**TONALITE,** in petrology, a rock of the diorite class, first described from Monte Adamello near Tonale in the Eastern Alps. It may be described as a quartz-diorite containing biotite and hornblende in nearly equal proportions. The prin- cipal felspar is plagioclase, but orthoclase occurs also, usually in small amount. Those varieties which are rich in orthoclase, in addition to plagioclase, have been called quartz-monzonites or adamellites, but a better term is grano-diorite, which has been very generally adopted in America for rocks which are intermediate in character between the granites and the diorites. The hornblende of the diorites is green, sometimes with a tinge of brown; the biotite is always brown and strongly pleochroic. Often these two minerals are clustered together irregularly or in parallel growths. They have generally a fairly strong tendency to idiomorphism, but may sometimes enclose plagioclase fel­spar in ophitic manner. Both of them decompose to chlorite, epidote and carbonates. The plagioclase felspar, which may form more than one-half of the rock, is andesine or oligoclase; simple crystals are rare, the majority being complex growths with centres of felspar rich in lime, while in the external zones the proportion of soda felspar increases greatly. The inner portions have often well-defined, but very irregular, boundaries, and are sometimes sponge-like, with the cavities filled up with a later, more acid, deposit. This seems to indicate that growth has taken place in stages, alternating with periods when the crystallized felspar was eroded or partly dissolved. The ortho­clase sometimes forms irregular plates enclosing individuals of plagioclase. Quartz occurs both in irregular simple grains and as micropegmatite. Occasionally pale green pyroxene is visible in the centre of crystals of dark green hornblende. The accessory minerals apatite, magnetite and zircon are always present, and very common also are orthite in coffee-coloured zonal prisms practically always encircled by yellow epidote, and reddish-brown crystals of sphene, simple or twinned.

In external appearance the tonalites are very like the granites but usually darker in colour. Tonalite-porphyrites often accom- pany them, having the same composition but with, phenocrysts of felspar, quartz, hornblende and biotite in a fine-grained ground- mass. Veins and threads of fine grey rock, mainly composed of quartz and Jelspar, often intersect tonalite-masses and have been called tonalite-aplites, seeing that they bear the same relations to aplites as the aplites do to the granites. They contain more soda- lime felspar than the normal aplites. Towards their margins the larger alpine masses of tonalite often assume banded or gneissic facies, due apparently to movement during intrusion.

In eastern Tirol another tonalite occurs at Rieserferner ; there is also a well-known mass of this rock near Traversella. In the south of Scotland (Galloway district) tonalites accompany hornblende- and biotite-granites, hornblende- and augite-diorites. The newer granites of the Highlands o∫ Scotland in many places pass into tonalites, especially near their margins, and similar rocks occur in Ireland in a few places. Grano-diorites have been described from California, and rocks of very similar character occur in the Andes, Patagonia and the lesser Antilles. Tonalites are also said to be frequent among the igneous rocks of Alaska. (J. S. F.)

**TONAWANDA,** a city of Erie county, New York, U.S.A., about 11 m. by rail N. of Buffalo on the Niagara River at the mouth of Tonawanda Creek (opposite North Tonawanda), and on the Erie Canal. Pop. (1900), 7421, of whom 1834 were foreign-born; (1910 census), 8290. Tonawanda is served by the New York Central & Hudson River and the Erie railways, and is connected with Buffalo, Niagara Falls and Lockport by electric lines. The industries depend chiefly on electric power generated by the Niagara Falls, 11 m. distant. There are rolling-mills, planing-mills, ship-yards, and blast-furnaces, and among the manufactures are wooden ware, flour and paper. The surrounding region was the scene of hostilities during the Seven Years’ War, and the War of 1812. The first permanent white settlement was made about 1809, and Tonawanda was in­corporated as a village in 1854 and was chartered as a city in 1903. the name of the city is an Indian word said to mean “ swift water.”

**TONBRIDGE** [Tunbridge], a market town in the Tonbridge or south-western parliamentary division of Kent, England, 29½ m. S.S.E. of London by the South Eastern & Chatham railway. Pop. of urban district (1901), 12,736. It is situatcd on rising ground above the river Medway, which is crossed by a stone bridge erected in 1775. The church of St Peter and St Paul, chiefly Decorated and Perpendicular, with some portions of earlier date, was completely restored in 1879. There are remains of an ancient castle, consisting chiefly of a finely pre­served gateway, of the Early Decorated period, flanked by two round towers. The castle was formerly defended by three moats, one of them formed by the Medway. Tonbridge School was founded by Sir Andrew Judd, lord mayor of London in the time of Edward VI., and was rebuilt in 1865, remodelled in 1880, and extended subsequently. Ornamental articles of inlaid wood, called Tonbridge ware, chiefly sold at Tunbridge Wells, are largely manufactured. There are gunpowder mills on the banks of the Medway, and wool-stapling, brewing and