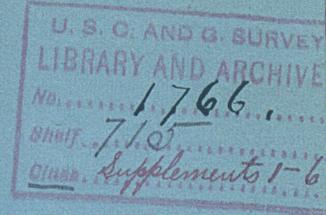


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FIFTH SUPPLEMENT

TO THE

PAPERS ON THE EASTERN AND NORTHERN EXTENSION

OF

THE GULF STREAM,

PUBLISHED BY

THE UNITED STATES HYDROGRAPHIC OFFICE,

WASHINGTON, D. C.,

DECEMBER, 1874.

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# National Oceanic and Atmospheric Administration

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[From the "Mittheilungen aus dem Gebiete des Seewesens," published by the Imperial Austrian Hydrographic Office, vol. ii, p. 617 et seq.]

## THE AUSTRIAN NORTH-POLAR EXPEDITION, UNDER WEY- PRECHT AND PAYER, 1872-'74.

Brief statements of the purposes of this expedition, its outfit, and its starting, were made in the Second Supplement to the "Papers on the Northern and Eastern Extension of the Gulf Stream," p. 27; in the Third Supplement, pp. 40 and 51 et seq.; and in the Fourth Supplement, p. 39 et seq.

1.—*Official report of Lieutenant C. Weyprecht to the committee, dated September 12, 1874.*

I have the honor to present to the committee the following preliminary report on the expedition. The sleigh-excursions, which were made under the direction of Lieutenant Payer, will be reported by him.

After sailing through the thick drift-ice, which enveloped the entire west coast of Nova Zembla to a distance of nearly one hundred miles, we met August 12, at the Pankratief Islands, the sloop *Isbjörn* with Count Wiltschek and Commodore Sterneck, and sailed in company with her through the narrow land-water along the coast to the Barents Islands. Violent WSW. winds prevailed, which drove the thick drift-ice rapidly past us, and detained us (in latitude  $76^{\circ} 16' N.$ , longitude  $61^{\circ} 17' E.$  of Greenwich) until August 21, during which time we established the proposed provision-depot on one of the islands. A fresh northeasterly wind setting in on the 21st, we weighed anchor and pushed, under steam, in a northeasterly direction, through well-diffused ice. In the afternoon, we reached a considerable opening which, however, toward midnight, closed completely to the northeastward; the wind abated, and the ice accumulated around us so rapidly that soon no water remained visible in any direction. We were then in latitude  $76^{\circ} 22' N.$ , longitude  $62^{\circ} 03' E.$ , 6 miles off the coast. Anxious not to lose the 15 miles which we had been fortunate enough to make without difficulty in this unfavorable season, I anchored the vessel to the ice, fully aware that we would be beset, but in hopes that soon an easterly wind would cause the weak pieces inclos-

ing us to part. Instead of the easterly winds, however, on which I counted after the heavy southwesterly gales of the preceding week, there were calms, only broken by westerly breezes, with much snow, which, under the influence of the rapidly-declining temperature, cemented the drift-ice firmly. There was no change until the 9th of September; the ice lay dense, and no water could be seen in any direction; the ship drifted with light breezes, now east, now west; the thermometer fell at night to  $5^{\circ}$ .

September 9, a fresh northeasterly wind at last broke the ice into detached fields, but the vessel remained frozen in the center of one of them. All efforts to work her to an opening, by steam and the ax were, on account of the unevenness of the ice, in vain, although the distance to the edge of the field was only 500 yards. Our movements depended entirely upon the wind; with the ENE. breeze, we drifted rapidly WNW. to latitude  $76^{\circ} 35' N.$ , longitude  $60^{\circ} 18' E.$ , but the southwest gales setting in, drove us back to nearly our former position.

All this time the ice lay so thick that, even if the vessel had been freed, it would have been impossible to have reached beyond the provision-depot.

October 1, we were in latitude  $76^{\circ} 50' N.$ , longitude  $65^{\circ} 22' E.$ ; October 5, we lost sight of the coast of Nova Zembla.

At this time, the pressure of the ice began; the field to which we were fast grew smaller each day; and on the 13th it broke, under a heavy pressure, into fragments. At first, it appeared as if the vessel would also be crushed, and she was lifted several feet, careening to port.

