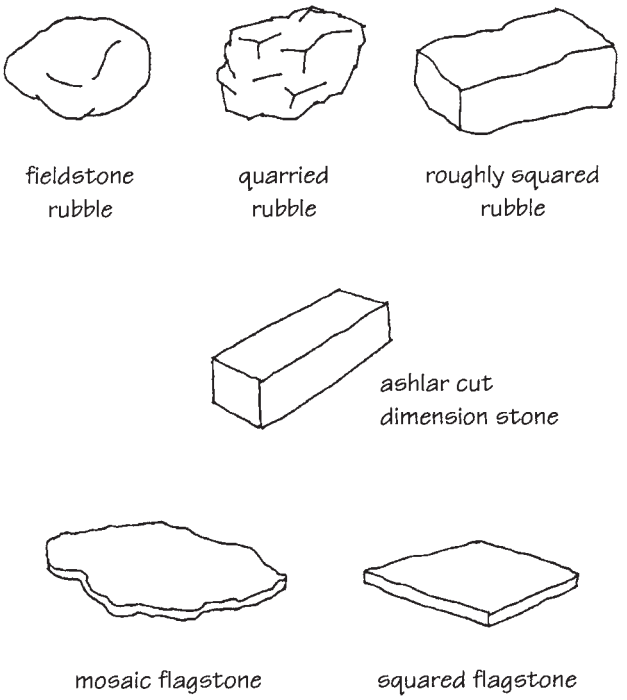

Figure 5-6 Building stone is used in several forms.

of the stone became more sophisticated. With the development of modern technology and improved methods of sawing, finishing, and polishing, granite was more readily available in the construction market and more competitive with the cost of other, softer stones.

Granite is an igneous rock composed primarily of quartz, feldspar, mica, and hornblende. Colors vary depending on the amount and type of secondary minerals. Feldspar produces red, pink, brown, buff, gray, and cream colors, while hornblende and mica produce dark green or black. Granite is classified as fine, medium, or coarse grained. It is very hard, strong, and durable, and is noted for its hard-wearing qualities. Compressive strength may range from 7700 to 60,000 psi, but ASTM C615, *Standard Specification for Granite Dimension Stone,* requires a minimum of 19,000 psi for acceptable performance in building construction (*see Fig. 5-1*). While the hardness of the stone lends itself to a highly polished surface, it also makes sawing and cutting very difficult. Granite is often used for flooring, paneling, veneer, column facings, stair treads, and flagstones, and in landscape applications. Carving or lettering on granite, which was formerly done by hand or pneumatic tools, is now done by sandblasting, and can achieve a high degree of precision.

For granite, the National Building Granite Quarries Association recommends a maximum variation in the dimensions of any individual piece of stone of one-quarter of the specified bed and joint width. Variations from true plane or flat surfaces on polished, honed, and fine-rubbed finishes at the bed and joint arris lines may not exceed $\frac{3}{64}$ in. or one-sixth of the specified joint width, whichever is greater. For other types of finishes, the maximum variation cannot exceed one-quarter of the specified joint width. Variations from true plane on other parts of the face surface are based of the type of finish (*see Fig. 5-8*).

