

EARLY DISCOVERERS
VIII

CORRESPONDENCE BETWEEN J. D. FORBES AND THE
REVEREND W. WILLIAMSON

By J. W. GLEN
(Clare College, Cambridge)

RECENTLY in the library of Clare College, Cambridge, I have come across a collection of letters formerly belonging to the Reverend W. Williamson who was a fellow and tutor of the College during the first half of the nineteenth century. The majority of these letters are in the hand of James D. Forbes, and as they are of some interest in the history of glaciology I thought it worth while to publish some extracts.

Perhaps the most interesting is the first, of which I reproduce a facsimile. It is dated Tuesday, 27 Augt., 1844, and reads as follows:

My Dear Sir

I have left with Auguste your books & Rulers with very many thanks. We are just starting most reluctantly for Geneva. I trust you will have the fine weather which we are just leaving. On the whole I have no reason to be dissatisfied with my experiments. I have observed a space of 180 ft across the flat part of the Glacier of which 90 feet were divided into 45 distances of 2 feet each marked by holes bored in the Ice by a common $5/16$ inch drill which I find answer better than anything else, covered with stones. These advanced progressively & without starts or very slight ones so as to present when I left it a most beautiful curve slightly convex upwards, of which I will endeavour to send you a tracing from Geneva. It seems to me completely to resolve the question of the fluidity of the Ice—but I hope that you will continue your experiments, which I have no doubt that you will do, with similar results.

I mounted up to the height above Trelaporte & saw you reach the Col du Géant.

Believe me Yours Sincerely

James D. Forbes

The Revd.

W. Williamson.

This letter appears not to have been posted, but to have been left at Montenvers for Williamson. It would seem to imply that Forbes made his first observations on a line of holes across the Mer de Glace with some of Williamson's instruments, and that Williamson was himself engaged in a similar experiment. It was from Williamson that Forbes first learnt of Hopkins's theory¹ in Geneva earlier in 1844, and hence became convinced of the desirability of detailed measurement at closely spaced points along a line across a glacier.

Williamson apparently did confirm Forbes's measurements, as the next letter is as follows:

Edinburgh 11 November 1844

My Dear Sir,

I fear that I shall appear very negligent of your interesting communication dated so far back as the 19th, Octr. But I shall have your pardon I hope, when I mention that on the night of the 20th, Mrs. Forbes was confined & presented me with a daughter—a very thriving child—but her own health has been so indifferent since as to keep me in a state of harassing anxiety, from which I am only relieved within a day or two by a fair prospect of recovery. My claf, too, began last week & added to my cares.

Nevertheless I have been fully alive to the interesting facts which your letter presents, & to the important confirmation which it contains of the views I have published on the real structure of glaciers, which I really believe no one but yourself has yet had the patience to make on anything like the same scale. I hope I may consider myself permitted to make some extracts from your letter if I shall ever be able to publish at length my later observations & speculations on glaciers. I feel somewhat shaken in constitution within a year or two & I feel that Literary Abstinence is my only chance of cure; I am unwilling to write anything which could produce controversy & yet I feel a difficulty in writing without the chance of incurring it.

In broaching a new Theory I felt the extreme importance of including in it no merely hazarded opinions, although they might very likely turn out right, because I know that the retraction of such when honesty requires it weakens immensely the authority of a Theory. I never pretended that I could explain every thing at once; but I was the more tenacious that what I professed to explain should not be lightly discarded as unproved.

Now you have got a point of contrary flexure & so have I. I do not pretend to explain it completely, but I request you will consider whether there is not something more than a vague analogy with a river which presents many such flexures; real relative backslidings of particles producing eddies. The same causes which produce unequal velocities in a River will produce them in a Glacier, such as a resisting Promontory, or a Tributary Glacier which, as I have somewhere stated, always (I think) produces an exaggeration of the veined structure. Now you will observe that such an occasional acceleration or retardation is more perpetuated in a Glacier than in a river, because surfaces of discontinuity once well formed, are naturally when re-frozen and filled with blue ice likely to give way in parallel directions. This view is confirmed by the well known irregular & twisted structure of the veins in the Great Aletsch Glacier; a vast ice stream on a small inclination which like the Rhine, or Rhone in its more sluggish parts, betrays a vast variety of independent currents & eddies because the action of gravity is not strong enough to pull all together, & to sink trifling anomalies.