The pressure of the ice continued throughout the winter almost uninterruptedly. The ice was constantly in motion; new cracks always caused renewed pressure, changing the position of the ship, now lifting her higher, and then again causing her to settle more or less. Necessarily, we had always to be prepared, under these circumstances, to leave her in the shortest time. Coal and provisions for 10 months, with materials for a cabin, were partly kept on the deck and partly on the ice in two boats. Two huts, built for an emergency on the ice, broke to pieces. The most severe pressures occurred at the end of January, 1873. At that time, we were compelled to change the places of the depots on the ice almost continuously; and frequently our surroundings were so much broken and so heavily pressed that it was very difficult to find a safe place. January 22, an ice-wall of 30 feet in height formed in a few minutes within a few yards of the stern of the vessel, cover-

ing a tent for magnetic observations and a pile of coal and wood. During these five months we had very little rest, and lying down without clothing was rarely permissible. The sun was last seen on October 19; on the 23d, the cabin-windows were covered. The ship could only be roofed with canvas forward of the mainmast, as abaft this the provisions had to be kept ready to be thrown overboard. The snow-walls in which the ship was incased had to be frequently rebuilt when new cracks of the ice caused them to part.

Notwithstanding these difficulties, the health of all on board remained satisfactory. Slight indications of scurvy appeared at the end of January, but they disappeared at once with the use of lemon-juice. I kept the crew astir, and cared also for their mental employment by obliging them to attend school and readings. The cold was borne easily, although the thermometer fell in February to  $-51^{\circ}$ .

The ship drifted during the winter with the winds, first northeast, reaching on February 4, 1873, her easternmost position, in latitude  $78^{\circ} 42' N.$ , longitude  $73^{\circ} 18' E.$ , and then in a west-northwest direction.

February 16, the sun re-appeared; but the severe cold did not permit us to uncover the windows and remove the awnings until April 7.

At the end of February, all the cracks closed firmly with a dreadful ice-pressure, but from that time the ship remained undisturbed. Before that time, the continuously-changing ice did not permit us to place the stationary instruments for observations.

April 15, we began digging the ship out; the snow-walls were removed and the rudder freed and lifted. The ship then lay with her stern elevated  $3\frac{1}{2}$  feet, careening slightly to port. I caused twenty-one large holes to be bored through the ice around her, intending to connect them with the saw; but this proved impracticable, as the ice was, at a few holes only on the port-side, weak enough for the latter. In most of them the water was reached only at depths of from 12 to 20 feet, and loose ice was found beneath this cover; in some, the water was not reached at all. Under these circumstances, I began to work directly at the vessel from the port-bow. The saws, which measured only 12 feet, were lengthened; and some heavier were made of boiler-casing copper, and ice-chisels and ice-borers were constructed of the heaviest ice-anchors.

The labor thus commenced proved extremely tedious and finally unsuccessful. Only small pieces could be sawed out, and these had to be broken and

removed in order to make room. Mines were of no effect; powder could only be used for blasting the pieces already sawed out. In this manner we worked on both sides of the vessel towards the stern; but beyond the main-mast all labor was in vain, the ice being too thick, and 30 feet beneath the surface new layers of it were met.

During the summer, the thaw lifted the vessel still higher; in the beginning of September, the immersion aft was only  $4\frac{1}{2}$  feet, while at the bow, which we had freed entirely, it was  $11\frac{1}{2}$  feet; in August, she had careened to port so much that it became necessary to prop her with spare yards and spars. In September, the new ice formed, and grew so strong that I ceased this fruitless labor altogether.

The summer-exertions had shown that the crew remained in possession of all their bodily strength. Many polar bears were killed, and their wholesome meat saved us considerably in provisions. Seal, which were eagerly hunted, added to this in the autumn.

By June we had seen from the cross-trees several larger cracks in the ice, but no navigable water. Toward fall these cracks approached closer, and the ice-field, which in the spring had appeared unbounded, became every day smaller, until in October, when the scenes of the past winter threatened to be renewed.

