

VENICE

by Sir Ashley Clarke

A lecture given in the Society's series of autumn illustrated lectures on Four Centres of Italian Civilisation on 26th October 1981.

I feel highly honoured by your Chairman's invitation to take part in this series of talks on four famous cities of Italy. But I also feel intimidated by the consciousness that many of you—perhaps all of you—know as much as I and indeed more about the architecture of Venice. However, where I perhaps have a slight advantage is in having been for the past 14 or 15 years directly concerned with its conservation and indirectly with the preservation of Venice itself in the face of severe long-term threats to its very existence.

So this evening, while I shall summarize as briefly as I can the major influences which have given Venetian architecture its special character, I shall be speaking primarily as a conservationist whose function is to defend it and aim to give it longer life.

I often hear people refer to Venice as "unique". Well, it is and it is not. It is not unique in being situated in a very humid environment nor in being supported deep down in its subsoil by cushions of water (aquifers). In these respects London has much in common with Venice. Where Venice is well-nigh unique is in the *degree* of environmental humidity with which the city has to contend and—very important—that it has to cope not only with fresh water from the skies but also with sea-water from below which penetrates all porous material and, rising by capillary action, leaves in it saline deposits which in turn attract further humidity. This is why from the start Venetians used Istrian stone at the base of all important buildings standing in or near a canal, Istrian stone being a very dense, almost 100% non-porous, limestone.

In fact, the overwhelming majority of buildings in Venice consist basically of two materials, brick and Istrian stone. Istrian stone literally comes from the Istrian peninsula, just south of Trieste and now in Yugoslav territory, where the quarries are still active. Marble is fairly frequent too, but as a rule only used decoratively, not structurally as in Athens. The choice by the earliest Venetian builders of Istrian stone for both structural and decorative purposes was one of the happiest that could have been made because only its skin is vulnerable to water. It is certainly one of the major reasons for the almost miraculous survival of such a wealth of historic architecture.

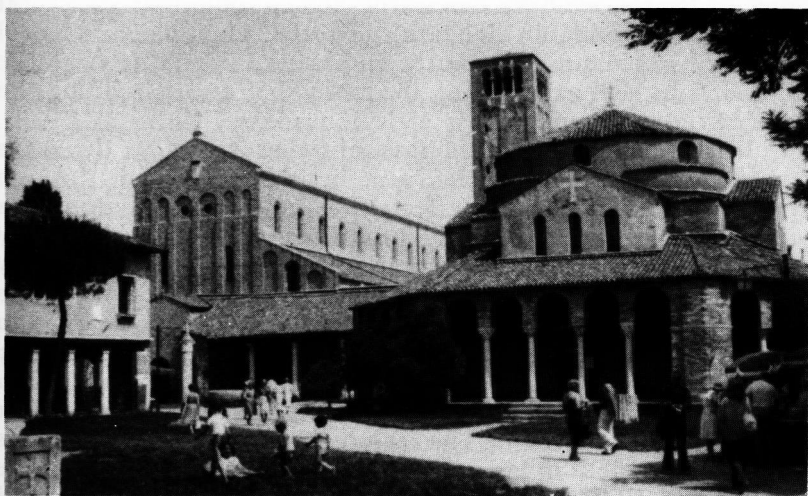
The city itself is built on a number of small islands which in the course of time have been joined together by bridges and often by the filling in of canals dividing them. The actual composition

of these islands, originally known as the Rivo Alto (the high bank), was considered by the early Venetians, when they established themselves there in the 9th Century, to be more solid than that of other islands in the Lagoon. But even so, to make them capable of bearing the weight of considerable buildings they had to drive wooden piles into the ground. These piles have in the most remarkable manner survived the centuries and so long as they remain damp they maintain their consistency. When, for some special operation of repair, these wooden piles have to be pulled out, within an hour they turn to powder.

One more general observation. Venice is much the youngest of the cities included in this series of lectures. Ravenna, for example, was a Roman municipality as early as the 1st Century B.C. When Constantine the Great in the 4th Century divided the Roman Empire into two and named Byzantium the capital of the Eastern half, Venice simply did not exist. The area where Venice was in due course to be created fell under the jurisdiction of the Eastern Empire and was later administered by a sort of viceroy called an Exarch.

In the 5th Century there were successive incursions of barbarians—Goths, Huns and Ostrogoths—who overran the Italian possessions of the Eastern Empire right down as far as Ravenna. Fleeing before them, the inhabitants of Aquilea and other settlements up to Altinum and beyond took refuge in the islands in the north of the Lagoon, especially round about A.D. 452 in Torcello.

