

VELOCITY OF EARTH MOVEMENTS CAUSED BY THE MESSINA EARTHQUAKE.

TO the *Reale Accademia delle Scienze di Torino* (1909-10, p. 355) Prof. G. B. Rizzo has contributed an interesting paper on the velocity with which earth movements occasioned by the earthquake which ruined Messina on December 28, 1908, were propagated to different parts of the world. First he gives in detail the observations made with various types of seismographs at 110 stations. These he sums up in tables, which show for the preliminary tremors or P_1 , their followers or P_2 , and the large waves or P_3 , the time taken by them to travel from their origin to these various stations, their average superficial velocity, and the velocities with which the two first types of movement may have passed along paths corresponding to chords. The first results are also shown as curves drawn on squared paper, the two ordinates, respectively, referring to time and distance. The greatest distance considered is 10,000 kilometres, or 90 degrees, although the tables give results to distances exceeding 18,000 kilometres, or 163 degrees. Dr. Rizzo remarks that none of these curves show the flexure near the epicentrum which Schmidt, like Seebach, has used to determine the depth of the hypocentre. The absence of this is taken by Dr. Rizzo to indicate that the origin of the Messina earthquake was very shallow, a conclusion which I do not think will be shared by all seismologists. Many seismologists will, however, agree with him when he bases the idea of a shallow origin upon the comparatively small area of destructivity.

Up to a distance of 1500 kilometres from the epicentre the velocity of all three phases of movements is constant. The inference from this is that up to such a distance the movements are propagated within the crust of the earth, which is estimated as having a thickness of 44 kilometres. From this distance there is a marked increase in the velocity of the first phase, which, however, is not shown by the succeeding phases. The third or large-wave phase he divides into three parts, which he calls L_1 , L_2 , and L_3 . L_1 appears to correspond with the commencement of maximum motion, whilst L_2 is the maximum movement itself. L_3 is the phase which travels the slowest, but if this is to be accepted as a definite and a recognisable phase in a seismogram, there seems to be no reason why we should not also accept very many other phases, which might be indicated by the letters L_4 , L_5 , L_6 , &c.

Of late years, very many hodographs of the character of the one now presented to us by Prof. Rizzo have been constructed. Prof. H. F. Reid has given us an excellent set of time curves relating to the San Francisco earthquake of 1906. Up to a distance of about 55 degrees from the origin these indicate velocities somewhat higher than those given by Prof. Rizzo, but beyond that distance they are very similar. This kind of difference which we find in the work by different seismologists may be due to differences in the manner in which they have interpreted seismograms, but it is much more likely to arise from the non-recognition of all the elements which should be considered when carrying out these particular investigations.

J. MILNE.

THE EBRO OBSERVATORY OF COSMICAL PHYSICS.

EL OBSERVATORIO DEL EBRO is situated in Roquetas, near Tortosa, on the river Ebro, Spain. It is in latitude $40^{\circ} 19' 14''$ N. and longitude $0^{\text{h}}. 1\text{m}. 58.5^{\text{s}}$ E. Its altitude is 51 m. Originally of private origin, it was inaugurated in September, 1904, in connection with the Collège d'Etudes Supérieures de la Compagnie de Jesus, Tortosa, with the assistance of many private individuals. In October, 1904, it was recognised by the Spanish Government as an establishment of public utility, and, following this, the Government in 1907 made a grant in aid, which is used to defray the cost of the publication of memoirs and bulletins.

The observatory consists of eight separate buildings, and observations are made in meteorology, solar physics, terrestrial magnetism, electricity, and seismology. An account of the observatory, and also of the observations of the total solar eclipse of 1905, is contained in the first

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memoir, written by the director, Padre R. Cirera, S.J. The second, third, and fourth memoirs are entitled, respectively, "La Observacion Solar," "La Seccion Magnética," and "La Seccion Electrica."

In the solar section, daily photographs of the sun are taken both in integrated light by photoheliograph and in "K" by the spectroheliograph, which is of the Evershed type. This instrument gives a disc of 62 mm. diameter, the primary image being formed by an objective of 150 mm. aperture and 2 m. focal length.

The areas and positions of spots, on the heliograph pictures, and of the flocculi, on the spectroheliograph negatives, are measured and published in the monthly bulletins.

In the meteorological section, all the usual observations of pressure, temperature, rainfall, winds, and clouds are made with well-known standard instruments three times a day, viz. at 7h., 14h., and 21h.

