

Document, Monument, and Building Site. Piero Sanpaolesi and the Dome of Santa Maria del Fiore in the Twentieth-Century Culture of Architectural Restoration

Pierpaolo Lagani

pierpaolo.lagani@unifi.it

Dipartimento di Architettura, Università degli Studi di Firenze, Italy

opposite page

Fig. 1

Florence, Dome of Santa
Maria del Fiore seen
from below, October 1962
(photo by P. Sanpaolesi).
University of Florence,
University Library System,
Library of Technological
Sciences [UNIFI|SBA],
Photographic Archive of
Restoration – Florence, S.
Maria del Fiore, 90-17.

Abstract

Piero Sanpaolesi's long engagement with the Dome of Santa Maria del Fiore constitutes one of the most significant intellectual laboratories in the formation of twentieth-century Italian restoration culture. Rather than treating the Dome as a celebrated object within Brunelleschian historiography, Sanpaolesi approached it as a historical and material organism to be understood through the continuous interplay of documentary sources, direct observation of the fabric, and reconstruction of the building process. From his early studies of the 1930s to the later writings of the 1970s, the Dome became the site in which a specifically restoration-oriented form of knowledge took shape. This article retraces that trajectory by focusing on three major moments: the revision of the Brunelleschian myth and of the 1418-1420 competition documents; the widening of the inquiry toward Brunelleschi's technical culture, including statics, mechanics, and mathematical knowledge; and the later analysis of constructive problems such as curvature, the double shell, and the herringbone brick pattern. Read in this perspective, Sanpaolesi's work shows how architectural history may turn into an operative knowledge of the monument, capable of grounding conservation in the understanding of its material, structural, and historical reality. The Dome thus emerges not only as a major object of study, but as the place in which knowing the monument already becomes a form of care.

Keywords

Piero Sanpaolesi; Dome of Santa Maria del Fiore; Architectural restoration; Architectural history; Restoration culture.

In the field of twentieth-century studies on the Dome of Santa Maria del Fiore, the work of Piero Sanpaolesi occupies a prominent position, not only for the broad chronological span of its development, but above all for the manner in which the monument is interrogated. From his earliest contributions in the 1930s to his later reflections in the 1970s and 1980s, the Dome never appears, in his writings, as an isolated episode within the Brunelleschian narrative, nor as a finished object susceptible of a definitive historiographical judgment. It is



opposite page

Fig. 2

Florence, Dome of Santa Maria del Fiore: Piero Sanpaolesi illustrates the herringbone brickwork (spinapesce) inside the space between the two shells of the Dome, 1977 (photo by A. Bartolozzi). UNIFI|SBA, Photographic Archive of Restoration – Florence, S. Maria del Fiore.

configured, rather, as a veritable laboratory, in which the reassessment of the sources, the direct observation of the building fabric, and the analysis of constructional procedures contribute not only to the historical reconstruction of the Dome, but also to the definition of a way of knowing it (and recognizing it) that, even prior to any intervention, orients its conservation¹.

A considerable portion of the critical reception of these studies has focused, on different occasions, on individual thematic nodes. Less frequent, by contrast, has been the attempt to consider them as stages within a unified trajectory, in which the Dome becomes the site for the elaboration of a method². It is precisely from this perspective that Sanpaolesi's writings reveal their greatest originality: they do not merely correct the biographical tradition of Manetti and Vasari³ (Giari, 2021; Barocchi, Bettarini 1966), nor do they merely clarify attributional questions that had remained open since the edition of the archival sources in the mid-nineteenth century (Guasti, 1857; Doren, 1908; Fabriczy, 1892). Rather, they progressively shift the focus from the masterpiece as an object of celebration to the built fabric as a historical and material organism, to be understood in the *longue durée* of its technical premises, its construction site, and its static behaviour⁴.

Read from this perspective, the corpus of Sanpaolesi's studies on the Dome takes on a significance that exceeds their albeit highly significant contribution to Brunelleschian historiography. Within them there emerges a form of knowledge of the monument that aligns with a central principle in the culture of architectural restoration: the reading of the monument as document, as the foundation of the design project. (Caccia Gherardini, 2025). Document, monument, and building site are not three distinct planes, but three dimensions of a single cognitive practice. From their interweaving arises a reading of the

Dome freed both from the rhetoric of the isolated genius and from a purely formalistic explanation, and restored to a history made up of constructional continuities, of autoptic verifications on the artefact, of *longue durée* technical transmissions, and of interpretative responsibilities that jointly involve the scholar and the monument.

