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An early application of system nomenclature to the Paleozoic of southern Norway

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Early geologic investigations commonly were undertaken to assess mineral wealth. Beginning in the 18th century those investigations often resulted in geognostic maps showing the distribution of distinctive lithologies in the mapped region. Maps showing the distribution of rocks based on their relative ages, determined by the fossils they contained, first appeared in the early 19th century, most notably the 1815 map of William Smith. Shortly after, the concept of 'Systems' developed where rocks formed during discrete time intervals were depicted on maps (for example, Murchison 1839, 1845). Construction of maps portraying 'Systems' required that units be defined and boundaries between units be accurately located. Integral to the process of geologic mapping was the construction of cross-sections that documented the attitude of the rocks along with essential criteria for identifying mapping units and their contacts. Many cross-sections were heavily annotated and can therefore provide insights into the decision-making process of geologists. By utilizing documentary evidence, such as maps, cross-sections, publications, correspondence and journal accounts, an appreciation of how geologic interpretations were made, and innovations in stratigraphic nomenclature spread, can be gained. A case study illustrating the utility of cross-sections in compiling geologic maps is presented here. In the summer of 1844, Roderick Murchison (1792–1871) attended a meeting of savants in Christiania, Norway held from 11–18 July. During the meeting he made an excursion with Baltazar Keilhau (1797–1858) across the Ringerigge plateau to the Steinsfjorden valley. The route they followed was informed by the geognostic map that Keilhau had made. In descending into Steinsfjorden they crossed the Krok-kleiva escarpment. Murchison's observations at the escarpment permitted him to apply for the first time the newly developed Paleozoic 'System' nomenclature to the region. Murchison's observations were recorded in his field notebook on 16 July 1844 in the form of a cross-section. That cross-section later was published in various outlets and was crucial evidence supporting Murchison's geologic map of the region. The cross-section sketched in his notebook, together with his descriptions of the observations made that day and recorded in his correspondence and journal, provide valuable insight into the process of applying the recently formalized Paleozoic 'System' nomenclature to Scandinavian rocks. The development of 'System' nomenclature represented an important advance in geology and continues to be used today.