VII. *Remarks on several icebergs which have been met with in unusually low latitudes in the southern hemisphere.* *By Captain* JAMES HORSBURGH, *Hydrographer to the East India Company, F.R.S.*

Read Feb. 4, 1830.

AN apology might probably be necessary, in offering the following remarks to the notice of the Royal Society, if they did not pertain to a phenomenon of a novel nature, which may be interesting to those members of the Society who are anxious for the elucidation of cosmographical science.

It appears that icebergs, until lately, have seldom been seen by navigators in their passage near the Cape of Good Hope and the coast of South Africa; for the journals of the ships belonging to the East India Company, during the whole of the last century, do not specify that any icebergs had been seen in the route of their navigation in the southern hemisphere, although several of these ships proceeded into the parallels of latitude 40°, 41°, and 42° south.

On April the 7th, 1828, the Harmonie, French ship from Calcutta, bound homeward, in latitude 35° 50′ south, longitude 18° 5′ east of Greenwich, saw several icebergs, some of them appearing to be 100 feet elevated above the sea, and passed between two of them, upon which the sea broke violently. When amongst these icebergs, the Harmonie fell in with the Spanish ship Constancia from Manilla, bound to Cadiz, the pilot of which describes them as follows:

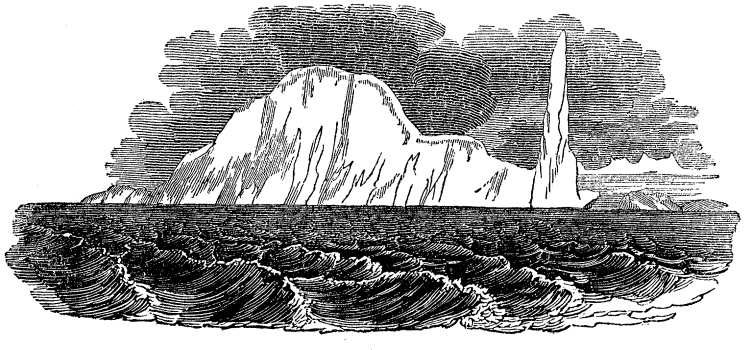
April 7th, 1828, at $10\frac{3}{4}$ A.M. saw a small island, appearing like a white cloud, and soon afterward some shadowy lines were observed in it, as is usual in land: upon a nearer approach, it appeared to be a large island of considerable height divided into two summits. Soon after, three other small islands were discovered at a short distance from the former. At $11\frac{1}{2}$ A.M., perceived that they were white, and that the light of the sun was reflected from their surface as from a mirror. We were perplexed with this phenomenon till noon, being then in latitude 35° 56′ south, longitude 16° 59′ east of Greenwich, by chronometer, corresponding with lunar observations. Sounded, but got no bottom at 135 fathoms; and the sea continuing of a green colour, we concluded these were icebergs, which had drifted to latitude 35° $54\frac{3}{4}$′ south, longi-

tude 17° 59′ east. Steered W.S.W. till 2 P.M. and spoke the French vessel L'Harmonie from Calcutta. At 3½ P.M. discovered two more icebergs, which we passed at 4½ P.M., the most southerly of these presenting a square of 25 or 30 toises of elevation, but without an apex like the other near it. At the distance of three miles to the north of these, another iceberg of large size appeared.

On the 28th of April, 1828, the brig Eliza from Antwerp, bound to Batavia, fell in with five icebergs in latitude 37° 31′ south, longitude 18° 17′ east of Greenwich, having the appearance of church steeples, and apparently from 250 to 300 feet high, which were passed within the distance of a quarter of a mile; and the sea broke so violently against these enormous masses of ice, that at first they were thought to be fixed on some unknown shoal, until on sounding, no bottom could be obtained.

These icebergs, seen by the Eliza three weeks after the former were discovered by the ships Harmonie and Constancia, although nearly on the same meridian, were 32 leagues to the south of those first seen, and therefore must have been different masses following nearly in the track of the former, and carried along from a high southern latitude by the current and waves towards the coast of South Africa.

