thus paved the way for Darwin's still broader, biological conceptions upon the same basis.

Hutton's scientific spirit and genial personality won for him many friends and adherents amongst the members of the Edinburgh academy. The most distinguished of these were Sir James Hall and the mathematician John Playfair. Hall (1762-1831) contested the validity of the opinion held by some of Hutton's opponents, that the melting of crystalline rocks would only yield amorphous glassy masses. Hall followed experimental methods; he selected different varieties of ancient basalt and lavas from Vesuvius and Etna, reduced them to a molten state, and allowed them to cool. At first he arrived only at negative results, as vitreous masses were produced; but he then retarded the process of cooling, and actually succeeded in obtaining solid, crystalline rock-material (*Nicholson's Journal*, No. 38, 1800). By regulating the temperature and the time allowed for the cooling and consolidation, Hall could produce rocks varying from finely to coarsely crystalline structure. And he therefore proved that under certain conditions crystalline rock could, as Hutton had said, be produced by the cooling of molten rock-magma. Hall then put to the test Hutton's further hypothesis, that limestone also was melted and re-crystallised in nature. To this hypothesis the objection had been made that the carbonic acid gas must escape if limestone were brought to a glowing heat, and the material would be converted into quicklime. This was Hall's first experience; then he devised another experiment. He introduced chalk or powdered limestone into porcelain tubes or barrels, sealed them, and brought them to a very high temperature. The carbon dioxide gas could not escape under these conditions. The calcareous material was thus subjected to the enormous pressure of the imprisoned air, and carbonic acid was converted under this pressure into a granular substance resembling marble. Hall calculated from a series of successful experiments that a pressure equivalent to fifty-two atmospheres, or to a depth of sea-water 1,700 feet below sea-level, was necessary for the production of solid limestone, 3000 feet of depth for that of marble, and 5,700 feet of depth in order to reduce carbonate of lime to a molten state.

These results were afterwards confirmed by other experimentalists. Thus Werner's theory that crystalline rock represented in all cases a precipitate from water was shown to be