The central section of the Petrovsky Palace, Leningradsky Avenue 40, Moscow (photograph by I. Hargittai). A star polyhedron (in close-up, top image) decorates the top of each of the two towers at the entrance. The Petrovsky Palace was designed by the architect Matvei F. Kazakov and built in 1776–1782 at the order of Catherine II. Years before he photographed the Petrovsky Palace, Istvan discovered a star polyhedron at the top of the Sacristy of St. Peter's Basilica in Vatican City and he wrote a note about it for *The Mathematical Intelligencer*.

Sacred Star Polyhedron[a]
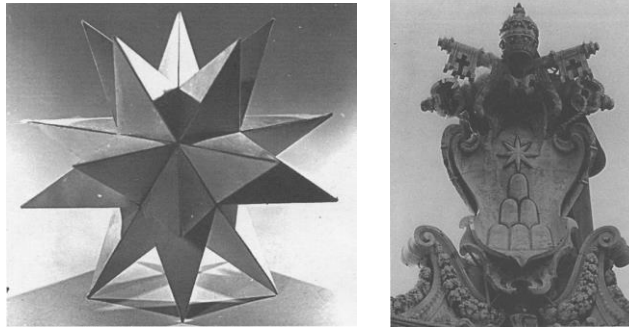
István Hargittai

Figure 1. Left: The Sacristy of St. Peter's Basilica in Vatican City; right: the star polyhedron at its top.

There is a beautiful star polyhedron at the top of the Sacristy of St. Peter's Basilica in Vatican City (Fig. 1). It was built by the architect Carlo Marchionni in the years 1776–1784. It is a great stellated dodecahedron, called also Kepler's great stellated dodecahedron (Fig. 2 [1]), with 2 of its 20 triangular pyramids left out to accommodate the vertical rod serving as the stand of the cross above the polyhedron. There are many other examples of star polyhedron decorations from even earlier times, such as at the top of the obelisks in St. Peter's Square and in the Rotunda Square in Rome, and on the gate in the Square of September 20 in Bologna (Fig. 3). The star polyhedron often stands on a pile of dome-shaped stones. An octagonal star standing on top of a pile of dome-shaped stones was a characteristic motif in the coat of arms of the Chigi family of Pope Alexander VII (1655–1667). This motif is prominently displayed on the colonnades of St. Peter's Square (Fig. 4).

Giovanni Lorenzo Bernini (1598–1680) and Francesco Borromini (1599–1667) were leading architects of the Baroque period and their activities overlapped with the reign of Pope Alexander VII. The octagonal star and the coat of arms of the Chigi family are conspicuously present in many of their works. Figure 5 shows Sant Ivo's Church and three of its details by Borromini. Two of them display star polyhedra on piles of dome-shaped stones and octahedral stars. However, the decoration beneath the cross at the top of the tower is not a polyhedron but a sphere.

Left: Figure 2. Great steUated dodecahedron. Photograph courtesy of Magnus J. Wenninger [1].

Right: Figure 4. Decoration from the top of the colonnade in St. Peter's Square, Vatican City.
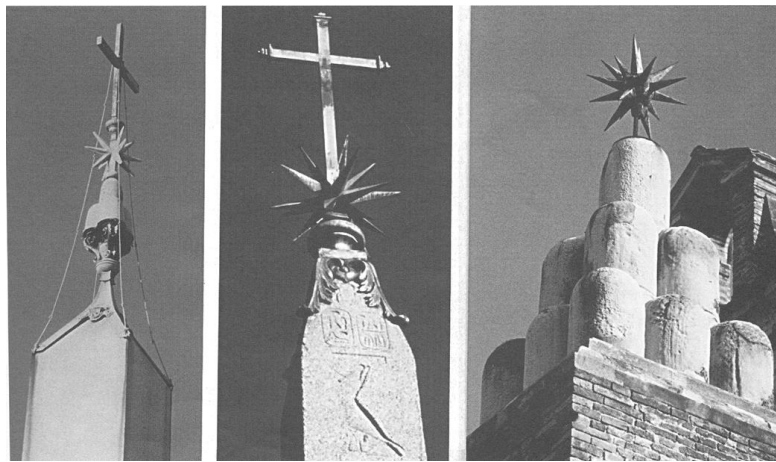

Figure 3. Left: Top of the obelisk in St. Peter's Square, Vatican City; center: top of the obelisk in Rotonda Square, Rome; right: one of the two side decorations of the gate in the Square of September 20, Bologna.
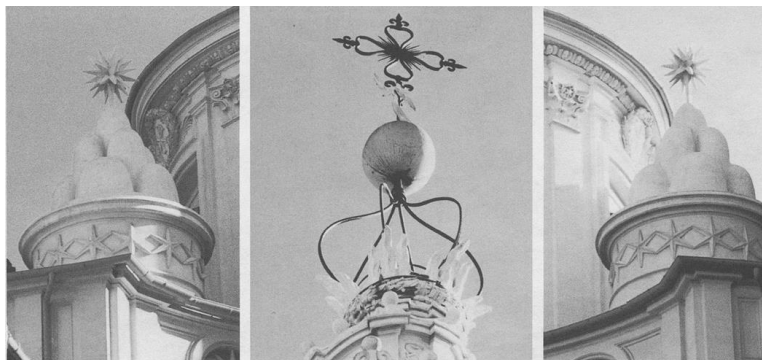

Figure 5. Three details of Sant Ivo's Church.