August 30, while in latitude  $79^{\circ} 43'$  N., longitude  $60^{\circ} 23'$  E. of Greenwich, unknown land was discovered stretching from west to north, and evidently of considerable extent. We named it, after His Majesty, "Emperor Francis Joseph Land," and the point first sighted, a high, conspicuous headland, "Cape Tegetthoff." In September and October we drifted along the coast of this land, crossing in the beginning of October the eightieth degree of latitude. In the first days of November our then very small ice-field drifted against the land-ice of one of the islands south of the coast, and froze to it; and there (in latitude  $79^{\circ} 51'$  N., longitude  $58^{\circ} 56'$  E.) we lay,  $2\frac{1}{2}$  miles from shore, undisturbed by the ice, until we abandoned the vessel.

Already, in September, anticipating that we would be compelled to remain in the pack-ice a second winter, I had sleighs constructed for the three boats, and made all necessary preparations for wintering on the ice. In November, two snow-huts were built for the magnetical and astronomical instruments;



and at a later date, a third, in which the crew celebrated their second Christmas.

The ship was enshrouded, as in the preceding winter. The skylights were closed October 21, and on the following day the last refracted rays of the sun were seen.

With the beginning of the winter, two cases of scurvy occurred; the victims being Carpenter Vecerina and Seaman Fallesich. The former remained seriously sick for a considerable time, and still suffers from a contraction of the left leg; the latter soon recovered. Engineer Krisch, who probably joined the ship with a weakness of the chest, was, in October, confined to his bed which he left but occasionally up to the time of his death.

With the new year began the regular observations for magnetic variation, which were of the highest scientific interest on account of the almost uninterrupted disturbances in consequence of extraordinarily intense auroræ boreales. These, with meteorological and astronomical observations, gave ample employment throughout the winter.

Violent snow-stürms, prevailing until May, detained us much of the time within the ship during this winter.

On the 16th of March, at 4 p. m., Engineer Krisch died, after a severe struggle, of consumption, to which, during the last weeks scurvy was added. We buried him on the 19th, on shore, and afterwards erected over his grave a solid cross, with an inscription-tablet of brass.

On account of the prevailing bad weather, we did not see the sun until February 29.

On February 23, I called the officers for a consultation regarding the ship. They expressed as their unanimous opinion that she would not hold together a third winter, and that, therefore, she should be abandoned in the spring, before the strength of the crew should be impaired.

March 10, Lieutenant Payer commenced his sleigh-excursions, from the last of which he returned May 3.

Seaman Stiglich shot himself March 28, accidentally, the ball entering at the left elbow and passing lengthwise through the entire forearm out of the thumb. Thanks to the unceasing care of Dr. Kepes, the ugly wound had healed completely before he left the vessel.

During March, April, and May, preparations were made for the retreat in the boats. I selected the two Norwegian boats and the second ship's

boat, the two former 17 feet, the latter  $15\frac{1}{2}$  feet long. I had them heightened 1 foot by canvas, and covered their entire length. The sleighs which we made for them proved of excellent service in the deep snow.

All three boats were so fitted as to secure safety in case of separation. For each a sleigh was prepared, with provisions, which consisted of pemmican, preserved meats, pea-sausages, flour, bread, chocolate, and spirits for fuel, weighing altogether 4,000 pounds. I recommend highly the prepared chocolate, presented by Mr. Kluge, of Prague, which proved of inestimable value.

With the exception of the records and diaries, and the zoological collections, all other material had to be left on board.

The health of the crew was very satisfactory at this time. Only Stiglich and Vecerina could not be employed in drawing the sleighs.

We left the vessel on the evening of May 20. The road was, from the beginning, so bad that half the crew could barely drag one of the boats or sleighs. We had to make each portion of the way five times, thrice drawing, and twice returning for the other boats.

The snow lay very deep between the packed ice-blocks, and was covered by a crust through which we broke at every step. Frequently, we sank to the waist, and often it was necessary to crawl on the hands and feet. Our progress was thus very slow, averaging, by hard labor, half a mile a day.

