

which appeared to him to indicate signs of former glaciation on a most enormous scale.

A transverse valley from the south joins the Sind valley at the plain of Sonamurg, and contains glaciers on its west side. These, the author stated, filled the valley at no remote period, and extended across the main Sind valley, where horse-shoe-shaped moraines, many hundred feet high, occurred, and dammed the river, forming a lake of which the Sonamurg plain was the result. The mountains which originated the above glaciers were described as being cut through by the Sind river, and the rocks of the gorge were observed to be striated, whilst rocks with a moutonnée appearance extended to a height of about 2000 feet.

The whole of the Sind valley was stated to be characterized by a succession of moraines through which the river had cut gorges, whilst the hill-sides were seen to be comparatively rounded to heights of 2000 feet or more.

The author had also formed the opinion that at Bâramulla the barrier of a former lake occupying the Kashmir valley was partly morainic, before reading Prof. Leith Adams's view of the glacial origin of some of the gravels of this point.

The whole valley of the Jhelam from this point to Mozufferabad showed extensive glacial deposits, which had been modified by denudation and by the superposition of detrital fans, widely different in character from the glacial deposits. Below Rampoor the valley was thickly strewn with enormous granite blocks resting upon gneiss, and the author believed that they had been transported by ice.

In conclusion, it was noted that the existing torrential stream had further excavated the valley since Glacial times and, in places, to a considerable depth.

OBITUARY.

JOHN BALL, F.R.S., F.L.S., M.R.I.A., &c.

BORN 20TH AUGUST, 1818; DIED 21ST OCTOBER, 1889.

THE sudden death of Mr. John Ball has removed from amongst us a man whose name will be remembered with veneration so long as Alpine geology and botany and mountaineering pursuits retain any of their present interest. As the eldest son of a distinguished lawyer—the Rt. Hon. Nicholas Ball, Attorney-General for Ireland, and subsequently Judge of the Court of Common Pleas—Mr. Ball was naturally destined for the legal profession, and after a brilliant career at Cambridge, he was called to the Irish bar in 1843. He however soon turned his attention from law to politics, and served for some years as Assistant Poor Law Commissioner for Ireland, a post which he resigned on his election in 1852 as Member for Carlow. His Parliamentary career, though brief, was distinguished. The statesmanlike foresight that led him then to advocate the principle of tenants' compensation for disturbance, and the courage

with which he sacrificed his Irish popularity by his defence of the extension of the Income-tax to Ireland, won for him the confidence of the leaders of his party, and led to his appointment in 1855 as Under-Secretary for the Colonies in Palmerston's first administration. But Mr. Ball's defeat at Limerick in 1858 induced him to abandon politics for science.

It was about this time that the Alpine Club was started, and though he was not one of its original founders, Mr. Ball's thorough knowledge of the Alps, and his brilliant exploits there, led to his election as its first President. It is almost impossible now to realize the difficulties with which Mr. Ball had to contend in his early Alpine explorations. The race of skilled mountaineers who now do most of the work of an ascent was not then in existence; though a local guide was indispensable, he usually hindered instead of helping, and was a positive danger on snow or ice; thus in Mr. Ball's ever-memorable passage of the Schwarzthor in 1845, the whole of the difficult work among the seracs of the Schwarz glacier devolved on him; or, again, in the first ascent of the Pelmo, the guide was left behind, too frightened to proceed, while Mr. Ball fought his way to the summit alone.

But it is probably not as a climber that Mr. Ball will be best remembered; others coming after him have reaped the rewards of his labours, and with a better race of guides have gained a wider popular renown by the ascent of better known peaks, or of those around which some striking tragedy has thrown the halo of romance. But while Mr. Ball climbed "he used his head as well as his heels," to quote an old saying of his, and he always studied the botany and geology of the districts he traversed. The former was his favourite science, and as every one knows who has used his Guide, he was as familiar with the local plants as with the local passes. In working out his well-known theory of the origin of the Alpine flora, he made numerous visits to the Pyrenees and the Balkans, and others to the Andes and the Atlas; a lengthy list of memoirs and papers testifies to the ardour of his botanical studies, while some of his results are of as much interest to geologists as botanists. In the controversies over the theories of glacier motion and the glacial origin of lake-basins, Mr. Ball's intimate acquaintance with the Alpine glaciers gave his utterances² exceptional weight; his paper on "Soundings Executed in the Lake of Como"³ seems to have settled the question as far as that lake is concerned. His papers on glacier motion are no less marked by the trenchant criticisms of the theories of Moseley and Croll than by the clearness with which he recognized the fundamental differences between glacier and lake ice.

