ture, is, as a natural consequence, inhabited by a different fauna; in fact, by a tropical deep-sea fauna, an extension of that of the West Indies. Not only the tile-fish, but certain crustaceans, are examples of these. Naturally they would be sensitive to cold. During the spring of 1882, violent and long-continued easterly and northerly winds prevailed, and numerous icebergs stranded on the George's Banks just north of the belt. We have every reason for believing that these winds carried the inshore waters, which were naturally cold, but whose temperature had been lowered by the stranded bergs, across the border-line and into the warm area. If this were the case, such delicate animals as the tile-fish could not possibly stand the sudden change which their more hardy neighbors could easily live through. So it was that the tile-fish and a few other species were exterminated from these grounds. Although the fish-commission has organized many extensive expeditions for the sole purpose of searching after the tile-fish, not a single specimen has since been found, either of the tile-fish or the other species. Whether or not they still exist in waters more southern is an open question; but we understand that Professor Verrill believes they will be found there. At any rate, it is certain that they are entirely absent from their former haunts, and that, if they do exist elsewhere, many years must elapse ere they inhabit this bank again in abundance. Such sudden changes as these, and local extinction of several species by such simple means, cannot help throwing much light upon paleontological geology.

RALPH S. TARR.

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## *COMETS AND ASTEROIDS OF 1884.*

WHILE the year 1884 has brought no comets of remarkable brilliancy or popular interest, compared with the comets of 1881 or 1882, nearly all the comets of the year will claim more than ordinary attention at the hands of astronomers, on account of the interest which attaches to the investigation of their orbits. Of the five comets seen, four have been periodic.

The first comet which was discovered in 1884 belongs properly with the comets of the preceding year, as it passed perihelion on Dec. 25, 1883. It was discovered, however, on Jan. 7, 1884, by Ross, an amateur observer, at Elsternwick, near Melbourne, Australia, — "a faint nebulous object, with an ill-defined central condensation, and a small, tail-like projection." It was not visible in the northern hemisphere, and was under observation for only about a month. The tail was one and a half degrees long on Jan. 18, 1884.

The first comet of 1884, in order of perihelion passage, was that discovered, or rather re-discovered, by Brooks, at Phelps, N. Y., on Sept. 1, 1883. It has been commonly known as the Pons-Brooks comet, or Pons comet of 1812, having been originally discovered by Pons at Marseilles in that year. An account of this comet has already appeared in *Science* (iii. 67).

The second comet, in both order of perihelion passage and of discovery, was that found by E. E. Barnard of Nashville, Tenn., on July 16, 1884. At the time of discovery it was a nebulous object, slightly condensed near the centre, and tolerably bright. It was found to move in an elliptical orbit with a period of about five and a half years, the elements bearing a very close resemblance to those of DeVico's comet (1844, i.). The comets do not, however, appear to be identical. The nearest approach to the sun was on Aug. 16.

The third comet of 1884 was discovered on Sept. 17, by Wolf, a student at Heidelberg, and is still under observation. In its physical appearance, the comet has changed very little since discovery. As far as I know, it has not at any time been visible to the naked eye, nor has it shown any indications of a tail. When examined on Nov. 13, with the nine-inch equatorial at the Naval observatory, under a magnifying-power of one hundred and two diameters, it presented the appearance of a 'slightly oval, nebulous object.' Near the centre of the nebula was a bright disk nearly circular, and in the centre of this disk the stellar nucleus. The line of demarcation between the disk and the surrounding nebula was, of course, extremely uncertain; but measures made with the filar micrometer gave, roughly, a diameter of 1′ 52″ for the outer nebula, and a diameter of 18″ for the central disk. Using the distances given in Krueger's ephemeris, these measures would represent distances of forty-seven thousand and seventy-five hundred miles respectively. By far the most interesting feature of the comet is its orbit. Krueger has assigned a period of about six and seventh-tenths years, but there is no evidence of any previous appearance. He remarks that at the returns in 1871 and 1878 it was unfavorably situated. In 1891 and 1864 its situation is favorable, if we can suppose that it follows the same path as at present. Krueger points out, furthermore, that in the early part of 1875 the comet must have suffered considerable perturbation by Jupiter, and before that time it may have been following an entirely different orbit. Perihelion was passed on Sept. 26.

Encke's comet, the most interesting short-period comet, has just been reported by Professor Young. It is extremely faint, but will grow somewhat brighter. It will not reach perihelion till March, 1885.

To complete the list, we should mention a 'suspected' comet to which some interest is attached. A faint, round, nebulous object was found by Spitaler with the twenty-seven inch refractor of the Vienna observatory, while searching for comet 1858, iii., on the morning of May 26, 1884. Unfavorable weather prevented a re-examination of this place till June 17 and 18, when the object could no longer be seen, nor

could it be found afterwards near its predicted place. It is still doubtful whether this was the expected comet.

