*carbon*, carbon dioxide (or carbonic acid), $CO_2$; with (10) *silicon* (the name from the Latin *silex, flint*), silica, $SiO_2$.

These and other *essentially stable oxides* are the chief constituents of rock-making materials. They are in strong contrast with the compounds that make up organic tissues, or those of plants and minerals. These contain, along with the oxygen present, carbon, hydrogen, nitrogen, and generally a little sulphur and phosphorus, elements that have a strong affinity for oxygen, but they are associated with too little oxygen to satisfy their affinities, and, moreover, all are under a degree of restraint from the living conditions. When these conditions are removed at death, ordinary chemical affinities rule, and oxides are formed out of the elements of the tissues, and of outside as well as inside oxygen — $CO_2$, CO, $H_2O$ being the chief products. If outside oxygen is mainly excluded during the decomposition, hydrocarbon compounds form, or those that constitute mineral coal, oil, gas, and the black or brown carbonaceous material that colors soil and many rocks; but these on burning become mostly $CO_2$ and $H_2O$.

*Carbon.* — Carbon is a prime element in living structures, as silicon is in rock-making minerals. In its pure state, crystallized in octahedrons and related forms, it is the *diamond*, the hardest of minerals. Crystallized in six-sided tables or scales of a dark lead-gray color, it is *graphite* (or plumbago), one of the softest of minerals; often called "black lead," because it leaves a trace on paper much like, but darker than, that of lead. Substances having like composition, but different in crystallization, as diamond and graphite, are called *paramorphs*. Charcoal is nearly pure carbon, but contains some hydrogen and oxygen; and the best mineral coal is only 75 to 85 per cent carbon. Carbon combined with oxygen, forming $CO_2$, or carbon dioxide, is given out in the respiration of animals, and is thus contributed to the air, and by aquatic animals to the waters, and is a large result, as before explained, of all decay. At the same time, it is the source of carbon to the growing plant. Carbon dioxide has great geological importance through its combination with lime (CaO), producing calcium carbonate, the formula of which is $CaCO_3$ (or its equivalent $CaO + CO_2$), the material of ordinary limestone.

*Silicon.* — Silicon combined with oxygen, and thus making silica ($SiO_2$), constitutes the two minerals, quartz and opal. Quartz is the most abundant, durable, and indestructible of common minerals. Silica also enters into combination with various oxides, and thus makes *silicates*.

Of the oxides in these silicates, alumina, $Al_2O_3$, is the hardest, most infusible, and most indestructible. Like silica, it is well fitted for a chief place in the earth's foundations; and next to silica it is the most abundant.

Silica combined with alumina alone, makes only infusible silicates; but if potash, soda, lime, magnesia, or the oxides of iron are present, the minerals in general are fusible, and are, therefore, suited for the material of a melted as well as of a solid globe.