On the 29th, we reached an islet about 5 miles south of the ship, which was so buried in the ice that we had not seen it. Two miles south of this, we came, on June 1, to the edge of the fast land-ice, where firmly-compressed drift-ice compelled us to wait half a month. I returned, with half of the crew, to the ship for a fourth boat, the dingy. On our return we tried, in several places, to get to the water, but in vain. On the 17th, a northerly wind opened the ice sufficiently for launching the boats. I placed seven hands in each of the larger, five in the third, and four in the dingy, dividing the provisions proportionally.

Our working through the dense drift-ice in the following weeks was extremely wearisome, as we were obliged to place the boats on the sleighs when passing over an ice-field, and then again to ship the sleighs when we found an opening. Open water of any considerable extent was rarely met; the fields of ice were but small, and the channels between them blocked with

crushed ice, which always froze at night. The continual shipping and unshipping, and launching and landing of the boats occupied the greater part of our time; and frequently we had to wait several days for a change in the ice. And all these exertions were, after all, frustrated by the prevailing southerly winds which drove us more to the northward than we could gain to the southward by the most continuous labor, and, on the 15th of July, we found ourselves close to the islet which we had left a month before.

On that day a northerly wind set in, opening the ice so much that we were able, in a few days, to work out of reach of the small fields. We could now make greater distances, over larger fields, without launching the boats so often, and there were greater openings and navigable channels between these fields. July 23, we crossed the seventy-ninth degree of latitude, and the farther south we attained the more favorable were our surroundings, although the returning southerly winds again caused considerable loss in distance.

August 7, in latitude  $78^{\circ}$  N., we unexpectedly felt a motion in the ice, heralding the vicinity of the open sea. We passed quickly from the pack-ice into looser drift-ice which, however, was still so thick as to detain us a week.

August 15, we reached at last the open sea, in latitude  $77^{\circ} 40'$  N., longitude  $61^{\circ}$  E., where we demolished the sleighs, and took definitely to the boats.

The crew were now divided into two watches, relieving each other at the oars every four hours. Calms favored us so much that on the following day we came in sight of the high mountains of Nova Zembla. As we still had provisions for three weeks, I did not touch at the depot, but steered south along the coast.

On the 28th, to celebrate the birthday of the Emperor, we landed, for the first time, north of the Admiralty Peninsula, and rested there over night. On the 22d, we searched in vain in Matotschkin Shar for ships, which I had certainly expected there. There was still a prospect of finding a Russian fishing-vessel in one of the rivers north of Gooseland; had there been none, I had resolved to sail thence to the White Sea.

For a few days past the weather had been cold and stormy; the boats had to be baled out continuously, on account of the frequent breaking of seas over them.

August 24, after a hard night, we weathered Cape Britwin, and at 6 p.

met, in the mouth of the Puhova River, in latitude  $72^{\circ} 40' N.$ , a boat which carried us to two Russian schooners, where we were received with the greatest cordiality. Taking our quarters on board of the *Nikolaj*, master Feodor Boronin, we chartered that vessel for \$1,200 and three of our boats, to take us to Wardö, where we arrived on the 3d of September. Master Boronin had offered to keep us on board until his return to the White Sea, but, as this would have detained us a month longer, and also from the enormous cost of travel overland, I deemed it preferable to hire the schooner for a direct return. I cannot praise too highly the kindness of every one on board of that vessel.

During the whole time, the health of all was excellent. Vecerina and Stiglich improved rapidly, and were soon able to take part in our labors.

During the entire expedition, the condition of the officers and crew was excellent, physically and morally. The cold was so readily borne that some of the men never used their furs.

Punishment was but rarely required, and there was no despondency, and no cases of insubordination.

The results of the expedition are of important scientific interest, especially as they were obtained in an unknown region of the Arctic Ocean, at a great distance from all the former stations for observation. Besides the discovery and exploration, at least in part of a great extent of land, mention is to be made of the meteorological observations for two years; of the magnetic observations, in a region subject to continual disturbances; of the deep-sea soundings and dredgings, through fifteen degrees of longitude; and lastly, of the insight obtained into the nature and workings of the thickest pack-ice during a period of 14 months.

In conclusion, I have to acknowledge the great kindness and hospitality accorded to us in Wardö, and everywhere on the coast of Norway.

