reasonable explanation of why the α particle ceases to produce ionising and other effects at a stage when it possesses a much greater amount of energy than that which is known to be required by a positive ion to produce other ions by collision. These effects would cease when the uncharged particle was no longer able to become ionised by colliding with a neutral atom. The energy (about 10^{-6} ergs) which it then possessed would represent the minimum energy which an uncharged particle must possess in order to shake out an electron on collision with a neutral atom.

Even if these speculations are ultimately disproved by the facts, it is interesting to note that, with such a constitution for the α ray, the experiments would measure the velocity correctly, whereas the mass, and therefore the kinetic energy, would be erroneous to the extent indicated.

Princeton, N.J., U.S.A. O. W. RICHARDSON.

The Effect of Radium on the Strength of Threads.

WE have carried out some experiments with cotton threads in continuation of those described by Miss Martin and one of us in NATURE of August 17, 1905. The following is a summary of the results obtained :—

No difference in the effect was found when the emanation was continuously removed during the exposure by a current of air. The same negative result followed an experiment in which it was sought to remove oxygen and moisture from the neighbourhood of the threads by enclosing radium and threads along with phosphoric anhydride in a tube from which the air was exhausted, some metallic sodium being afterwards heated to fusion in a side tube.

When threads or a piece of filter paper, after exposure to radium, are dyed with methylene blue, the exposed part is found to take a deeper colour than the rest. This is given as a test for the presence of oxycellulose.

A series of three-day exposures was made at increasing distances from the radium. The effect was found to become inappreciable at 18 mm. distance. When the weakening produced was plotted against distance, the curve showed a corner at 9 mm., suggesting the similar feature found by Prof. Bragg and others on the ionisation curves of α rays to mark the end of the effective range of one set of rays.

A comparison under the microscope of the broken ends of exposed and unexposed threads showed that the fibres in the former case were straight up to their ends, while the unexposed fibres were curled back on themselves. This would indicate a loss of elastic quality through the action of the radium.

J. L. MCKEE.
W. B. MORTON.

Queen's College, Belfast, December 27, 1906.

The Upheaval of the Sea Coast by Earthquakes.

THE question so long discussed by geologists concerning the upheaval of the land by earthquakes has been impressively revived by recent events. In the San Francisco *Argonaut* of November 3, 1906, Prof. H. D. Curtis, of the D. O. Mills Expedition of the Lick Observatory at Santiago, Chile, reports that the harbour at Valparaiso is now 10 feet shallower than before the earthquake of August 16, 1906, and he concludes that the movement was mainly vertical. In the Bulletin of the Geological Society of America for May, 1906, Messrs. Tarr and Martin give a memoir on the changes of level at Yakutat Bay, Alaska, produced by the great earthquake of September 3–20, 1899, two of the most terrible shocks of which occurred on September 10 and 15. The investigators prove conclusively that an uplift occurred extending along the whole Yakutat coast for more than a hundred miles, the maximum movement in Disenchantment Bay being 47 feet 4 inches. Uplifts of 7 feet to 20 feet were common, while slight subsidences also occurred in a few places.

In view of these facts, how can anyone claim that the earth is entirely solid and deny the vertical movement of the land under earthquake forces, as is done by Prof. Suess in his great work on "The Face of the Earth"?

T. J. J. SEE.

U.S. Naval Observatory, Mare Island, California, December 8, 1906.

THE observations of Messrs. Tarr and Martin in Yakutat Bay undoubtedly form a valuable addition to the knowledge we possess respecting sudden adjustments in the earth's crust.

In September, 1899, a portion of the west coast of Alaska was shattered. Fault lines were created or extended, and the displacements along these lines have been measured. On January 31, 1906, off the coast of Columbia, and on April 18 of the same year in Central California, rock movements similar to those at Yakutat were recorded. Every world-shaking earthquake—and there are about sixty of these per year—is an announcement of a molar movement. We do not know the magnitude of the masses involved, but from measurements like those made by Messrs. Tarr and Martin we may estimate them as being represented by one or two million cubic miles of rocky material.

J. M.

Emerald Green Sky Colour.

THE account of the colour of the sky on December 10, 1906, sent by your correspondent from St. Moritz closely resembles an experience of a friend and myself on December 27.