It is no coincidence that, in his more mature writings, in which Sanpaolesi interrogates the cracks in the building fabric, its centuries-long settlements, and its overall stability, the tools forged over decades of historical research are not set aside, but reoriented: the very knowledge that had made it possible to reconstruct the way in which the Dome had been built now offers itself as the necessary basis for revealing its behaviour over time and for guiding its conservation (Sanpaolesi, 1977; 1980). It is in this shift of function, rather than in a change of object, that the profound continuity of Sanpaolesi's trajectory is measured, together with his capacity to transform a historical study into a critical practice of architectural restoration.

The trajectory that leads Sanpaolesi from the historiographical reassessment of the 1930s to the reflections on conservation of the 1970s does not, therefore, coincide with a simple shift of interests from one disciplinary field to another. What can be discerned within it, rather, is the coherent deepening of a single problem: how to know the historical monument in its material and constructional reality, and how to ground, upon such knowledge, any credible discourse on its conservation. The Dome, from this point of view, is not merely one of the principal themes of his research, but the site in which that problem allows itself to be observed with particular clarity, to the point of making the Brunelleschian building fabric one of the most significant milestones in the formation of a modern culture of architectural restoration.

¹ The theme of the Dome accompanies Sanpaolesi throughout the entire span of his career, from 1936 to 1980. Among the extensive published bibliography on the subject, the principal contributions include Sanpaolesi 1936, 1941, 1962, 1972, and 1980; for a first comprehensive survey of these writings, cf. LAGANI 2025.

² Sanpaolesi's extensive critical reception, however, is accompanied by no small number of objections. After 1941 his name becomes an obligatory point of reference in studies on the Dome, but it is especially in the later literature that his work is repeatedly called into question (see, among others, COOLIDGE 1952; LUPORINI 1964; PRAGER, SCAGLIA 1970; RAGGHIANI 1977; SAALMAN 1980; DI PASQUALE 2002).

³ According to Sanpaolesi, Brunelleschi "ha avuto la fortuna, e insieme la sfortuna, che il suo contemporaneo Manetti ne abbia scritto la vita, lasciandola però incompiuta" [had the fortune, and at the same time the misfortune, that his contemporary Manetti wrote his life, leaving it, however, unfinished], so that Vasari "fece affidamento per la sua biografia" [relied for his biography] on that partial and ideologically oriented testimony, ultimately "ripetere ampliata ogni leggenda" [repeating every legend in an amplified form] (SANPAOLESI 1936, note 1, p. 321). All translations are by the author.

