The Cathedral of Noto still dominates its city with grace and majesty despite its gutted interior and broken dome. The collapse of S. Nicolò on 13 March 1996 was just the latest misfortune in a long succession. From shortly after the inception of the city of Noto on its present site in 1693 until the late 20th century collapses and closures caused by earthquakes plagued the church. The foundations of the original Chiesa Madre of S. Nicolò can be still be seen seven kilometers northwest of the present city among the ruins of old Noto (Noto Antica), destroyed in the earthquake of 1693. The Baroque city of Noto and its Chiesa Madre of S. Nicolò are products of a massive earthquake reconstruction effort which continued into the late 18th century. When earthquakes rumbled through the new city of Noto in 1727, 1780, 1818 and 1848 each damaged or collapsed S. Nicolò. The last earthquake to strike the city in 1990 opened cracks in the church which directly contributed to its failure in the rainstorm of 1996 (Gavarini 2000).

Since S. Nicolò experienced multiple earthquakes it is fair to ask whether the architects and stonemasons chosen to build or repair it attempted to make the church seismically resistant. Only construction documents corroborated by the ruins of the building itself can definitively answer this question. The challenge is to try to understand the architect’s or builder’s intention. The methods 18th-century Sicilians used to insure stability in earthquakes might differ markedly from our own. For example, one commonly held principle of antiseismic design derived from Classical authors and advised by architectural theorists like Antonio Averlino (Il Filarete), Andrea Palladio, and Francesco Milizia (Laner and Barbisan 1986, 13-27, 30-35, 56) was that buildings should be constructed over caverns or incorporate vertical shafts and hollow walls to avoid inhibiting vapors expelled from the earth during an earthquake (Guidoboni 1989). This idea is so counterintuitive we might miss it even if we saw a building intentionally built over a void. Other intuitive ideas about how to stabilize a building are closer to our own. The Mannerist architect, Pirro Ligorio, after examining the ruins of Ferrara after the
earthquake of 1570, offered his own observations about building safety (Guidoboni 1997). He criticized buildings that were simply too old, built with thin walls, lacking in reinforcement, bonded with inferior mortar. He blamed the craftsman guilds working without the guidance of a trained architect (like himself, of course) for the poor design and execution of the buildings that failed. His remedy was first to build well, with the best of materials and to use iron ties where necessary to bond walls together. He saw evidence of heavy exterior walls oscillating at different frequencies and striking one another. He proposed uniform wall thickness as a way of insuring that buildings moved together in earthquakes and hypothesized that regular ground plans were far more resistant to shaking than irregular ones. Ligorio’s intuitive reasoning seems considered, and generally in accord with present-day ideas of seismically resistant design. He, and countless architects who followed him, had to face the problematic behavior of brittle masonry walls which lack resilience when subjected to lateral forces generated by earthquakes.

The temporary church of S. Nicolò built in 1693 was certainly influenced by the fear of earthquakes. Because citizens feared the return of the deadly earthquakes which leveled not only Noto, but more than forty cities in Southeastern Sicily, they built small low structures throughout the 1690s (Tobriner 1982). The *baracca* of S. Nicolò, like others in the city, was modest. But within a decade, all over Noto, the temporary buildings were being replaced by larger ones in stone. Among these permanent building was S. Nicolò, begun in 1696. Like other buildings in the new Noto, S. Nicolò, was a patchwork of newly quarried and previously cut stonework. As stonemasons established quarries on the slopes of the new site of Noto, they sent mule train after mule train to Noto Antica to excavate stone from the ruins. The marble portal of the main doorway of S. Nicolò, lying in ruins in Noto Antica, was transported to the new city in 1696 and incorporated in the new façade. In 1718 the insignia of the city found in Noto Antica was solemnly affixed to the façade of the new Chiesa Madre clearly underscoring the transfer of the city.

