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A Note on the Geography of Franz Josef Land

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Source: *The Geographical Journal*, Vol. 3, No. 6 (Jun., 1894), pp. 492-497

Published by: geographicalj

Stable URL: <http://www.jstor.org/stable/1773584>

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A NOTE ON THE GEOGRAPHY OF FRANZ JOSEF LAND.

By ARTHUR MONTEFIORE, F.G.S.

THE selection of Franz Josef Land as the immediate objective of Mr. Frederick G. Jackson's expedition and the route for his advance in a northerly direction offers so high a probability of reward, that one can scarcely fail to be glad that it is the English expedition which has decided on what appears to afford the surest approach to a fertile field of geographical discovery. It will be remembered that in the *Geographical Journal* for April, 1893, Mr. Jackson pointed out briefly the main advantages of this route, and those members of this Society who have made Arctic geography a special study will not fail to recognize their particular merits. In the discussions which have arisen from time to time at the meetings of the R.G.S., our leading Arctic authorities have dwelt on the great importance of Franz Josef Land as a route to the more immediate vicinity of the North Pole, but it will suffice if I quote, as an example of "expert" opinion, one sentence from the concluding passages of Admiral Markham's 'Life of Sir John Franklin' (London, 1891). "In order to carry this (Polar exploration) out to a successful issue, our attention and our energies should be directed towards the little known Franz Josef Land, for it is in this direction that the greatest prospect, almost amounting to a certainty, of success will be obtained." That is the opinion of an Arctic explorer of great and successful experience, deliberately expressed, and supported by arguments with which students of Arctic geography are familiar, and with which they can scarcely fail to agree.

Now that Mr. Jackson will this summer lead an expedition to Franz Josef Land—a scientific expedition fully and without stint equipped at the cost of Mr. Alfred C. Harnsworth, an Arctic enthusiast and a Fellow of our Society—one naturally turns from the contemplation of the *Fram*, now lying, as we believe, in the strict embrace of oceanic ice, and from the interesting attempt which Peary is making to establish the insularity of Greenland. For after a lapse of many years, our own countrymen are taking up the Arctic work in which this country has achieved such great things—not merely in the generations immediately behind us, but during the whole period of Arctic exploration. With the splendid work which the loss of Franklin called out we are all familiar; but how many of us can recount the full tale of the Arctic expeditions which sailed from England before the present reign? It is a long list, for they are sixty, save two; and, although none attained its object, each added something to its own and its country's credit.

The immediate interest, then, which surrounds the little-known Franz Josef Land may make this brief note on its geography useful for reference. I have collected the facts almost entirely from the journal of Payer, who led the only expedition which has penetrated the country;

but the *résumé* of the journal of Mr. B. Leigh Smith, who twice visited and once wintered on the southern coast of Franz Josef Land, is useful as recording several minor discoveries in the south-west, as well as affording valuable information as to the character of the winter climate. This *résumé* appeared in the *Proceedings* of the Royal Geographical Society, vol. iii. pp. 129–145, and vol. v. pp. 204–220. It is to Payer, however, that we must turn for information on the geography of the interior, the geology and zoology of the country, the conditions of travel, the northward development of the land, and the prospects of geographical discovery in the higher latitudes.

Franz Josef Land was discovered by the Austro-Hungarian expedition on August 30, 1873. The *Tegetthoff*, which had been slowly drifting, fast locked in the ice, since August 20, 1872, was then in 79° 43' N. lat. and 59° 33' E. long. Weyprecht and Payer loyally named the new land after their sovereign, and the high bluff they had first seen Cape Tegetthoff. It was not until November 1, however, that the party landed on Wilczek Island, their ship having then drifted to 79° 51' N. lat. and 58° 56' E. long. Three hasty visits to this island—insufficient even to determine its configuration—were all that could be done before winter prevented further work. This was the second winter which the ship had passed, locked in the ice. The return of the sun on February 24 found the preparations for a sledge journey well advanced, and on March 10, a party of seven men and three dogs, with Payer in command, left the *Tegetthoff* for a reconnaissance in the neighbouring islands. This terminated on the 19th. On March 26, Payer, with a similar number of men and dogs, again left the ship; on April 1 he reached Austria Sound, and, travelling on its frozen surface, he successively attained Cape Tyrol (April 4), Rawlinson Sound (April 8), Cape Brorok, 81° 45' N. lat. (April 11), and finally Cape Fligely, 82° 5' N. lat. (April 12). Returning the same day southwards, he regained the ship on April 23, a remarkable sledging record. A third journey—this time to the westward—was begun on April 29, and concluded on May 3, the most westerly point reached being the south-east coast of McClintock Island, 56° 25' E. long. It is to the second of these journeys that we are wholly indebted for the geography of the interior.