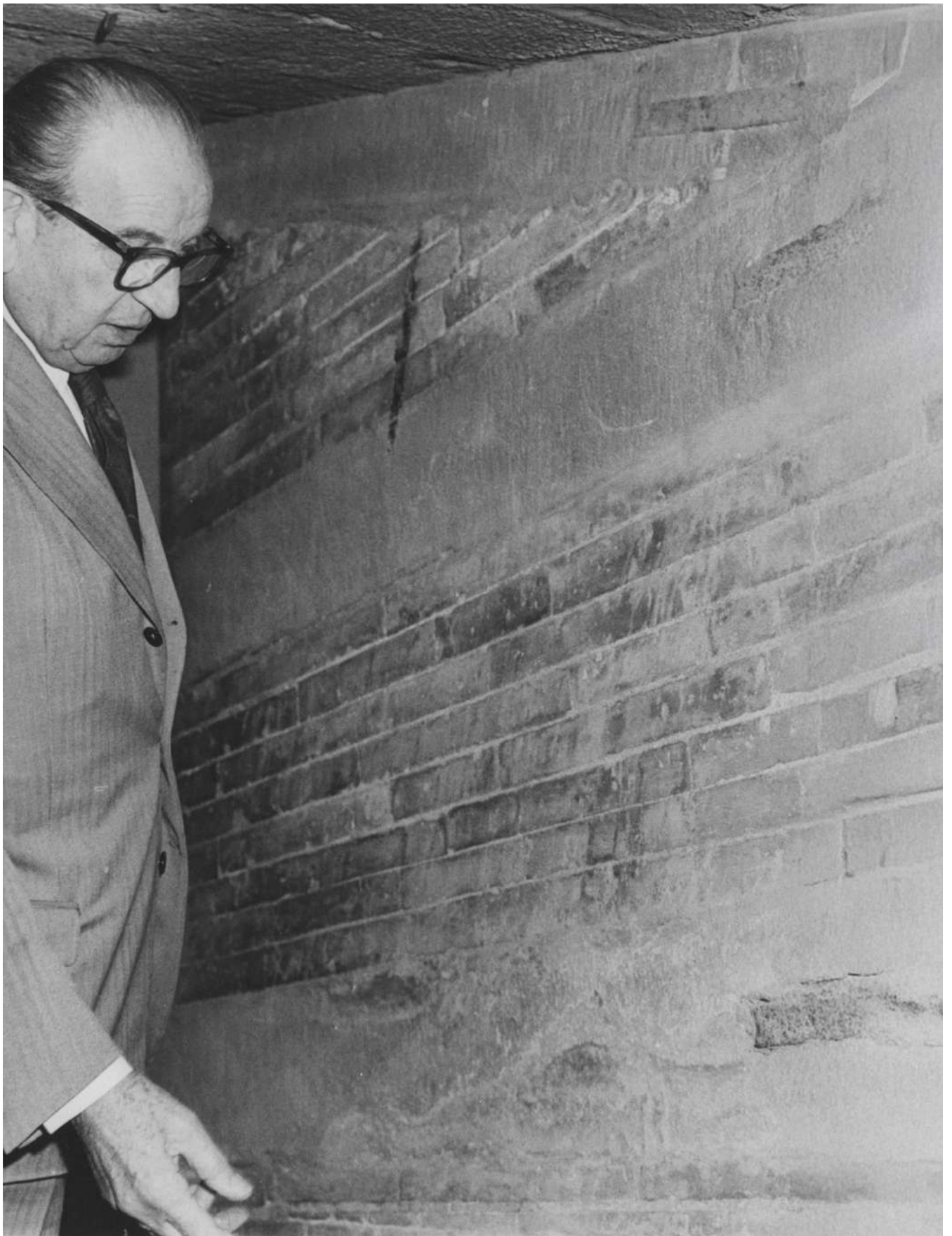




Fig. 3
Florence, Dome of Santa Maria
del Fiore, cracks on the intrados
of the Dome. (University of
Florence, Department of
Architecture, Piero Sanpaolesi
Private Archive [APPS],
Major Works, Brunelleschi,
Faldone Opere Brunelleschi
2 Foto Brunelleschi,
Inserto III, fascicolo 1.)

The Dome between Myth and Construction

When Sanpaolesi first addresses the theme of the Dome, the historiographical field he encounters is anything but free. It is, on the contrary, a terrain crowded with sedimented interpretations, with legends transformed into facts, and with documents read, as the scholar himself would observe, “non rettamente e completamente” [not correctly and completely] (Sanpaolesi, 1936). The fifth centenary of the closing of the Dome, celebrated in Florence in 1936, provides the institutional occasion within which his first contributions are inscribed, but also the framework within which the distance of his research from the dominant disciplinary climate is most clearly measured⁵.

In the inaugural address of the *I Congresso Nazionale di Storia dell'Architettura* [First National Congress of the History of Architecture], the Dome is adopted by Gustavo Giovannoni as a symbol of the Rome-Renaissance continuity, in markedly rhetorical and identitarian tones (Resoconti, 1938). Within this framework, the Brunelleschian building fabric is called upon to bear a significance that is no longer merely architectural, but disciplinary and political: a sort of ultimate proof of the Italian continuity of great construction⁶.

The contribution *Il concorso del 1418-20 per la cupola di S. Maria del Fiore* [The 1418-20 competition for the dome of S. Maria del Fiore] (Sanpaolesi 1936) and the first monograph on the subject, *La cupola di Santa Maria del Fiore: il progetto, la costruzione*

⁴ According to Sanpaolesi, the documents published by Cesare Guasti in 1857 “non sono stati rettamente e completamente usati dagli studiosi” [have not been correctly and completely used by scholars] (SANPAOLESI 1936, note 1, p. 321). The problem, it should be noted, is not a lack of sources: it is their distorted interpretation, which Sanpaolesi attributes directly to the long shadow cast by the biographical tradition.