During the year, ten new asteroids or minor planets have been discovered, making the total number now known two hundred and forty-five. The new-comers are as follows: (236) Honoria, discovered by Dr. J. Palisa, at Vienna, April 26; (237) Hypatia, by Palisa, June 27; (238) by Knorre, at Berlin, July 1; (239) by Palisa, Aug. 18; (240) Vanadis, by Borelly, at Marseilles, Aug. 27; (241) Germania, by Dr. R. Luther, at Düsseldorf, Sept. 12; (242) Kriemhild, by Palisa, Sept. 22; (243) by Palisa, Sept. 29; (244) by Palisa, Oct. 14; (245) by Palisa, Oct. 27 (at first taken for Andromache). W. C. WINLOCK.

## *FURTHER NOTES ON BOGOSLOFF ISLAND.*

AN examination of the official report of Capt. Healy, Lieut. Cantwell, and Dr. Yemans, of the U. S. revenue-cutter Corwin, and of the drawings and photographs by which it is accompanied, affords a few further notes of interest in regard to this remarkable island. It may be recalled that the new peak was first seen, so far as now known, by Capt. Anderson of the Matthew Turner, Sept. 27, 1883, and that therefore the application to it of the name of Capt. Hague, on the ground that he was the discoverer, as suggested by Lieut. Stoney, is erroneous. We prefer to retain the prior name of Grewingk, who first collected and discussed all the existing data in relation to the island and its changes.

BOGOSLOFF ISLAND AND SHIP ROCK. FROM A PHOTOGRAPH BY LIEUT. G. H. DOTY, 1884.

In regard to the Bogosloff peak, the new observations determine that it contains a dike or central longitudinal wall of laminated rock, probably volcanic, of which Ship Rock may be an outlying spur. The top and ends of Bogosloff are entirely, and the sides partly, uncovered by the disintegration of a very friable rock of different character from the core. The high sharp pinnacles observed in 1873 appear to have been destroyed by the commotions attending the upheaval of Grewingk. The highest (east) point is now about three hundred and thirty-four feet, the centre two hundred and ninety feet, and the west part three hundred and twenty-four feet in height. These differ slightly from Stoney's figures, and considerably from previous measurements. Allowing for all the probable diminution in height, due to various causes, we are convinced that a large part of the discrepancy is due to error in earlier measurements, including our own; since the length of the peak, which cannot have changed much, is only about a thousand feet. The earlier estimates of the height of Grewingk were about double its real height. The tendency is always toward overestimating a height when there is nothing adjacent for comparison, and accurate measurements from on shipboard are extremely difficult. The south spit of Bogosloff has certainly increased greatly in length since recent disturbances, and now measures about eighteen hundred feet, when previously it did not exceed one-third the length of Bogosloff. The north end of Bogosloff rises nearly vertically with a sort of cave at its base. The shores of both peaks are fringed with large water-worn bowlders of hard rock. The axis of the old peak and spit is in a south-east by east direction. There was not the slightest sign of recent vulcanism about it; and the crags were the haunt of myriads of birds, but too crumbling to scale. There are no birds on the new peak, and those accidentally entering its vapors are quickly suffocated. Ship Rock rises eighty-seven feet, and has been elevated about twenty feet above its old level, judging by the barnacles still clinging to its sides. The apex has crumbled a little, and is less squarely cut than formerly.

Grewingk is less sharp than Bogosloff. As nearly as could be determined through the steam-jets, the highest peak of Grewingk is less than four hundred and fifty feet, and its base is somewhat over three thousand feet long. A deep ravine which apparently represents the crater, but is too full of steam to afford a fair view, extends in a north-easterly direction through the upper third of the mass, and cuts off a peak south-east from it, estimated to be four hundred feet high and about one-fifth the volume of the whole summit. The sides of Grewingk rise with a slope varying from ten to forty-five degrees; near the base it is gentler; and the surface of soft ashes, thickly covering broken rock. The slope, after the first three hundred feet, becomes steeper, and chiefly of loosely piled rocks; at two-thirds of the total height from the base, a wall of volcanic pudding-stone checks further progress. On the north-west side many irregular rocks appear: the other sides are more thickly strewn with ashes. There is no lava. Many steam-jets are visible, but are noiseless or only purr slightly. In one place, two-thirds of the way up, there is a group of fifteen jets on a nearly horizontal plane, which were notable for the force with which the vapor was emitted, and for their intermittent regular pulsing. All the vents were surrounded with dendritic sulphur crystals.