

time in the form of letters in the *Edinburgh New Philosophical Journal*. He established the important fact that glaciers move more rapidly in the middle than at the sides and bottom, and argued from this differential motion that the glacier ice behaved like a slightly viscous mass, which under the influence of gravity was bound to flow slowly downward after the manner of a lava stream. So many of the glacier phenomena were explained by Forbes's theory of the plasticity of the ice, that it immediately found wide acceptance.

The Swiss botanist, Martins, explored glaciers in Spitzbergen and Scandinavia. He demonstrated the former greater extent of the glaciers in those territories, and made the first detailed study of "ground-moraines," and the kind of sediment deposited by the river out-flows from glaciers (glacial diluvium).

In all countries where science was cultivated rapid studies were made between 1840 and 1850 in glacial geology; Great Britain, the Pyrenees, the Black Forest, Upper Italy, Scandinavia, North America, were diligently and successfully searched for evidences of an epoch of extensive glaciation. Germany was much longer in accepting the new teaching. Leopold von Buch strongly opposed the results attained by the Swiss glacialists, and his influence retarded scientific inquiry of the question in North Germany.

The city of Munich enjoys exceptional natural advantages of position for glacial research, seeing that the Bavarian plain upon which it stands has been smoothed and scratched by the ancient glaciers upon the Bavarian Alps and the Tyrol, and the river Isar, which flows through Munich, gives immediate access to the system of Alpine valleys formerly occupied by these glaciers. The famous astronomer, Gruithuisen, had published at Munich, in 1809, a paper on the erratic blocks of the South Bavarian plain, wherein he stated that they had been brought from the neighbouring Tyrolese and Bavarian Alps. He advanced the idea that glaciers had transported them to the low Alpine levels, and then the ice-masses in which the erratics were wedged had been borne northward across the plains by enormous floods, the same which had spread the nagelfluë conglomerates over the sub-Alpine Bavarian plain. As the ice-masses melted, the erratics were left in their various positions. This was in substance the conception adopted by Karl Schimper several decades later.