[The Dome of Santa Maria del Fiore: The Design, the Construction] (Sanpaolesi, 1941), assume, in this context, a significance that exceeds mere erudite correction. Sanpaolesi's position does not present itself as a frontal polemic, but as a methodological revision that, in its effects, redefines the field. The Dome can no longer be reconstructed solely on the basis of the biographical tradition of Manetti and Vasari, whose narrative is now legible as a document of a culture, not as a mirror of the constructional history (Sanpaolesi, 1936; Sanpaolesi, 1941). At the root of this divergence lies a methodological statement that Sanpaolesi delivers to the reader with unusual clarity. "È ciò che ho cercato di fare in questo scritto" [This is what I have tried to do in this essay], he writes, "che ho condotto sui documenti pubblicati dal Guasti, dal Doren e dal Fabriczy, oltre che su osservazioni e confronti diretti del monumento" [which I have based on the documents published by Guasti, Doren, and Fabriczy, as well as on direct observations and comparisons of the monument] (Sanpaolesi, 1936, p. 322). This sentence already indicates the three levels on which the research will be built: the philology of the published sources, the critique of the biographical traditions, and direct verification on the monument – a triad that in later writings will be enriched by the systematic reference to the building site, recognised as a veritable laboratory of knowledge. The competition of 1418-1420 represents the first testing ground for this new approach. The documents published by Guasti in 1857 and taken up again by Doren in the early twen-

Fig. 4
Florence, Dome of Santa Maria del Fiore, cracks on the intrados of the Dome, detail of a course of herringbone brickwork (spinapesce). (University of Florence, Department of Architecture, APPS, Major Works, Brunelleschi, Faldone Opere Brunelleschi 2 Foto Brunelleschi, Inserto III, fascicolo 1.)

⁵ The *I Congresso Nazionale di Storia dell'Architettura* [First National Congress of the History of Architecture] was held from 29 to 31 October 1936 in the Salone dei Dugento at Palazzo Vecchio, in Florence. The initiative was promoted by the committee for the celebrations in honour of Filippo Brunelleschi, established by the Podestà of Florence, Count Paolo Venerosi Pesciolini. The Podestà appointed an organizing com-

Fig. 5

Piero Sanpaolesi, Appunti sulla cupola brunelleschiana della cattedrale di S. Maria del Fiore a Firenze [Notes on the Brunelleschian Dome of the Cathedral of S. Maria del Fiore in Florence]. (University of Florence, Department of Architecture, APPS, Major Works, Brunelleschi, Faldone Opere Brunelleschi 1, "L'architettura pisana dalle origini. L'architettura bizantina. La facciata di S. Maria del Fiore. Dissesti Fondali. Considerazioni su Arte nel rinascimento. Strutture a cupola autoportanti" ["Pisan Architecture from Its Origins. Byzantine Architecture. The Façade of S. Maria del Fiore. Foundation Settlements. Considerations on Renaissance Art. Self-Supporting Dome Structures"], Inserto III, fascicolo 1, plico 18.)

mission composed of prominent figures from the academic and institutional world of the time, among whom Gustavo Giovannoni stands out as president of the commission.

⁶ The year 1936 – the year of the proclamation of the Empire and of the autarkic turn – marks the point of maximum consensus for the Fascist regime, also in terms of cultural control. It is in this climate that the *I Congresso Nazionale di Storia dell'Architettura* [First National Congress of the History of Architecture] is held, whose introductory address by Giovannoni constitutes the ideological framework within which Sanpaolesi's contributions in the five-year period 1936–1941 are situated.

tieth century had been absorbed into a narrative that continued to filter them through Manetti and Vasari (Guasti 1857; Doren 1908; Fabriczy 1892). Sanpaolesi restores their true procedural physiognomy, with meticulous adherence to the archival record: the Opera's notice of 19 August 1418 is not the designation of an anticipated winner, but the formal opening of a public competition. The competition does not certify an already established superiority: it constructs it, by degrees, through technical and administrative steps that involve multiple actors and produce progressive decisions. It is within this movement that the relationship between Brunelleschi and Ghiberti undergoes its most profound revision. The joint appointment as provveditori, the identical monthly salary, the equivalence of the extraordinary payments of 1420, and above all the expert report of 1420 – rediscovered by Doren in 1909 as a collegial notarial act – document a condition of formal parity that cannot be reduced to an administrative expedient⁷.