In the midst of reconstruction a major earthquake struck Noto in 1727, badly damaging the new stone S. Nicolò for the first time (Boschi et al. 1993). So badly damaged was the marble main portal in the earthquake of 1727 that it was at risk of total ruin. This decorative feature and the stone around it which had previously collapsed with the old church in 1693, nearly failed after it was installed in the new. The interior of the church must have been at risk as well because authorities removed the precious Arch of S. Corrado (the patron saint of Noto) and installed it for safe keeping in the church of S. Domenico. The 1727 earthquake not only damaged S. Nicolò. The facade of the church of S. Francesco broke apart, the vault of S. Agata fell, the cross of the church of SS. Trinità tumbled off, S. Maria di Gesù was damaged, and a portion of the facade of the Jesuit seminary facing the present Piazza XVI Maggio collapsed (Canale 1976, 58, 363, 288–89; Boschi et al. 1995; Gallo 1964).

The 1727 earthquake should have proven to the people of Noto that seismic events recurred and that they were extremely dangerous to masonry structures. Yet no evidence of antiseismic construction techniques appears in the first church of S. Nicolò, badly damaged in the earthquake of 1727, even though this first church was built within memory of the great earthquake of 1693. Just the year before, in 1726, a major earthquake destroyed scores of buildings in Sicily’s capital city of Palermo, only a few days ride from Noto. Palermo had initiated some surprisingly avant-garde antiseismic construction methods (La Duca 1995). For example, after the 1726 Palermo earthquake we know that antiseismic solutions for domes made of stucco and wood instead of stone were discussed and implemented. Strengthening of damaged structures through the copious use of iron was introduced. Even a law prohibiting the use of heavy balconies was promulgated.

What effect did the lessons of the Palermo earthquake of 1726 and the earthquake of 1727 have on reconstruction in Noto? An aristocrat writing Noto’s early history states that after the earthquake «the walls of convents, palaces and churches were in such poor condition, so full of fissures, that they had to be repaired either with buttresses or iron chains.» Variations on these techniques are used after earthquakes in present day Sicily. Rosario Gagliardi, the most famous architect working in 18th century Noto, must have known about how to build antiseismically. For example, Gagliardi was employed as the architect of the new church of S.
Maria la Rotonda in 1730 in which the walls were strengthened with iron rods. Twenty years later in 1750 in an assessment of the church of S. Michele in the Sicilian town of Scicli he proposed two solutions to roofing in relationship to earthquakes (Nifosi 1988, 32, 37). He advised that light vaults of wood and cane and plaster would resist earthquakes more effectively than stone arches. Gagliardi’s discussion of vaults in Scicli proves he was cognizant of seismic hazards and understood antiseismic strategies. Yet no seismic strengthening is recorded at S. Nicolò. While workers seem to have been repairing the «pietra d’intaglio» [ashlar masonry] of the «arches, pilasters, and windows», Gagliardi was employed to take down and to remount the bells of the church. It seems that Gagliardi was adding a single belfry to the facade, perhaps a miniature or full-scale tower façade. What is not described are the antiseismic iron rods or chains he used in S. Maria la Rotonda. Instead, the upper part of the facade, probably ruined in the earthquake, is remade. It is difficult to judge this work in relation to seismic safety.

Between October 8, 1745 and August 21, 1746, for reasons still unclear, the campaign to finish the first church was abandoned and an entirely new church begun. Perhaps the earthquake of 1727 had dealt the first church a fatal blow, the extent of which experts only realized over time. It is possible that the initial damage caused further failures much later just as the damage from the 1990 earthquake contributed to the failure of S. Nicolò in 1996. Social and aesthetic reasons could also account for the abandoning the 1696 design. Perhaps the first church, still incomplete, was insufficiently large or grand in relation to new mother churches being erected in other cities of southeastern Sicily. The new second church begun in the 1740s was designed encapsulate the nave of the first church. Documents record that stone is delivered to the site as early as 1746. The shipments of stone are presumably for the new walls for the apse and chapels being built at the northern end of the church, which could be built while the facade and nave of the first church remained undisturbed.

