

## Research Items

**Nudity in English Folk-Dancing.** A photograph of a carved wooden panel, about 14 in. long, formerly in Lancaster Castle, representing figures apparently engaged in a morris dance, is published in the *Journal of the English Folk Dance and Song Society*, vol. 1, pt. 2, by Miss A. G. Gilchrist. The panel is of uncertain date, but is probably contemporary with Henry VII. There are seven figures represented, of which one wearing a cloak and feathered cap carries pipe and tabor, while another, wearing a high cap and distended skirt and bearing a ladle for contributions, is evidently the 'Maid Marian'. The fool wears cap and bells and carries a bauble or bladder. The third figure in the procession is either a nude woman or a boy with artificial female characteristics personating a woman. Sir Edmund Chambers, to whom the photograph has been submitted, suggests a connexion with whatever it may be that lies at the bottom of the Lady Godiva legend and procession. There is evidence for the appearance of nude figures in English dances in the Puritan denunciation of "light, lewde and lascivious dancing" in which the "greatest abuse" of all was "dancing naked in nets", the morris dancers, it was said, coming to dance about church during divine service. It is to be noted that nude figures on misericords, dating from the fourteenth to early sixteenth centuries at Beverley St. Mary, Worcester, Norwich, and elsewhere, wear nets while riding on goats, stags or geese. It has been suggested that these nets may have served the purpose of 'fleshings'. The subjects of medieval misericords seem frequently to have been derived by the artist from what he had seen in plays and pageants.

**Growth Phases of the Organism of Cattle Pleuropneumonia.** The micro-organism of this disease in some of its stages of growth is just on the limit of visibility and is filterable at times through a Berkefeld V filter. Bordet noted that in serum-broth cultures spirillar and filamentous forms develop together with small globular and ring forms. Other authors have suggested that some of these appearances may be artefacts, and various guesses have been made as to the position of the organism, which has been given such generic names as *Asterococcus*, *Micromyces*, *Mycoplasma* and *Asteromyces*. J. C. G. Ledingham has now studied the problem, and has obtained much information by the use of impression preparations of growth on solid media (*J. Path. and Bact.*, 37, No. 3, 393; 1933). According to him, in the initial stage of growth, numerous deeply staining chromatic corpuscles are seen with ramifying filaments of varying length and containing in their substance small chromatic bodies. Detached pieces of filaments form the vibronic forms of Bordet. The threads form complicated masses of filaments having much resemblance to actinomycotic colonies. Terminal and endomycelial chromatic nodes in the mycelial filaments swell up into large oval structures, and in the fully developed colony become surrounded with a thick sheath amidst the tangled mycelial threads. Ledingham considers that the organism, as well as that of 'agalactia' which was also studied, must be placed in the family *Actinomycetaceae*. Filterability through filter candles, he suggests, may be due to an unusual plasticity of the protoplasmic structure.

**Plum Rust Fungus on Apricot and Peach.** The disease of the plum caused by a rust fungus, *Puccinia pruni-spinosae*, has been known to occur in English gardens for many years. A recent paper by Prof. E. S. Salmon and Mr. W. M. Ware (*Gardeners' Chronicle*, Dec. 30, 1933, pp. 490-492) reports that the disease is now attacking apricots and peaches in several districts. The new hosts do not appear to be attacked very severely, and the damage caused is very slight in comparison with the heavy losses of American and New Zealand growers. Descriptions of the fungus are given in the paper referred to, and the interesting suggestion is made that the physiological variation described by Jacky as "form 2" has been introduced to Great Britain from the Continent. *Anemone coronaria*, the St. Brigid anemone, is the winter host of the fungus.

**Stocks for Cherries and Pears.** The fundamental work of the staff of the East Malling Research Station on the standardisation of apple stocks is now being extended to the cherry and pear crops. In the *Journal of Pomology and Horticultural Science*, 2, No. 4, December 1933, two papers are published—"Stocks for Morello Cherries" by Mr. N. H. Grubb (pp. 276-304), and "Free' or Seedling Rootstocks in use for Pears; their Description, Selection, Vegetative Propagation and Preliminary Testing" by Mr. R. G. Hatton (pp. 305-334). Three main types of cherry stocks were tried—sweet cherry, Mahaleb and acid cherry—and each type was budded or grafted with scions of Morello. Sweet cherry carried a scion growth of moderate vigour, but selected stocks showed considerable differences. Mahaleb was considerably larger than sweet cherry in the early stages, but later became weaker and more spreading in habit. Acid cherry stocks were found to be distinctly dwarfing. Mr. Hatton has classified the free pear rootstocks of Europe, obtaining four main botanical groups (A, B, C and D). Some very striking differences in vigour of vegetative clones have been found, and tested under field conditions. The botanical groups all varied considerably, and it is interesting to note that the extremes of vigour were exhibited by members of type C. The stock numbered C7 produced a total wood-growth of 124 metres, whilst C4 only gave 58 metres.

**Kerguelen Archipelago.** Sir Douglas Mawson contributes to the *Geographical Journal* of January a paper on Kerguelen which embodies the results of his observations during the *Discovery* visit in the summer of 1929-30. The Kerguelen Archipelago, Heard and Macdonald Islands are considered to be subaerial features of a vast submarine rise on the floor of the Southern Ocean. This rise, which was traced by the *Discovery* into a high southern latitude, was formerly supposed to represent the remains of a submerged continental land mass, but Sir Douglas Mawson believes that the petrological evidence points rather to the Kerguelen area being an igneous blister on a deep ocean floor. It may, however, have been of considerably greater extent during the low-level stage of the sea in the peak period of Pleistocene glaciation. Another point of interest is the evidence that the present land topography owes most of its features to the work of ice. Sheet ice has done much of the work while deeply-cut glacial grooves are

superimposed on the earlier more general erosion. It is clear that in places, particularly on the west, shelf ice did much to protect the coast from marine erosion. The paper includes a revised map of south-east Kerguelen.