"Il progetto della Cupola quale noi la vediamo" [The design of the Dome as we see it], writes Sanpaolesi, "è, sia per la forma sia per la struttura, opera di ambedue gli artisti" [is, both in form and in structure, the work of both artists] (Sanpaolesi, 1936, p. 333). This is not a matter of replacing one myth with another, but of recognising that the history of the Dome is not the scene in which a single brilliant individual prevails over the others, but rather a complex institutional process, involving craftsmen, provveditori, consultants, and the decision-making bodies of the Opera. This redefinition of the authorial profile is accompanied by the repositioning of the Dome within its own *longue durée* design horizon: the octagonal plan, the height of the drum, and the pointed-fifth curvature itself are all elements deriving from an earlier design, traceable to the Arnolfian conception and its subsequent fourteenth-century elaborations, in particular to the role of Giovanni di Lapo Ghini⁸ (Sanpaolesi, 1941).

The decade following the 1941 monograph represents, on the surface, a phase of latency. Beneath the surface of this dispersion, however, a decisive movement takes shape. What had remained implicit in the research of the 1930s – the idea that the Dome could not be explained simply as the outcome of a design history, but required an investigation into the technical and intellectual conditions that had made it possible – begins to become an explicit question. The turning point is legible in the essay *Ipotesi sulle conoscenze matematiche, statiche e meccaniche del Brunelleschi* [Hypotheses on Brunelleschi's Mathematical, Static, and Mechanical Knowledge], and finds its fulfilment in the monograph *Brunelleschi*, published in 1962 (Sanpaolesi, 1951; 1962). The knowledge postulated in these pages are neither vague attributes nor individual talents, but an articulated set of verifiable forms of knowledge: mathematics as an operative instrument, statics as an intelligence of equilibrium, mechanics as the theory and practice of lifting. The Dome ceases to be an isolated miracle and becomes the point at which a specific technical culture finds its most demanding application. It is here that the notion of *sodezza* [solidity] is introduced, designating that quality of construction in which formal coherence and structural stability coincide, and which makes it possible to overcome the historiographical opposition between beauty and resistance. The reference to Giovanni dell'Abbaco, already present in the 1951 contribution, indicates that the Dome does not arise from a mathematically intuitive genius, but from a culture in which measurement, calculation, and proportion were everyday operations, taught in the abacus schools. The intelligence of the building fabric thus ceases to be an individual property and becomes the most refined manifestation of a collective knowledge, available within the Florentine milieu of the early fifteenth century⁹.

opposite page

Figs. 6a-b
Florence, Dome of Santa
Maria del Fiore, brickwork
of the outer shell. (University
of Florence, Department of
Architecture, APPS, Major
Works, Brunelleschi, Faldone
Opere Brunelleschi 2 Foto
Brunelleschi, Inserto III,
fascicolo 1, plico 21.)

⁸ Giovanni di Lapo Ghini, a figure systematically obscured by the historiography that had elevated Brunelleschi to the status of solitary founder of the Renaissance, is for Sanpaolesi the necessary mediator between the Arnolfian design and the building site of 1420: to him is owed, when static problems became prevalent, the preparation of a model of the armature for the Dome, and the responsibility for a drum built “tale da sopportare un edificio di grandi dimensioni” [such as to bear a building of large dimensions]. Its material execution was entrusted to Giovanni d’Ambrogio, who led the construction of the drum up to the large put-log holes, part of the 1367 project and rediscovered, as decisive material evidence, in the surveys conducted by Sanpaolesi himself in 1936. The Brunelleschian building site of 1420 does not, therefore, represent an absolute beginning, but the resumption of a constructional design already largely defined in the previous century.

⁹ On the Florentine abacus culture and on the role of mathematicians alongside the master builders – notably Giovanni dell’Abbaco, who was remunerated as early as 1417 “per sua faticha e chonsiglio sopra Chupola maggiore” [for his labour and counsel on the great Dome] – cf. SANPAOLESI 1951, pp. 34–46, and GUASTI 1857, docs. 23, 46, 60.

