how the waves in each range are generated and detected. There are two errors under the head of the detection of X-rays. It is not necessary for a body to be heated for it to emit electrons under their action (e), and it is at least misleading to state without further detail that X-rays show no ordinary reflection or refraction (f). Apart from these two points, the chart is accurate, and is likely to find a home on the walls of most elementary laboratories.

Rapid Chemical Changes.—The February number of the *Proceedings of the Royal Society* contains two papers by Dr. F. J. W. Roughton on heat effects in rapid chemical changes. The time required for completion of a reaction is often a very small fraction of a second, if the reacting materials are in good contact, and the measurement of this time, or the setting of an upper limit to it, especially if coupled with a determination of the thermal effect, calls for a special technique. Dr. Roughton has applied for this purpose a modification of the method used by him and Dr. H. Hartridge for studying the velocity of rapid reactions; the reagents are mixed whilst travelling at high speed through an observation tube, and the temperature of the mixture read at various points by delicate thermocouples, time intervals being deduced from the speed of flow of the fluid. After an exhaustive inquiry into the possible sources of error, Dr. Roughton concludes that it is possible to measure absolute temperatures in the mixture to an accuracy of 10^{-3} deg. C., and temperature differences to somewhat less. The order of magnitude of the time intervals involved is indicated by his result that the total heat of neutralisation of most acids and bases is liberated within a period of less than one hundredth of a second. Attempts are now being made to extend the accuracy of the temperature measurements to 10^{-4} deg. C., which will permit of the study of some reactions of considerable physiological importance.