**Primary Standard of Light.** In an article published in *World Power* of August 1933, Dr. J. W. T. Walsh gave a history of the attempts that have been made to establish a primary standard of light leading up to the work of Ives on the black-body standard. As a direct consequence of this work, the International Commission on Illumination recommended that the brightness of a black body under precisely defined conditions should be adopted as the primary standard of light. Following on these lines, the United States Bureau of Standards developed a form of black body standard which is regarded as very satisfactory. It consists of a small tube of refractory material held at the freezing point of platinum by immersion in a bath of the solidifying metal. The tube is made of thoria and the lower end is filled with powdered thoria. The apparatus is placed in an induction furnace operated by current at a million frequency. The brightness of the hole at the top of the tube is then measured photometrically. In a second article published in the January number of *World Power*, Dr. Walsh gives the results obtained with this apparatus at the national laboratories of France, Great Britain and the United States. These results are: France 58.84 international candles per square centimetre, Great Britain 59.10 and the United States 58.84. This shows that the standard developed at the Bureau of Standards represents a primary standard of light which is reproducible from specification to the precision of about a quarter of one per cent. This is a great advance on any previous proposal. The adoption of this standard will in no way affect the value of the international candle. Its only function is to ensure that there is no drift in its value.

**Heats of Dilution.** A study of the heats of dilution of aqueous solutions of zinc, cadmium and copper sulphates at 25° (Lange, Monheim and Robinson, *J. Amer. Chem. Soc.*, December 1933) has given results of interest in the theory of strong electrolytes. Within the limits of error, the measured (intermediate) heats of dilution were proportional to the square root of the molality below 0.001 molal. Although this is in agreement with the limiting Debye-Hückel law, the value of the factor of proportionality was not in agreement. The extension of the theory by Gronwall, La Mer and Sandved requires that the heats of dilution should fuse into the limiting law straight lines at very low concentrations. It was found, however, that the individuality of slope persists to the lowest measured concentration, 0.00005 molal, although this behaviour is not disclosed by other methods of measurement, such as electromotive forces and freezing points, a result which the authors suggest is partly due to the lower accuracy of such types of measurement. The values for the heats of dilution are also not in agreement with those found by the electrochemical method, although there is no theoretical ground for expecting the two methods to yield different results. The values for the  $a$  parameter (correction for ionic radius) in the extended theory are found to be different for zinc and cadmium sulphates, although the electrical method had given practically the same values, and the values of the initial slopes for these 2-2-valent salts were in poor agreement with the value required by the limiting law.

**Cracking of Cement.** A report issued by the Department of Scientific and Industrial Research (Building Research Tech. Paper No. 15, "Temperature Rise in Hydrating Concrete". London: H.M. Stationery Office, 1s. 3d. net) deals with the rise in temperature in concrete in the process of setting and hardening caused by the chemical reactions between water and cement. In large masses of concrete the rises in temperature may be considerable, and this may not only affect the properties of the material itself but also may influence the distribution and intensity of stresses throughout the mass. The fundamental cause of some of the serious cracking that has occurred in large masses of concrete, is the expansion due to the heat evolved during the hydration process followed by contraction during the subsequent cooling. Rapid-hardening cements attain a high strength during the period when the temperature is highest. During subsequent cooling the concrete may become subjected to internal strain, and this possibility has caused considerable concern among engineers. The report contains particulars of observations of temperature rises made on some fifty important concrete structures in various parts of the world. They show generally that with modern cements there is a tendency to attain higher maximum temperatures, and to attain these temperatures in a much shorter time, than was the case with cements formerly used. The report describes the laboratory methods developed at the Building Research Station for measuring the rise in temperature of a particular concrete under conditions simulating those of practice.

**Design of Beam Arrays.** One advantage of short-wave transmission in radio communication is that it is possible to concentrate the radiation to a certain extent in one direction, thus forming a beam of waves. In his classical experiments, Hertz showed that by using a parabolic reflector and placing the transmitter along the focal line, much more powerful effects were produced in a receiver placed on the focal line of a similar reflector when the reflectors faced one another. Hence these waves can be reflected by conductors. A series of vertical aerials with their bases on a parabola (called a beam array) will act like Hertz's reflector. In practice, great care is taken to ensure that the axis of the beam lies in a great circle path joining the transmitting and receiving stations, but hitherto little attention has been paid to the correct angle of elevation of the beam. In a paper read to the Institution of Electrical Engineers on January 3 by T. Walmsley, the results of an investigation into the factors controlling the economic design of beam arrays are given and definite conclusions are obtained. The author states that before the design of an array system is undertaken, tests should be made over several months to find the best angle of propagation in the vertical plane. If, as in the case of the Berlin-Rugby circuit, this varies appreciably with the season of the year, an array capable of having its angle of projection varied should be built. In the case of the Rugby-New York circuit, the best angle of projection—about 79° to the vertical—varies very little during the year. As the wavelength increases the cost of array systems for a given efficiency rapidly increases. In this case also the cost increases as the angle to the vertical at which the radio energy is required to be projected or received increases.