monument: the contracts of 1420 speak of a pointed-fifth arch, and to a pointed-fifth arch point both the autoptic observation of the masonry lifts and the geometric restitution of the springings, yielding the value of $4/5$ between radius and half-diameter of the springing as the interpretative key to the profile (Sanpaolesi, 1977). At the centre of the controversy lies, in reality, a question of method: namely, whether photogrammetry, applied to a monument such as the Dome, can on its own reconstitute the design geometry, or whether, in order to be correctly interpreted, it requires systematic comparison with the other available sources¹⁰. On a different plane, but with convergent outcomes, moves the long reflection on the double shell, read as the solution that makes it possible to transform the lateral thrust of the great dome into a condition of predominantly vertical compression. It is within this configuration that Sanpaolesi’s celebrated judgment concerning the structure that “pesa e non spinge” [weighs and does not thrust] on the masonry of the drum finds its most precise meaning: the synthetic formulation of a *longue durée* constructional principle, whose Roman matrix Sanpaolesi has always defended (Sanpaolesi, 1941; 1971). It is at this point that the herringbone brickwork [*spinapesce*] enters the scene, the theme on which Sanpaolesi’s research achieves its densest concentration. The herringbone arrangement of the bricks, already recognised in the writings of the 1930s as an observational datum on the building fabric, is now subjected to an analysis that completely redefines its status. It is neither a bonding motif nor a decorative artifice: it is a veritable structural device, which allows the masonry to be self-supporting during construction, drastically reducing the reliance on timber centring. The vertical bricks, arranged at progressively tighter intervals towards the summit, act as ‘*spalle*’ [‘shoulders’] that clamp the horizontal courses, transforming each stretch of masonry into a sequence of small arches capable of sustaining themselves during the intermediate phases of the building site (Sanpaolesi, 1971; 1972). Onto this structural reading Sanpaolesi grafts, in the essays of 1971 and 1972, the hypothesis of broader scope: namely, that the specific herringbone coursing with which the Brunelleschian

Dome is built is “di provenienza e d’origine persiana” [of Persian provenance and origin] (Sanpaolesi, 1972). The reference is to the vast horizon of self-supporting domes widespread in the Iranian area, and in particular to the mausoleum of Öljaytū at Soltaniyeh. The hypothesis is not without precedent: already Giovannoni, in 1936, had evoked – in order to contest them – “partigiani d’oltralpe” [partisans from beyond the Alps] who maintained the Oriental origin of the Dome, and his reaction makes it possible to gauge, in retrospect, how long a road this thesis – dismissed, in the official discourse of the fifth centenary, as a politically suspect deviation – had already travelled (Resoconti 1938). The orientalist hypothesis, therefore, does not arise in 1971 as an isolated intuition, but presents itself as a critical, technically grounded reworking of a pre-existing historiographical line. The relationship between the two lineages – the Roman one of the double shell and the Persian one of the herringbone brickwork – is not to be understood as alternative: Sanpaolesi does not replace one hypothesis with the other, but recognises that the monument is the point at which multiple technical traditions meet and integrate, because within the technical culture of the Florentine Quattrocento there coexisted the intellectual and operative conditions that made it possible to recognise them, elaborate upon them, and put them to use¹¹.

It is within this constellation of problems that Sanpaolesi’s method reveals its full maturity. The curvature is not merely a geometric datum; the double shell is not



