

RESEARCH ITEMS

Early Chinese Lacquer Toilet-Boxes

Two pieces of outstanding importance from the last of the Eumorfopoulos collection have been presented to the British Museum; one, a Chinese lacquer toilet-box, purchased by the National Art-Collections Fund, and the second, the blue splashed T'ang pottery horse which was the late owner's special favourite, presented by Mrs. G. Eumorfopoulos in memory of her husband (*Brit. Mus. Quarterly*, 14, 3; 1940). In a description of the two pieces by B. Gray, the lacquer box is stated to be much the most important piece of Early Chinese lacquer to have left the East. It is remarkable for its fine state of preservation and for unique features of its decoration. Judging from finds made by Japanese archaeologists in Korea, painted lacquer was the most usual material for articles of luxury in the Han period, after Chinese taste had changed about 600 B.C. from an interest in plastic form to a preference for enrichment of surfaces. In the 'Hwai-style period' inlay was extensively used to enrich the bronzes; but in the Han period a freer technique of painting came into fashion. Though also tomb furnishings, the lacquer boxes, tables and utensils must certainly have been used by the owners before death. In the tombs of Lo-lang of South Korea, of the considerable number of lacquer objects found, the most important are the toilet-boxes. These are of three main shapes, small oblong, high rectangular with coffered lids, and circular boxes with domed lids. Although several are inscribed as having been made in Szechwan, until lately no piece was known to have been found on Chinese soil. The present example, however, is said to have been found in a tomb at Haichow in the northern part of Kiangsu near the old bed of the Yellow River. It resembles generally the round toilet-boxes found at Lo-lang, but has important differences, and it differs in the style of the painted decoration. In consequence it has been assigned to the third century B.C. This is before the period to which the Korean boxes all appear to belong in the first century A.D. Probably the true date is somewhere between the two.

Parasites of the Oriental Fruit Moth

CIRCULAR 561 (June 1940) of the United States Department of Agriculture is devoted to an account of the importation, rearing and colonization of various parasites of the oriental fruit moth (*Grapholitha molesta*). The authors, H. W. Allen, J. K. Holloway and G. J. Haeussler are officers of the U.S. Bureau of Entomology and Plant Quarantine. Since about 1923, when this moth became a formidable pest in the eastern States, a good deal of consideration has been given to its control by means of parasites. The reason for this emphasis has been the absence of generally accepted artificial means of control and the great reduction in the insect's destructiveness in some areas where heavy parasitization by indigenous parasites prevails. Much of the parasite work is centred in a special laboratory at Moorestown, N.J., where extensive rearing of imported parasites has been carried out. Of these latter, seven are European species, two Australian and seventeen from China and Japan. One of the most important phases

of the work has been the multiplication of the indigenous parasite *Macrocentrus ancylivorous* and its colonization throughout the area infested by the moth. The breeding for colonization of six of the principal imported species was also a major aspect of the work. It is noteworthy that no satisfactory results have been obtained by the propagation and liberation of the indigenous egg-parasite, *Trichogramma minutum*. It has not yet been possible to make recovery tests from a large proportion of the parasites liberated in different areas affected by the moth. From such recoveries that have so far been made the indications are promising, and several species have multiplied rapidly immediately following their release.

Heterosis

I. N. SVESCHNIKOVA (*J. Hered.*, 31, 349-360; 1940) has analysed the chromosome constitution, vigour and other characters in hybrids between species and varieties of *Vicia*. It is believed that there is a relation between the length of the chromosomes *A*, *F* and *E* and the growth of definite quantitative characters. This relationship can be explained by the existence of additional genes due to duplication of parts of the chromosomes. There is a gradual change in the homologous chromosomes in the closely related species *V. amphicarpa*, *sativa*, and *angustifolia*. Thus the *A* and *F* chromosomes progressively increase in length from *N. amphicarpa* to *V. angustifolia doliochosomica*, while basal branching of 2-3 branches in *amphicarpa* increases to 20 in the last variety, and the bending-back of the standard and wings similarly increases in degree in the species. Hybrids between a race of *V. angustifolia brachisomica* and *V. a. doliochosomica* show 150 per cent increase in height over the parents. On the other hand a different race of *V. a. brachisomica* in a similar cross gave dwarf, stunted plants. Other species-crosses support the view that genes for growth are combined in the species hybrids and that plus-heterosis or minus-heterosis (depressed vigour) may be produced. Sveschnikova also notes that dominance as well as heterosis is more pronounced in species with the longer chromosomes. Segregation in second generation hybrids gives results expected on this hypothesis.

Earthquakes during October

DURING October last, five distant earthquakes were registered at Kew Observatory. The first, on October 1, had an amplitude of 25 μ at Kew, and the second, on October 4, probably the largest in the month, gave a ground amplitude of 110 μ at Kew, being estimated at an epicentral distance of 10,260 km. The third, on October 11, probably 12,300 km. distant, gave a ground amplitude of 78 μ at Kew, whilst the fourth, on October 22, may have originated 2,040 km. away. On October 27, an earthquake, probably at an epicentral distance of 8,720 km. from Kew, commenced registration with a compressional wave at 5h. 47m. 39s. at Kew, and at its maximum attained an amplitude of 39 μ there. This latter record, however, was disturbed by irregular long-period waves which had been noticeable through-

out the day. A further earthquake was recorded by the Bombay Observatory on October 5 and was thought to have had its origin in Tibet. Early on October 11, the region around Los Angeles and Hollywood was shaken by a tremor felt for 10 seconds, though no damage was reported. The Rumanian earthquake of October 22 has been reported previously. Late on the night of October 26 an earthquake rocked the Republic of Costa Rica in Central America, causing some apprehension, though again no damage has been reported.