So this is where Venice began. If you imagine these sandbanks, known as *barene*, without any buildings, the



Torcello: The Basilica, and (*right*) the Church of Santa Fosca.

landscape which greeted those proto-Venetians must have looked pretty much like this. The first buildings were made of wattle and for a matter of centuries hardly progressed beyond wood. But as time went on a sizeable city was built up in which there were no less than twelve large churches. Though there was a massive exodus in the 8th Century (probably due to the prevalence of malaria) the city survived well into the Middle Ages. Nothing now remains of all that except for the little group of buildings round these two churches, the Cathedral of the Assumption, this octagonal Byzantine building dedicated to Sta Fosca, one or two small villas and a few farms.

Of the original cathedral of the 7th Century only traces of the Baptistry remain. There were important reconstructions in 864 and again in 1008. We do not know what the original building looked like; but since the present building is in its lay-out a typical Early Christian Basilica—with the nave divided from two lateral aisles by columns—it is a fairly safe assumption that the original ground plan, though doubtless smaller, was similar.

The restoration of this Basilica is one of the most ambitious projects now in progress in Venice. It is being executed, in partnership with the Italian State, by a group of voluntary organisations of which *Venice in Peril*, the British Fund for Venice, is the leader. Our principal object is the preservation of the valuable mosaics with which the main apse, the West Wall and the South Chapel are adorned. Many of these are 11th Century work by Byzantine artists and craftsmen, who subsequently or contemporaneously worked at St. Mark's. The huge Last Judgment at the West end has already been restored. But, of course, we have necessarily had to undertake structural work to consolidate the fabric of the church, to control damp—rising damp, rain water and water infiltrating from the Lagoon—as well as repairing the main roof and rebuilding the roof of the main apse.

In tackling the delicate task of re-attaching to the walls passages of mosaic which have become detached through penetration of damp or the effect of earthquakes, the restorer has to some extent to feel his way. The operation is master-minded by the Central Institute of Restoration in Rome and we employ expert mosaic restorers from the Basilica of St. Mark, using the tools and techniques with which they are familiar but adapted to the problems revealed *ambulando*. Nowadays, it is generally considered wrong in principle to remove mosaics from the wall in order to restore them, as they did in S. Apollinare in Classe at Ravenna some years ago. The reason for this is that the liveliness of a wall mosaic is in large measure due to the way in which the light strikes it. Since each tessera (or cube) is inserted by hand into the bedding of mortar which holds it in position and itself

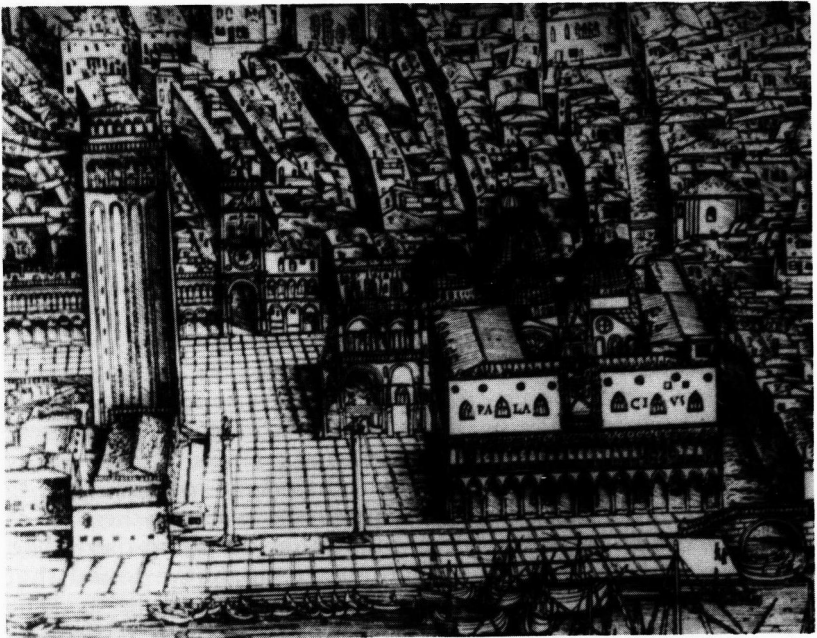
adheres to the wall and since the craftsman is careful not to flatten each surface as he completes it, the result is a great variety of angles at which light is reflected. Whereas, if you remove to the laboratory the area to be restored, it is almost impossible, when the time comes to replace it, to reproduce the original diversity of surface.