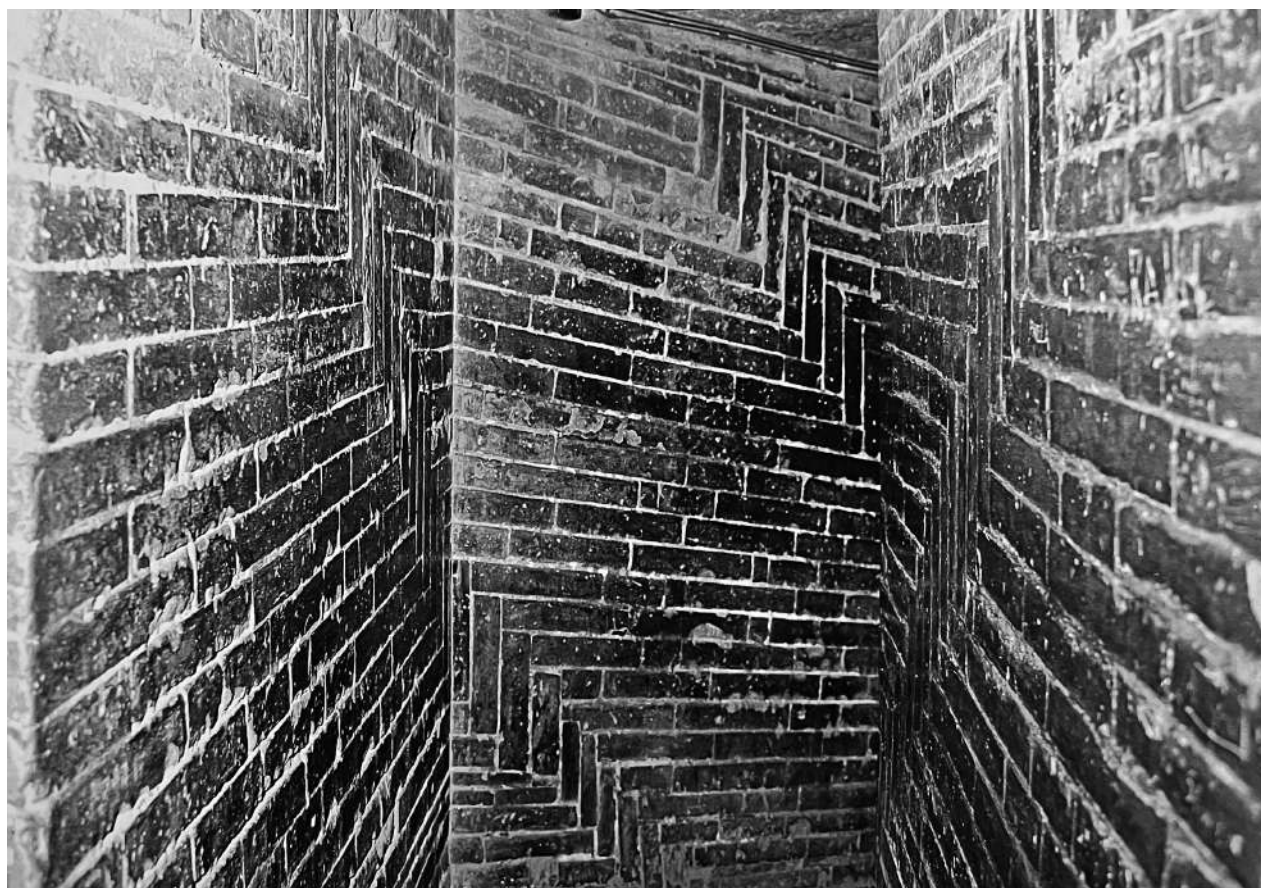
merely a static scheme; the herringbone brickwork [*spinapesce*] is not merely a masonry texture. Each of these elements becomes, in the course of the investigation, a node in which the three planes of research – the document, the monument, the building site – interweave to the point of becoming indistinguishable. It is within this interweaving that the further shift is prepared: the one that, in the contributions on conservation of the 1970s, leads research on the Dome to become something different from, and at the same time more demanding than, a constructional history. It is the passage in which, without any break in continuity, knowledge of the monument begins to question itself about its own responsibility towards it.

The Internal Laboratory of a Culture of Architectural Restoration

It is precisely on this interweaving that Sanpaolesi's work on the Dome is concretely measured: an interweaving that can be grasped with greater clarity not in the published pages, but in the working papers.

The *Archivio Privato Piero Sanpaolesi* [Piero Sanpaolesi Private Archive], held at the Department of Architecture of the University of Florence, preserves a nucleus of materials of particular significance for understanding the long elaboration of Sanpaolesi's thought on the Dome (Pisani, 2023). Here, too, is preserved the latest and most compact dossier of his reflection on the Dome: the papers relating to the unfinished monograph on Brunelleschi, whose final revision dates to between 1979 and the early months of 1980¹².

¹² The polemic is sparked in 1972 by an essay by Sanpaolesi and Birardi against *Il rilevamento fotogrammetrico della Cupola di Santa Maria del Fiore* [The Photogrammetric Survey of the Dome of Santa Maria del Fiore], carried out by Mario Fondelli (cf. Ferri et al. 1971); it then continues in the journal "Arte Viva" in the form of Letters to the Editor. Fondelli defends the elliptical/variable curve recorded by photogrammetric means, while Sanpaolesi and Birardi reiterate the distinction between the interpretation of the metric datum and historical-critical judgment; cf. FONDELLI 1972, 1973a, 1973b, and SANPAOLESI, BIRARDI 1972a, 1972b.



