

stationary objects such as forts, docks, buildings, ships at anchor, etc., the artillery officers were provided with a map of the whole area of bombardment, which was laid out in squares, each square having its own number. The Japanese having, at the close of the Chinese war, been in possession of Port Arthur themselves, and having possessed during the past few years an excellent bureau of intelligence, knew the exact location of every building or object of importance in and around the city. Consequently, when the artillery officers were directed to attack a building in a certain square, or a particular fort, they knew exactly what angle of elevation to give their gun, and how far to traverse it, so as to cause the shell to fall with mathematical accuracy upon the particular object to be hit.

The attack upon the warships, however, was another proposition, for they could be, and were, shifted, from time to time. To make sure of hitting them, it was necessary to have some direct line of vision. The Japanese knew that such a line of vision could be obtained from the top of a hill to the west of the city known as 203-Meter Hill—the Russians knew it, too. Hence that awful struggle for possession of this hill, which cost so many thousands of lives. The Japanese won the position. When they had taken it, they placed observers provided with the hyposcope—a telescope that enables the observer to observe the surrounding country without exposing himself above the surrounding parapet—upon the summit, in suitable positions, and held the hill with sufficient force to prevent its being retaken. The batteries were then trained at the individual warships, and the effect of the shells was telephoned from 203-Meter Hill to the various batteries, and the errors corrected, according as they were long, short, or wide, until the huge shells commenced to drop with unerring accuracy down through the decks and out through the bottom of the doomed warships. The ships tried to escape observation by hiding on the outside of the harbor behind the Tiger's Tail hills, and in a cove behind Golden Hill; but there was no escape, and ultimately every ship of the squadron was sunk.

That was the beginning of the end. The 11-inch batteries when directed at the forts tore gaping holes in the parapets, and according to the testimony of Gen. Stoessel, they were simply irresistible. One by one, after furious bombardments, the walls of the great forts were blown up by the explosion of the subterranean mines that had been laid by the sappers and miners, and the Japanese massed in readiness for the attack in the inner parallels, swept in through the wide gaps thus formed, and seized the fortifications, from which, a few months before, they had been swept back in terrible and crushing defeat.

**Geology and Geography at the American Association for the Advancement of Science.**

BY EDMUND OTIS HOVEY.

Geology and geography together occupied a large share of the attention of the members of the American Association for the Advancement of Science at the third Philadelphia meeting of the Association, which was held at the University of Pennsylvania, December 28 to 31, 1904. Section E, Geology and Geography, of the Association held its regular meeting on December 28, the principal feature of which was the address of the retiring vice-president, Prof. Israel C. Russell, of Michigan University, on "Co-operation Among the Geographic Societies of America." An abstract of this important paper appears in the current SUPPLEMENT. The officers of the section are, vice-president and chairman, Prof. E. A. Smith, of University, Ala.; secretary, E. O. Hovey, of New York city.

The general programme was introduced by Prof. A. P. Brigham, of Colgate University, with a paper on "Early Interpretation of the Physiography of New York State," in which was outlined in an interesting manner the observations made by the early white travelers through the Mohawk Valley and westward, and the descriptions published by President Timothy Dwight, Governor De Witt Clinton, and others. Some of these observations were very keen, especially when we consider that the whole region was heavily forested at that time, and indicate that the idea of the existence of an ancient lake (the "Iroquois Water" of recent writers on the Glacial Geology of New York) is not so new as some have supposed.

In a paper on "The Menace to the Entrance of New York Harbor," Prof. Lewis M. Haupt discussed the projects which have been and are now being carried on by the general government for improving the channels of the Lower Bay. The details of this paper will be found in the SCIENTIFIC AMERICAN of January 7.