The basic technique is relatively simple. It consists first of carefully surveying the whole area to be restored, plotting and marking out the areas of detachment. The restorer takes each of these in turn and identifies the central point. Here he extracts one tessera and through the resulting hole penetrates with a drill the bedding and right into the wall. He then inserts into the wall a sort of rawl-plug and a plastic tie-rod, designed to anchor (so to speak) the whole of that particular area. This is held in place by a plexiglass disc which in a couple of years can be removed. In the whole of the Last Judgment there are now as many as 500 of these tie-rods. Of course, there are some passages which are so badly detached that other measures have to be taken, such as injecting fresh material between the bedding and the wall. At the base of the big mosaic, for example, we found that the rising damp had been particularly damaging. Curiously enough, we found that the elect were in a very precarious position, whereas the conditions in hell were not at all bad.

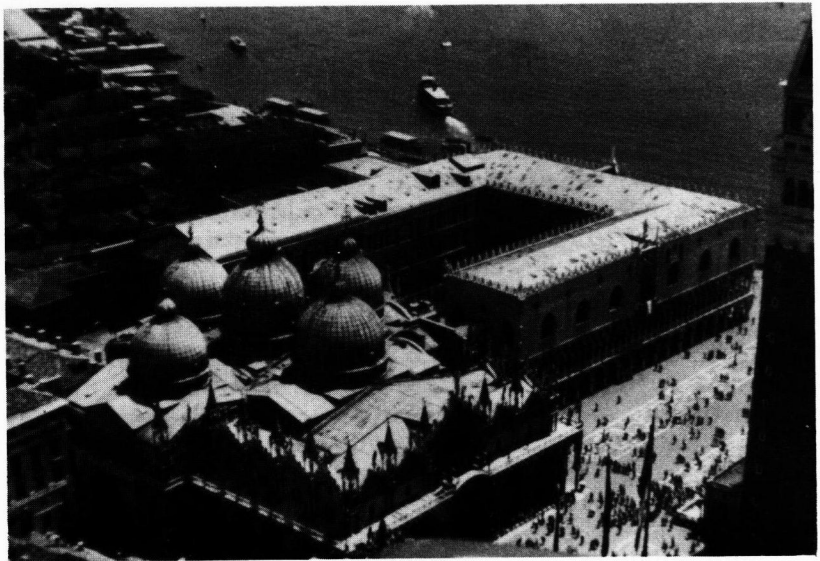
I have spent a little time on Torcello not only because of its historical importance and the link with St. Mark's, but also because Sta Fosca and the Basilica, representing, as they do, the two principal types of paleo-Christian architecture, also typify such a decisive element in Venetian art and architecture, namely the long-lasting influence of Byzantium. The Republic never ceased to be eastward-looking—not only to Byzantium but also to Egypt, the Middle East and even eventually to China. In Florence one of the strongest impulses in painting towards what became the Florentine Renaissance style was the revolt, starting with Giotto, against the two-dimensional formalism of Byzantine painting. In Venice there was never any such revolt, only a gradual and rather slow evolution.

In architecture, of all the styles represented in Venice, the pervading influence of Ruskin has been to persuade us that Gothic in its various forms was the "distinctive" expression of Venetian architectural genius, with its curious combination of Islamic motifs and a fanciful use of tracery. However that may be, the two most "distinctive" buildings in Venice stand side by side—the Doge's Palace and St. Mark's. Here you see them in a diagram-map of 1500 by Jacopo de'Barbari as though he were hovering over the city.

Both buildings have passed through several transformations owing to destruction by successive fires and have retained



Relief Map of Venice, 1500, by Jacopo de' Barbari, showing the Doge's Palace, St. Mark's and Campanile.



St. Mark's Basilica, the Doge's Palace and part of the Campanile seen from above.

accretions in different styles. But basically, while the Doge's Palace is Venetian Gothic, St. Mark's is Venetian Byzantine. St. Mark's, originally built in the 9th Century in honour of the saint whose remains had been stolen from Alexandria, may well have started as an Early Christian Basilica but was later re-modelled on the 6th Century church of the Apostles in Constantinople and therefore closer to Aghia Sofia, the greatest of all early Christian churches. The ground plan, in both its interior and exterior organisation, is typically Byzantine. It takes the form of a Greek cross with an atrium on the West side later extended also to the north side. Over the crossing is the central cupola flanked by other cupolas over the four arms. These onion-shaped cupolas are only shells: the actual domes are much shallower, as you will be able to judge from the pictures of the interior.

Over the left-hand portal there is a mosaic which shows how the façade looked originally, that is to say with strictly rounded arches over the portals. The additions purporting to transform the rounded arches into pointed arches and accompanying them with pinnacles and statues were executed only at the end of the 14th Century as a salute to the new fashion for Gothic architecture.

