

Research Items.

EXORCISM IN ZANZIBAR.—Mr. W. H. Ingrams describes in the September number of *Man* certain customs observed by the inhabitants of the village of Makunduchi, Zanzibar, which are not found elsewhere among the natives of the island. The inhabitants of this village and the adjacent village of Jembiyani speak a peculiar and distinctive dialect, although both belong to the Wahadimu, the aboriginal inhabitants of the island. One characteristic feature of their culture is an exorcising dance performed by the women, the orchestra only consisting of men. The women possessed of the devil sit in a small tent while the dancers move backward and forward from sunlight to shade under a palm-leaf shelter. Some of the women carry iron tridents on long handles, others knives and swords, and others model outrigger canoes and paddles. As the devil cannot speak the local dialect, a special incomprehensible jargon is used. The devil can only be contracted at sea, and a legend of the origin of this state of possession has it that the devil first appeared from the sea in a canoe and holding a trident. It is suggested that the rite and legend may enshrine a memory of a cult of Poseidon introduced by early Greek sailors who, it is known, travelled along East Africa, and to whom the first description of Pemba and Rhapta is due. It is noted that a coin of Ptolemy X Soter has been discovered at Msasani, north of Dar-es-Salaam.

MAGIC AND MEDICINE AMONG THE AMERICAN INDIANS.—Mr. Charles Whitehead, of the U.S. National Museum, in Art. 10 of vol. 67 of the Proceedings of the Museum, gives an account of the Indian exhibits in the collections which illustrate the history of medicine. The Indians attributed disease to the operations of spirits, or it might be caused by absence of the patient's soul. Consequently the remedial measures were almost entirely magical, and even in the therapeutic use of plants, more importance was attached to their magical properties, the incantations with which they were gathered and the ceremonial accompanying their use, than to experience of their healing properties. In fact, their use was usually determined by some imagined resemblance or relation to the symptoms of the disease, or its mythical cause. Disease was closely connected in their myths with animals, especially the deer. Consequently, for a disease caused by the rabbit, the antidote must be a plant called the rabbit's foot, rabbit's ear, or rabbit's tail; for snake diseases the plant used is snake's tooth; for worms, a plant resembling a worm, and so forth. Their knowledge of surgery was based on a comparative knowledge of the anatomy of the higher animals. Splints, bandages, and the cautery were used, and bone-sets, cupping by sucking, poulticing, cutting, counter-irritation, and venesection were practised. For the last, small chips and flakes of flint were employed as lancets.

TYPES OF AVALANCHES.—In an article on "Les Catastrophes de la Neige" in *Matériaux pour l'étude des calamités*, No. 5, 1925, M. A. Allix suggests a classification of avalanches based first on the condition of the snow, and secondly on the effects of the avalanches. He recognises avalanches of dry snow, occurring below freezing point, and of wet snow, with a higher temperature. These produce respectively cold and warm avalanches, the terms being used relatively. Cold avalanches occur as streams of fine powdered snow following the snowfall. When once a crust has formed on the fallen snow it moves in slabs or flakes (*plaques*) to which different names are given.

Warm avalanches of wet snow occur in larger slabs of relatively slow movement, of which several forms are recognised. All avalanches have a common origin in loss of equilibrium. If the snow is in a state of unstable equilibrium, the most insignificant cause may start the avalanche. A fall of rock, the movement of a train in the valley, even the sound of a voice may furnish the secondary cause. Other causes also operate: unequal contraction due to rise and fall of temperature; saturation of snow with water; and lack of initial cohesion. The paper considers protective measures and includes a short bibliography of the subject.