As far as a country whose eastern and western limits are unknown can be described in conventional terms, Franz Josef Land may be regarded as a large insular mass with a chain of small islands lying along its southern coast, the most considerable of which, taken from east to west, are Salm, Hall, M'Clintock, Hooker, Northbrook, and Bruce Islands. The most southern point of the mainland is Cape Grant, 80° 5' N. lat., but portions of the island chain extend south of the 80° parallel. Westward exploration by the Austrians ceased a little west of 57° E. long., but Mr. Leigh Smith, by actual navigation, extended this to 44° 45' (west of Cape Neale), and saw the land stretching

away, cape beyond cape, to about 42° E. long. On the east nothing is known beyond 62° E. long., so we may say that the known parts of Franz Josef Land stretch across 20° of longitude (on a mean latitude of $80^{\circ} 30'$ N.). The most northerly point yet reached is Cape Fligely ($82^{\circ} 5'$ N. lat.) and Petermann Land was observed in about $83^{\circ} 10'$ N. lat. The land itself is cleft asunder, almost due north and south, by that dominating feature of its known interior—Austria Sound. On the west lies Zichy Land, separated from the island chain by Markham Sound, a south-westerly prolongation of Austria Sound; and on the east there rises Wilczek Land, with its great Dove glacier 60 miles wide. On the parallel of 81° N. lat., Austria Sound is at its narrowest, and between this point and $81^{\circ} 40'$ it spreads out both east and west, forming two wide-mouthed bays, and opening up several deep fiords. At $81^{\circ} 40'$, the latitude of the southern extremity of Prince Rudolf's Land, the sound forks, the branch running north-east being called Rawlinson Sound, and that trending north-west preserving the original name. Prince Rudolf's Land is the most northerly portion of the Franz Josef Land group which has been visited. It lies, on the 82° parallel, between $57^{\circ} 50'$ and $60^{\circ} 15'$ E. long., these being the longitudes of Capes Germania and Rath, respectively its most westerly and easterly points in this latitude. After attempting in vain to ascend Rawlinson Sound, Payer turned back, and, advancing along the west coast of Prince Rudolf's Land, reached Cape Fligely, $82^{\circ} 5'$ N. lat., the most northerly point yet attained in this direction. The weather was fortunately clear, and he saw, some 60 or 70 miles due north of him, the mountains of another land, which he called Petermann Land; and away to the westward, stretching in a north-easterly direction from 82° N. to $82^{\circ} 25'$ N., the distant but yet distinct outlines of King Oscar Land. Between Cape Fligely and this land there stretched a wide expanse of open water, and beyond the water a close formation of old ice; north, too, of Cape Fligely lay open water (but "of no great extent") and ice. The connection of Petermann Land with Wilczek Land or Prince Rudolf's Land was not determined, but a protruding cape about $82^{\circ} 20'$ N., which received the name of Cape Sherard Osborn, undoubtedly was part of Prince Rudolf's Land. Although it is possible that Petermann Land is divided from Wilczek Land by Rawlinson Sound, it is more probably a continuation of it.