Very respectfully,

WEYPRECHT,

*Lieutenant, Imperial Austrian Navy.*

ON BOARD OF THE STEAMER FINMARKEN,

September 12, 1874.

2.—*The sleigh-expeditions, from the report of Lieutenant Julius Payer.*

As stated in the above report of Lieutenant Weyprecht, a council of the officers determined, February 23, 1874, to abandon the *Tegetthoff* in May.

Lieutenant Payer reports on the sleigh-expeditions, which were made during this time, as follows:

The success of the sleigh-expeditions depended entirely on good fortune, as the participants would probably have been sacrificed and the force remaining with the vessel greatly weakened had the latter drifted away before the return of the expedition. The exploration, and the general survey of the discovered land, however, was of so great importance as to warrant the risk.

The weather was still unfavorable, the cold severe, and the meridian-altitude of the sun low, but the necessity of an early start homeward weighed against these adverse circumstances.

I left the vessel March 10, accompanied by the Tyrolese mountaineers Haller and Klotz, and the seamen Cattarinich, Lettis, Popischil, and Luki-nowich, with three dogs and our largest sleigh. Traveling in a northwesterly direction, along the coast of the western land, we ascended the rocky capes Tegetthoff and MacClintock, (2,500 feet high,) and then crossed the picturesque Nordenskiöld Fjord, in the rear of which was an immense ice-wall, the edge of the Sonklar Glacier.

The land is extremely desolate; immense glaciers frowned down on all sides from the mountain-wilderness, the greater masses of which rose to steep cones and plateaus of the predominant Dolerite formation. All were enshrouded in a dazzling white, and the columns of the symmetric mountain-strata appeared as if frosted. Nowhere did the natural color of the rock crop out as in Greenland, Spitzbergen, or Nova Zembla. This is evidently caused by the copious precipitation and the consequent constant great humidity of the air, and its condensation against the cold walls.

This uncommon humidity, together with the rarity of clear days, caused also, contrary to our arctic experience elsewhere, distances to be readily overestimated.

The low temperature (minimum  $-40^{\circ}$ , while at the ship it was at the same time,  $-34\frac{1}{2}^{\circ}$ ) necessitated continual precaution; it made the nights in the tents, as also the entrance of the region of the Sonklar Glacier, with the least wind, very painful. Our clothing was always stiffly frozen, and the strongest liquors appeared to have lost all power.

Returning to the vessel on the 13th, we prepared immediately for a second trip, of 30 days, for the exploration of the land to the northward.

We started early on the 24th, the company consisting of Mr. Orel, the

Tyrolese Haller and Klotz, and the seamen Zaninovich, Sussich, and Luki-novich, all under my direction. Unluckily, there were now only three dogs fit to be used in drawing the large sleigh, weighing, when loaded, 1,800 pounds, the others having died or become too weak; these however, proved of great service.

Contrary to expectation, the temperature on this trip did not fall below  $-15^{\circ}$ ; the drifting snow, however, with the wet air, the opening of crevasses, and the overflowing sea, caused much hardship. The results of this expedition, especially as regards topography, cannot well be given without sketches and charts, which are not yet prepared; but it will, preliminarily, suffice to state that the discovered land, in size about equaling Spitzbergen, consists of two large masses, the eastern of which we named Wilczek-Land, the western Zichyland. The whole is intersected by numerous fjords, and surrounded by many islands.

A broad channel, Austria Sound, runs meridionally almost through the center of the entire group, trending north from Cape Hansa, and branching, in latitude  $82^{\circ}$  N., below Crown Prince Rudolph Land, to the NE., into a broad arm named Rawlinson Sound, which we could trace to the northernmost cape, named Cape Pesth.

Dolerite prevails everywhere. Its horizontal terraces and abruptly-truncated table-mountains give this land a character which resembled that of Northeast Greenland. The mean elevation is from 2,000 to 3,000 feet. The southern part appears to rise to 5,000 feet. All the great depressions between the mountain-chains are covered by glaciers of such gigantic dimensions as are only found in the Arctic world. Their daily progress could only, in a few instances, be ascertained by direct measurement. The Dove Glacier, on Wilczek-Land, is of no less width than the Humboldt Glacier of the Kennedy Channel. Cliffs, 100 to 200 feet in height fringe the coasts.