Inside, the walls are completely covered by mosaics executed between the 11th and 16th Centuries, the earliest of which are wholly Byzantine in style and iconography, as also is the floor in marble mosaic laid out in the Roman manner. Here you see the double pulpit, the lower serving for the reading of the Epistle and the upper both for the Gospel and for the sermon. It has an almost Islamic air. The figures of the Apostles on the iconostasis are of 1394 by the Dalle Massegne brothers in the Gothic style.

The building next door, the Doge's Palace, stands exactly where the Venetians set about constructing their administrative centre at the beginning of the 9th Century when they moved to the Rivo Alto. The original building, very likely in the Byzantine style, was burnt down in 976 when there was a revolt against the then Doge. In the succeeding centuries, as a result of a series of disastrous fires and subsequent reconstructions, the Palace gradually took on the shape and general aspect with which we are familiar today. The decisive reconstruction was undertaken between 1340 and 1360, when a vast new hall was built in the top storey for the major legislative body of the Republic, the so-called *Maggior Consiglio*. This ran the whole length of the façade on the water-front and, of course, its shorter end faced the *Piazzetta*.

This coloured wood-cut, which is by a German artist called Erhard Reuwich and is roughly contemporary with the *De' Barbari* map, shows that by the end of the 15th Century the Palace had already acquired the new typically Venetian style of architecture, combining Eastern with Gothic characteristics and

abounding in decorative detail; it has, as you see, a lower portico and above it an open loggia with tracery decorations and at the top the Sala del Gran Consiglio with traditional crenellations.

The features of these two buildings one can see reproduced with many variations all over the city. That is one of the explanations of the homogeneity of the architecture of Venice. Another is the deeply conservative instinct of the Venetians, whether official guardians of monuments or simply private citizens. Here you see the Palazzi Farsetti and Loredan, formerly private dwellings but which now house the Municipality. As you see from the close-up on the right, both buildings are dominated by the Byzantine arch. Although an even older palazzo, the Cà da Mosto, still a private dwelling, shows in its arches a discreet flirtation with a later style in the cusp at the apex of the arches on the piano nobile.

On the other side you see a group of well-restored palazzi which use both types of arch. The Palazzo Grimani on the left is Lombardesque and therefore early Renaissance, the Querini-Dubois is featureless and the Bernardo on the right is Ducal Palace Gothic.

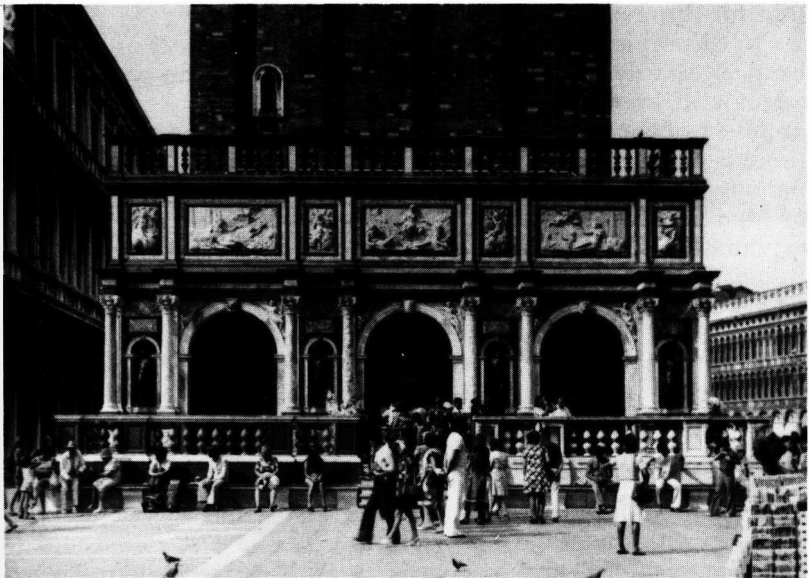
Reverting to the cusped arch which we saw on the Cà da Mosto, from these photographs you can detect the most likely way in which the Venetian taste could have evolved into a taste for the pointed arch. This is to say, that the ogee arch which is most common in Venice came about as a result of a decorative rather than a structural evolution: it was not the result of a search for an ever bolder equilibrium, as in territories further West, but an architectural embellishment. And here are two palazzi which whole-heartedly embraced the Venetian Gothic style; the Cà d'Oro, a 15th Century rebuilding of a much earlier palazzo which was indeed completely gilded, and the Cà Foscari, the private house of the Doge Francesco Foscari, who had the longest reign in the history of the Republic. This palazzo is now the headquarters of the University.