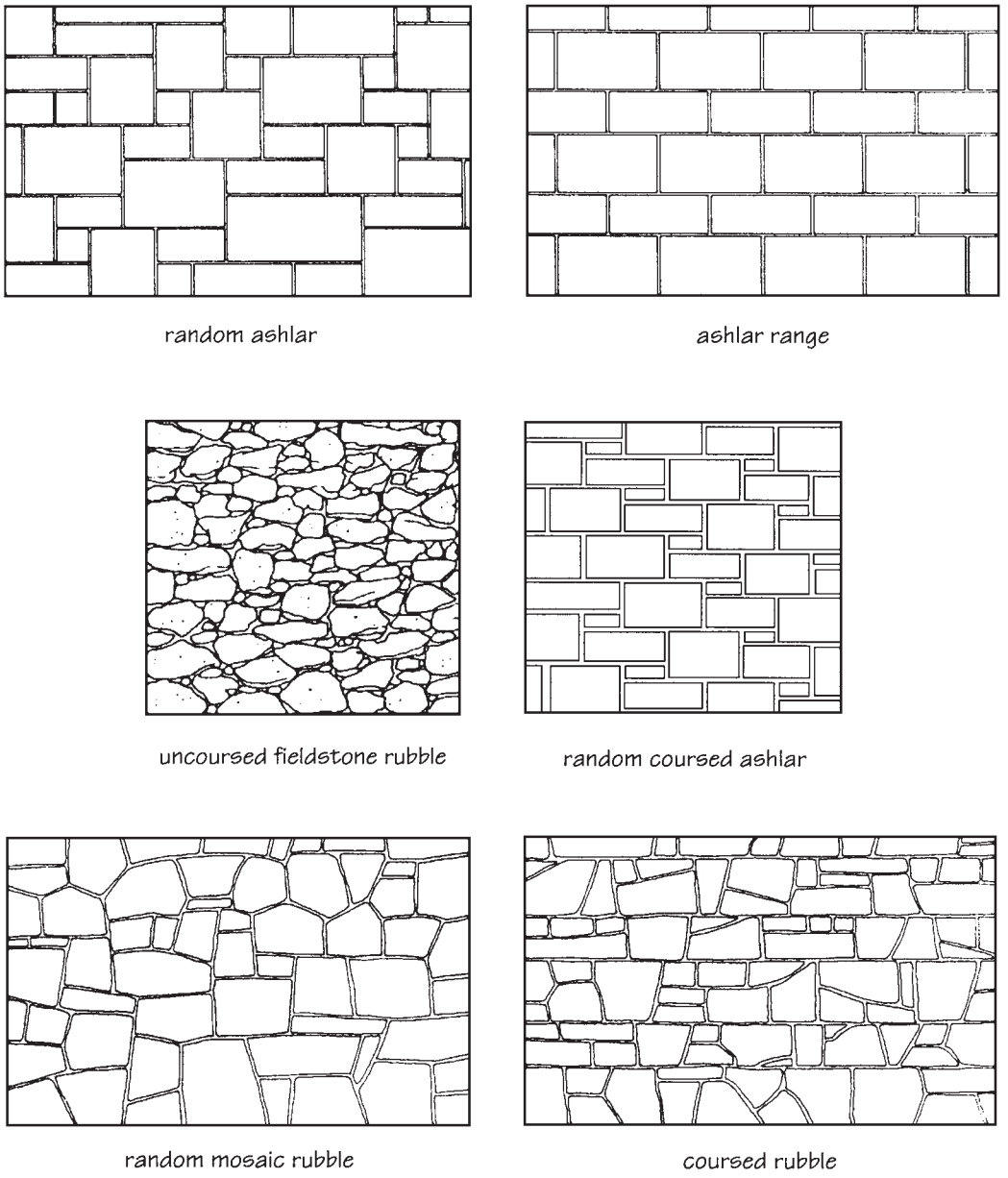

Figure 5-7 Stone bonding patterns. (*From Ramsey and Sleeper,* Architectural Graphic Standards, *6th edition, ed., 1970. Reprinted by permission of John Wiley & Sons, Inc., and Allen,* Fundamentals of Building Construction, *3rd ed., 1999.*)

5.4.2 Limestone

Limestone is a sedimentary rock which is durable, easily worked, and widely distributed throughout the earth's crust. It consists chiefly of calcium carbonate deposited by chemical precipitation or by the accumulation of shells and other calcareous remnants of animals and plants. Very few limestones consist wholly of calcium carbonate. Many contain magnesium carbonates in varying proportions, sand or clay, carbonaceous matter, or iron oxides, which may color the stone. The most "pure" form is *crystalline* limestone, in which calcium