Dr. J. W. Spencer, of Washington, D. C., submitted a communication on "The Submarine Great Cañon of the Hudson River," in which he collated the results of soundings which have been made during a period of more than a century, but especially those of the last forty years. Prof. J. D. Dana first recognized the submarine channel of the Hudson as evidence of late con-

tinental elevation. Lindenkohl first perceived the cañon-like character of the outer portion of the channel near the border of the continental shelf, the channel suddenly becoming a gorge 2,400 feet deep in the submerged plain. Lindenkohl thought that the cañon was terminated by a bar, but Dr. Spencer has determined that no bar exists, and that the cañon cuts through the edge of the continental bench for about eight miles farther. It then widens to a valley, which can be readily recognized for an additional 12 miles and to a depth of 9,000 feet at a distance of 71 miles from the head of the submarine channel, near Sandy Hook. The cañon is double, the upper part being four miles wide, while the inner, lower, more sinuous portion is less than two miles across. The period of great elevation, amounting to about 9,000 feet, coincides with that of the early Pleistocene. Since that time there has been a subsidence to somewhat below the present level, followed by a re-elevation of 250 feet, as seen by the shallow channels of the continental shelf. The region is now sinking at the rate of two feet a century, and is undergoing other and less important changes.

In a second paper on "The Improbability of Land in the Vicinity of the North Pole," Dr. Spencer said in part:

"When Dr. Nansen discovered the deep Polar Basin, sharply defined by a continental shelf, 300 to 350 miles wide, north of Siberia, with this continuing to Spitzbergen, situated in its very edge, it was proof that no land was to be expected rising out of the basin until the continental shelf on the American side should be reached. The broad Siberian shelf continues even north of Bering Straits, and there are soundings which suggest the location of its approximate border. Alaska encroaches upon this shelf apparently to near its border, thus reducing its breadth to probably 50 miles. Beyond into Beaufort Sea, the Mackenzie River empties by a fjord known to a depth of more than 1,140 feet, and another from behind Bank's Land of 1,836 feet, not far from its own head far within the line of the islands. Among the islands, another of the discovered fjords reaches to more than 2,400 feet.

All of these features prove that the archipelago of high mountains is only a dissected plateau, now sunken and with drowned valleys between the island, which valleys incise the continental shelf in such manner as to indicate that the shelf itself cannot extend far beyond the outer line of the known islands. A sounding about 30 miles north of Grinnell Land, with a depth of 432 feet, further suggests that the edge of the shelf is being approached, for the outer margin of this seems to be limited by a depth of about 300 feet beneath sea level." From these submarine topographic features, which are the very best guide, the author supposes that no important islands exist beyond the line of the known archipelago, and that the deep Polar Basin reaches for 300 to 350 miles from the Pole, approaching the American continental shelf north of Grinnell Land.

The formal session of Section E closed with the reading of eight papers by title in the absence of their authors, and the sessions of the succeeding days of the general convention were given over to the Geological Society of America. The vice-president and chairman for Section E for the next annual meeting of the Association is Prof. William North Rice, of Wesleyan University, Middletown, Conn., and the secretary is Edmund Otis Hovey, of New York city.

**Prize for Electrical Inventors.**

American inventors have an equal chance with citizens of other countries at a prize of 6,000 francs, offered by the "Association des Industriels de France contre les Accidents du Travail," now organizing to hold a congress in June, 1905, with the object of investigating apparatus which will insure the greater safety of workmen employed on high tension electric conductors. The prize will go to the inventor for the apparatus that will best indicate safely and clearly whether an electric conductor is alive or not. It must be equally applicable to direct and alternating currents of all voltages and must be reliable and incapable of doing damage to itself, the operator, or the distribution system under any circumstances. But his success will mean a very great boon to those men whose work brings them into close proximity to high potential electric wires and machinery. Now that a current of 60,000 volts has become practicable and is much employed for long-distance transmission, this enormous potential being coupled with large quantities of the electric fluid, the danger to the electrician and to workmen who must be employed in caring for such a line and for the apparatus at its ends has become a very serious matter. Danger through carelessness cannot be remedied by any apparatus, perhaps, but such a device as that proposed by the French congress would give timely warning which would save many lives.—Iron Age.