The vegetation is far beneath that of Greenland, Spitzbergen, and Nova Zembla; it is probably the poorest on our globe. Drift-wood, of inconsiderable age, was not uncommon, but nowhere in great quantities. The land is, of course, uninhabited, and, with the exception of polar bears in the southern part, almost entirely void of animal-life. Some parts of the land are of impressive grandeur, as, for instance, Sterneek Sound, the Wüllerstorff Mountains, Cape Klagenfurt, and Lamont Bay.

This, as well as the subsequent excursions, has shown the difficulties

which a future expedition would encounter in finding winter-quarters; no place was found fit for a harbor.

The ascent of high elevations, such as Cape Koldewey, (latitude  $80^{\circ} 15'$ ), Cape Frankfurt, (latitude  $80^{\circ} 25'$ ), Cape Ritter, (latitude  $80^{\circ} 45'$ ), Cape Kane, (latitude  $80^{\circ} 10'$ ), Cape Fligely, (latitude  $82^{\circ} 05'$ ), simplified, not only the examination, but also the choice of our route.

An unbroken surface of ice, covered with innumerable icebergs of no great age, extended from shore to shore; and in many places the passage was obstructed by fissures, broad barriers of piled ice, (Torossy hummocks,) which were crossed only with great difficulty and a considerable loss of time.

I can only point out our route here briefly. Touching at the shore of the extensive Salm Island, we crossed, March 26, the eightieth parallel of latitude, and then, April 3, the eighty-first; five days later, we obtained a good observation, in latitude  $81^{\circ} 37' N.$ , which assured us that we had reached, on land, nearer the pole than any previous expedition. Passing Cape Frankfurt, we entered a region of which our first trip had given us no idea.

Southeast of Crown Prince Rudolph Land, we turned into the great Rawlinson Sound, which appeared to run a long distance in a northerly direction; but we soon came to a chaotic mass of crushed ice, through which we labored for some days with the greatest difficulty, frequently erring in our course on account of the sluggishness of the compass-needle, caused in this high latitude by the small horizontal magnetic intensity. The farther we advanced the wilder grew the chaos of icy hillocks, which finally compelled us to return to Austria Sound. Even in this high latitude, many polar bears were met.

The decrease of the provisions and the short time at our disposal necessitated forced marches, and a division of the party. Four of the men, under the command of the Tyrolese, Haller, remained, with the large sleigh, under a rocky wall of Hohenlohe Island, in latitude  $81^{\circ} 38' N.$ , while Orel, Zani-novich, and myself pushed onward with the dog-sleigh, intending to cross Crown Prince Rudolph Land as directly north as possible. This route lay across the great Middendorf Glacier which, from analogous experience, promised to be at this still cold season the most passable. After a tedious travel along the steep slope of the glacier, several miles in extent, we finally

succeeded in ascending to the top; but, after making but a few hundred paces on the plateau, Zaninovich disappeared suddenly, together with the heavily-loaded sleigh and the dogs, in a great crevasse, from which he was rescued with difficulty by one of those lucky chances which so frequently favor the hardy mountaineer. We deemed ourselves fortunate in being able to proceed on the next day, but we made no further attempt over the glacier.

A long circuitous route brought us to the western shore of the island, along which we now tried to push north.

There a surprising change took place all around us. A dark-blue watery sky appeared on the northern horizon. Dull-yellow vapors accumulated beneath the sun; the temperature rose, the ground softened, and was covered with drift-snow. We had observed, during the last days, numerous birds traveling south, but now all the cliffs of the land were literally covered with bands of auks, teists, &c. Immense swarms rose, and the land reached by the rays of the sun was enlivened by the noisy buzz and song of the beginning of the brooding-season. All around were tracks of the polar bear, the hare, the fox, and the seal covered the ice. But all these indications could not convince us that we were in the vicinity of "the open polar sea."

Our route had become unsafe; there was no longer a winter-coat over the ground, only young ice, covered with a salt crust of from one to two inches in thickness, suspiciously flexible, and covered with the débris of late pressures. We were obliged to keep tied together by a rope, and to transport everything singly; to make constant use of the ax, and sound the icy cover. After passing Auk Cape, which was a living mass of birds, we came to the two lonely rocky towers of Pillar Cape, where the open water began.

