The Japanese Earthquake of September 1.

OWING perhaps to the destruction of printing presses in Tokyo, no printed reports on the earthquake seem to have reached Great Britain. The following details are given in a letter from Prof. S. Fujiwhara, of the Central Meteorological Observatory at Tokyo, to Sir Napier Shaw, who kindly lent the letter.

The area of destructive motion is about one degree square. The area swept by fire was about 12 square miles in Tokyo and 3 square miles in Yokohama. The number of houses burnt in Tokyo was about 320,000. As Prof. Fujiwhara remarks, it was probably the greatest fire that has ever occurred in the world. In all probability, there will never be another like it, for there now exists no great wooden city such as Tokyo was before the earthquake. Wooden houses suffered little from the actual earthquake, while brick buildings proved unusually dangerous. Iron-concrete buildings, however, resisted both earthquake and fire, and the Tokyo of the future will probably be a city of iron-concrete material.

It has been ascertained by actual soundings that the floor of Sagami Bay has sunk by from 70 to 100 fathoms, while the coast has risen by from 1 to 5 metres, the area in which these changes of elevation occurred being nearly the same as the area of destructive shock.

The first and greatest shock occurred at 11 h. 58 m. 44 s. A.M. During the daytime, the wind was from the S.W., and the observatory for the time was safe. But about 8 P.M. the wind shifted to the W. and then to the N.N.W., and at 11.55 P.M. the main building caught fire and burnt out in less than two hours. Most of the recording instruments had already been broken by the shock. "I think," says Prof. Fujiwhara, "it would be worth to report that our brave observers continued the hourly observations during the fire. No single observation was lost." The air temperature rose 5° to 6° C. above the value otherwise expected. At 11 P.M. the maximum wind velocity was about fifty miles an hour. The maximum temperature in the screen, about 40 metres from the main building, was 42·4° C. "From the data we can easily see that the furious wind, which blew from N.N.W. and so intense that nearly all important buildings in this vicinity were lost during this wind, was caused by the fire." It is satisfactory to be able to add that, though the losses in books and material are serious, the members of the observatory staff are all safe.

Since the above was written, the *Monthly Bulletin* for last September of the Imperial Marine Observatory at Kobe (Japan) has been received. It contains the times and other elements of 107 after-shocks of the great earthquake which occurred during that month. The most important of these after-shocks were recorded on September 1 at 5 h. 23 m. 28 s. (G.M.T.), September 2, at 2 h. 47 m. 44 s. (the greatest of all) and 9 h. 28 m. 0 s. C. D.

Photoelectric Conductivity of Crystals.

IN the *Zeitschrift für Physik* of June 29, B. Gudden and R. Pohl describe additional work done by them on crystal conductivity. Crystals are divided into two groups: (1) those with optical dispersion pointing to considerable mobility of the electrons, and having, in the region of transparency, a refractive index greater than two; (2) those in which photoelectric action takes place only when impurities are present, which may exist as single molecules or as colloidal particles; examples of this are blue or green fluor spar, quartz as yellow citrine or violet amethyst, rock salt. Group (1) is divided into two sub-groups: (*a*) the active absorption of light takes place only in the "ground" material (diamond, zinc blende, sulphur, selenium, etc.); in (*b*) it takes place partly in the ground material and partly in the impurities (alkaline earths and zinc sulphide with centres of phosphorescence).

In their previous papers the authors have shown the importance of the so-called primary current, due to the starting of a movement of the released electrons towards the anode, without any "inertia" effect, such as is caused at a later stage by the space charge produced by the almost stationary positive ions. With pure flawless crystals of group (1*a*) the mechanism appears to be as follows: the electrons travel quickly to the anode, possibly jumping from atom to atom. The positions of the positive charges change gradually in the electric field, under the action of thermal movements or of light of long wave-length, towards the cathode. The time required for the completion of this change is measured by hours in the case of diamond, and by seconds in the case of zinc blende. The double layers at the electrodes remain unchanged for several hours in the dark; but disappear when illuminated, owing to a photoelectric current in the reverse direction. Current passes into or out of the electrodes only after a certain density of the surface charge has been reached.

In group (1) impurities diminish the photoelectric effect and make it impossible to distinguish between primary and secondary current; the current diminishes with the time, increases slower than the incident light energy, and cannot be saturated by increased voltage; the "output" is less than the quantum equivalent, while the authors find these quantities are equal for group (1*a*); the additive law which holds for group (1*a*) does not do so for group (1*b*). In the case of a twin crystal the dividing surface interferes with the flow of the primary current.

In the second division of group (2) there is no positive space charge, no law of addition, and the number of electrons is less by several orders of magnitude than the quantum equivalent of the absorbed light energy. It is possible to imagine that an electron broken off from a particle starts to move towards the anode, but unites with another impurity particle after going a short distance, instead of reaching the anode as in group (1*a*). It may be that in pure crystals of group (2), electrons, if produced by X-rays, can travel to the anode. Experiments in this direction are in progress.

University and Educational Intelligence.

BIRMINGHAM.—Dr. W. J. Hickinbottom has been appointed assistant lecturer in chemistry.

The Council has approved of the establishment of a Board of Mining Research.

The secretaryship will shortly become vacant, owing to the retirement of Mr. G. H. Morley, who was appointed in 1880. Applications for the post, accompanied by twelve copies of not more than three testimonials, must be received by the present secretary by, at latest, February 28. The person appointed will begin his duties on June 1.

CAMBRIDGE.—Mr. F. J. W. Roughton, Trinity College, has been elected University lecturer in biochemistry. The following grants have been made by the Special Board of Biology and Geology from