

GLACIOLOGICAL OBSERVATIONS ON MORSÁRJÖKULL  
S.W. VATNAJÖKULL

By J. D. IVES *and* CUCHLAINE A. M. KING  
(University of Nottingham)

CONCLUDING glaciological observations of the Expedition to south-east Iceland, 1953, organized by the University of Nottingham Exploration Society.

## Part II: REGIME OF THE GLACIER, PRESENT AND PAST

**ABSTRACT.** Information concerning the supply area of Morsárjökull, a small outlet glacier of Vatnajökull, was derived from a firn profile measured in a pit 6 m. deep.

The conspicuous bulge on the medial moraine is, by extrapolation from the annual movement, attributed to a former glacial recession between 1890 and 1900. This bulge is correlated with discontinuous moraines near the head of Skeidarárjökull.

Moraines indicating a former greater extension of the glacier are mentioned and evidence showing the recent rapid retreat and thinning of the glacier is presented.

**ZUSAMMENFASSUNG.** Die Kenntnissnahme des Sammelgebietes des Morsárjökull, einem kleinen Auslaufgletscher des Vatnajökull, wurde in einer 6 m tiefen Grube gemessenen Firnseite entnommen.

Die an der Mittel-Moräne sichtbare Ausbauchung wird, durch Extrapolation der jährlichen Bewegung, einem ehemaligen Gletscherrückgang zwischen 1890 und 1900 zugeschrieben. Diese Ausbauchung wird mit diskontinuierlichen Moränen nahe dem Auslauf des Skeidarárjökull in Beziehung gebracht.

Moränen, die auf eine ehemals grössere Ausdehnung des Gletschers hinweisen, werden erwähnt, und der Beweis für den jüngst reissenden Rückgang und Schwund des Gletschers wird dargelegt.

## I. REGIME OF THE GLACIER

Observations made on Vatnajökull between 1936 and 1940<sup>1</sup> indicate that the gross accumulation and ablation on the ice cap are very great. In order to estimate the amount of net accumulation in the supply area of Morsárjökull a pit 6.1 m. deep was dug in the firn at the Ice-camp, 2.5 km. north of Midfellstindur, at 1200 m. above sea level (see Fig. 1, p. 479). Two distinct horizons, marked with dust, showed the autumn surfaces of 1952 and 1951. The two surfaces were separated by 2.38 m. of firn, indicating that in this area there was a considerable depth of surplus accumulation left over from the 1951-52 winter. The 1952 autumn horizon was covered by 2.84 m. of firn. This depth, however, would not be surplus accumulation for the 1952-53 winter, as the pit was dug in mid-July and the ablation season in this area may be expected to extend throughout September, according to Ahlmann.<sup>2</sup> Subsequent ablation measured near the pit between 15 July and 11 August accounted for a further 1.113 m. of this, giving a daily average ablation of 40.5 mm. Allowing for a fall in daily ablation towards the end of the ablation period, at least another 0.915 m. may be expected to be lost, leaving a 1952-53 winter surplus of only 0.818 m. in this area.

By mid-July the snow line had risen above the ice fall which feeds the glacier to about 1100 m. Very little solid precipitation was recorded at the Ice-camp between 15 July and 11 August, although rainfall was considerable (493 mm.).

Ablation measurements were made daily during the same period on fifteen stakes placed in the firn running in a straight line from the Ice-camp southwards to the ridge east of Midfellstindur. Average daily ablation for all pegs was 45.3 mm. Variation in daily ablation and from peg to peg was noticeable. The summer has been described as one of the hottest in living memory, so that these figures of ablation are probably somewhat in excess of an average year. Similarly the 1952-53 winter brought mild conditions to the farms on the low ground where snowfall was slight. It may be assumed that accumulation on the firn fields was also below normal.

From the specific gravity measurements shown on the firn profile (Fig. 2, p. 481) the average specific gravity for the two seasons 1951-52 and 1952-53 are respectively 0.610 and 0.575. The total accumulation area has been estimated as 24 sq. km. and 23 sq. km. respectively for the two seasons. This gives a total net accumulation of 34.8 million cu. m. of water for the season 1951-52 and of 10.8 million cu. m. of water for 1952-53.