The observations of atmospheric potential, ionisation, &c., are undertaken by the meteorological department. In the department of geophysics, the observations of magnetic values and variations are made, and hourly values are tabulated. A microseismograph "Vincentini" and a "Grablovitz" pendulum are used in the seismological section. The results of all these observations, both tabular and curves, are published in monthly bulletins.

The first bulletin is for January, 1910, and those for February, March, and April have also been published. The January bulletin contains a short account of the observatory, and accounts also of the methods used in making and reducing the observations.

Having regard to the amount of work which each bulletin represents, and noting the convenience of having all the different elements registered in one volume, the director, Padre R. Cirera, S.J., is to be congratulated on having been able to issue them so shortly after the making of the observations.

M.

EMOTION AND MORALS.

ON Saturday afternoon, March 11, a meeting of the British Psychological Society was held at King's College, London, Mr. A. F. Shand in the chair, when Dr. William Brown read a paper on "Emotions and Morals." After a brief survey of the views of earlier writers on the nature and classification of the emotions and their relation to ethics, in which, however, the doctrines of Aristotle and Adam Smith ("Theory of Moral Sentiments") were treated at some length, the author proceeded to discuss the meaning of the terms "passion," "emotion," and "sentiment" in relation to the theories of Ribot, Shand, and McDougall. According to ordinary uses of the term, and also to its etymology, passion would seem to indicate an uncontrollable state of mind, in the form either of an actual emotion or a system of emotional tendencies. Although Shand's employment of the term sentiment to express the conception of "a system of emotional dispositions centred about the idea of some object" would theoretically cover the latter of these two uses, passion seems to be a more appropriate and expressive word to indicate those systems which are uncontrollable by the rest of the mind, and issue, under appropriate conditions, in uncontrollable emotions, e.g. "a passion for politics," "a passion for the stage."

The word sentiment, as used in literature, has acquired associations of weakness or placidity which constitutes a slight drawback to its use in scientific psychology to cover all cases included in the technical definition of Shand above-mentioned. "Tender emotion," identified by Ribot and McDougall with the parental instinct, seems to have a wider connotation, and receives more adequate treatment from Shand. In particular, the element of tenderness or pathos present in many æsthetic emotions has little connection with the parental instinct.

The question of "emotions and art" was treated at some length, with special reference to music and the drama. Neither the sensationalistic nor the formalistic theory is adequate as an explanation of music. The ancient Greeks were right in regarding music as "the proper language of the emotions," but it is important to realise that the emotions of music are not, strictly speaking, identical with the emotions of everyday life. They

are analogous to the latter, and this explains the appropriateness of the music to the words in opera, but they really belong to a world of their own and possess a meaning of their own. This is why the music of an opera, even when entirely appropriate to the words, may transcend them in such a way that elements of grossness in the story entirely lose their real "work-a-day" significance in the total presentation. The "Salome" of Strauss is a striking illustration of this.

As regards the psychology of acting, the important statistical investigation carried out by Mr. William Archer, the dramatic critic, more than twenty years ago, is the only work of definite scientific value hitherto produced. Mr. Archer's chief purpose was to test the paradoxical view of Diderot, accepted by Coquelin, but rejected by Sir Henry Irving, that stage emotion should not be real, and that the really first-class actor should be a man of little or no "sensitivity." The results showed that in almost all cases of first-class acting in England, not only did the principal signs of real emotion—real tears, blushing, pallor, &c.—occur, but the artists experienced genuine emotion, and often found real emotion from their private lives help them on the stage by mingling with and intensifying their feigned emotion. A state of dual consciousness while acting was found to be common, but not universal.

Mr. Archer adds many further comments of considerable psychological value, and predicts that the subject will be taken up some day by trained psychologists and subjected to an exhaustive discussion.

As an illustration of many of the points raised by Mr. Archer, a letter very kindly written by Miss Ethel Irving as a reply to a query as to her state of mind when playing intense emotional parts, was quoted and discussed, and a general theory of stage-emotion was sketched out and illustrated by a brief description of Miss Irving's recent emotional acting, especially in Henry Bataille's play, "Dame Nature."

GREEK LANDS AND THEIR PEOPLE.¹

THE establishment by the University of Oxford, from resources supplied by New College, of a new chair for the exploration of ancient history obviously requires, in view of the facilities which already exist for the study of the subject, the justification which is supplied in the inaugural address delivered by Dr. J. L. Myres, the first occupant of the Wykeham professorship.