It was during Francesco Foscari's term of office (from 1423 to 1457) that the zenith of Venetian Gothic was reached in such monuments as the Porta della Carta, the highly ornamental entrance to the Doge's Palace which, as we know from the famous picture of a procession in the Piazza S. Marco by Gentile Bellini, was covered in gold picked out in blue and red. But already in the adjoining Foscari Arch, begun by Bartolomeo Bon and completed by Antonio Rizzo, there is evident the beginning of a transition to the classical Renaissance style, though with a backward glance at the architecture of the Basilica of St. Mark. Perhaps that is what Ruskin meant when he said that the awakening of interest in the classical style caused the thoughts of Venetians to turn back to Byzantium. Rizzo was also responsible

for the Giants' Staircase and most of the East wing.

The impulse towards the Renaissance style came from a Lombard, Pietro Solari known as Pietro Lombardo, and from a Bergamesque, Mauro Codussi. Lombardo was initially a sculptor and I daresay many of you think of him first as the author of the magnificent memorial to the Doge Pietro Mocenigo in the Church of SS. Giovanni e Paolo. But he was also the designer and builder of S. Maria dei Miracoli and the Palazzo Dario, which, like so much early classical work in Venice, were encrusted in polychrome marble. Colour and decoration were prominent features of these early Renaissance buildings, as indeed they were in Florence. But the accent is specifically Venetian. You would not expect to find in Florence a building quite like this Church of San Michele on the cemetery island by Codussi, who also designed the Palazzo Vendramin-Calergi (now the Municipal Casino), the Churches of S. Zaccaria and S. Marco (now the Municipal Casino), the Churches of S. Zaccaria and S. Maria Formosa, as well as the Scuola di S. Marco (now the Municipal Hospital).

However, it was a Florentine, Jacopo Sansovino, who in the 16th Century profoundly influenced the development of classical architecture in Venice and, incidentally brought it much closer to the European norm. He had fled from Rome when it was sacked in 1527 and he became the head architect at St. Mark's, known to this day as the "proto". He is very much in evidence in the Piazza



Designed by Jacopo Sansovino: The Loggetta at the base of the Campanile in St. Mark's Square. (Photo: Superintendancy of Venetian Monuments).

di S. Marco: the little Loggetta at the base of the Campanile was his, he must have had a say in the rebuilding of the Procuratie Vecchie designed by Bartolomeo Bon, and his masterpiece, the Marcian Library, which he did not live to see completed, stands on the Piazzetta opposite the Doge's Palace. Almost equally influential was another very great non-Venetian architect, Andrea Palladio, the creator of S. Giorgio Maggiore and of the Redentore. Although the bulk of his work was done outside Venice, at Vicenza and in the Veneto, his influence on other Venetian architects was lasting and profound.

Venetian Architecture in the 17th Century was less idiosyncratic than in previous centuries. But Venice was fortunate in securing once again talent from outside, notably in the person of Baldassare Longhena, who was responsible for completing and realising the designs of Codussi for the Procuratie Nuove, for Cà Pesaro and several other palaces. But his major contribution to the physiognomy of Venice was S. Maria della Salute. After his death Venetian architecture tended to deteriorate from baroque into rococo and fussiness, such as you see in the façade of S. Moisè. But largely under the continuing influence of Palladio it regained a degree of credibility in the 18th Century, the last century of the Republic. It did produce one distinguished architect, Giorgio Massari, who built the Pietà, the Gesuati and Palazzo Grassi. It was nevertheless clear that the great days of Venetian architecture were moving to a close. I must leave it at that for this evening.