**Correspondence.**

**A Planchette Inquiry.**

To the Editor of the SCIENTIFIC AMERICAN:

If you have readers who are interested in experimenting with planchette, I wish they would tell me what means they have found best to make it impossible that the board shall be moved by the fingers of the operator, consciously or otherwise. I can accomplish the purpose by placing upon it two sheets of paper, one of them the transparent sort that is used to protect photographs, and the other a paraffined sheet such as candy is sometimes done up in. By careful selection of the right kinds of paper, I succeed in getting a combination which renders it impossible for the operator to move the planchette; the upper sheet slips on the lower. But it is a troublesome and awkward business, and I hope readers can tell me of something better, or that possibly you can suggest something. I have thought of a ball-bearing device, placing an edge round the board, which shall inclose a number of bullets a trifle larger in diameter than the edge is thick, and laying a smooth board on them. Do you think of anything better? I suppose the subject must have been studied by many people, as nobody can fail to perceive the absolute necessity of cutting out the possibility of any motion coming from the operator's fingers. The amazing results that planchette yields with certain people, the above precaution being taken, assuredly justify taking the necessary pains to cut off all possibility of movement by the operator. G. M. T.

Albany, N. Y., January 2, 1905.

**Tuberculosis from Milk.**

To the Editor of the SCIENTIFIC AMERICAN:

In the December 24 issue of your valued paper, I notice an article, "Bovine and Human Bacilli Found to be Distinct," which is certainly interesting, as the finding of this German imperial commission, in a way, sustains the stand taken by many scientists of Europe; but at the same time, we ought not overlook that Koch, in his London address, did not maintain that there is a difference in species, but merely that the virus of human consumption is not identical with the virus of bovine perlsucht, and his assertion that these differences between human and bovine tubercle bacilli are not bridged by any connecting links, provoked the strongest opposition; and observations called forth by Koch's assertions have positively demonstrated the existence of intermediary stages; and the opinion is constantly gaining ground, that bovine tubercle bacilli is especially virulent for man, and such an authority as Prof. von Behring, in his Cassel lecture, said: "We shall surely not go wrong when we assume that with a little patience and expert knowledge, we shall be able to make these two varieties absolutely similar again, even in respect to their virulence." Therefore, if we keep in mind the above, the fact that the German imperial commission found in some corpses bovine bacilli in the glands and human bacilli in all other portions of the body—this fact, I say, is significant, and still more significant and important is the fact that three of the cases were young children; and not only is the surmise permissible, but it is pretty sure that they received the bacillus from a diseased cow. This cannot be passed off with a casual advice of carefulness as to using prescribed measures against infection for bovine bacillus. Measures have been tried, measures have been made, and no amount of measures will ever succeed, and especially in America, where about seventy to eighty per cent of our cattle are tuberculous or tubercularly affected. Take the large herds and perform the usual test, and you will be surprised at the number of animals that will react! It is simply frightful—if you stop for a minute to consider this grave danger, this scourge of humanity! Just to think we have tubercular calves, then tubercular cows, tubercular milk, and then tubercular children! What are we doing in this blessed country of ours to offset this great danger? Nothing whatever! The mere killing of an animal here and there has no effect whatever; and in this respect Germany is certainly far ahead of us, as the government in a few parts of the empire has taken up Prof. von Behring's method of immunizing against tuberculosis, and the same has since (1901) proven a great success. Immunize the cattle here, prevent bovine tuberculosis, and you will in time exterminate human tuberculosis.

I hope you will give these few remarks space in your valued paper, as it is a subject worthy of discussion in every way, a subject in which we New Yorkers are especially interested, as here in the city we come daily in contact with this terrible disease, and Prof. von Behring's method ought to be certainly taken up here and tried; and to judge by experiences in Germany, success is assured.

THEODORE D. ADLERMAN, M.D.

New York, December 29, 1904.