Hypothetical Construction Phases
- 1746 - 1754: beginning work on the second church
- 1769: demolition of the first church, new facade and completion of the second church
- 1769 - 1776: construction of the lateral elevations, side chapels, towers and presbytery
- 1790 - 1817: collapse and reconstruction of the dome
- 1848 - 1861: collapse of the second dome and enlargement of presbytery and the construction of a new dome

Figure 2
S. Nicolò. Plan illustrating successive building campaigns (drawing: Emanuele Fidone)
Authorities called in Gagliardi in 1753 to render an expert's opinion as to the condition of the first church. The question was whether to reutilize the nave and facade of the first church or finance new construction. Gagliardi strongly condemns the construction and aesthetics of the entire first church in order force church authorities to finance a new building. Gagliardi writes «internally and externally I declare the building to be false to architecture without the possibility of being able to be brought to any approximation of proportion or architectural perfection. Second, you can't vault it because the walls are very weak and full of holes . . . In my view the church should be demolished and so the new church, which one can see is already underway, and rises with a fine and regular sense of architecture can be built.» Gagliardi's condemnation of the structure and the architectural design of the first church is a legal document and must been taken extremely seriously. That he did not exclude his own work on the facade is surprising, since his condemnation could be legally binding, inferring that the architects who had directed the works (himself included!) would have been financially responsible for the shortcomings of the building. A second document of Oct. 1, 1753 complained that the walls were improperly constructed of «pietra molle» (soft stones).

After initial reluctance the church officials endorsed the new second church. From 1764 to 1769 work began on the chapel of S. Corrado, the chapel of the SS. Sacramento, the left campanile and the right lateral elevation of the second church.

The lateral right wall was laid outside the perimeter of the nave of the first church, which was still intact. Figure 3. Both the right and left lateral elevations with their dynamic rhythms, expressive decorative features, and quality of surface and depth are in the style of Rosario Gagliardi. Between 1769 and 1776 the old church in the interior of the new walls was demolished, and the new interior with piers to support the clerestory, the façade, and dome were constructed.

Although his name is never mentioned in the documents, the author of the plan and original elevation for the second church of S. Nicolò is probably Rosario Gagliardi. The plan of the church is very close to a number of variants of a basilica plan attributed to Gagliardi as well as to other buildings he designed like SS. Crocifisso in Noto. Only in 1767 is the «architetto» named, and he is Gagliardi's associate, Vincenzo Sinatra (Di Blasi 1990, 18). Before Gagliardi died in 1762 Sinatra had established a close professional relationship with him which was further strengthened when Sinatra married Gagliardi's niece. Working for Vincenzo Sinatra as his capomastro was Giuseppe Sinatra, Vincenzo's son by a previous marriage. By the time construction of the facade had begun Gagliardi's full Baroque style had waned in popularity and Sinatra toned down the facade, as his patrons, the aristocrats of Noto, would have wished. The second church was opened for services in 1776.

Several features of the second church of S. Nicolò (Figure 4) could have been attempts to make it
seismically resistant. The first possibility is that the lateral elevation of Gagliardi’s project called for a building with excessive mass and a low height to width ratio which lowered the center of gravity. The massive lateral walls and deep chapels of the nave might aid the stability of S. Nicolo in an earthquake. The depth of the wall itself and its continuity with minimal apertures, combined with the interior walls, which link it the internal piers, provide resistance in two directions. Further, the buttresses above the lateral facades help stabilize the clerestory walls. The second possibility is that Gagliardi may have attempted to lessen mass bearing on walls. If the interior were vaulted in cane and plaster, exerting negligible thrust on the clerestory walls, the seismic threat to the structure would have been lessened. Gagliardi designed domes in Noto like the one atop the Jesuit church of S. Carlo, as “Lombard domes”, with framed timber roofs and interiors of wood, bamboo and stucco instead of heavy masonry. The interior of S. Chiara has an intricately designed light stucco and wooden vault. In his work throughout Noto there is a lack of large domes, tower facades, or high towers. An acknowledgment of seismic problems might explain why Gagliardi’s church of S. Domenico is unusually squat and why he adopted the method of miniaturization in his tower facade churches which reduced how far the last story projected above the roof. Because S. Nicolò was the Chiesa Madre, it required a dome. The kind of dome favored by Gagliardi is illustrated in his design for S.

