Siberian branch (Irkutsk) it is learned that Sannikow travelled on the upper Man River, following it five hundred versts, to its confluence with the Yenisei. He met with numerous and interesting pictured rocks, all on hard, nearly vertical surfaces. Later he visited the Minussinsk district, and described many tumuli, statues, and peculiarly disposed stones, probably having a signification in the burial ceremonies of the former inhabitants. The Caucasian branch (Tiflis) reports generally on the geographical work in the Caucasus. As before, the Caucasian military topographical section has done good work, especially east of the Caspian. The telegraphic determination of longitude between Batum and Nikolaiew has been made. General Stebnitzky has prepared a large work on the orography of the Caucasus. The hydrographical work on the east coast of the Black Sea, under Admiral Zarudny, continues. Four new meteorological stations have begun work, and it is hoped soon to have two stations on the road across the Caucasian chain, and one at Kars. These reports also contain a large amount of information in regard to the other geological and ethnological explorations going on. O. E.

St. Petersburg, Oct. 15.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

Flood Rock explosion.

THE articles upon the Flood Rock explosion contained in your issue of October 16, to which my attention has just been called, though evidently the utterances of men who are more familiar with the quiet work of the study than with the varied and complicated requirements of engineering practice, demand an answer through your columns, in order that the fair-minded portion of your readers may not be misled into erroneous judgments through the unjust and unfriendly remarks concerning the delay in firing the mine that have been placed before them.

The story of the Flood Rock explosion may be told in a very few words. For ten years a great work of engineering, costing a large amount of money, had been going on, the successful accomplishment of which depended upon the successful explosion, by electrical action, of 290,000 pounds of high explosives. The whole work required the most careful study and forethought, to avoid accident to life or limb, and to eliminate, as far as possible, the chances of damage to any part of the system, upon whose good order, at the critical moment, the success of the undertaking depended.

It was essential that, as soon as the mine should be ready, it should be fired, for at any moment there was a possibility of accident to the apparatus, which would delay, if not ruin, the work of years; but at what time precisely we should be ready for the explosion could not be certainly predicted, though from the way in which the work was progressing, we hoped to be ready to fire at high water, 11 A.M., on Saturday, October 10. Work on the mine had been going on night and day under the personal direction of Lieutenant Derby, who spared himself no inconvenience and avoided no danger connected with it, in order to get the thing through in time; and yet, as it happened, the preparations could not be quite completed until a few minutes after 11 o'clock on the day appointed, when the mine was fired. I hardly need say that this delay was unavoidable.

General Abbot, who had been requested by General Newton to take charge of the photographic and the seismoscopic arrangements for the explosion, had by personal application to the superintendent of the Western union telegraph company, secured the use of a wire for a short time, from the firing point at Astoria to Patchogue in one direction, and to West Point in the other; and when the representative of the geological survey applied to him for information in regard to the explosion he offered to send chronometer ticks to the Western union office in New York, so that they might be transmitted to the observers who were not under his (Gen. Abbot's) orders. No advantage was, however, taken of this offer, though the Western union company would doubtless have been as willing to grant the use of their wires to these gentlemen as to General Abbot.

One of our engineer points of observation, that at Willet's Point on Long Island Sound, was not connected electrically with the firing point; the nearest telegraph station being three miles distant, at Whitestone. Yet the young officers who were detailed to watch the seismoscope there, watched until they got their observations, and would have watched for an hour if necessary, or until notified to stop. Observations, it is stated, were also successfully made at Columbia college, Yonkers, Princeton, and Cambridge, though none of the observers at these places were in electric connection with the firing point.

The same degree of intelligence which secured successful results in these instances would doubtless have prevented Professor Paul from losing his observations at Staten Island, and would have saved him the discredit of having written a very ill-tempered letter; and an intelligent study on his part, of the results of the explosion at Hallet's Point in 1876, would have prevented him from mistaking the slight disturbance which he observed, for that which would necessarily be produced by the explosion of nearly 150 tons of high explosives.

If, then, there was, as has been charged, any blundering or want of intelligent co-operation in this matter, it is evident that it was on the part of those who failed to take the necessary precautions to insure the success of their observations, and not on the part of the corps of engineers of the army, whose long and honorable service has been uniformly marked by an intelligent and faithful performance of its duties, and by freedom from mean and degrading jealousies.

WALTER MCFARLAND,
Lieutenant-Colonel of Engineers.

New York, Oct. 28.

I fully acknowledge that the time observations upon the explosive waves from Flood Rock were a matter of secondary importance, mostly of scientific interest, and, even in the 'quiet of the study,' think I can appreciate, perhaps not fully, but in a high degree, the complicated difficulties in the way of

successfully bringing about the explosion, so graphically described in Colonel McFarland's letter.

