

Waldemar Christofer Brøgger, For. Mem. R.S., Hon. F.R.S.E.

DR W. C. BRØGGER, Emeritus Professor of Mineralogy and Geology at the University of Oslo, died on February 17, 1940, at the age of eighty-eight. Scottish geologists share in the bereavement of their Norwegian colleagues, for in matters geological Scotland stands very near to Norway, nearer even than it does to England. The subjects which Brøgger illuminated in the course of his long life—Early Palæozoic faunas, the mineralogy and petrology of crystalline rocks, glaciation and raised beaches—are all such as commonly attract Scottish investigators. Brøgger, it is true, was particularly fortunate in the wealth of material that lay within easy reach; but this material was even more fortunate in the amazing skill and industry of the master who handled it.

Brøgger was won for geology by Theodor Kjerulf, his predecessor in the Chair at Oslo, at that time known as Christiania. It is fitting therefore that one of his most dramatic triumphs should be connected with a trilobite that carries the specific name *kjerulfi*. As early as 1875 Brøgger pointed out the resemblance of *Paradoxides kjerulfi* Linnarson to an American form *Paradoxides thompsoni* (Hall), both of them later transferred to Olenellid genera away from *Paradoxides*. In 1886 these fossils furnished Brøgger with the basis for a paper "Om alderen af Olenelluszonen i Nordamerika," in which American geologists were asked to revise their stratigraphy and to place their Olenellus fauna below, not above, their Paradoxides fauna, so as to agree with the findings of Scandinavia. The story is well told by C. D. Walcott in *The Fauna of the Lower Cambrian or Olenellus Zone* (1890, p. 545).

On his way to this intercontinental correlation Brøgger, in 1882, produced a notable memoir entitled *Die silurischen Etagen 2 und 3 im Kristianiagebiet und auf Eker*. This dealt in admirable fashion with the stratigraphy and palæontology of the local Upper Cambrian and Lower Ordovician; and it also included a preliminary survey of the considerably younger igneous rocks of the district, which presently were to take first place in the author's affections. These igneous rocks, long thought to be Devonian, have recently been proved to be Permian in age by O. Holtedahl through a discovery of associated fossils.

In 1890 Brøgger succeeded Kjerulf at Oslo, and the same year published his first great work on the Permian igneous assemblage, entitled *Die Mineralien der Syenitpegmatitgänge der süd-norwegischen Augit- und Nephelinsyenite*. This has proved a veritable mine of

mineralogical and petrological interest; but far from being an end in itself it was followed between 1894 and 1933 by *Die Eruptivgesteine des Kristianiagebietes* in seven volumes. The whole of this series is not directly concerned with the local Permian, for Vol. II introduces a comparative account of the Triassic igneous rocks of Predazzo in Italy, while Vol. IV is given up to an exceedingly interesting set of Precambrian igneous rocks rich in calcite occurring in the Fenn district not far from Oslo. The special alkali character of the Oslo Permian eruptives necessitated much definition and naming of new rock-types, supported by abundant chemical analyses. Brøgger excelled in such systematic work, but he never let himself become its slave. He readily recognised a community in the diversity of the Oslo assemblage, and applied to it the conception of differentiation from a parental stock. He saw too that the chemistry of the intrusions was in complete contrast to that of the country rock, and he strongly opposed any idea of assimilation. He postulated, perhaps too freely, a laccolithic mechanism of emplacement, drawing analogies from the laccoliths described by Gilbert in the Henry Mountains. Brilliant in so many directions, Brøgger failed somewhat in tectonic perception. Thus he overlooked the presence of quite a number of cauldron subsidences and related structures. Their discovery was reserved for his pupil and successor J. Schetelig, about the same time as Scottish geologists were interpreting like phenomena in Glencoe. Schetelig had the great satisfaction of converting his master to the new interpretation, but their joint descriptions never saw the light of day. In spite of hopes expressed, when in 1911 he received the Wollaston Medal from the Geological Society of London, Brøgger never quite completed his "main lifework: 'The History of the Eruptive Province of the Kristiania Region,' the finishing of which, by the force of circumstances, has been interrupted and postponed by official duties for several years."

The official duties to which Brøgger referred were indeed onerous, but they were not alone responsible for his leaving to others some igneous work still remaining to be done in the Oslo district. His scientific production in other directions was enough in itself to occupy any ordinary man. Here we can only refer to *Om de sen-glaciale og postglaciale nivåforandringer* (1900–1901, with English summary) and *Strandliniens beliggenhed under Stenalderen* (1905). The latter provides the first full treatment of the time relation connecting successive Stone Age cultures with migrations of strand line in the Oslo Fjord.

He was elected an Honorary Fellow in 1905.

E. B. B.