Such at least are my latest thoughts on this curious subject. I had a letter a few days since from Studer who says that at the Milan meeting Charpentier announced himself (to his friends) as a convert to my views.

If you see Heath pray remember me to him kindly—& to Mr. Power if he be still (as I think) of your College.

Believe me, Yours very truly
James D. Forbes.

The Revd.
Wm. Williamson
Clare Hall
Cambridge

Tuesday 27 Sept
1844

My Dear Sir

I have left with respect your
book & thank you with many thanks
We are just starting (and I sincerely
for Geneva I trust you will have the
fine matter which we are just having
On the whole I have no occasion to be
disatisfied with my experiments. I have
observed a space of 170 ft across the flat
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resolve the question of the possibility
of the ice - how I hope that you will
continue your experiments with kind
regards -

I mounted up to the height above
Trelapard & saw you reach the Col de
Grand

Believe me yours sincerely
James D. Forbes

The Revd.
Wm Williamson

Forbes did not succeed in avoiding controversy, for the next letter reads:

My Dear Sir,

In a letter which I had from Ellis some time ago he mentioned the discussion which had taken place at the Philosophical Society on glaciers; & that you & the Master of Trinity had shewn good fight in my defence; a service of which I feel very much the kindness, for I am chary of my reputation at Cambridge & Mr. Hopkins,

from his local influence is likely to have the ear of the rising generation of clever men, who may not yet have learned the difference between a clever mathematician & a physical philosopher.

My reason for writing just now is to ask you to look at two plaster models which I have sent Ellis, & which shew both the linear markings and crevasses very well.

Believe me, Yours very truly
James D. Forbes.

Edinburgh
22 Dec. 1844
Revd. W. Williamson

I imagine that no reader of this *Journal* needs reminding who Forbes was, but perhaps a few notes should be appended on the recipient of these letters.

William Williamson was born at Campton, Bedfordshire, in 1804 and educated at Westminster. He entered Clare Hall in 1820, and was second wrangler and won the second Smith's prize in 1825. After leaving Cambridge he went to Lincoln's Inn and was called to the bar in 1830, after which he practised as an equity draftsman and conveyancer until he returned to Clare to become tutor in 1839. He was ordained priest in 1842 and took a B.D. the following year. In 1850 he retired from his fellowship and married, spending the rest of his days as rector of Datchworth, Herts. He died in 1875. These biographical notes are based on the information in Venn, J. A. *Alumni Cantabrigiensis*.

I am indebted to Dr. A. B. Pippard, the Librarian of Clare College, for permission to publish these extracts.

REFERENCE

1. Forbes, J. D. Eighth letter on glaciers: Experiments on the plasticity of glacier ice. *Edinburgh New Philosophical Journal*, Vol. 37, No. 74, 1844, p. 375-81.

REVIEWS

CLIMATOLOGICAL ATLAS OF CANADA. MORLEY K. THOMAS. A joint publication of the Division of Building Research, National Research Council, and the Meteorological Division, Department of Transport, Canada. Ottawa, National Research Council, 1953. 256 pages. Price \$2.00.

THROUGHOUT the world climate is one of the determinants of building practice; nowhere is this more evident than in the great northern continental interiors of which Canada claims so large a share. This publication is indeed apposite, for in recent years the development of large-scale construction by numerous public authorities has been marked, especially in connexion with defence programmes and the exploitation of natural resources. Eighty-four climatic maps covering all the normal requirements are here presented; for example, we find winter and summer design temperatures on a percentage basis, and mean annual totals of degree days below 65° F. as a basis for design of heating systems. To the glaciologist, the maps referring to snowfall and to the limits of permanently frozen ground will have decided interest. The relationship of the latter to other climatic elements is by no means simple. Among the snowfall maps, that showing the computed maximum snow load likely to occur is noteworthy; in parts of Quebec it may exceed 90 lb./sq. ft. (10.12 kg./cm.²). The greatest recorded depths of snow on the ground lie through south-east Labrador, apart from small areas in British Columbia at high altitudes. The mean annual snowfall is also greater in south-east Labrador than anywhere else in Canada; so far as observations go, some places average over 200 in. (5 m.). The maps are clear and well printed; a large amount of information is efficiently displayed, in this compact, unpretentious and very soundly conceived atlas.

GORDON MANLEY