

buildings. Their rigidity gives such panels the advantage of requiring less underlying support than do most roofing materials. In the 20th century, panels of corrugated aluminum are sometimes used for the same reason. Other metal roofs are made up of smaller units shaped to resemble shingles or ceramic tiles.

The fourth type of roofing is based on bitumen, natural semi-solid petroleum residues such as tar and asphalt. Since colonial times natural tar deposits have been used—along with tar-impregnated sheets of cloth, felt, or paper—to make built-up roofs. Unlike roofs made up of smaller units, which must be pitched upward to prevent water from entering the joints between units, monolithic roofs of tar (or earth) can remain impervious when almost flat (many flat-roofed Spanish Colonial houses of the Los Angeles area had built-up tar roofs, the material coming from nearby natural tar pits). Although most common on commercial buildings, built-up roofs have also been a standard technique of house roofing since the mid-19th century. Tar normally has to be heated to make it liquid enough to spread on built-up roofs. It also must be protected from the sun's rays, which make it hard and brittle, by gravel or other material. By the late 19th century, techniques had been developed to convert tar or asphalt into "cold" roofing by impregnating sheets or shingles of felt, paper, or cloth with bitumen. Such composition roofs had the advantage of being easy to apply, relatively inexpensive, and fire-resistant. They have become the dominant roofing (or re-roofing) material for American houses in the 20th century. Other materials, in addition to petroleum-based bitumen, have also been used for making composition shingles. In particular, shingles of asbestos fibers bound together by concrete were widely used in the early decades of the 20th century.

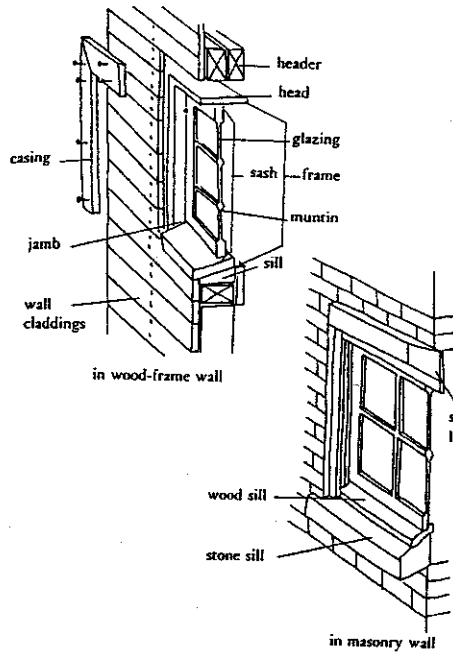
#### ARCHITECTURAL DETAILS

In addition to walls and roofs, many kinds of architectural details contribute to the external appearance of houses. The most important of these are windows and doors; chimneys; porches; and decorative details.

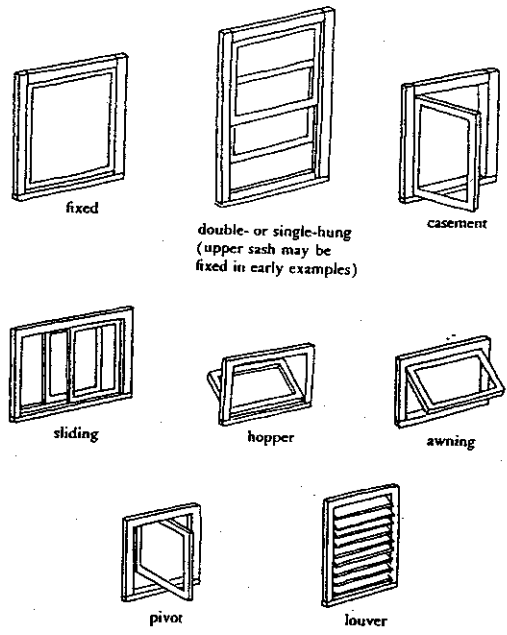
**WINDOWS AND DOORS**—Windows are wall openings that provide light and ventilation for the house interior. The word itself derives from "wind-holes," early openings that served principally to supply draft, and emit smoke, from internal fires. Early windows were without glass, which was a rare and expensive luxury until the 17th century. When ventilation wasn't required, the openings were covered with fabric or skins or by solid wooden sashes or shutters. Many schemes have been devised for opening and closing such shutters, and later glazed sashes; most have been in continuous use since at least Medieval times.

