

Zeitschrift: Archives des sciences et compte rendu des séances de la Société
Herausgeber: Société de Physique et d'Histoire Naturelle de Genève
Band: 44 (1991)
Heft: 1: Archives des Sciences

Artikel: Pallas' theory of the earth in German (1778) : translation and reevaluation : reaction by a contemporary : H.-B. de Saussure
Autor: Carozzi, Albert V. / Carozzi, Marguerite
Kapitel: II: Eighteenth-century terminology of Schiefer and granite
DOI: <https://doi.org/10.5169/seals-740194>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 02.08.2025

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

CHAPTER II

**EIGHTEENTH-CENTURY TERMINOLOGY OF SCHIEFER
AND GRANITE****Schiefer**

The German term of *Schiefer* raises a critical problem of terminology for translation. It does not discriminate between *shales*, that is, argillaceous sedimentary rocks characterized by thin laminae representing bedding planes, and *schists*, their slightly- to highly metamorphic equivalents. When shales change into schists by the addition of new minerals, they display a new striking planar structure called *schistosity*. These planes generally develop obliquely, at a variable angle to the laminae of the original shales. Transformation of shales into schists may result from moderate tectonic stresses and shallow burial accompanied by slight mineralogical changes (to produce slates, for instance) or from strong tectonism associated with deep burial under high pressures and temperatures and related important mineralogical changes (micaschists, garnet-schists).

Pallas named rocks in the schistose bands which are immediately adjacent on both sides to the axial granites: primitive *Schiefer*. However, he emphasized that those of the eastern band were more metamorphic and more mineralized than those of the western band which he also called *Schiefer*. In reality (see Chapter VI), the western schistose band consists mainly of highly folded Ordovician to Devonian shales, bituminous shales, and sandstones whereas only Cambrian metamorphic schists (phyllites) are weakly metamorphic and lie against vertical Precambrian metamorphics. The eastern schistose band however consists of highly metamorphic schists with intercalated ophiolites and jaspers.

Furthermore, in his description of mountains of third order, Pallas used again the word *Schiefer* in *Sandschiefer* for shales and arenaceous shales of younger geological age.

In this translation, the terms *shales*, for sedimentary, and *schists*, for metamorphic rocks, have been used according to the modern geological context of the Urals to avoid the confusion generated by translating indiscriminately *Schiefer* by schists.

Granite

Pallas' manner of describing rocks called *granite* reveals problems of terminology during the eighteenth century. He knew, and said so in his theory, that the most common composition of granites which form the top or the core of great

mountain chains was quartz, feldspar, and mica. Granites occur, he specified, mostly in large masses. Nevertheless, he observed in the Ural Mountains that the rocks typical of the axial chain consisted of highly inclined beds of feldspar and quartz. He did not use the word granite and in his map of the Urals he described these rocks correctly as *Vitrescirendes Gebürge u. Quarz* (vitreous rocks and quartz). Sometimes in 1776, he changed his mind because he must have read J. G. Wallerius *Systema Mineralogicum...* (1772), the most famous book on mineralogy at that time.

According to Wallerius (1772), granites included various types of rocks:

“SAXA DURA, GRANULARIA, SOLIDA, AD CHALYBEM SCINTILLANTIA, QUAE NON FISSILIA ET VIX IN STRATIS REPERIUNTUR. GRANITAE.”

Spec. 199: “1. SAXUM Quartzo & spato scintillante, in diversa proportione, mixtum. GRANITES SIMPLEX” [namely quartz and shiny feldspar in various proportions; today either a feldspathic quartzite or an aplite or a pegmatite].

Spec. 200: “2. SAXUM, Quartzo & Basaltico lapide, in diversa proportione mixtum, GRANITES BASALTICUS” [the modern aplite or pegmatite with tourmaline].

Spec. 201: “3. SAXUM, Quartzo, Spato scintillante & Mica, in diversa proportione mixtis, compositum. GRANITES...”

“Est compositum Saxum à *Quartzo, Spato scintillante & Mica*, fortius vel debilius, in diversa proportione, coadunatis; à diversitate lapidum componentium diverso gaudens colore; durum, ad chalybem scintillans, polituram suscipiens plus minus perfectam, pro diversitate combinationis particularum; reperitur etenim vel *granulare* vel quasi in *unam massam fusum*; in igne fragile & pulverulentum redditur. Multiplici est differentia, lieat, principales solum describere varietates.” [This is the modern description of the composition of granite, that is, quartz, feldspar, and mica, in various proportions, with either a granular or a smooth texture. Wallerius' expression *quasi in unam massam fusum*, however, does not mean “fused together in a fire,” but simply mixed into a mass with a smooth surface. In Latin, the word *ignis* or *calor* would have to be added to refer to the origin of granite by fire.]

H.-B. de Saussure (1779) followed Wallerius (1772) but considered Species 199 rather rare in the Alps, Species 200 very common, and Species 201 actual granite [*granit proprement dit*], that is, that type of granite which is characteristically forming the highest peaks of the Alps.

In the eighteenth century, the term granite was thus not given only to Species 201, most typical for granites, but also to rocks consisting only of two major components (quartz and feldspar) and a variety of other combinations of minerals forming rocks called today granodiorites and diorites. Henceforth, Pallas might have changed the term *Vitrescirendes Gebürge u. Quartz* for rocks forming the axial chain

of the Urals to *Granite* because other famous contemporary German and Swedish naturalists said that the axial chain of high mountains consisted of granite.

REFERENCES

- SAUSSURE, H.-B. (1779-1796). *Voyages dans les Alpes, précédés d'un essai sur l'histoire naturelle des environs de Genève*, Neuchâtel, Samuel Fauche. See volume I, § 137-148.
- WALLERIUS, J. G. (1772-1775). *Systema mineralogicum, quo corpora mineralia in classes ordines, genera et species suis cum varietatibus divisa, describuntur, atque observationibus, experimentis et figuris aeneis*, 2 vols, Holmiae, Impensis L. Salvii. See vol. I, p. 405-410.