Giorgio in Ragusa Ibla of 1738 (Figure 5). This dome with its modest cupola, low drum, and heavy walls is extremely conservative. Unfortunately, like all domes whether they be masonry or steel, this one would have been at risk in earthquakes.

Several puzzling changes, perhaps related to earthquake damage, occurred in the nave during the construction of this second church (Figures 6 and 7). The internal transverse arches are not aligned with the exterior buttresses. How can this strange inconsistency be explained?

One could hypothesize the presence of a truss roof which was built in relation to the external buttresses, perhaps designed for a lower stone vault in a first campaign, around 1770. This solution was then changed to the one we see today. They decided on a higher vault in cane and plaster with the transverse arches in stone which are off-axis in relation to the buttresses. The builders could have decided to alter their original design for aesthetic or structural reasons. It is possible that the building may have been damaged by the earthquakes of 1666 and 1667 which struck Noto. It is also possible that cracks appeared in the piers of the building, causing builders to rethink the design for the clerestory, roof and vault. If this hypothetical change did occur, the diminishing of the weight of the vaults could be seen as an antiseismic strategy, but the off-axis arches introduce torsion into the structure because of the irregularity of the load path.

The ruins of the second church of S. Nicolò (Figure 8), and the documents related to its construction are in accord: This was a masonry building built in the tradition of Noto (Fianchino and Sciuto 1999, 71-82,
100–124). Like other Noto buildings S. Nicolò is entirely stone, without a single brick. The stones called out in the documents are the stones which were used in other buildings (Fianchino 1983, 74–75). Some are quarried from the site of the city and others are brought from quarries nearby. They include various grades of sandstone and limestone (Emmi and Realini 1996, 111–120). The construction techniques are similar to those described by Giovanni Biagio Amico (1684–1754) in his treatise *L'Architetto Pratico* (1726/1750) and detailed by modern scholars of 18th century Sicilian architecture (Cottone 1987, 81–86). Amico writes that among the various kinds of walls «There is also another way of making encased walls . . . in which the exterior is constructed of squared stones and linked together with other squared stones keyed are right angles, and filled with stones and earth, or mortar. In Sicily they use mostly uncut and roughly cut stone, filling the remaining voids with small stones and mortar with finely hammered lime (Amico 1726/1750, 1, 63).» This stone masonry technique, described by Vitruvius, was well known in Antiquity. The ruins of the exterior walls of S. Nicolò clearly illustrate the use of irregular stones placed in rough rows inside an outer ring of cut stone, » pietra d’intaglio.» This technique was common throughout southeastern Sicily as a comparison between S. Nicolò and the Monastero dei Benedettini of Catania demonstrates (Barbera and Lombardo 1989, 20–25). The ultimate stability of the mass of stones depends upon the strength of the mortar and if all else fails on the ashlar masonry skin of the wall.

In the last campaign to finish the nave of S. Nicolò stonemasons made a major miscalculation in the construction of the nave piers which nullified any attempt to make the building safe in earthquakes. The static loads of the clerestory, side vaults, nave vaults, and dome are all carried by the piers, so their construction is particularly important. But in S. Nicolò the nave piers are the weakest part of the entire building because of one mistake, the use of round river stones in their construction (Figure 9). While river stones are excellent in compression they are smooth and round making it difficult for mortar to adhere to them. As architectural treatise writers uniformly advise, they must be broken up if used in walls. To do otherwise is to build a structure that violates the rules of good architectural practice (Alberti 1988, book 3, 8, 11). After the Calabrian earthquakes of 1783 authorities condemned the use of round river stones in walls as being one of the causes
for building failures in earthquakes (Tobriner 1983, 135). The Bourbon government of Naples prohibited the use of uncut river stones in all new construction in Calabria.