To admit light through the closed window, frames covered with translucent oiled cloth or paper came to be used instead of solid shutters in prosperous Medieval houses. Many such windows were used in colonial America, but glass glazing was also becoming widespread in England, Holland, and France at about the time of the first New World colonization. These 17th-century window sashes were glazed with many small panes of glass, usually either square or diamond-shaped, held in a wooden or metal frame by narrow strips of soft lead. Throughout the 18th and early 19th centuries, window sashes came to be glazed with panes of increasing size, as glass-making techniques improved and costs decreased. By the mid-19th century, panes large enough to glaze sashes in only one or, at the most, two units became widely available. Since then, multi-paned sashes have been used only because of historical precedent rather than technological necessity.

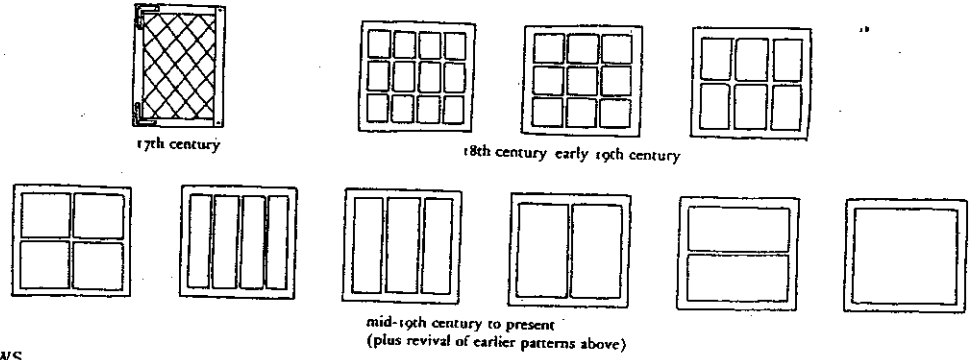
COMPONENTS



SASH OPERATION

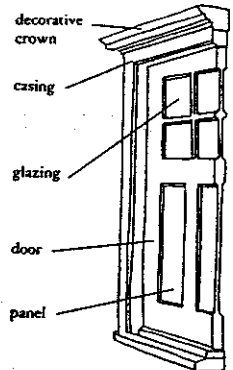


TYPICAL SASH GLAZING PATTERNS

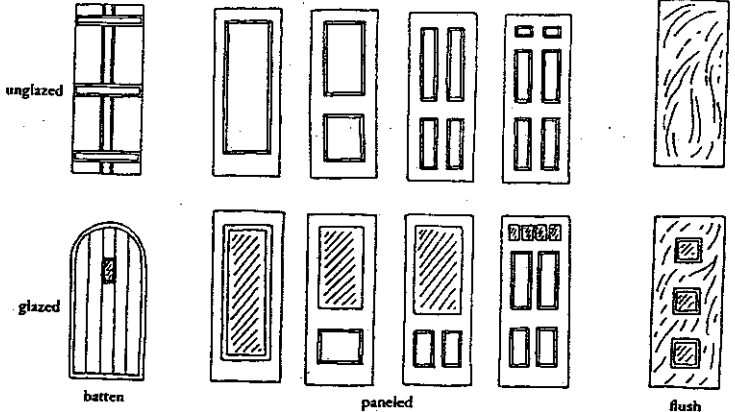


WINDOWS

DOORWAY COMPONENTS



TYPICAL EXTERIOR DOORS



DOORS