The East India Company's ship Farquharson, April 20th, 1829, in latitude 39° 13′ south, longitude 48°46′ east, fell in with a large iceberg, and when near it the measured altitude gave 150 feet for its height above the surface of the sea, and it appeared to be about two miles in circumference. If the height measured from an altitude of this iceberg be correct, the whole height from its base to the apex must have been 1000 feet or upward, by allowing for the difference of gravity between ice and water, compared with the form of the iceberg above the sea. When near it, the annexed view was taken.



Antecedent to these icebergs, discovered in April 1828, and April 1829, none appear to have ever been seen to the northward of the 42nd or 43rd degree of south latitude, in the Southern Ocean; but His Majesty's store-ship Guardian struck upon one in latitude 44° 10′ south, longitude 44° 25′ east, on the 24th December 1789.

In the Encyclopedia by the late Dr. Rees, it is stated that "floating ice has occasionally been found in both hemispheres as far as 40° from the poles, and sometimes, as has been said, even in latitudes 41° and 42°." But it is now ascertained that icebergs are carried to a greater distance from the poles before they are dissolved.

As the icebergs in the southern hemisphere have been found further from the pole in April than at any other time, it might be expected that in the corresponding month of October they would in the northern hemisphere be found at the greatest distance from the Arctic pole; it however appears that in the same month of April or May*, icebergs have been seen at the greatest distance from the latitude of their formation, in the northern as well as in the southern hemisphere; in accordance with which the following examples may be stated:

April 14th, 1817, the Minerva from New York, bound to Liverpool, fell in with four large icebergs in latitude 42° 47′ north, longitude 47° west.

April 3rd, 1823, the Mountstone sailed from Plymouth for St. Johns Newfoundland, and on the 7th of May struck against a mass of ice during a thick fog, and shortly afterward filled with water:—the latitude not given.

May 14th, 1814, the fleet bound to Quebec, in latitude 44° 18′ north, longitude 50° 50′ west, fell in with upwards of twenty large icebergs, some of which were 80 feet above water; and in the afternoon of the same day the convoy passed a field of ice about 20 miles in extent, and about 30 feet elevated above the sea, some parts considerably higher.

From the foregoing observations, the following remarks naturally arise:

* There are, however, some exceptions to this remark; as icebergs (it is said) have been seen in July or August not far distant from the Azores; but perhaps this seldom occurs, for in these months southerly winds prevail, with a warm atmosphere, and frequently a current setting to the northward: all, together, forming a barrier of resistance to the advancement of icebergs to a low altitude in the North Atlantic Ocean.

First,—That in April, or early in May, both in the northern and southern hemisphere, icebergs, or large masses of ice, have been found in lower latitudes than at other times, which appears to be anomalous, as a difference of six months in time might be expected between the nearest approach to the equator of the northern and southern icebergs.

Secondly,—That the existence of a large tract of land near the Antarctic circle seems to be necessary for the origin and accretion of the southern icebergs, and probably situated somewhere between the meridian of London and longitude 20° east; from whence these icebergs have been carried in a N. and N.N.easterly direction by the united forces of current, winds, and waves, prevailing from S.S.W. and S.W.; for Sandwich Land, in latitude about 60° south, longitude 27° west, seems to be too far west from the prevailing line of direction of the currents, winds, and waves, to be the place of formation of the icebergs found near the Cape of Good Hope, and of that seen by the Farquharson. Bouvet's Island, and Thompson's Island, in latitude about 54° south, longitude $5\frac{1}{2}$° east, are not of magnitude sufficient to have been the basis of these icebergs; and Kerguelen's Island, in latitude 49° south, longitude 70° east, is too far to the eastward to have been their original base.

Thirdly,—That from the unprecedented appearance of icebergs in the vicinity of the south coast of Africa in April 1828, and in April 1829 further to the eastward, some unknown cause probably produced a disruption of these icebergs from the place of their formation, such as an earthquake, or volcanic forces, which seldom or never had before happened in those regions; but more particularly during the last century, a period when icebergs have not been seen in the Southern Ocean near the coast of South Africa.

If, however, these icebergs were dislocated from the land by some unknown cause, which seldom or never had before happened, the anomaly adverted to above, of the northern and southern icebergs appearing in the lowest latitudes in April or May, would in such case only apply to these icebergs having been carried from the polar regions by similar currents in the same months, instead of a difference of six months, in reference to the set of the North Atlantic current and that of the Southern Ocean, as might have been expected.