Though others may have made more striking first ascents, or have left a deeper mark in Alpine geology, there seems to be no question that in his knowledge of Alpine topography, Mr. Ball stood absolutely without a rival. Mr. Ball knew the Alps as no other man ever knew them. His great "Alpine Guide"⁴ has rendered invaluable service to all subsequent work on the geography of the Alps. It is not till one has tested this work in some unfrequented region, and compared it with other guide books of the same period, that one can realize with what marvellous instinct its author had seized all the salient features in the district. It is hoped that a new and revised edition of this Guide will be prepared by the Alpine Club, as to give Mr. Ball's greatest work a new lease of usefulness would be the most appropriate memorial to one of the earliest of Alpine explorers and the greatest of scientific mountaineers.

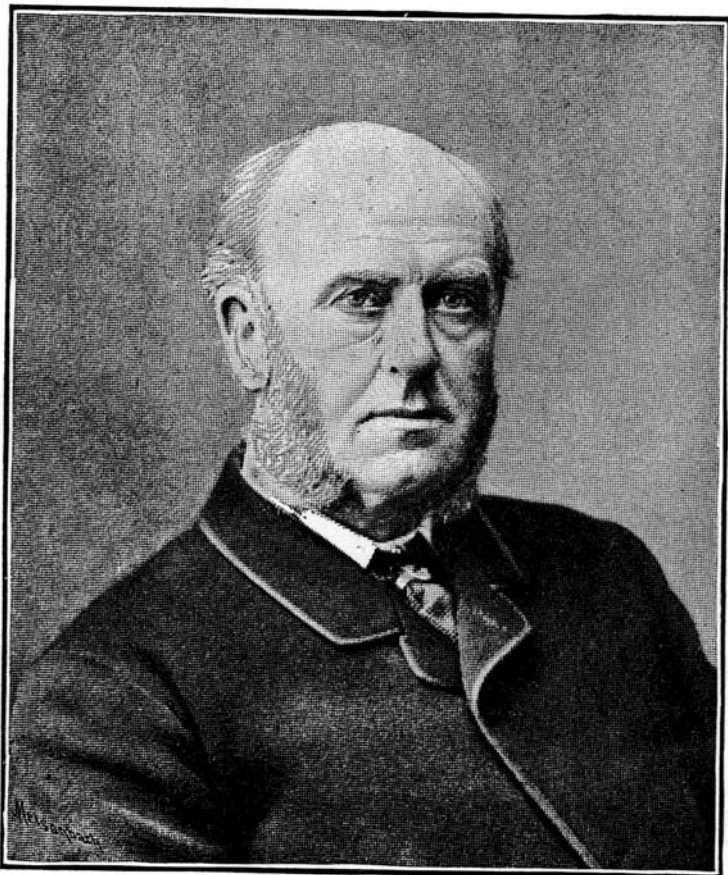
J. W. G.

¹ "On the Origin of the Flora of the European Alps," *Proc. Geogr. Soc.* new ser. vol. i. 1879, pp. 564-88.

² "On the Formation of Alpine Valleys and Alpine Lakes," *Phil. Mag.* vol. xxv. 1863, pp. 81-103. "On the Formation of Alpine Lakes," *Phil. Mag.* vol. xxvi. 1863, pp. 489-502. "On the Cause of the Descent of Glaciers," *Phil. Mag.* vol. xl. 1870, pp. 1-10. "On the Cause of the Motion of Glaciers," *Phil. Mag.* vol. xli. 1871, pp. 81-87.

³ *Geol. Mag.* Vol. VIII. 1871, pp. 359-63.

⁴ Western Alps, 1863; Central Alps, 1864; Eastern Alps, 1868.



*Your very truly
A. G. Geikie*