Austria Sound stretches a surface of ice from Wilczek Land to Zichy Land, but it is not a wholly unbroken one. In 1874, at any rate, a wide expanse of water lay at its southern extremity immediately north of Hall Island. Again, there are at least ten islands of noteworthy extent rising out of the sound, Wiener Neustadt, just south of 81° , and Rainer, $81^{\circ} 20'$, being the most considerable. The ice of Austria Sound is on the whole smooth and level, but from time to time long narrow barriers of hummocky ice occur, and the whole of the known extent of Rawlinson Sound is extremely rough, and this rough ice protrudes

thence into Austria Sound, narrowing down to its southernmost limit at Andrée Island $82^{\circ} 25'$. Still, the whole length of Austria Sound, from $80^{\circ} 40'$ to $81^{\circ} 50'$, may be traversed on what is practically level and easy ice. It is worth noting that the great portion of the ice was not of more than one year's growth. This, of course, leads one to hope that in the month of September the Sound would be navigable.

Bold and intensely boreal are the coast-lines presented by Franz Josef Land east and west of Austria Sound. From mountains, conical but not volcanic, vast glaciers descend to the sound. All is snow and ice, and wherever rock surfaces are exposed they are covered with a thick layer of ice, the colour of the rock being indistinguishable. Even the most precipitous cliffs, and the vertical basaltic columns which continually crop out, tier upon tier, are (at least in April) encrusted so thickly with ice that Payer could find no word more apt for them than "crystallized." (This may be partly owing to the high degree of humidity.) The formation being basaltic, we are not surprised that Franz Josef Land present no continuous mountain chain—that we should find, rather, isolated groups of the plateaux, cones, and table-topped hills characteristic of the formation. Payer compared the mountain forms of Franz Josef Land to those of Western Greenland, and contrasted them with those of East Greenland, parts of Spitzbergen, and Novaya Zemlya. The average height to which the mountains attain is 2000–3000 feet, but in the south-west this rises to about 5000 feet. If we advance northward along Austria Sound, and confine our attention to its eastern shores, the Wullersdorf mountains (3000 feet) would form the chief feature of the southern end; north of these there spreads a wide glacier until the rock eminences of Capes Heller and Selmarda are reached. Immediately north of these rise the mountains of La Roncière Peninsula, extending from 81° to $81^{\circ} 10' N.$, and lying roughly parallel to the southern limit of the great Dove glacier. This glacier is at least 60 geographical miles wide, C. Buda Pest, $82^{\circ} N.$, which protrudes into Rawlinson Sound, marking the most northerly known limit. Still going north, we come to Prince Rudolf's Land, which has an elevation of about 3000 feet. The whole of the south-east side explored is occupied by a great glacier, the Middendorf glacier, having a sea wall several hundred feet in height; but on the west side the precipitous cliffs and capes expose rock surfaces. Returning from Cape Fligely by the western shores of Austria Sound, similar rock eminences and precipitous table-topped cliffs alternate with glaciers, but the former are far more continuous than on the east, while there is no great glacier like the Dove or the Middendorf. As might be expected, the coast-line is more developed, and the fiords deeper and more frequent.

The geology of Franz Josef Land promises to be of great interest. Speaking briefly, one may say that, as far as is now known, it is similar

to that of Spitzbergen. The Dolerite, which is so familiar to the traveller in that group as well as in Greenland, is the dominant formation of Franz Josef Land. The lowest rocks found are of the Oxford Clay; above them are cretaceous rocks (with fossil conifers); and above these the flow of Dolerite. It is probable, I think, that in the extreme north of the Franz Josef Land group, the carboniferous rocks which dip and are lost in Novaya Zemlya will reappear. Though imprudent, it is almost safe to predict that the geological formation of the immediate region of the Pole will prove to be carboniferous.

There has not as yet been a good opportunity for examining the flora of Franz Josef Land, but it may be described as representative of an Alpine zone about 1000 feet higher than that which is typified by Spitzbergen or Novaya Zemlya. Patches of tiny flowering plants occur, and Mr. Grant (of Mr. Leigh Smith's expedition) was able to supplement—near Eira Harbour—the list given by Payer (vol. ii. p. 88). For Mr. Grant's list, reference should be made to *Proceedings R.G.S.*, vol. iii. p. 134. Prominent in the lists are, as we might expect, several saxifrages and the familiar *Ranunculus nivalis* and *Papaver nudicaule*. A summer in Franz Josef Land will doubtless cause several additions to be made.