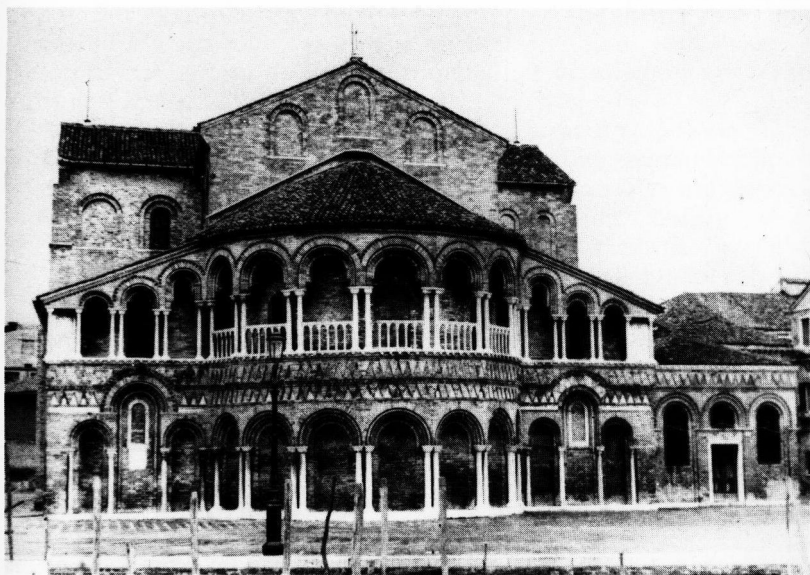
In this rapid summary of the architectural history of Venice I have necessarily left out the names of many Venetian architects of talent and even—in the case of Sanmicheli, for example, the architect of the prodigious fortress of S. Andrea—of genius. But there is another point. Some of you may wonder why in all this panoply there is no Romanesque to compare with the Cathedrals of Modena or Pisa: Vézelay or Aix: Romainlôtier or Ely. The explanation seems to me to lie in the close affinity between the Byzantine and Romanesque styles. Both owe their origin to Rome and use the rounded arch but they were developed in the one case by Greeks and in the other by Western Europeans—"Latins", Ruskin calls them.

The difference in the manner of using the rounded arch lies, of course, in the Romanesque arch being strictly semi-circular while the Byzantine arch is normally stilted. Here on the left you see the Fondaco dei Turchi before restoration (it was the Turkish mediaeval emporium). You will note that it has a great deal in common with the non-Venetian buildings I have just mentioned. The comparison is perhaps even more instructive when you see the Fondaco dei Turchi as it was restored in the late 19th Century. This does point up the similarities and divergences of

the two styles. But it is almost a text-book example of how not to restore an ancient monument, because an academic reconstruction has obscured its antecedents and perennial character. The 18th or 19th Century restorer, confident in his superior knowledge of what a particular style required, did not recoil from "improving" an object by over-painting, adding missing elements to a sculpture or amplifying the architecture of a building.

Nowadays, in restoring a work of art or a piece of architecture our object is to eliminate noxious elements, then to consolidate it and protect it for the future. We do not aim primarily to beautify it or aspire to supply elements lost in the course of time. But we of course rejoice if our action has served to make it more legible and perhaps to reveal the original intention of the artist or architect who created it.

Here is another piece of over-restoration done in 1887. The original church of S. Donato in Murano was built in the late 7th Century but underwent a complete rebuilding in the 12th Century and was badly mis-handled by one of its incumbents in the 18th Century. It is a Basilica in the Byzantine tradition and has been lately very well restored internally—particularly the mosaic floor of which you can see two details—immortality partaking of the Eucharist and vigilance getting the better of guile. Though my strictures on over-restoration apply to this case, it is at least interesting to see how the restoration served to



A Basilica in the Byzantine tradition which has suffered from over-restoration: San Donato in Murano.

emphasise the affinity of the style with Romanesque. Indeed, one can argue that other monuments as well known as these have much in common with that style. I know people who maintain that even St. Mark's is basically Romanesque.

I have left myself very little time to speak of some specific monuments restored by my two Funds. In a week's time it will be exactly fifteen years since the terrible disaster which inundated Florence and Venice and brought these Funds into existence. We soon discovered that the problems of Venice were more durable and more serious than those of Florence and at an early stage our whole attention was directed towards helping Venice. The Americans and the French were, like us, early in the field and we have since been joined by some thirty other similar Funds, both Italian and international, supported almost exclusively by voluntary contributions from the public.

Our own first comprehensive restoration was at the Madonna dell' Orto where we had our first experience of re-building the whole of the lower part of the walls, mostly to a height of between 4 and 5 feet but in some places to a height of as much as 12 feet, with the insertion of a lead damp course. The Venetians have an age-old technique for this called *scuci cuci* . . . The principle of a conventional damp course (using lead as the isolating material) was not unknown in Venice but to the best of my knowledge, this was the first time that it had been applied to the entire fabric of a major building.



Madonna dell' Orto in 1969 after restoration by the International Torcello Committee.
(Photo: Superintendancy of Venetian Monuments).

When we started at the Madonna dell'Orto we also wanted to clean and consolidate the twenty three statutes in Istrian stone on the façade; the roof was reasonably sound; we knew that on the inside we should have to renew the electrical system and the lighting as well as the intonaco (plaster) on the walls and make good all the windows. What we did not know was the work we should need to do on the Valier Chapel and—much worse—that we should need to take up the marble floor through which damp was penetrating into the church. Except for fragments of two earlier floors, there was nothing underneath but damp earth. On the other hand, we had an undertaking from the Superintendent of the Works of Art that, in return for our substantial part in setting up the great painting laboratory at S. Gregorio he would restore the eleven Tintoretts in the church.