From the stand-point of an outside would-be observer, the story of the Flood Rock explosion may be told as follows. The idea of determining the velocity of the vibrations through the ground was suggested at a late date, and the preparations were necessarily hurried and incomplete. No official information could be obtained, fixing even approximately the date of the explosion, and we were obliged to depend upon the newspapers for that information. Near the end of the week preceding its occurrence, the papers announced that the time was set for Wednesday, October 7, at 9 A.M. We hurriedly collected the apparatus prepared to date, boxed it, and shipped it to New York on Monday the 5th, and were to follow it that night, when the evening papers announced a postponement probably till Saturday the 10th. Nearly all the astronomical observatories within 200 miles of New York had been invited to co-operate (see *Science*, vi. 327), and had been asked to watch the New York papers, and been promised a telegram several hours before the event, fixing, if possible, the nearest minute at which it would occur.

The announcement and warning by General Newton on the afternoon of Thursday the 8th, together with a letter at the same time to the representative of the geological survey, were the first information we had of the time set for the explosion.

I would say that General Abbot cordially cooperated with us, and that his offer to send his time-signals to the Western union office (after the explosion) was duly appreciated. We did not take advantage of it, however, as it would have been very troublesome to distribute signals to fourteen observatories or institutions scattered in all directions over an area of 200 miles radius, and it was entirely unnecessary, as every one of them had the means of determining standard time for itself, or was in daily receipt of standard-time signals at noon. With the delay in the time of firing, of which we do complain, we understand that General Abbot had nothing to do.

It should be distinctly noted that the engineer observers within sound of the telegraphic ticks from the chronometer at Astoria, and waiting for the preliminary automatic signal from the firing-key, were in a vastly more favorable position in case of delay; and if this had been anticipated, and there had been time and opportunity to distribute the chronometer ticks and firing-signal to all the outside stations, of course it would have been done.

Regarding the observations cited by Colonel McFarland as having been successfully made at Columbia college, Yonkers, Princeton, and Cambridge, I would say that, at the first two, it was due to their proximity, while, in view of Professor Young's description of the Princeton observations (*Science*, vi. 335), it seems somewhat of a strain upon the meaning of language,— unless used in some approximate, engineering sense,— to call them a success; and at present the writer considers it somewhat doubtful if the Cambridge observations refer to the explosive wave. The statement that the two officers at Willet's Point would have watched an hour, if necessary, only goes to show how much better posted the engineer observers were as to a possible delay in the firing.

As to my own observations at Staten Island, their failure is of itself of little importance, but it is to me a source of wonder and sincere admiration to see how much more an engineer officer can know about them than the observer himself. They will be described in due time with the other reports. At present I can only say that under the same circumstances, if endowed with only the same 'degree of intelligence' I then possessed (even after a study of the Hallet's Point explosion of 1876), I should probably do just the same again; but, with the rapid growth since Oct. 10 of my knowledge of engineering science, I can hardly state now how long I would *not* wait for the occurrence of a definitely predicted engineering phenomenon.

Suffice it now to say that eight out of the seventeen stations were successful in observing either the first arrival or the pretty certain non-arrival of the vibrations. The others were all thrown off by the delay, combined, in four cases, with observation of earth-tremors occurring at several places during the first ten minutes after eleven. It would almost seem as if the earth itself were, about that time, growing uneasy at the delay in the oncoming of the dread event.

H. M. PAUL.

Washington, Nov. 9.

The arms of the octopus, or devil fish.

Prof. T. Jeffrey Parker (*Nature*, October 15, p. 586) refers to an octopus of the New Zealand fauna, with arms five feet five inches long, as the longest seen by him, and as exceeding what Mr. Henry Lee calls the longest-armed octopus known, namely, that from Vancouver Island, which had arms five feet long.

In 1874 I speared an octopus in the harbor of Iliuliuk, Unalashka, which was afterward hung, by a cord tied around the body immediately behind the arms, to one of the stern davits of the coast survey vessel under my command. As soon as the animal died and the muscles relaxed, I noticed that the tips of the longer tentacles just touched the water. On measuring the distance with a cord, I found it to be sixteen feet, giving the creature a spread from tip to tip of the longest pair of arms, of not less than thirty-two feet. The arms toward the tips were all exceedingly slender, but rather stout toward the body, which was somewhat over a foot long. The largest suckers were two and a half inches in diameter; the whole creature nearly filled a large washtub. Parts of this specimen are now in the U. S. national museum. Having heard octopi were eatable, and the flesh looking white and clean, we boiled some sections of the arms in salt and water, but found them so tough and elastic that our teeth could not make the slightest impression on them.

WM. H. DALL.

Washington, Nov. 13.

The care of pamphlets.

In printing my letter on p. 408 of your issue of Nov. 6, you printed the Dewey classification numbers with a comma, thus obscuring their character as decimals. According to the custom of Mr. Dewey, you might have placed a comma or period after the third figure, but unless you did that you should have printed them without punctuation marks; 526, for instance, is a primary division, of which 52641 is a subdivision.

P. PICKMAN MANN.