THE MANURING OF FRUIT TREES.—In the *Journal of Pomology and Horticultural Science*, vol. iv. Nos. 3 and 4, June 1925, Mr. T. Wallace makes perfectly clear the need for more scientific experiments upon the manuring of fruit trees, and commences the description of a series of manurial experiments he has carried out at the University of Bristol Agricultural and Horticultural Research Station, Long Ashton, in which fruit trees, bush and smaller fruit, have been grown in sand culture in pots and supplied with mineral salts in solutions of known composition. These experiments should ultimately provide data of great interest to the plant physiologist, carried on as they have to be over long periods of time. In the present paper, the results obtained with apple trees, in experiments lasting over four years, are briefly given. In order to aid diagnosis of possible causes of trouble when the expert is called in to report upon lack of progress in fruit trees grown commercially, Mr. Wallace has adopted the plan of comparing the growth made by trees receiving all necessary nutrient elements with that made by trees in which one essential element alone is lacking. In four years, cultures along this line have yielded many results of great interest. For example, the large leaf growth and relatively good root growth obtained in cultures lacking calcium or magnesium compares strikingly with the poor root formation when potash is deficient, when the leaves also show great tendency to scorch and to fall early. Nitrate or phosphate deficiency is associated with late and weak development of both leaf and flower bud. Characteristic tints also appeared in the foliage before falling in many cases; thus magnesium deficiency was associated with purple blotches in the relatively large leaves before they fell. Such distinctions suggest that Mr. Wallace's hope to obtain information of value for diagnosis, if applied cautiously to meet the problems arising in practice, is in a fair way to be fulfilled.

RAINFALL IN KOREA.—The Meteorological Observatory of Zinsen (known more familiarly to the western world as Chemulpo) has published a volume of remarkably complete statistics on the "Rainfall in Chôsen (Korea)." The text is entirely in Japanese, but the tables, which form the bulk of the work, have also English headings, and being accompanied by a series of excellent maps, ignorance of the language is no bar to extracting any information which may be desired. Although Korea was probably the first country in the world in which rainfall observations were taken at a network of stations (a number of rain-gauges were in use so early as A.D. 1442), modern meteorology is of very recent development, and in a country of the size of Britain there are records for only 215 stations, most of which were established less than ten years ago. Apparently no attempt has been made to correct these various short series to a common period, and the maps must be regarded as provisional

only. Nevertheless they give us our first clear idea of the distribution of rainfall in Korea. The annual amounts are similar to those in Britain, ranging from 18 to 68 inches, but the falls come chiefly in the summer monsoon in very heavy showers. Ten inches in a day have been recorded at many stations, and the maximum of 19.42 inches (485.5 mm.) in a day at Kosyu greatly exceeds anything known in Britain. The tables also include heavy falls in successive days, greatest and least monthly totals, number of days with various totals, and greatest falls in eight hours and in one hour. The latter table is based on self-recording gauges at eight stations.

THE ACOUSTICS OF HALLS.—The ease and certainty of the methods worked out by Sabine for the testing and improving of the acoustic properties of lecture halls are well illustrated by an article by Mr. A. G. Coombs in the September issue of the *School Science Review*. The new school hall at Berkhamstead was notoriously bad, the audience being unable to distinguish the words in the confused sounds that reached them. On shouting in the empty hall the reverberation continued for 10 seconds, and calculation of the time from the dimensions by Sabine's method gave 13 seconds. By covering the back wall and the ceiling under the gallery with 1800 square feet of "Cabot" quilting made of fireproof eel-grass, and the floor of the gallery with 850 square feet of cocoanut matting, the time of reverberation of the empty hall was reduced to 3 seconds, and of the hall and audience to 1.5 seconds, and it is now possible to hear in it without strain. The author has found the oboe suitable for producing the sound of constant loudness necessary for the tests.

BULLET PHOTOGRAPHY.—Although there is a general impression that the study of ballistics has made great advances since the War, it is only occasionally that an article dealing with such advances is published. The Bureau of Standards at Washington has designed an apparatus for bullet photography for the Frankford Arsenal, and Scientific Paper, No. 508, by Mr. Philip P. Quayle, Assistant Physicist to the Bureau, gives an account of the apparatus and some of the interesting results obtained by its means. The spark is derived from a Leyden jar charged by an electrical machine and passes on the closing of a trigger spark gap by an electromagnet operated, without interfering with the bullet, either by the firing mechanism or by the passage of the head wave of the bullet over an interrupter. By means of the apparatus it has been shown that the service projectile from a 0.30 Springfield rifle ceases to be accelerated within a foot of the muzzle. Thirty-six figures are given, most of them photographs of the bullet with the head and sound waves, and several of them relate to the effects produced by the passage of the bullet through a soap bubble containing hydrogen (*v. also NATURE*, May 16, p. 765).

