

most prominent. Of the number represented, either by entire specimens or by fragments, not only do the greater part exhibit technical qualities identical with the pottery from Copan, but especially in the conventional use of certain decorative motives, and in the employment of a graphic system common to that of the Codices and to the sculptured monuments of Maya, these affinities are very manifest. The same relationship makes itself felt, although in a less striking manner, in the other classes of objects. It is not claimed that this relationship, however intimate, covers the whole ground, or that there is any homogeneity throughout the whole body of ceramic products, as if it were the work of a homogeneous people and represented a culture developed from within. On the contrary, there is in the tendency towards diversity of type strong evidence of an admixture of races, or of extensive importations derived from a variety of sources."

The relation which the art of the Uloa Valley and the other confines of the Maya area bears to that of the great central Maya ruins is a matter of the deepest interest to archaeologists. Although it is much to be regretted that Mr. Gordon is prevented from continuing his interesting researches amongst the ruins of Copan, it is no small satisfaction to know that he has found other work to do, in which his knowledge of Maya art will be fully utilised.

A most interesting series of photographic and other plates accompanies the "Memoirs."

#### A NEW VERTICAL COMPONENT MICRO-SEISMOGRAPH.

THE microseismograph, devised a few years ago by Prof. Vicentini, of Padua, is now well known as one of the most valuable of the vertical pendulums used in Italy for recording earthquake movements. With the aid of Dr. G. Pacher, several improvements have been made in it, the latest being the construction of a microseismograph for recording the vertical component of the motion (*Atti del R. Ist. Veneto di scienze, &c.*, vol. lvii., 1899, pp. 65-89). In many of the details, it closely resembles the older instruments adapted for the horizontal components only. The chief points in which it differs from the latter are the following. The pendulum consists of a bar of iron 1.50 m. long, 75 mm. wide, and diminishing in thickness from 10 mm. at one end to 7 mm. at the other. Near the thin end the bar carries three discs of lead, weighing altogether about 45 kg. The other end is fixed in a bracket built into the wall, and so inclined that the bar, under the action of the heavy mass, is horizontal at the free end. The magnifying and recording apparatus consists of two levers made of aluminium tube. One of these, bent at right angles (the longer arm being vertical), is connected with the pendulum, and transforms its vertical movements into horizontal ones. The second lever is horizontal, and its longer arm ends in a fine thread of glass, the point of which records the movements of the pendulum, magnified about 130 times, on a strip of smoked paper which passes below it at the rate of 24 mm. per minute. The first experiments showed that for rapid vibrations the heavy mass remained in a practically stationary condition. Every passing carriage produced a group of rapid vibrations, with periods varying from one to two-tenths of a second. During the short time in which the instrument has been at work, several earthquakes have been registered, and Drs. Vicentini and Pacher have increased the interest of the vertical component records by appending also those of two other microseismographs, giving the horizontal components only. These show that the vertical movement predominates during the whole of the time when the ground vibrates rapidly in a horizontal direction; and that the same sudden changes of intensity characterise the seismograms of both apparatus. The new instrument also records the slow pulsations which follow the rapid vibrations, but much less distinctly than the vertical pendulums, and it consequently sooner attains a state of rest.

#### THE STUDY OF WAVES.

A CLAIM for the recognition of the study of wave structures of the earth's surface as a distinct and not unimportant branch of geography was advanced by Mr. Vaughan Cornish at the Royal Geographical Society on Monday. For the study he

proposed the name kumatology, from *κύμα*, a wave. Mr. Cornish illustrated numerous forms of waves by means of lantern slides, and described in detail some curious waves, of which photographs were shown, which travelled up-stream, not as a "bore," but without change or form. These may be observed in streams which plough their way through sandy beaches to the sea. The water-wave was really controlled by a submerged sand-wave, the up-stream flank of which was exposed to a heavy shower of sand from the turbid water. The stream being shallow and its surface in waves, the crest of the water-wave was pushed up-stream as the up-stream flank of the sand-wave received additions of material. The scour of the water was thereby deflected, and the lee slope of the sand-hill was scoured away just as fast as the weather slope grew. Thus the sand-hill moved up-stream, although every particle of sand and every particle of water travelled down-stream. Mr. Cornish showed photographs of ripple-marks mimicking organic forms, and of rippled clouds, and the ripple-ridging of hill-sides, and went on to deal with the rippling of sand by wind, of which he has made a special study. Tables of measurements were exhibited which proved that the shape of these ripples was approximately constant for wave-lengths from 1 to 145 inches. The shape was the same in desert sand as in the sand of the seashore, the mean ratio length being 17.6 for the blown-sand ripples of the shore, and height 18.4 for those of the desert, difference 3.9 per cent. He had succeeded in reproducing these ripples by the action of a steady artificial blast upon ordinary heterogeneous sand, but artificially assorted sand containing no fine particles was not thrown into ripples. For this it was necessary that there should be particles fine enough to be tossed away by the eddy which forms in the lee of the larger grains. Similarly the formation of sand reefs or waves had been observed in the Mississippi when the mixed detritus begins to settle, the finer stuff being churned up from the bottom, and swept away, leaving the coarser materials arranged in ridge and furrow. Sand-dunes were built up by the wind on similar principles. Photographs of desert sand-dunes were shown, one of which exhibited the recent encroachments of sand which have buried the road between Karachi and Clifton. The sand-dunes here are advancing as a train of waves before the south-west monsoon.

#### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

A GENTLEMAN who desires to remain anonymous has offered to give 25,000*l.* towards the proposed Birmingham University on condition that a sum of 225,000*l.* is previously subscribed. The amount already promised is 135,000*l.* Under the terms of the gift the 225,000*l.* must be obtained within one year from now.

THE Paris correspondent of the *Chemist and Druggist* states that M. Dabout, doyen of the Paris Faculty of Sciences, and Prof. Lippmann are to represent the Paris University at the jubilee celebrations of Sir George Stokes at Cambridge next June. The Faculty of Medicine and the School of Pharmacy will send delegates to the Congress to be held at Berlin from May 24 to 27, for the purpose of studying the means of combating tuberculosis, especially amongst the lower classes.

ON the recommendation of the Lord-Lieutenant the Queen has approved of the appointment of Prof. Alexander Anderson as president of the Queen's College, Galway, in succession to Mr. W. J. M. Starkie, who has become Commissioner of National Education in Ireland. Prof. Anderson was a student of Galway, and has held for many years the chair of Natural Philosophy in the College, which chair he will retain. He was a high wrangler at Cambridge, a Fellow of Sidney Sussex College, and also a Fellow of the Royal University of Ireland. He is well known for his many contributions to the literature of physics, and for the manner in which he has developed the science school in the Galway College.

AN interesting investigation has just been commenced in the engineering department of the Massachusetts Institute of Technology. The object is to determine the modulus of elasticity or the deflection due to a load applied for a long interval (in this case, a year) in comparison with that due to a suddenly applied load. It appeared from tests made many