We were returning from a geological ramble to the west of Crediton, in Devonshire, and were walking eastward, while behind us and gradually overtaking us there had been for several hours a thick snowstorm which later on was to envelop us. Between three and four o'clock in the afternoon we remarked the peculiar appearance of the sky; in your correspondent's phrase, there was "instead of the usual blue, a fairly large expanse of vivid emerald green." I may add that the ground was everywhere white from previous snow.

It will be seen that the conditions in Devonshire on December 27 correspond as regards time of day, point of compass, and state of atmosphere with those observed at St. Moritz on December 10.

With J. W. Noble I shall await with much interest the explanation.

F. G. COLLINS.

Exeter.

Perception of Relief by Monocular Vision.

THE following fact seems to show that the aperture of the pupil plays an important part in the perception of relief by monocular vision.

When a polyhedron made of wire is looked at through a small pin-hole pierced on a piece of card, and the pin-hole is moved about slightly, the polyhedron seems to rotate a little about an axis perpendicular to the direction of motion of the pin-hole. The effect is most remarkable by lamplight, when the pupil is more dilated than it is in broad daylight.

T. TERADA.

Science College, Imperial University, Tokyo, November 15.

THE GEOLOGY OF THE GERMAN ANTARCTIC EXPEDITION.[1]

THE most striking geographical achievement of the German Antarctic Expedition was its determination that Antarctica occurs farther north in western Wilkes Land than had been inferred by some authorities from the work of the *Challenger*. Prof. von Drygalski and his comrades have re-established faith in Wilkes's Termination Land; as from their Kaiser Wilhelm Land they saw high land to the north-east, only about one hundred miles from the site assigned by Wilkes to his Termination Land. The most fully investigated locality in the newly discovered Kaiser Wilhelm's Land is the Gaussberg, a basalt mountain on the southern shore of the bay in which the *Gauss* reached its farthest south.

1 "Deutsche Südpolar-Expedition, 1901–1903." Edited by Erich von Drygalski. II. Band, Kartographie, Geologie, Heft i. Pp. 87, 1 map, 8 plates. (1) E. von Drygalski: Der Gaussberg, seine Kartierung und seine Formen. (2) E. Philippi: Geologische Beschreibung des Gaussberges. (3) R. Reinisch: Petrographische Beschreibung der Gaussberg-Gesteine. (Berlin: G. Reimer, 1906.) Price 18 marks.

The first part of the second volume of the expedition reports is devoted to a full description of the geography and geology of the Gaussberg. It includes three memoirs. A detailed account of the geography of the mountain is given by Prof. von Drygalski, in which he describes its form, position, and glaciation. The most interesting part of von Drygalski's report deals with the glaciation and the forms of the mountain. The inland ice from Antarctica abuts against the southern slope of the Gaussberg, although as a rule its junction with the inland ice is hidden by ice of local origin. The mountain is 370 metres in height, and it was at one period completely overridden by ice from the south; and the admirable photographs which accompany Dr. Philippi's report illustrate the subdued glaciated contours of the whole mountain. Some moraines occur on it, and indicate transport from south to north.

The valleys upon the flanks of the Gaussberg are not due to erosion, but are depressions between the lava streams or along lines of rapid weathering. In his description of the mountain, Prof. von Drygalski obviously writes with great restraint to prevent infringing on the geological report contributed by Dr. Philippi, whose memoir is accompanied by a series of excellent photographs of the mountain, its moraines, and its lavas. The whole mountain is composed of volcanic rocks, which are described in full petrographic detail, accompanied by analyses and illustrations, by Dr. R. Reinisch, of Leipzig. The rocks are leucite-basalts and leucite-basalt tuffs, rich in glass. The only other indigenous rocks occur as inclusions in the lava; they are nodules of olivine and fragments of pyroxene-gneiss and pyroxene-granite, which appear to indicate that a platform of plutonic rocks occurs at a comparatively slight depth below the basalts.