ROTATION OF THE PLANE OF POLARISATION OF ELECTROMAGNETIC WAVES.—Experiments with a molecular model consisting of four metal balls fastened together by wooden rods so as to form an irregular tetrahedron, which showed that in certain positions the plane of polarisation of an electromagnetic wave was rotated by this molecular model, have previously been described by Dr. Karl F. Lindman; and in the *Annalen der Physik* for August he describes a series of observations in which a considerable number of similar models with the balls embedded in spheres of paraffin wax were prepared, and placed in veneer or cardboard boxes which were put in the path of the waves. As many as eighty-five such molecular models were packed irregularly into a

single box, and it was shown that their action on the waves was that of a practically isotropic substance, the rotation of the plane of polarisation depending only on the thickness of the layer of models through which the wave passed, and not on the orientation of the box, the amount of the rotation being proportional to the thickness. The direction of the rotation depended on the form of the asymmetrical molecular models. Observations were made with waves of different frequencies, and it was found that the relation between the rotation of the plane of polarisation, the wave-length employed and the wave-length of the natural vibrations of the models agreed with the formula deduced from Drude's electro-dynamical theory.

STEEL MOULDING SANDS.—The steel castings industry of Great Britain is notoriously inferior to the best continental practice, particularly German and Belgian. One reason for this is that insufficient attention is paid to moulding sands and their properties. A very comprehensive paper on "Steel Moulding Sands and their Behaviour under High Temperatures," presented at the recent meeting of the Iron and Steel Institute by Mr. A. L. Curtis, does something to remedy this defect. Mr. Curtis has shown that great variation occurs in natural argillaceous sands of Pliocene origin, of which the St. Erth variety may be taken as representative, and that similar variation occurs in steel facing mixtures in current practice. It may be concluded, therefore, that much more frequent control tests are necessary before either choosing supplies of raw sands or preparing facing mixtures in the steel foundry. Mr. Curtis has developed certain tests, *e.g.* refractory and washing tests, which are more rapid than chemical analysis, and suggests that control tests could be rapidly made by these methods. He also describes permeability and dry crushing tests which afford a sufficient indication of the physical qualities of any resultant facing mixture. The factor of mechanical "green" strength has an important bearing on steel facing mixtures. Mr. Curtis indicates that results of his tests on these lines are in progress. The paper is fully illustrated with figures and photomicrographs. It should prove very useful to the industry.

MALLEABLE AND NON-MALLEABLE NICKEL.—For more than one hundred years after its application, nickel found very little industrial application. This was partly because the metal itself was not widely known and partly because as ordinarily produced it was non-malleable. In 1879 Fleitmann discovered a process for producing malleable nickel on a commercial scale, which consisted simply in adding about 0.1 per cent. of metallic magnesium to the molten metal just before casting. This process has been very successful, and is the method used to-day in the production of malleable nickel castings, and of ingot metal to be worked into sheet, rods, wires, and tubes. It has generally been supposed that it was the presence of oxygen which rendered the nickel non-malleable, and that magnesium acted as a deoxidiser. Recent work by Merica and Waltenberg has shown that this is not the case. Reference is made to this work in the *Metallurgist* of August 28. These authors conclude that neither oxygen, carbon, silicon, arsenic, iron, copper, cobalt, nor manganese impair the malleability of nickel. The harmful element according to them is sulphur, the presence of which, in amounts exceeding 0.005 per cent., is sufficient to cause lack of malleability in furnace-refined nickel. Magnesium as a desulphuriser is remarkably efficacious in removing the sulphide Ni_3S_2 which is present as a eutectic, and surrounds the nickel crystals with a film which renders them brittle.