History of The Arch

IN view of the fact that some writers have claimed that the principle of the arch was not known until long after Solomon's time and that therefore the keystone could not have been used in the Temple, consider the following article from the Encyclopedia Britannica:

ARCH,
Any combination of blocks of building material, generally wedge-shaped and with radial joints, employed to cap an opening wider than any of the blocks themselves capping it. In form, arches are usually, though not always, built with the soffit following a curved line. By extension, the word arch is used for any curved head of an opening or recess, even when the material is homogeneous, as in a oncrete arch. From the use of arch forms, to bridge the spaces between the beams in early fireproof construction, the word arch is employed technically for any structure between steel beams, even when the structure may be of reinforced concrete, and, therefore, theoretically a beam, and not an arch at all.

In the normal arch, the inside face or soffit is known as the intrados, the outside face as the extrados, the wedge-shaped blocks as voussoirs, the center voussoir as the keystone and the two end voussoirs as the springers. The spring of the arch is the level of the bottom of the springers, which usually coincides with the beginning of the curvature, but a stilted arch is one in which the apparent spring is well below this beginning. The haunches of an arch are the parts between keystone and springer. A continuous arch, such as a tunnel, is known as a vault.

Due to the nature of its construction, with wedge-shaped blocks, any arch exerts at its spring, not only a downward weight, but a tendency to spread which is known as thrust, and for the arch to remain stable it is necessary for this thrust to be resisted adequately by abutments, buttresses or the strength of the wall itself in which the arch is placed. This quality of exerting thrust has profoundly affected architecture.

The principle of the arch has been known from very early times. When neolithic man discovered that a wide opening could be spanned by leaning two stones together at its apex, the first arch was made, and such triangular arches are widely found throughout the Mediterranean basin (for example, one at Alea in Arcadia; a similar triangular shape, though in corbelled construction is seen in the Gate of the Lions at Mycenae). The earliest known developed arches with curved sides occur in the Tigro-Euphrates valley, at least as early as 4000 B.C. In Egypt, also the arch was known, although it was used only for utilitarian purposes.
Almost all of these early examples are over drains, where the abutment question was simple, but in Asia, the Assyrians, at least, used the arch monumentally in gateways. It was, however, in Italy, at the hands of the Etruscans, that the arch received its most important early architectural treatment, as in the famous gate of Perugia. Following the Etruscans the Romans adopted the arch as perhaps the chief structural feature in the design of monumental buildings and by them its use was spread all over the civilized world to become an integral feature of all the architecture succeeding them until the middle of the 19th century.
Since that time the discovery of the fact that iron, and later steel, could be formed into beams of great strength over long spans has reduced the use of the arch to a subsidiary and often merely decorative position.