By the time we had damp-proofed the floor with gravel, concrete and vermiculite we became aware that not only money but time was running out, because it also became evident that we could only hope to restore the statues on the facade as long as the scaffolding of the major contractor remained up. In the end we received permission from the Superintendent of the Monuments when it was too late to do more than restore the big statue of St. Christopher with the Child on his shoulder.

I mentioned earlier the general principles on which our restoration activities are based. While not exactly contesting them, our Italian friends sometimes have reservations about them. For example, they have long accepted the theory that time confers on a work of art a patina which inevitably enhances its aesthetic value and should be touched, if at all, only with the utmost delicacy.

Take this statue. The Superintendent argued that these black streaks added chiaroscuro to the sculpture and interest to the face. We argued in return that if we did not remove what was merely dirt covering sulphation the figure would before long disintegrate. When we were finally allowed to treat the statue it seemed to us that the artist's intention *was* more clearly revealed but above all that the statue could now look forward to a much longer lease of life. The other figures we could not treat for lack of money. So the Superintendent's other cherished patina remains particularly on the figure representing Faith under the topmost pinnacle.

The same principles guided us in dealing with this monument, the Loggetta of Sansovino, at the base of the Campanile of St. Mark's. Here we were more fortunate. This small but very characteristic monument was designed by Sansovino in 1540. It reflects the architecture of the lower part of the façade of St. Mark's and comprises, besides Istrian stone, five different types of marble. It needed a new lead roof; the bronze

figures needed no more than a good clean; but the Istrian stone of the large and small reliefs as well as the decorative marbles were badly polluted by sulphur dioxide in the atmosphere. The restoration work was carried out under the guidance of Mr. Kenneth Hempel by Miss Julia Musumeci and with the help of apprentices whom she trained in the new techniques. When cleaned, protection of the Istrian stone consisted in the application of a form of cosmolloid wax which repels water; while a more effective form of protection could be given to absorbant material by impregnating it with a silicone-based resin.

Opposite the Loggetta is the Porta della Carta of which I spoke earlier. It is the work of Bartolomeo Bon. The restoration of this monument was a major operation lasting three and a half years. It was master-minded and periodically supervised by Mr. Kenneth Hempel and Julia Musumeci (now Mrs. Hempel as they got married after completing the Loggetta). The work was done by the young people they had trained. On the left you see the Porta della Carta some years before restoration: on the right after restoration. Here is an important detail, a bust of St. Mark in porous saccharoidal marble, which illustrated the effect of sulphation. The losses on the nose and forehead are the result of a weakening of the surface. The bust has been cleaned consolidated and impregnated with a silicone-based resin.

Here is the very beautiful figure at the summit representing Venice as Justice. This figure is in Carrera marble but is seated on two lions of Istrian stone. Consequently, it was possible to apply to her, as to the statues removed from the niches to the laboratory in the Doge's Palace, a new technique of impregnation within a vacuum.

At SS. Giovanni e Paolo we are restoring the great stained glass window, the work of Mocetti and Alvisè Vivarini. The Superintendent of the Monuments has entrusted this work to a famous restorer from Bologna named Nonfarmale. Although his experience has so far been confined to painting and stone in which areas he is undoubtedly highly regarded, he has for some time been associated with the Chartres stained glass restorers in their laboratory at Champs sur Marne. We believe that at our laboratory inside the church he is making good and cautious progress.

Finally, I must mention what we regard as our masterpiece, the restoration of S. Nicolò dei Mendicoli. The church has antecedents going back to the 7th Century but the building you see here is basically a reconstruction of the 12th Century in the Venetian Byzantine style. Its exterior is undistinguished but inside it is one of the most engaging in Venice. Apart from fires, earthquakes and other natural disasters it was one of the churches closed, though luckily not actually demolished, by the French



Venetian Byzantine: The Church of San Nicolò dei Mendicoli, nave and iconostasis.

when they conquered Venice in 1797. Its long closure and neglect during the 19th Century caused great damage, which an extended restoration in the early years of the century failed to remedy altogether. Its condition when we took over was pitiful indeed; and, surrounded on three sides by canals, it was seldom free of stagnant water inside during the winter. This is a picture of the interior after restoration; the roof, the fabric, the floor have been put to rights, the church is now damp-proof, the polychrome gilded statues and parcel gilded decorations are all restored and the pictures mostly by Dal Friso, pupil of Paolo Veronese, have been cleaned. The statues round the nave and in the chancel date from the end of the 16th Century but this representation of St. Nicholas himself is much older: from the archives in the church his date would appear to be 1437.