This far world was of impressive beauty. From a height, the dark sea with its pearly icebergs lay before us, overtopped by the heavy clouds, through which the glowing rays of the sun penetrated to the glittering waves. Close over the sun appeared a second sun, less bright, and through the waving vapors the icy mountains of Crown Prince Rudolph Land, apparently of an immense height, cropped with rosy brightness.

April 12 was the last day of our northern progress, brighter than the preceding days, although not entirely clear; the temperature was 14° above zero; the route over the sea, covered only with young ice, proved altogether impracticable beyond Pillar Cape, and we were compelled to take again to the mountains, here 1,000 to 3,000 feet in height, after burying our baggage

in a crevasse of the glacier under which we had rested the preceding night, in order to secure it against the polar bears abounding here. At Cape Germania, (latitude  $81^{\circ} 57'$  by meridian altitude,) we also left the dog-sleigh, and proceeded thence, connected to each other by a rope, in a northerly direction, parallel with the coast, over the crest of a glacier which, to our left, descended in mighty terraces to the coast-water. The dangers of this route increasing with every step, on account of the many crevasses and the infirm crust, through which we frequently broke, compelled us, after a march of five hours since noon, to abandon the attempt to reach a higher latitude than that of Cape Fligely, which we estimated to be  $82^{\circ} 05' N$ .

What we saw from this elevation might, considered in a biased manner, readily add fuel to the animated controversy of the day regarding the nature of the inner polar region. A broad water-basin stretched along the coast, with several strips of ice of recent growth through it, while drift-ice of moderate thickness extended from west to northeast, meeting there the horizon. Taking into account the lateness of the season, and the prevailing westerly winds, there was no cause for considering this part of the sea less navigable in summer than the openings at other places, from which inferences have so frequently been drawn that the pole must be oceanic. But what a single hour shows cannot stand against repeated experience, and counter demonstrations based upon it. Leaving out of consideration the present obstructions by the young ice, a conclusion would only be admissible that a vessel, having reached the northern coast of Zichy-Land, might be able to push from 10 to 20 miles farther north, as far as we could see from our place of observation, where were navigable openings in the ice. Were a vessel able to pass through the Austria Sound, which is 100 miles in length, she would certainly find, higher north, nothing but packed ice. I cannot refrain from making these remarks, even in this hurried account, as it appears to me of great importance not to overrate, in inferences as to navigability, the finding of open water in so high latitudes; there is no greater danger in arctic exploration than quickly-grasped conclusions lacking firm foundation; they lead into errors, prop a few rotten surmises, and worst, bring to grief the explorer confiding in them.

Of far greater importance than a vague discussion of the navigability of this remote part of the arctic region were the facts before us: the extensive new lands, covered by high mountains, interlaced by broad sounds, and trace-

able beyond the parallel of latitude  $83^{\circ}$  to an imposing promontory, (Cape Vienna,) forming the western extremity of land, which we could not name more appropriately than Petermann-Land.

Without venturing a theory as to the existence and form of circumpolar lands, or of a connection of our discoveries with Gillis-Land to the SW., we will only point out that the coasts along which we had traveled, with their northern extension, as well as the configuration of the glaciers which we had seen, could not but create the impression of the existence in this region of a very extensive area of land, supporting Dr. Petermann's supposition of an inner arctic archipelago. Very remarkable were the innumerable icebergs in all the sounds of Franz Joseph Land, in contrast to their absence in the more southern waters, the Nova Zembla Sea. There were no observations by which they could be traced to currents, but the latter fact suggests that they are carried north by them.

As already stated, the newly-discovered land did not show a geological affinity with Spitzbergen, but with East Greenland it was unmistakable.

The Austria-Hungarian flag waved for the first time in the high north; under it we buried a document, testifying to our presence, in a cleft of the rock, and turned backward for the ship, 160 miles to the southward.

