

other appreciably until their distance apart is less than 0.8 of their length, and that this influence is becoming very noticeable when the distance apart is 0.6 of their length. It was also found that, with the models in any given position, the forces involved varied as the resistance of the models, *i.e.* for these speeds roughly with the square of the velocity as theory would lead us to expect.

The variations of the forces as one model was moved to varying fore and aft positions relative to the other (keeping the lateral distance the same) showed the very strong tendency which any model had to cant into the stern of the other model which it was overtaking, how this tendency to cant changed, as the models were brought abreast each other, to a strong sheer of each model towards the other, and, finally, when one model was shifted so that its bow was well forward of the bow of the other, it had a strong desire to cant away from the latter. This is all much the same as the consideration of our two ovals has led us to expect, and goes to show that passing vessels, even in deep water, are liable to exert strong forces upon each other. If they are moving at approximately equal speeds in the same direction, *i.e.* if the forces are maintained for a considerable time, then these forces will tend to produce erratic movements of the ships, requiring careful navigation if a collision is to be avoided.

No experiments have been made up to the present to test this suction or interference in shallow water, except those made recently at the National Experiment Tank at Teddington in connection with the *Hawke* and *Olympic* collision; but the general reasoning already given is good ground for supposing that such influence would be greatly magnified as a vessel passed from deep to shallow water.

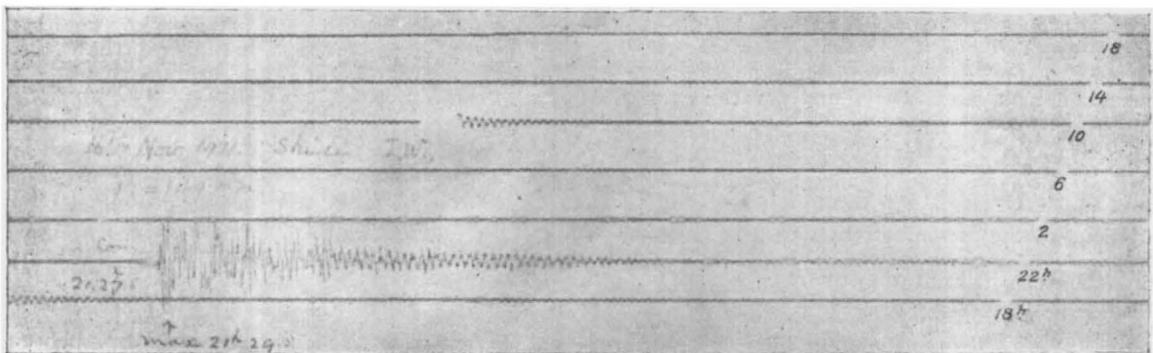
THE CENTRAL EUROPE EARTHQUAKE, NOVEMBER 16, 1911.

ON the night of November 16, at 10.25, western Germany, eastern France, and Switzerland were rudely shaken by an earthquake of exceptional in-

earthquake was marked by ruin from Magdeburg to Berlin. Everywhere terror-stricken people "rushed" from their houses, and at Ebingen 500 of its inhabitants gathered round a fire during the night and recounted their weird experiences.

It is difficult to reconcile these descriptions of widespread ruin with the fact that there does not appear to have been a single casualty. One thing about which we can be certain is that the earthquake was felt eastward to Erfurth, westwards to Nancy, and southwards to Milan. At least 17,000 square miles of Central Europe received a shaking perceptible to the greater number of its inhabitants. Outside this area it was recorded by many seismographs. Whether the disturbance was or was not recorded in very distant places largely depends upon the character of the instrument employed to record teleseismic motion. Experience has shown that seismographs recording photographically pick up these effects at greater distances from an epicentral area than those which register mechanically.

The accompanying seismogram of east and west motion, as recorded in the Isle of Wight, shows that the disturbance commenced at 9h. 27m. 30s., and reached a maximum two minutes later. The inference from this is that the origin was 5 degrees or 300 geographical miles distant. That it was a near earthquake is also indicated by the rapidity of the vibrations. At the distance indicated we reach the upper part of the Rhine Valley, a district from Frankfort, through Bâle to Constance, well known to seismologists as an earthquake-producing region. In a popular sense the upper part of this is a valley, but from the manner in which it originated it is sometimes referred to by geologists as a *graben*, or piece of territory that has fallen downwards between two faults. In this instance one of these faults borders the Vosges and the other the Black Forest. It is a tectonic displacement along which adjustments from time to time have taken place, each of which represented a relief of strain and was accompanied by a shaking. One well-known paper solemnly informs its readers that this earthquake was of Teutonic origin,



tensity. At Frankfort-on-Main houses were cracked. In Freiburg, Stuttgart, Munich, Mülhausen, and in other towns, chimneys and roofs were damaged. The valley of the Upper Rhine was shaken throughout its length. At Constance two colossal statues fell from the Post Office upon the pavement. According to reports in the daily papers, walls were split, church spires were wrecked, roofs were shattered, people were "thrown out of their beds," telephone and telegraph communications were destroyed, and the path of the

and, considering the country in which it was made, the statement may be regarded as correct.

At present it cannot be said with certainty that this disturbance originated from the chief of these tectonic lines or from one of their numerous offshoots. To the right and the left of the Rhine Valley the country is cracked through and through with many minor fractures, a sudden movement on any one of which might be capable of producing all that has been observed.

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