The age of the mountain is doubtful, but appears to be late Cainozoic. Dr. Philippi suggests that the eruptions may have begun in the Pliocene, and, in his opinion, they were either late Pliocene or Pleistocene. The local glaciers Dr. Philippi describes as comparatively unimportant in their development. Erratic blocks from the inland ice that once covered the whole mountain are scattered to its summit. The erratics include boulders of granites, gneiss, amphibolites and other crystalline schists, with some quartzites, sandstones, and conglomerates. They indicate the continental structure of the land to the south. The section of Dr. Philippi's report which is probably of most general interest discusses to which of the two coastal types this land belongs. According to Reiter's well-known suggestion, Wilkes' Land is of the Atlantic type, while Victoria Land, as the continuation of the New Zealand line, is of the Pacific type. The evidence available from Cape Adare and Kaiser Wilhelm Land suggests that all the intervening coast is of the Atlantic type. According to Dr. Philippi, Victoria Land is the same. His conclusion rests on two considerations. Firstly, Victoria Land is a plateau land, and when Suess originally distinguished the Atlantic and Pacific coast-types he regarded coastal plateaus as confined to the Atlantic type. The coast of northern Queensland is, however, in part a plateau edge, but it may be retained in the Pacific type, as its characters have probably been determined by a succession of step faults parallel to the coast, a structure which Prof. Suess describes as characteristic of the Pacific type.

No doubt these inner step-faulted coasts of the offlying seas of the Pacific are younger than the outer folded coast of the main ocean, and it may be convenient to separate them as secondary Pacific coasts. If so, then Victoria Land may be described as having a secondary Pacific coast, like the southern end of New Zealand and the eastern coasts of Australia; and the outer folded Pacific coast may then have passed from the middle of the South Island of New Zealand eastward towards Graham's Land along a line which is still unknown, and has perhaps been completely destroyed.

Unless the Pacific coast type is to be so re-defined as to assign an Atlantic structure to much of the Pacific coast, no adequate tectonic reason has been yet advanced for the removal of Victoria Land from the Pacific group. The second argument for this step is petrographic. Becke and Prior have both suggested that the Pacific and Atlantic types of coasts are characterised, not only by different tectonic structures, but by different groups of volcanic rocks. The volcanic rocks erupted along the Pacific folds are richer in silica, alumina, soda, and magnesia, and the volcanic rocks discharged from the fractures along the Atlantic shores are richer in potash, lime, and iron oxides. The characteristic volcanic rocks of the Pacific are rhyolites, dacites, andesites, and acid basalts. Those characteristic of the Atlantic are trachytes, phonolites, tephrites, and basic basalts. The affinities of the volcanic rocks of the southern end of New Zealand and of Cape Adare are with the Atlantic group. As a rule, the distribution of Becke and Prior's petrographic types coincides to a remarkable extent with Suess's two tectonic divisions of the coasts of the world; but the petrographic and tectonic features do not appear to coincide universally, and it is doubtful whether the former is as suitable a taxonomic character as the other.

The Gaussberg area, situated as it is at the western end of Wilkes Land, is of such special interest that it is unfortunate that circumstances prevented the German explorers from reaching a wider extent of land, as these memoirs show the high quality and thoroughness of their work. J. W. G.

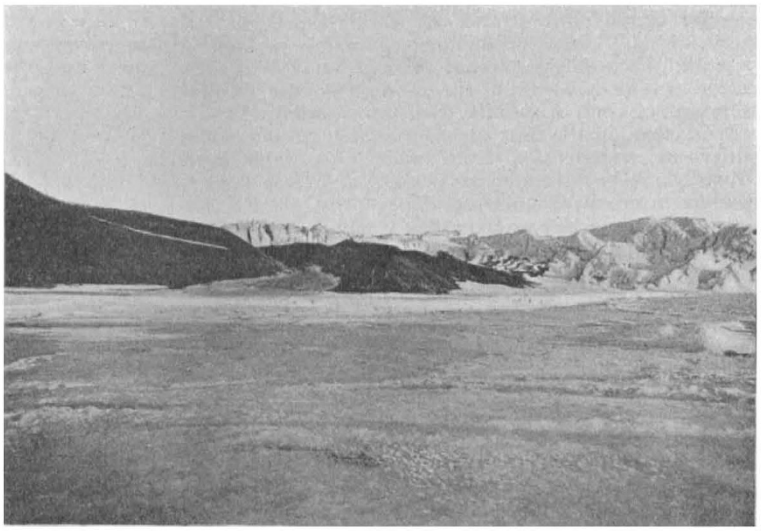

FIG. 1.—Edge of the Inland-Ice and Moraines at the north-western corner of the Gaussberg.