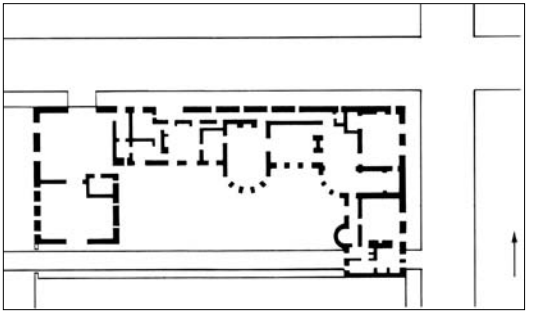
public buildings of England and France. In the United States, however, the most important applications of central heating and mechanical ventilation did not occur until the second half of the 19th century when the commercial high-rise buildings of Chicago were built.

From commercial uses, architects soon applied the idea of centralized heating to residential design. An early example is the Glessner house by H. H. Richardson.[3] Built in Chicago between 1886 and 1887, the house was first designed to be well adapted with thick masonry walls on the north side, large windows around a south-facing garden, and a decentralized system of individualized fireplaces. The major living spaces face southward to capture the winter sun. Then, almost as an afterthought, Richardson provided space under the floors for modern ducts and registers that could be connected to a central furnace at a later time. The connection was, of course, eventually made.



The Glessner House, Chicago. (Drawing by Daniel Wright, architecture student, based on a drawing in *The Architecture of H. H. Richardson and His Times* by Henry-Russell Hitchcock 1966, 106.)

Today, millions of typical builder's houses in the United States depend almost exclusively on hidden machines for climate control. Subdivision layout determines location and trendy styles drive house form. Every developer knows that prospective owners expect to heat the house in winter and cool it in summer just by fiddling with a thermostat. Why worry about taking care and expense with energy-conserving design when the occupant can be counted on to foot the long-term cost of maintaining comfort? Modern dwellers have now mostly lost the time-honored knowledge of how to migrate within their houses or how to transform them. The rituals that once accompanied such adaptations no longer exist to carry the story of the place.

(Left) Frosted Leaves in Winter. (Right) Father and Son in the Snow. (Photo by Mary Knowles.)

Using Our Body's Own Heat

A frosty leaf reminds us that everything in nature responds metabolically to alternations of heat and cold, of light and dark. In winter, the plant appears quite lifeless; the juices stop flowing, the leaves lose color and dry up. In spring, life returns. This all happens automatically with the seasons. We expect to see it happen all around us all of the time.

People playing in the snow on a cold winter day chemically convert energy inside their own body cells to stay warm. Of course, they also wear thick, insulating clothes. But it is what they ate for breakfast or lunch that invisibly and automatically keeps them warm as they play.

Resting in the Shade Beside Hotel Del Coronado Pool, San Diego, CA. (Photo by Mary Knowles.)

Of course to stay alive, our bodies continue to produce heat whether or not the surroundings are cold, so we compensate in several ways. In summer, we perspire and dress lightly. We may seek out shade, perhaps under an umbrella, where we may sit for a while until we get too hot, then dive into a pool for relief. We may repeat this cycle several times over the course