After joining our anxiously-waiting comrades at Hohenlohe Island, and abandoning everything except the tent and provisions, we made forced marches, and soon came to the imposing and beautiful Ladenburg Island crossing its glaciers. Arriving at Cape Ritter, (latitude  $80^{\circ} 45'$ ), April 3, we were startled by finding the sea-water pressing everywhere through the lower layer of the snow, and by the dark water-sky over the mouth of the great Markham Sound. At night, we could distinctly hear the roaring of the ice-pressure and the surf. The next day we came to Hayes Island, and to open water flowing rapidly northward; the southern part of Austria Sound had opened completely, and the flood rushed furiously against the ice-strand. Without a boat, it was truly a fearful situation. After roving about for two days, through a fearful snow-storm, we finally succeeded in escaping from this chasm over the land and along the walls of the glaciers, and in reaching unbroken ice at Cape Frankfurt; and, on the 10th of April, we found the ship at the spot where we had left her, south of Wilczek Island.

A few days of rest were greatly needed by all of us; we had drawn the sleighs each day 8 to 10 hours, with not more than 5 hours' sleep.

Mr. Brosch, Haller, and myself made, in the first days of May, a third excursion with the dog-sleigh, westward, to a mountain 40 miles distant from the ship, from the top of which we saw the unlimited extent of the land in this direction. We could trace it readily to about the forty-sixth degree of longitude; showing the same character as the northern land, mountainous and interlaced by numerous fjords. The highest point (Richthofen Peak) rose to about 5,000 feet. Thick pack-ice covered the sea southward to the horizon, and afforded by no means an encouraging view for our passage home.

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The following letters to Dr. Petermann, published in the "Geographische Mittheilungen" for 1874, p. 452 et seq., bear upon conclusions drawn from the above reports:

1.—*Lieutenant Weyprecht to Dr. Petermann.*

NOVEMBER 1, 1874.

Inferences which I cannot approve have been hazarded from the scanty reports thus far published.

Our material regarding hydrography, meteorology, magnetism, &c., is quite compendious, and will, at least in part, prove of great scientific interest; but it requires thorough preparation and sifting before it can be published. This will be done by myself, Lieutenant Brosch, and Ensign Orel in the course of the next year, (1875,) and, until the completion of this labor, I must protest against all absolute conclusions ventured from general outlines without a knowledge of the detail.

I will briefly sketch a few of the principal points of my own conclusions:

1. The inferences as to an open polar sea in the highest north are as futile as those of the absolute impenetrability of the ice south of the newly-discovered land.

2. All inferences as to the extension of the Gulf Stream into these regions, based upon the drifting of the vessel, are erroneous.

3. The question of a passage eastward, north of the Siberian coast, is in no manner solved from the results of our expedition. I still consider the programme, which I placed, in December, 1871, before the Academy of Sciences at Vienna, feasible; and I am prepared at any time to undertake to carry it out.

2.—*Lieutenant Payer to Dr. Petermann.*

NOVEMBER 5, 1874.

I beg you to publish in the "Geographische Mittheilungen" my conclusions from the results of our expedition.

1. There is neither an open nor a completely unnavigable Polar Sea, but a chance for navigability varying with and depending upon circumstances. I do not consider that the pole will be reached, or a successful northeastern passage found, through this chance.

2. The English-American route appears to me the most promising for reaching high latitudes, especially by sleigh-excursions from winterquarters.

3. The last chance for penetrating into the inner polar region will always be by sleighs.

3.—*Lieutenant Weyprecht to Dr. Petermann.*

NOVEMBER 8, 1874.

My intentions regarding the publication of the results of the expedition are as follows:

It will take me the entire coming year, with the two naval officers, to prepare the scientific results. The material is very great; for instance, about 10,000 magnetic readings, of high interest. The Academy of Sciences will undertake the publication. Lieutenant Payer will prepare the charts and the description of the land.

I intend to publish, also, a cheap edition of a narrative, the cost not to exceed half a dollar a copy, without illustrations, in order to show my appreciation of the aid rendered the expedition by the lower classes of the people. I shall also publish short, popular memoirs of the scientific results.

Probably I may very shortly publish in a Vienna paper my diary, which is only to be copied.

I have not written anything yet outside of the brief reports to the Vienna committee. What I have spoken in public was without preparation.