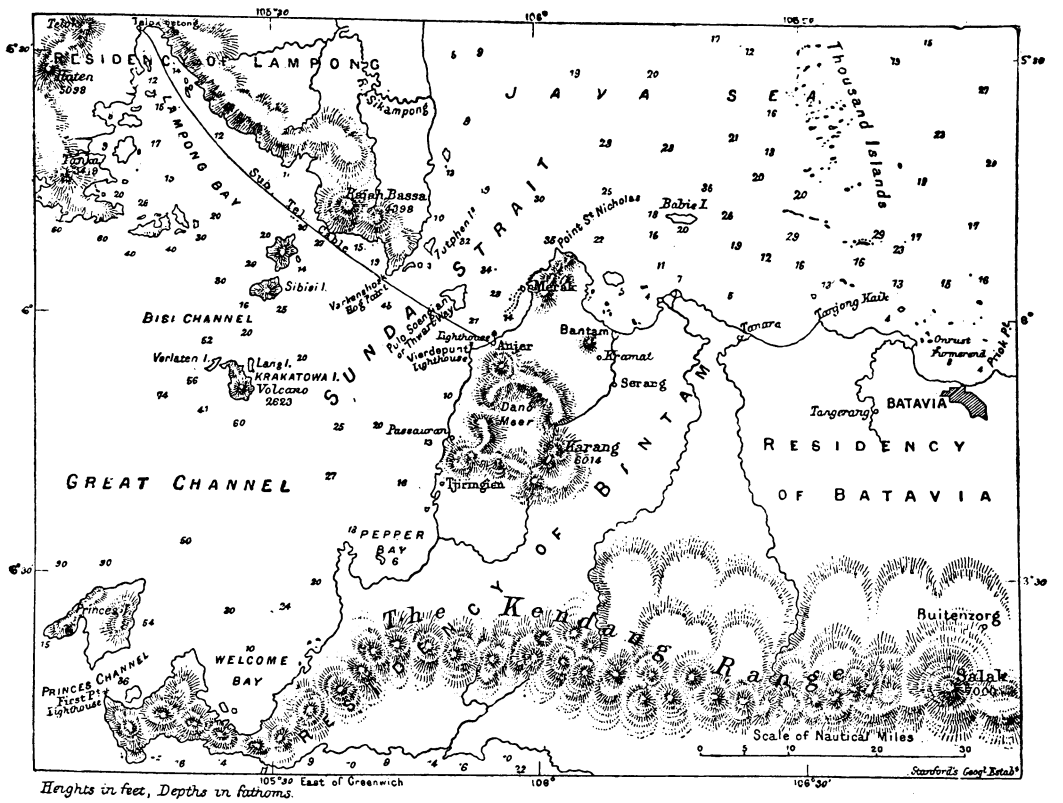
around, above, and below an artery, freely branching, bifurcating, and supplying all the neighboring formations with a large number of delicate fibrillae. . . . The bundles of nerve-fibres give off delicate ramules to the afferent vessels by which they enter the tuft; and here they produce a delicate plexus spun around its capillaries. It was impossible to decide where the ultimate fibrillae branch in the capillaries of the tuft. . . . Sometimes I obtained specimens in which it seemed as if the ultimate fibrillae branched beneath the covering, flat epithelia in the delicate connective tissue between the convolutions of the capillaries. . . . In perfect specimens there is no difficulty in the cat; and Dr. F. M. Hamlin, on mounting foraminifera. New apparatus was described as follows: new microscope-stand with concentric movements, by J. D. Cox; new modification of the Spitzka microtome, by V. S. Clevinger; and a new binocular arrangement, by Edward Bausch.

The next annual meeting will be held at Rochester, N.Y., in August, 1884.

The officers for the present year are: president, Hon. Jacob D. Cox; vice-presidents, William A. Rogers, T. J. Burrill; secretary, D. S. Kellicott; treasurer, George E. Fell; executive committee, Albert H. Chester, William Humphreys, and H. A. Johnson.



satisfying one's self of the fact that every tubule is encircled by a plexus of non-medullated nerve-fibres, coursing either in the immediate vicinity of the tubule, in the interstitial connective tissue, or within the dense layer subjacent to the epithelia, known as the *membrana propria*, or even with the layer along the feet of the epithelia themselves."

Short papers were read by Dr. Salmon Hudson, on the yeast-plant; by J. M. Mansfield, on division of labor among microscopists; by Dr. L. M. Eastman, on egg-like bodies in the liver of the rabbit; by Dr. George E. Fell, on a peculiarity in the structure of the human spermatozoon. Dr. Lester Curtis made some observations on vessels of the spinal cord of

THE JAVA UPHEAVAL.[1]

THE details which have reached us during the past week, of the terrible seismical manifestation at Java, prove it to be one of the most disastrous on record. Probably, moreover, it is the greatest phenomenon in physical geography which has occurred during at least the historical period, in the same space of time. The accompanying sketch-map will afford some idea of the extent and nature of the change which has taken place, and the character of the sea-bed and the land in the region affected.