Earthquakes Registered in Switzerland

DURING July 1940, nineteen earthquakes were registered at the Swiss observatories of Basle, Chur, Neuchâtel and Zurich. The shock of July 1 was in the Azores and that of July 6 in the West Indies. The deep-focus shock of July 10 (ca. 550 km.) was in the region of Tibet, and that of July 14 in the Aleutian Islands. The earthquakes of July 26, 27 and 31 were respectively in the Jura, Central America and Anatolia. During August, sixteen earthquakes were recorded. On August 4 the epicentre was near Simplon and on August 6 in the Swabian Alps near by. The shocks of August 16 and 22 were in Asia Minor and the Aleutian Archipelago respectively, all the epicentres being determined at Zurich.

Seismological Observations at St. Louis

BETWEEN June 5 and August 1, 1940, twenty-three earthquakes were registered on seismographs throughout the United States of America belonging to the Jesuit Seismological Association. At the central station at St. Louis, J. B. Macelwane, S.J., and his colleagues evaluated the initial time, epicentre and depth of focus of the twelve most intense of these from all the records available to them. Besides their own, these included records from stations belonging to the United States Coast and Geodetic Survey and private observatories. The shock of June 5, on a basis of twenty-one records, had its epicentre in north-west Canada, and that of June 17 originated in the Pacific Ocean north-east of Hawaii. The second shock of June 23 originated in the Gulf of California. On July 6 there was an earthquake near the Windward Islands, while the shocks of July 10, 13 and 14 were centred in Manchuria, near Panama, and in the Aleutian Islands respectively. The earthquakes of July 19, 20, 27 and 30 had epicentres in the Aleutian Islands, near Samoa, near Guatemala, and in Anatolia respectively, and the shock of August 1 had its epicentre in the Sea of Japan between the Japanese islands and the mainland. The deepest focus shock was that of July 10, near 550 km., and other deeper than normal shocks were on July 6 (160 km.), July 14 (80 km.), and July 27 (100 km.). All the determinations are said to be tentative.

Ionization of the Lower Atmosphere

IN the *Proceedings of the Royal Irish Academy* (46, Section A, No. 7; 1940) J. J. Nolan adds another paper to his many contributions to the study of the ionization of the lower atmosphere. It is pointed out that concentrations of small ions in the atmosphere of the order of 2,000–2,500 per c.c., obtained from the equation for equilibrium of ionization in a pure gas, that is, $\frac{dn}{dt} = q - \alpha n^2$ where n is the concentration of small ions of one sign (positive and negative

being assumed to be equal), q is the rate of production of ion pairs per c.c. and α is the coefficient of recombination between positive and negative small ions, are very rarely met with in the atmosphere, while in cities n can fall below 100 owing to the attachment of ions to Aitken nuclei. The author goes further into the subject, discussing relevant observations, made in various parts of the world, including Australia and Java, and suggests that the equilibrium of small ions at any place in the lower atmosphere is represented by the equation $q = \alpha n + \beta nZ$, where n and Z are the concentrations of ions and nuclei, α being apparently constant under normal conditions, while β depends upon the nature of the nuclei present.

Solubility of Lead Salts

THE solubility of lead sulphate in ammonium acetate solution is a well-known reaction in analytical chemistry. It has been attributed to the formation of undissociated lead acetate (Noyes and Whitcomb, *J. Amer. Chem. Soc.*, 27, 747; 1905) and to the formation of an acetoplumbite complex ion (White, *Amer. Chem. J.*, 31, 4; 1904). Sanved (*J. Chem. Soc.*, 2967; 1927), from the increased solubility of lead acetate and other lead salts in alkali acetate solution, concluded that the ion formed is probably $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)^+$, a result of the primary dissociation of lead acetate; but the experimental results were obtained with high and varying salt concentration, where the application of the law of mass action could only be qualitative. S. M. Edmonds and N. Birnbaum (*J. Amer. Chem. Soc.*, 62, 2367; 1940) have determined the solubility of lead iodate at constant ionic strength in presence of varying acetate ion concentrations. The results are interpreted in terms of a complex ion $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_{n+2-n}$ and the slope of the curve shows that $n = 1$. Hence the complex ion is $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)^+$ and it may be inferred that the same product is formed from lead sulphate. Of the two alternative explanations, the formation of a complex ion seems, therefore, more probable than the production of undissociated lead acetate.

Trimethylcarbinol as a Cryoscopic Solvent

As a cryoscopic medium of moderate solvent power and having a melting point not far removed from room temperature trimethylcarbinol seemed to have the desired properties. The cryoscopic constants of this substance are, however, very discrepant. In a new investigation by F. H. Getman (*J. Amer. Chem. Soc.*, 62, 2179; 1940) it is shown that by a suitable experimental procedure a sample of trimethylcarbinol having a steady melting point can be obtained; the freshly distilled solvent is removed to a room at a temperature considerably lower than its freezing point 25.1° , thus preserving it in the solid state except when required for use. The melting point then altered only slightly with time. A series of thirty solutes was used and the freezing point concentration curves were drawn. The slope of each curve at the origin gave the cryoscopic constant K . Apart from cases where interaction between solvent and solute occurred the mean value of K was 8.37, whereas the value calculated from one of the discrepant heats of fusion (21.88 cal./gm.) is 8.15. The use of trimethylcarbinol is thus shown to be entirely satisfactory as a cryoscopic solvent, provided due care is used in its preparation and preservation, and it is particularly useful when a melting point not far removed from room temperature is desired.