The mistake of using round river stones in the piers is compounded by the use of poor rubble limestone and weak mortar and an even weaker external ashlar revetment (Binda et al. 2000a, Binda et al. 2000b). The mortar in the piers is not particularly strong and was not viscous enough to penetrate between the rubble. As a result there are unfilled holes in the cores of the piers. The stones in the core are of poor quality as well. In fact, except for the river stones, Gagliardi’s description of the construction weakness of the first church, and his accompanying condemnation of the same year, fit the description of the construction of these piers and the stones of which they are composed. The exterior «pietra di intaglio» had the potential of confining the problems of the core. But only one thin width of cut stones was laid. Unlike designs advised by Vitruvius, which were supposed to be made of chains of stones, there is but one width of poorly bonded stone. To make matters worse, the design of the piers had indentations for niches which induced the masons to lay stones which in some cases touched only at the corners. The miracle is that S. Nicolò stood as long as it did.

How can the poor construction of the piers be explained? It should be noted that the piers, nave roof, and dome were the last part of the building campaign. Coinciding with the demolition of the old church. The upper parts of the church are better crafted with material superior to the lower. The demolition of the old church would have produced a great deal of material which would have had to have been carted away. Gagliardi’s condemnation of the first church was long forgotten. Perhaps material from the first church was reused in the piers to simply use it up. The river stones, too, were probably on the site. Perhaps there had been an overrun and these stones were extras. So to use up unwanted material the bases of the piers were begun with river stones and soft limestone. There also could have been unsupervised filling of the carefully cut exterior perimeters of the piers. Master masons set the cut stone (pietra d’intaglio) while day workers may have been responsible for filling the interiors. Hence the mistake.

Another possibility exists which is linked to the reluctance of the aristocrats to fund the project and the anxiety of the populace regarding their unfinished Chiesa Madre. After the initial ardor to complete the building, enthusiasm waned. In the 1740s and 1750s aristocrats appear to have been reluctant to fund the project. Instead they concentrated on their own churches and chapels. But by 1770 the funding outlook brightened. A document of 1770 enumerates an aristocratic bequest of funds to the Chiesa Madre that so inspired the populace that they donated not only their own money but their own labor, motivated by «un Santo Zelo.» What effect did this «zeal» combined with faith and impatience have on the construction of the church? Is it possible that the citizens of Noto were moved, like the aristocrats and commoners of the Miracle of the Carts in Medieval Chartres, to carrying stones to the construction site of the Chiesa Madre. Could these stones have come from the Asinaro River which flows near the site of Noto? Faced with the pious donation of mounds of inappropriate material, and the further donation of free unskilled labor, perhaps the capomastri headed by Giuseppe Sinatra made disastrous misjudgments. Yet another possibility is that seeing the poor quality of the rubble limestone available for the filling of the piers the capmastro decided that stronger limestone, even in the shape of smooth river stones, was better than nothing. Understanding the problem he interspersed the river stones with the other fill in the piers.
The piers may have begun to show signs of weakness during construction. The vertical cracks discovered in the piers by Luigia Binda and her group of researchers indicate they were spreading and buckling under vertical gravity loads at least as early as the re-plastering of the church around 1950 and most likely before (Binda et al. 2000b). Could the cracks have alarmed the capomastri sufficiently for them to attempt to diminish the load by lightening the roof? Could this explain the puzzling change in the vault design? We will never know.