The volcanic island of Krakatoa lies about the

[1] Taken from *Nature*, Sept. 6.

middle of the north part of the passage between Java and Sumatra, a passage which has formed an important commercial route. The strait is about seventy miles long and sixty broad at the south-west end, narrowing to thirteen miles at the north-east end. The island, seven miles long by five broad, lay about thirty miles from the coast of Java; and northwards the strait contracts like a funnel, the two coasts in that direction approaching very near to each other. A few weeks ago, as we intimated at the time, the volcano on the island began to manifest renewed activity. The whole region is volcanic; Java itself having at least sixteen active volcanoes, while many others can only be regarded as quiescent, not extinct. Various parts of the island have been frequently devastated by volcanic outbursts, one of the most disastrous of these having proceeded from a volcano which was regarded as having been long extinct. The present outburst in Krakatoa seems to have reached a crisis on the night of Aug. 26. The detonations were heard as far as Soerakarta; and ashes fell at Cheribon, about 250 miles eastwards on the north coast of Java. The whole sky over western Java was darkened with ashes; and, when investigation became possible, it was found that the most wide-spread disaster had occurred. The greater part of the district of North Bantam has been destroyed, partly by the ashes which fell, and partly by an enormous wave generated by the wide-spread volcanic disturbance in the bed of the strait. The town of Anjer, and other towns on the coast, have been overwhelmed and swept away; and the loss of life is estimated at 100,000. The island of Krakatoa itself, estimated to contain 8,000,000,000 cubic yards of material, seems to have been shattered, and sunk beneath the waters; while sixteen volcanic craters have appeared above the sea between the site of that island and Sibisi Island, where the sea is comparatively shallow. The Soengepan volcano has split into five; and it is stated that an extensive plain of 'volcanic stone' has been formed in the sea, near Lampong, Sumatra, probably at a part of the coast dotted with small islands. A vessel near the site of the eruption had its deck covered with ashes eighteen inches deep, and passed masses of pumice-stone seven feet in depth. The wave reached the coast of Java on the morning of the 27th, and, thirty metres high, swept the coast between Merak and Tjiringin, totally destroying Anjer, Merak, and Tjiringin. Five miles of the coast of Sumatra seem to have been swept by the wave, and many lives lost. At Taujong Priok, fifty-eight miles distant from Krakatoa, a sea seven feet and a half higher than the ordinary highest level suddenly rushed in, and overwhelmed the place. Immediately afterwards it as suddenly sank ten feet and a half below the high-water mark, the effect being most destructive. We shall probably hear more of this wave, as doubtless it was a branch of it which made its way across the Pacific, and that with such rapidity that on the 27th it reached San Francisco harbor, and continued to come in at intervals of twenty minutes, rising to a height of one foot for several days. The great wave generated on May 10, 1877, by the earthquake at Iquique, on the coast of Peru, spread over the Pacific as far north as the Sandwich Islands, and south to New Zealand and Australia; while that at Arica, on Aug. 13 and 14, 1869, extended right across the Pacific to Yokohama (*Nature*, vol. i. p. 54). It is misleading to speak of such waves as tidal: they are evidently due to powerful, extensive, and sudden disturbances of the ocean-bed, and are frequently felt in the Pacific when no earthquake has been experienced anywhere, though doubtless due to commotions somewhere in the depths of ocean. So far, these are all the facts that are known in connection with this last stupendous outburst of volcanic energy. It has altered the entire physical geography of the region, and the condition of the ocean-bed. The existing charts of the strait, with their careful soundings, are useless for purposes of navigation; and, when quiescence is restored, a new series of soundings will be necessary. Doubtless the results of the outbreak will receive minute attention at the hands of the Dutch government; and, when all the data are collected, they will form valuable material for the study of the physical geographer.

LETTERS TO THE EDITOR.

Humblebees vs. field-mice.

IN SCIENCE of Sept. 7 the vice-president of section F (biology), in his address of Aug. 15, referring to the aid given by humblebees in fertilizing Trifolium pratense, is reported as saying, "Bumblebees prefer to raise their colonies in old nests of meadow-mice. I mentioned in my last report, that it had been suggested that we should not keep many cats, nor allow hawks, foxes, or dogs to catch these mice; for they make nests which are quite necessary for the bumblebees, which help fertilize our red clover, and thereby largely increase the yield of seed."

I would beg leave to differ from the author of the suggestion referred to, on the ground, that, if carried out, the effect produced would be apt to be quite the contrary of that intended. As field-mice prey upon the nests and combs of the humblebees, acting as a great check to their increase in numbers, the greater the precautions taken to prevent the killing of the mice, the greater would be the tendency towards the extermination of the humblebee, and therefore the less would be the yield of seed, resulting from the lack of aid rendered by these insects in fertilizing the red clover.

In support of my objection, I would refer to Darwin's Origin of species, sixth edition, third chapter, where, under the head of "Complex relations of all animals and plants to each other in the struggle for existence," he says, "The number of humblebees in any district depends in a great measure on the number of field-mice, which destroy their combs and nests; and Col. Newman, who has long attended to the habits of humblebees, believes that 'more than two-thirds of them are thus destroyed all over England.'" E. NUGENT.

Pottstown, Penn., Sept. 15, 1883.

The influence of winds upon tree-growth.

I observe that in the vicinity of Cambridge and Boston, wherever the common New-England elms stand in a moderately isolated site, and one exposed to the wind, they lean, in a large majority of cases, trunk and all, to the south-east. This is true, also,