In conclusion, a word about the physical problems of Venice—or rather about the two most obvious ones, namely the sinking of the city and the *acqua alta* (high water).

Venice has been sinking for centuries, but only very slowly—barely one millimetre a year—up to the 1930's, when the speed of sinking suddenly started to increase. In creating the industrial zone in 1931 Count Volpi, though with the best of intentions, disregarded the rule which should be graven on the heart of whoever wants to benefit Venice in any way whatever, namely, "Never try to solve one problem of Venice without taking into account the effects your solution may have on all the other problems." It was right to seek an economic outlet for the inhabitants of Venice: it was wrong to do so without properly considering whether that would affect the environment and ecology of the Lagoon area.

What happened so far as sinking is concerned was that since the water of the Lagoon is either salt or brackish and since no arrangements had been made to bring fresh water into the industrial zone, the industrial establishments drove a large number of artesian wells into the ground and assembled ever more powerful pumping machinery to ensure a supply of fresh water from the subsoil. The result was that the cushions of water on which, as I said earlier, the city rests, started to empty. That led in turn to subsidence because the aquifers or cushions of water are only very gradually replenished by water coming down from the mountains and percolating through the alluvial soil of the Lombard plain.

The remedy applied by the Italian authorities from 1970 onwards, namely to bring in fresh water from the rivers to the industrial zones and to shut down the vast majority of the artesian wells, has been very effective. If it has not stopped the sinking altogether it has at least reduced it to no more than it was a century ago.

The other problem — the acqua alta or excessive high tides — is proving more difficult from many points of view, not least because of the costliness of all the remedies so far examined. The solution of the sinking problem does not cancel the sinking that has already taken place. You will, I am sure, have worked out in your heads that one millimetre a year becomes 10 cm. (or 4 inches) in a century and 50 cm. (or 20 inches) in five centuries. Since there are three sea entrances to the Lagoon, that makes the city very vulnerable to wind, weather and other phenomena in the Adriatic. Varying on average from about twenty to thirty five days in the year the high tide exceeds one metre above the mean level of the sea. That may not sound very much to you: but in practice it means that the whole of Piazza S. Marco is flooded and if the excess is over 1.20 m. not only is there liable to be a foot or two of water in your hall but the smaller shops who have their stock-in-trade on the ground floor stand a good chance of losing it



Diagram map of the Lagoon of Venice.

all. On 22nd December 1979 the excess was 1.59 m. and on 4th November 1966 it was just under 2 m. On that occasion, under stress of the *scirocco* (south wind) the tide did not change for twenty hours.

Six years ago the Italian Government launched a competition for ways of controlling excessive high tides at the three entrances to the Lagoon. There were five competitors and all were unsuccessful. Two years ago a Commission of Experts was set up in Venice to try and conflate the five entries and produce an acceptable solution. The Commission has now done so and their proposal, which has received a favourable nod from the Minister of Works, is undergoing detailed consideration prior to submission to Parliament. It will cost some 400 milliard lire (about £180m). The principle of it is that a barrage will be built round each of the three entrances and in each there will be openings which in ordinary conditions will allow navigation to pass freely but which will be provided with sluice gates which can be brought into action when there is an early warning of a very high tide. That is at least a solution. But personally—and I stress the word personally—looking to the long term I am a bit sceptical. If the remedy is to be a lasting one I incline to the view that rather than confronting nature (as this does) it is better to try and harness nature. In the competition there was a proposal by a British firm which was outside the terms of reference and was therefore not examined. Nor was it seriously examined by the Commission of Experts. It consisted of a fully costed plan to raise the level of the entire city of Venice by a process of mud-jacking. I think that the Experts would have been on safer ground if they had considered this, not necessarily as an alternative but as a possible concomitant to their own plan.

I hope that nothing I have said this evening will deter any of you from visiting or re-visiting Venice. Compared with the pessimism with which my friends and I set out in 1966 to lend a hand, today the prospects look quite a lot brighter. And if you are thinking of reading about the architectural matters on which I have touched this evening may I commend to you two recently published books on which I have drawn freely in preparing this evening's talk: John McAndrews's *Venetian Architecture of the Early Renaissance*, published by the Massachusetts Institute of Technology; and—easier to get hold of—*The Architectural History of Venice* by Deborah Howard and published by Batsford. I shall be happy to try and answer any questions you may wish to put to me and, in any case, thank you very much for your attention.