

## Allalin metagabbro and omphacite jade

The metagabbro of the Allalin Glacier is the host rock of an omphacite jade, which Louis Frederic De Saussure used to call “lemanite”. Jade occurs in a granular mixture with the other gabbro minerals and also more concentrated in the form of veins and sausages and consists of a mixture of omphacite, kyanite and zoisite.

Comprised of plagioclase feldspars, augite and olivine, gabbro was transformed during the Cretaceous period (40 million years ago) by subduction of the European plate (oceanic lithosphere) beneath the African plate. It was transformed at a depth of 50 to 100 km under eclogitic facies at high pressure (25 Kbar) and relatively low temperature (500 °C) and then increased to about -25 Ma. years during the uplift of the Alps into the greenschist facies.

Among the mineral types of metagabbro we mention omphacite (light olive green), chromium-bearing actinolite or “emeraldite” (in emerald green sticks), kyanite (bluish), talc (white powder), zoisite (white) and paragonite (a white sodium). mica), some garnets and rutile (red) as well as pyrite inclusions.

The metagabbro shows pseudomorphoses of varying extent and size. The primary minerals plagioclase (calcosodium), feldspar, augite and olivine transformed into grains of jadeite, omphacite, zoisite, epidote, albite, sericite; Olivine was epigenized to talc (in a ring around garnets and in alteration voids), chlorite, and serpentine; Garnets can be transformed into hornblende, black chloritoids and biotite.

The metagabbro itself is part of a complex of so-called ophiolitic green rocks, in which serpentinite and eclogite dominate.

There are three types of jade: they are silicates;  
two are pyroxenes: **jadeite**  $\text{Na,Al}(\text{Si}_2\text{O}_6)$  and **omphacite\***  $(\text{Ca,Na})(\text{Mg,Fe,Al})\text{Si}_2\text{O}_6$ ;  
one is an amphibole: **nephrite**, a variant of the compact actinolite  $\text{Ca}_2(\text{Mg,Fe})_5(\text{OH,Fl,Si}_4\text{O}_{11})_2$ .



Omphacite jade has an intermediate composition between a sodium pole (jadeite) and a calcium pole (diopside) and is both a mineral and a mixture. A mixture of more than 80% jadeite is called jadeitite and between 20 and 80% omphacite.

The formation of jade occurs in the presence of metamorphic fluids with hydrothermal alteration. It can be formed by the transformation of a rock such as gabbro (here omphacite) or by precipitation in open cracks in serpentines (more common with jadeite).

The Allalin gabbro was last transported by glaciers in the form of blocks and pebbles to the Geneva and Lake Biel regions 20,000 years ago, where it was found in the Neolithic between 5,000 and 2,500 BC. BC was used to make polished axes.

Note\*: The name “Jade Omphacite” has been recognized by the International Gemological Association.

**Bibliographical notes:**

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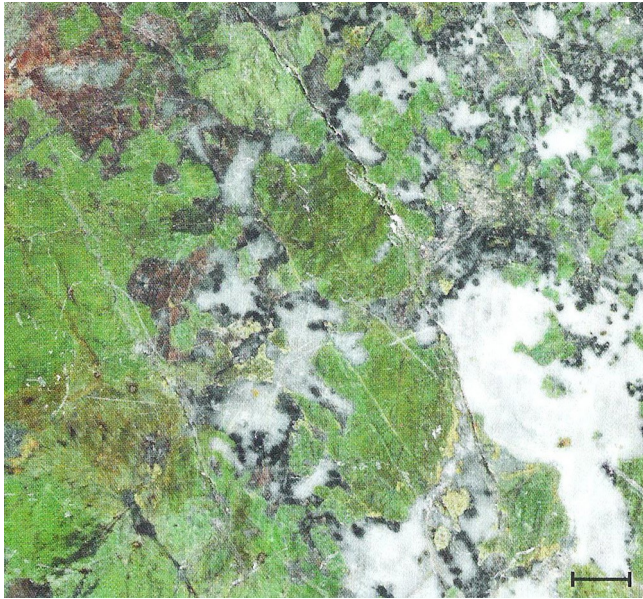
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## Allalin-Metagabbro

A total of 37 different minerals were found in the Allalin Metagabbro! This has to do with its complex history. The most noticeable are the whitish and green spots; the white ones represent the former igneous plagioclase feldspar. They consist of a finely intergrown mixture of zoisite, disthene and light mica. If the green spots are light green, they consist of chromium-containing omphacites, if they are darker green, they consist predominantly of amphiboles. The rock is overall very hard and sometimes extremely tough.

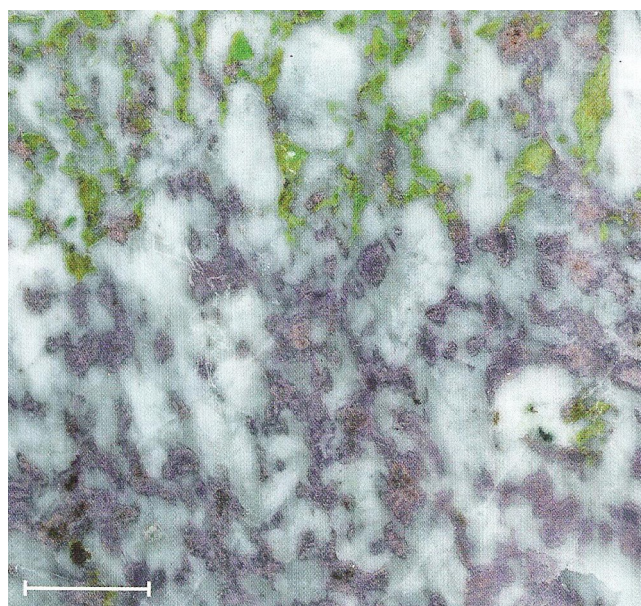


The most striking type: Allalin metagabbro, with grass green chrome omphacite

Gabbro with preserved igneous mineral stock. Augite black, Saussuritized plagioclase white.



Eclogite metagabbro with the two Eclogite minerals garnet and omphacite, plus black Mg chloride and white zoisite.



Bright variety with purple glaucophane.