Dr. Myres justly remarks that, up to the present, the historical course has been too largely devoted to the centuries adjoining the fifth; that it has too jealously confined its researches to the ascertained results of earlier inquiries; that it has discouraged novel methods of investigation; that, in short, its work has become stereotyped and unenterprising. In pointing out a more excellent programme of research, he directs special attention to what may be termed the economic geography and biology of the peoples of the Eastern Ægean. Much has already been done on these lines of research, as in the cartography of Curtius and Kaupert, the examination of battlefields by experts in the art of war, M. Berard's application of sealore to Homeric geography, the study of the influence of malaria on the decay of nations, and, lastly, Mr. Huntingdon's investigations of historic meteorology. But much still remains to be done towards exploring the effects of environmental control on the course of history.

The modern Greek race, it is admitted, is largely intermixed with Albanian, Vlach, and Levantine elements. But this fusion of peoples has been continuous from primitive times, so that the history of the Mediterranean area is, as a whole, a history of its invasions, the earliest sea-borne settlers being of the "Mediterranean" reinforced by "Alpine" and "Armenoid" types. But amidst these racial movements, the mountains, the sea, the climate, the flora, have been there from the beginning, and the ethnological situation now depends not so much upon race as upon the prepotent influence of the environment. "No type of non-Mediterranean invader has ever

¹ "Greek Lands and the Greek People." An Inaugural Lecture delivered before the University of Oxford, November 11, 1910, by Prof. J. L. Myres, Pp. 32. (Oxford: Clarendon Press, 1910.) Price 1s. 6d. net.

learnt so quickly how to live under Mediterranean conditions as to escape extinction in the process"; the "external environment modifies breed in Man by offering the alternatives of extinction or conformity."

This environment falls into at least three types. First, the prevalence of scrub-lands results in the smallness and discontinuity of the Mediterranean populations; there is little produce from this area, and so "the Greek world is in general a jamless world"; there is little sport except in the mountain region; the cow and the horse are "oasis animals, fed almost by hand." In the forest region the conditions are more propitious, the olive, grape, orange, and lemon providing considerable sources of revenue, while the goat furnishes the milk supply, and the pig is as important as it was in the household of Ulysses. On the other hand, the ubiquitous, restless goatherd is a constant source of political confusion, while the almost exclusive employment of women and children in the collection of forest produce tends towards the growth of the matriarchate.

Secondly come the grasslands, and the relation of the pastoral races to Ægean culture, leading on to the third type, that of the agriculturist, of which the leading characteristic is the crowding into the season between March and July of processes which in more northern lands extend to October, thus leaving one of the busiest seasons of the English year to idle hands "devoted to the devil's work of seasonal war."

The programme of the new chair thus promises an attempt towards the solution of the ethnical problems of the Ægean on new and scientific lines; and though the address of Prof. Myres is not free from certain characteristic foibles of the Oxford school, anthropologists will readily admit that no more competent and imaginative scholar could have been selected to hold the Wykeham professorship.

A DESTRUCTIVE DISEASE OF POTATOES.

A VERY interesting and valuable report on "Wart Disease of Potatoes" has been issued by the Harper Adams Agricultural College. As in the case of previous reports on the same subject, the cost of publication, and also expenses connected with garden trials, have been borne by Mr. Beville Stanier, M.P.

The present report brings together a number of facts which, taken together, show the magnitude of the danger now threatening potato-growing in Great Britain. The comparatively new and most destructive fungous disease known as "Wart Disease" was first reported in Shropshire in 1901 in the Woore district; by 1908 it had assumed alarming proportions in this and other counties—facts which are here emphasised by some admirable maps. The extent to which the disease has now spread in Great Britain is shown by one of these maps, in which a continuous belt of affected counties stretches down the west side of Great Britain from Perth to Glamorgan—no fewer than thirty counties being affected. In the majority of these counties the disease is confined, as yet, to gardens and allotments (the soil of which in some cases has become so contaminated that it is impossible to grow potatoes profitably), but the authors of the report very rightly lay stress on the fact that the risk of the disease spreading from these centres of infection to the fields of farmers is very great. A perusal of this report, indeed, must convince the reader that this disease—which the Vice-president of the Irish Department of Agriculture referred to last year in the House of Commons as "that terrible disease known as 'Black Scab'"—must now actually be spreading to farm-lands in many counties in England and Scotland, as has already happened in Lancashire and Cheshire.

An instance is given of a consignment of seed potatoes (obtained from a county where the disease is very prevalent) which, distributed for use as "seed," gave rise to a number of outbreaks extending over a five-mile radius. The disease is spread also by animals; cases are here recorded where trespassing pigs and poultry have carried the fungus to clean ground and caused outbreaks of the disease. The use of manure from animals (especially pigs) fed on raw "warty" potatoes is a common means of