

ASTRONOMICAL DETERMINATIONS IN FRANZ JOSEF LAND IN 1933

by

E. K. FEDOROV.

(Extract from *Arctica*, Leningrad, Vol. II, 1934, p. 89). (1)

During the winter of 1932-33, the scientific station of the Arctic Institute at Tikhya Bay in Franz Josef Land organised an expedition in the eastern part of the archipelago; its chief object was to determine the elements of the terrestrial magnetism. It was also to make astronomical determinations and to do certain geodetic and topographic work en route.

The present article gives a resumé of the astronomical results and the more interesting cartographic results of the expedition.

The astronomical determinations were obtained with an EDELMANN theodolite, the vertical circle of which enables angles to be measured to within 20", and the horizontal circle to within 10". At each position, from two to four series of observations were made of the zenith distance of the sun in different azimuths. Each series consisted of 8 or 16 observations of the sun's limb, arranged symmetrically. Longitude determination was based upon readings of DENT chronometer No. 1827, the correction of which was known at the beginning and end of the 28-day trip.

For approximate determinations of declination and the measurement of horizontal angles, there was a smallish prismatic compass capable of being attached to the foot of the photographic apparatus. With the aid of this compass, a summary triangulation of the region was made, and plans were made of the neighbourhood of two astronomical stations.

When more than two series of observations were made of the altitude of the sun, the figures formed by the intersection of the Sumner lines show that the error in the determination of the co-ordinates varies between $\pm 0.2'$ and $\pm 0.5'$ of great circle arc.

The results appear in the following table. Where only two series of observations were made, an error of $\pm 0.5'$ has been assumed, i. e. the greatest error experienced.

When a comparison is made of the results obtained with the charts of the archipelago published by the Arctic Institute and by the Hydrographic Department (2), one is immediately struck by the divergencies in the delineation of the northern part of Wilczek

TABLE.

ASTRONOMICAL POSITIONS DETERMINED BY E. K. FEDOROV IN 1933.

No.	Name.	Number of Series.	Co-ordinates.		$\pm \delta$
			φ N.	λ E.	
1	Cape Heller, Wilczek Land.....	2	80° 46.5'	59° 38'	0.5'
2	Cape Ganne, Wilczek Land.....	4	80° 52.0'	61° 40'	0.5'
3	Hofmann Island.....	2	81° 18.0'	60° 25'	0.5'
4	Cape Bauermann, Rainer Island.....	2	81° 25.3'	59° 08'	0.5'
5	Teplitz Bay (*), Rodolphe Island.....	4	81° 47.5'	57° 57'	0.2'
6	On the ice.....	3	80° 31.0'	57° 16'	0.5'
7	On the ice.....	3	81° 15.0'	61° 25'	0.5'

(*) Peters's co-ordinates are : $\varphi = 81^{\circ}47.6'$, $\lambda = 57^{\circ}58'$ (*Scientific Results of the Ziegler Polar Expedition*, pp. 603, 612).

(1) Original text in Russian.

(2) Chart of the archipelago of Franz Josef Land published by the Arctic Institute under the direction of W. Wiese and R. Samoilovich, Leningrad, Arctic Institute, 1932.

Chart of the northern part of the Barents Sea, with the islands of Spitsbergen, Franz Josef Land and Novaya Zemlya, No. 1063. Published by the Central Hydrographic Administration.

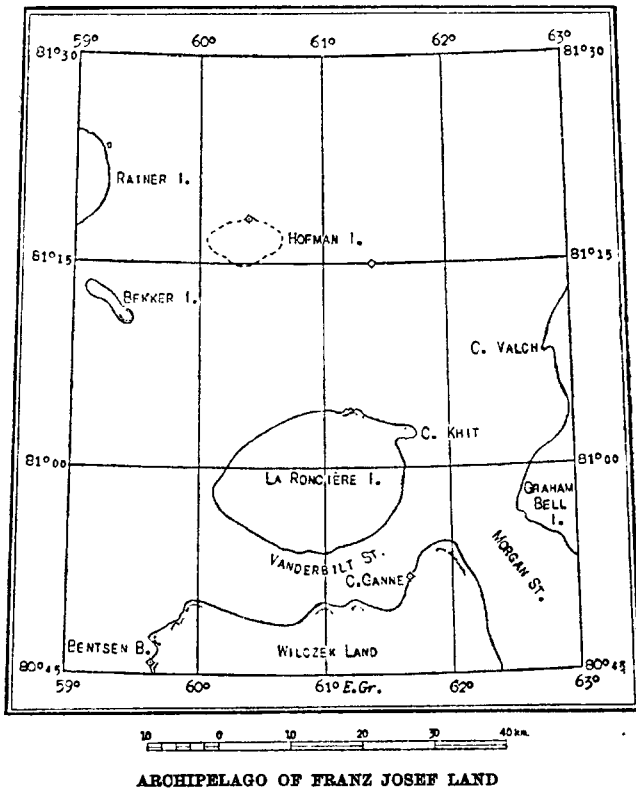
Chart of the northern part of the Kara Sea, No. 1210. Published by the Central Hydrographic Administration.

Land and of La Roncière Island. E. K. FEDOROV has drawn the sketch reproduced herewith, for this region, based on the co-ordinates of three astronomical positions. The coast line was obtained by means of a series of compass cuts from a few intermediate points on the ice, between astronomical positions 2 and 7.