S. Nicola’s construction history is complicated still further by the failure and reconstruction of its dome. While a detailed history of the domes of S. Nicola is not germane to this essay an assessment of their possible antiseismic qualities is. The dome of the second church, the first dome, was badly damaged in an earthquake on June 5, 1780. The dome collapsed and the remains of both it and the apse were demolished by late June. In 1789 the French traveler Léon Dufourny describes work under way to build a second dome. According to Dufourny, the architect Stefano Ittar was in charge of the works. Dufourny explains that Ittar was diminishing the dimensions of the windows of the crossing and reshaping them as ovals in an attempt to provide better support for the dome. Dufourny is dubious that this strategy is sufficient to correct the problem. Since Ittar is never mentioned in the documents, it is possible he left the project which was then executed by Bernardo Labisi, the son of Paolo Labisi, who appears in the cantiere of S. Nicola as an architect in 1809 and an engineer in 1809 and 1813. By 1816 windows were installed and by 1817 the dome was plastered. In 1818 another earthquake damaged the new second dome. It was evaluated for possible repairs in 1839, only to be shaken to ruins in 1848. The third dome was begun by Luigi Cassone in 1857 and completed in 1861.

Unfortunately, information about the first two domes is extremely limited, and even the design process of the third is unclear. Still the question can be posed whether there is any evidence of antiseismic construction features. In other words are there any special design features or reinforcement strategies particular to antiseismic design? Several possibilities emerge. The first involves the partial filling of the nave windows (Figure 10) at the crossing before the installation of the second dome that Dufourny ascribes to Stefano Ittar. This tried and true method was used many times before. For example, after the second dome of Hagia Sophia partially collapsed in an earthquake in 984 four windows were closed to consolidate it (Mainstone 1997, 89–99). Ittar may have also designed the buttresses of the crossing below the dome, which are built of inclined cut stone to effectively counter the thrust of the weight of the drum. The beautiful stonework thoughtfully laid to counter the lateral thrust contrasts markedly with the work in the rest of the building. Another example of antiseismic considerations was the unsuccessful attempt by Cassone to limit the weight of the third dome by using pumice stone. Unfortunately the stone could not be obtained.

Figure 10
S. Nicola. Oval window and buttresses at crossing. In the late 18th century the original aperture was diminished and a smaller oval window inserted to add strength to the crossing (photo: author)
Building the cathedral of Noto 1987

University of Catania advised Cassone to use brick and strong pozzolana mortar for the dome, which would have yielded a stronger structure than Noto’s typical mortar and stone construction but this suggestion was not taken.

What could have been done to improve the performance of S. Nicolo? Masonry is extremely rigid and brittle and therefore vulnerable seismic damage. A masonry structure is composed of thousands of pieces bound together by mortar. The challenge is how to aid a masonry structure to move as a unit without breaking apart. In relation to domes, the famous treatise of Giovanni Poleni, *Memorie istoriche della Gran Dome del Tempio Vaticano. e de’danni di essa, e de’ ristoramenti loro* (Parma 1748), would have been a useful source for the builders of S. Nicolo. Poleni explains the mechanics of dome failure and discusses counter measures like the use of iron chains to control the thrusts of domes. Poleni’s analysis the effectiveness of the iron bars and chains used in St. Peter’s dome in relation to earthquakes is extensive. Iron rods had been used by Brunelleschi in his Ospedale degli Innocenti in Florence to control the splaying of arches (Saalman 1993, 40–48). In the 16th century Giacomo della Porta used iron rods to control hoop forces when he was completing the dome of St. Peter’s (Robison 1988, 257). Later in the 17th century Francesco Borromini used iron chains to counter the thrust of his complicated dome of S. Ivo alla Sapienza (Connors 1996, 680). Iron was used by the Perrault in the 17th century in the eastern facade of the Louvre (Berger 1993, 65–67). It was iron that was recommended as an anti-seismic measure after the earthquake of 1751 in Gualdo Tadino, Umbria (Tohbriner 1997). Giovanni Battista Mori recommended iron reinforcement after the Calabrian earthquake of 1783. When the church of S.Maria degli Angeli in Umbria was badly damaged in an earthquake in 1832 its dome was repaired with bands of iron and the entire reconstruction was tied together by iron straps (Mancini and Scotti 1989). But there is no such reinforcement in S. Nicolo.

