Hornfels Encyclopedia Article

Hornfels

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Hornfels

Hornfels is a fine-textured **metamorphic rock** formed by contact **metamorphism**. Contact metamorphism occurs when a mass of hot **magma** intrudes into preexisting **rock**, whether by injecting itself into a crack or by ascending in a large body (e.g., **pluton**). Rock in close proximity to the magma is temporarily softened or melted and recrystallizes with an altered texture, producing a hornfels. The term hornfels is often restricted to rocks produced by contact metamorphism of shale, **slate**, or mudstone.

In contrast to schists and gneisses, hornfelses show little or no foliation or layering. They form under conditions of approximately anisotropic (directionless) stress, so there is no tendency for the **crystals** to align in any particular direction. Traces of **bedding** present in the parent rock may remain in a hornfels but are not caused by metamorphosis.

Because they form by contact metamorphosis, hornfelses occur in shells or layers around bodies of intrusive magmatic rock. When seen in cross-section, as at Earth's surface, these shells or layers appear as rings or bands surrounding areas of magmatic rock. These rings are termed contact aureoles. A contact aureole may be only a few centimeters thick or several kilometers thick, depending on the size of the magmatic intrusion. An aureole of less-metamorphosed rocks, often spotted slates and semihornfels, frequently surrounds the hornfels aureole and blends smoothly with it. As is generally the rule with metamorphic rocks, coarser texture in a hornfels indicates more thorough **melting** and slower recrystallization.

Hornfels may be chemically altered by the magma that metamorphoses them, but generally reflect the chemical composition of their parent rocks; thus, **quartz**, **feldspar**, biotite, muscovite, pyroxenes, garnet, and calcite are common ingredients of hornfelses. However, as hornfelses are defined by process of origin (contact metamorphism), not by composition, one must establish that a rock has originated in a contact aureole to classify it as a hornfels.

See Also

Country Rock; Intrusive Cooling; Metamorphic Rock