The fauna of Franz Josef Land presents great encouragement to the explorer. Even in mid-winter bears are plentiful, while in the less severe seasons they occur in great numbers, almost appearing to live and move gregariously. Mr. Leigh Smith's summer visit and the winter which he subsequently spent on Cape Flora (Northbrook Island) most clearly corroborated this very important point—that animal life abounds during the genial season, and that bear and walrus are hardly less plentiful in the winter (thirty-four bears and twenty-four walrus having been shot in the winter, the remarkable openness of water throughout that season chiefly accounting for this). Birds are very numerous, Mr. Leigh Smith noticing their first appearance, flying north, as early as February 8. So far no reindeer or ptarmigan have been found, but there is a slightly misleading statement in the report of the *Eira's* second voyage (*Proceedings R.G.S.*, vol. v. p. 210), viz. that hares were not found by the Austrians. It is true that Payer, in his rapid journey up and down Austria Sound in the month of April, did not meet with any hares, but he distinctly states that he found traces of them.

The winter temperature of Franz Josef Land—as far, at any rate, as its southern coasts are concerned—affords evidence of some ameliorating influence. The occasional rise of temperature to a high degree, though significant, is not of such importance as the fact of the high average means. The *Tegetthoff* wintered in 79° 51' N. lat. (not 79° 43', vide *Proc. R.G.S.*, vol. v. p. 209), and the Leigh Smith party about five miles more northerly, but nearly 100 miles further west. On the *Tegetthoff*, the means of November, December, January, February, March, and April were

respectively, -15.72° , -19.93° , -12.1° , -19.36° , -9.53° , and $+5.72^{\circ}$ F.; while on Cape Flora we have recorded for November, -1.25° ; December, $+4.79^{\circ}$; January, -25.7° ; February, -26.7° ; March, -1.4° ; and April, -1.24° F. Just as there were exceptionally high temperatures, so there were low temperatures. In January, February, March, with the Leigh Smith party, there were records of -43° F. (below which the thermometer did not register); and the Austrians, for the same months, recorded minimums of -50.5° , -47.8° , -51.0° F. The prevailing winter winds are from the east-north-east. The summer fogs are frequent, and there is a slight precipitation of rain. The low-lying clouds and fogs, though depressing and troublesome, have a silver lining, for they retard the escape of the land's heat.

It is to take up the fascinating exploration of Franz Josef Land where it was laid down; to advance northward up Austria Sound towards and, I hope, *beyond* Petermann Land; to discover the relations of land masses and seas yet to be surveyed; and to investigate the geology, zoology, and botany of that unknown region, that Mr. Frederick Jackson and Mr. Alfred Harmsworth are devoting—the one his energies, the other his wealth, and both their patriotic enthusiasm, in the expedition with which their names are connected.

RECENT AFRICAN LITERATURE.

By E. G. RAVENSTEIN.

BEGINNING our survey of recent African literature with South Africa, we may fairly give the precedence to Mr. Selous' recent work,* which deals with that redoubtable hunter's explorations and pioneer-labours since 1881. That a work written by Mr. Selous should abound in hunting-stories is only what might be expected. It is not, however, merely a book written for the gratification of sportsmen, for it presents very ample information on the country, its resources, inhabitants, and recent history, in which Mr. Selous played so conspicuous and commendable a part. Information coming from so experienced a traveller, of whose thorough knowledge and good faith there can be no doubt, should be received with confidence. When speculating on the builders of Zimbabwe, Mr. Selous accepts the hypothesis that they came from Southern Arabia, but denies absolutely that they were possessed of a high degree of civilization. On the contrary, they were a "rude" people, not even possessed of written characters, and to describe the remains of their buildings as "ruined cities" appears to him to be a gross exaggeration. This is true, no doubt. At the same time it is possible that

* 'Travels and Adventures in South-East Africa,' by Fred. Courteney Selous. London (Rowland, Ward & Co.), 1893.