It is important to remember that S. Nicolo was being reconstructed during a period in which earthquake resistant construction was known, even in Noto. In a treatise of Christian Wolff’s *Elementa Matheseos Universae* (1715–17) translated for Paolo Labisi in 1746 as *Elementi dell’Architettura Civile* there is a discussion of lateral bracing in roof systems and a depiction of the «craticola» used in foundations which served «ad impedire ne’ tremuoti lo scompaginamento delle parti» (Tohbriner 1997, 34–37). Books and articles on antiseismic design (Di Pasquale 1986; Lanier and Barbisan 1996; Barbisan and Lanier, 1995) like Eusebio Sguario’s *Specimen physico-geometricum de terraemottu ad architecturae* (1756) were in circulation and because of the earthquakes of Lisbon in 1755 and Calabria in 1783 discussion of seismic problems became more common in the 18th century (Placanica 1985). Francesco Milizia in his *Principii di Architettura Civile* (1781) discussed antiseismic construction strategies (Di Pasquale 1986). Common sense solutions for limiting a building’s exposure to earthquake damage like building its dome in cane and plaster, reducing the dome’s height, or eliminating it entirely seem never to have been discussed in Noto. Such changes in traditional practice are not without precedent: After the earthquake of 1783 the Bourbon government of Naples limited the height of buildings because of seismic danger. Yet we can well understand the problem the people of Noto faced. It is unthinkable that the Chiesa Madre, much less the Cathedral not have a dome.

Instead of improving the performance of S. Nicolo, 19th and 20th century alterations may have accentuated the inherent weakness of the structure. With the elevation of S. Nicolo to the status of Cathedral came the necessity to create an even more exalted architectural statement. The chancel and apse were extended and the stone arches of the transept added. Of course the status of a Cathedral called for a high dome so when the last reconstruction occurred the engineer in charge, Luigi Cassone, complied. Twentieth century alterations followed the pattern of the 19th century. Church officials attempted to stabilize the Cathedral by adding a flat concrete roof which prejudiced the structure in two ways. The weight of the roof was added to the structure and the tops of the former transverse arches were cut (Figure 11). Rather than improving the performance of the structure by providing a stiff diaphragm to distribute the loads, the roof may have aggravated the situation. When one side pier failed instead of a localized failure, the roof spread the damage by transferring load to the rest of the nave, and thereby collapsing the entire interior.
The Cathedral of S. Nicolò is an important and paradoxical symbol for the city of Noto. It represents the Noto that aspired to be a center of culture during the waning years of the Baroque style in the 18th century. It records Noto’s last transformation in the 19th century into an aspiring ecclesiastical power. Noto’s citizens as well as the Church attempted to use the new Cathedral to capitalize on religion to bring prosperity to the city. The Cathedral in the 19th century embodied a memory of past importance of the 18th century as well as Noto Antica. On the positive side, the reconstructions symbolize Noto’s resolve to exist and continue as a city. Technically, there seems to have been pride and faith in traditional unadulterated stone masonry that was replaced again and again after earthquakes with little change in technology. One wonders whether the architects took failure for granted, realizing that it was likely that the exterior walls, side aisle domes, and nave arcade would survive while the dome and part of the crossing would likely fail. Perhaps they felt they could do no better. Less positively, the reconstructions could be seen as repetitions of failure without significant innovation or care taken to find a more appropriate solution. These reconstructions seem to indicate a lack of interest in the challenges that must be met when building in earthquake-prone Sicily. The history of the Cathedral of S. Nicolò is a story of tenacity and enduring tradition, but also of disregard for the lessons of the past.

NOTES
1. This paper represents a summary of the studies in Tobriner et al. 1998. All cited dates and documents relating to the Cathedral of Noto are from this reference. The entire study is scheduled to appear as the first issue of a series to be published by the Architecture Department of the University of Palermo. An earlier version of this paper was submitted to Construction and Building Materials.