The discrepancies which arose in drawing the chart did not exceed 1' of great circle arc. It may consequently be accepted that the errors in the location of the coast do not anywhere exceed 2 kilometres.

The disagreement with the existing charts starts at Cape Heller; instead of one cape at this point there are two — and between the two capes a little bay called, at our suggestion, "Bentsen Bay", after the seaman of the WELLMAN Expedition who died here on 2nd January 1899.

Further on, the coast line between Cape Schmarda and Cape Willas is concave and runs generally in a N. E. and N. N. E. direction. Cape Ganne is thus moved a considerable distance to the S. E. In contradistinction to the west coast, which forms a single unit from Cape Heller to Lat. $80^{\circ}30'$ N. and takes the shape of a continuous glacier, the north coast is intersected by capes between which glaciers slide down along the hillsides. The highest points of the coast are Cape Schmarda (150 to 200 m. — 490 to 660 ft.) and Cape Willas (200 to 250 m. — 660 to 820 ft.).



La Roncière Island is shaped like a cupola with very gentle and regular slopes. The contour of the coast in the southern and eastern parts is a glacier section; in the northern part, starting from Cape Khit, as far as one could see from a distance, there is a sandbank and, at one place, a very evident reef. Cape Khit itself forms a low platform (10 to 20 m. — 33 to 66 ft.).

The determinations made on Hofmann and Rainer Islands do not show any great discrepancies as compared with the charts, but in this region confusion exists in the drawing of the small islands.

In April 1933, P. I. BALABIN discovered a small rocky islet near Rainer Island, south of Cape Bauermann. The existence of the three islands shown near the coast, north of Cape Bauermann, must be considered doubtful, neither ourselves nor P. I. BALABIN having seen them in the spring of 1933.

Near Cape Schrötter in Hohenlohe Island (east and north-east of the Cape) we discovered a group of five low-lying islets, called at our suggestion "Oktyabriata".

To the group consisting of the small islands Torup, Gowen and Coburg Islands, P. I. BALABIN in April 1933 added a fourth which he called Soloviev Island.

It has been stated by Captain D. M. APOLLONOV of S. S. *Smolny*, and by Mr. V. G. KUNACHEV, that there is another group of small islands in the Triningen Strait, about half way between Cape Bauermann and Cape Schrötter.

All this tends to show that on the chart of Franz Josef Land, in spite of the work of numerous expeditions, we have hitherto only acquired a very rough representation of reality.

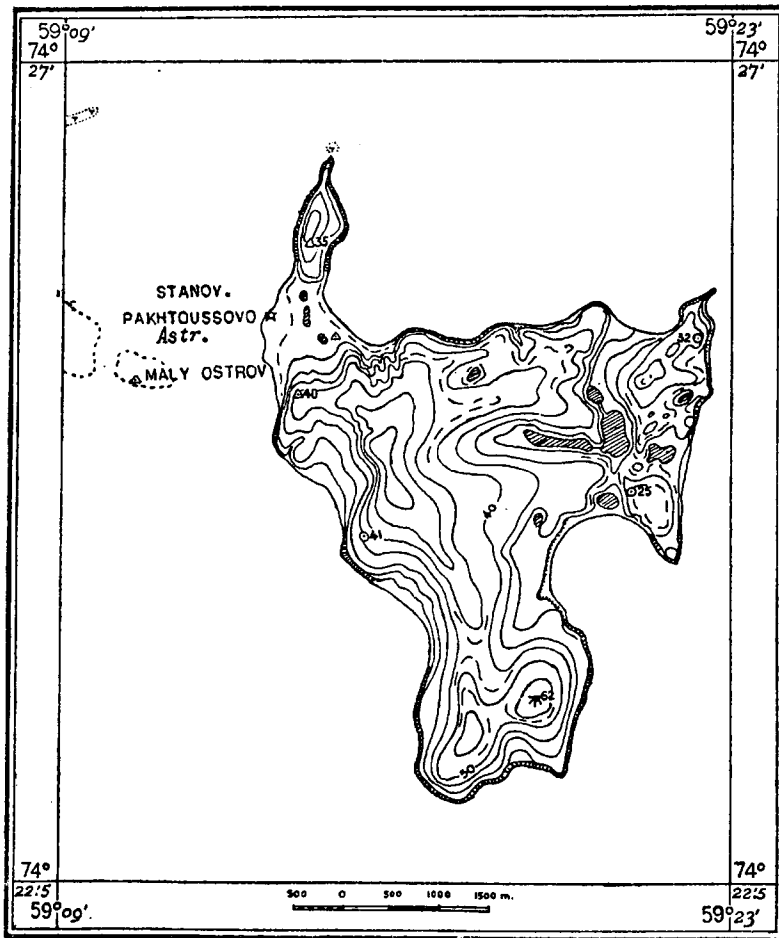
DETERMINATION OF RADIO-ASTRONOMIC POSITION IN 1934 IN THE PAKHTUSOV ISLANDS (EAST COAST OF NOVAYA ZEMLYA).

by

VAS. SHELIAGIN.

(Extract from the *Bulletin of the Arctic Institute*, Leningrad, No. 11-12, 1934, p. 404). (*)

This astronomical work was carried out with the object of determining reliable reference positions for the bases of the geological survey entrusted to the Arctic Institute



(*) *Original text in Russian.*