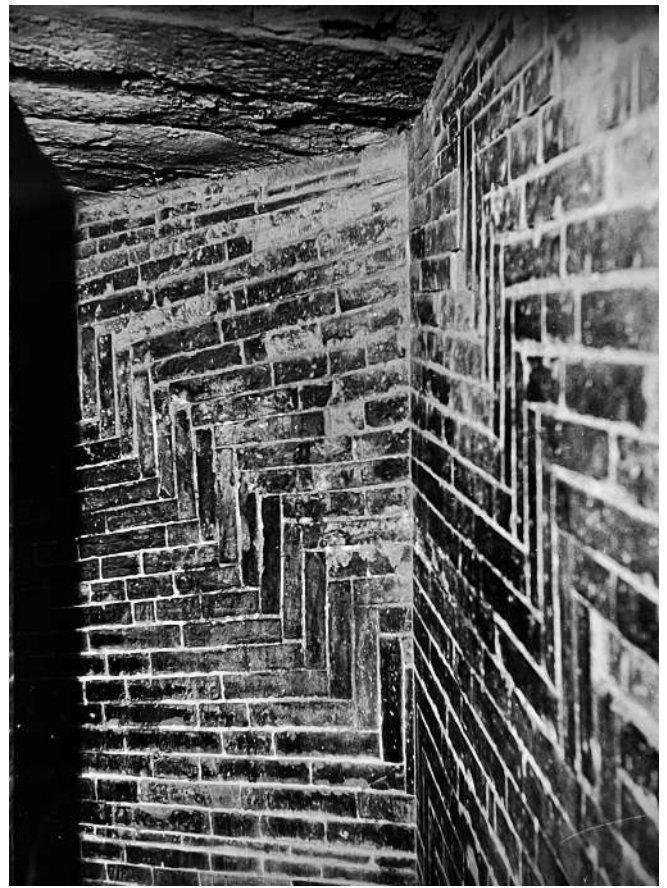
¹¹ This is one of the most interesting passages in the entire research on Sanpaolesi and on the historiography of the Dome, because it makes it possible to reconstruct a genuine genealogy of the oriental hypothesis. The proposal of 1971-72 is not an isolated intuition, but the critical and technically grounded reworking of an interpretative line that had already emerged – and been immediately rejected – in Giovannoni's official address of 1936, delivered, not coincidentally, in the year of the fifth centenary of the consecration of the Cathedral (1436-1936), the celebratory framework most exposed to the ideological control of the regime. Measuring the distance between that first polemical allusion and Sanpaolesi's systematisation makes it possible to appreciate how long the trajectory of the thesis had been: from a politically suspect deviation to a (more or less) argued hypothesis.

The value of these papers does not lie in replacing the published works, but in rendering more legible their substratum: not a set of scattered findings, but a coherent laboratory, in which document, monument, and building site are confirmed as the three planes of a single cognitive practice.

The papers show, first of all, that the revision of the Brunelleschian myth, already evident in the printed writings, is even more explicit in the later drafts. In the *Fascicolo Generalità e altro* [General Matters and Other], the Dome is defined, in a formula as simple as it is incisive, as a “mito sconosciuto” [unknown myth], precisely because its historiographical consecration had ultimately led scholars away from its “singoli edifici” [individual buildings] and, above all, from its “caratteristiche strutturali” [structural characteristics]¹⁸.

The statement clarifies with particular effectiveness the original core of the entire research: to free the Dome from its own rhetorical monumentality in order to restore it to a historical and constructional reading. From this perspective, even the question of the competition and of the co-authorship between Brunelleschi and Ghiberti, although reaffirmed in the papers with great clarity, no longer constitutes the centre of the discourse, but rather one of the stages in a broader reconstruction of the technical logic of the monument.

It is above all in the files dedicated to Brunelleschi's static and mechanical knowledge and to his technique that Sanpaolesi's most mature thought emerges. On the one hand, he insists, with a frankness that the published texts had tempered, on



the specificity of Brunelleschi's contribution in the field of statics: "Filippo s'è trovato dunque ad affrontare quasi da solo il grave problema statico della volta della cupola, perché è in questo aspetto, cioè nelle conoscenze di statica, che il Ghiberti viene meno" [Filippo thus found himself having to confront almost alone the serious static problem of the dome's vault, because it is in this respect – that is, in the knowledge of statics – that Ghiberti falls short]¹⁴.

On the other hand, however, this centrality is never bent in a heroic or mythographic sense, because it is immediately referred back to a broader problem: the relationship between technical experience, practical knowledge, and the choice of forms. In a passage that stands as a veritable epistemological declaration, Sanpaollesi warns that "a noi non è lecito adoperare per spiegare quei processi costruttivi le nostre attuali esperienze" [we are not permitted to use our present-day experience to explain those constructional processes], but that it is necessary to "ricostruire le esperienze di quegli operatori" [reconstruct the experience of those practitioners] without arbitrarily speaking of constructional "errori" [errors]¹⁵. Shortly thereafter, he specifies that "l'esperienza sensoriale e la responsabilità pratica possono condurre ad affrontare e trovare soluzioni ai problemi prima che sia possibile formulare nella sfera teorica il relativo sistema concettuale" [sensory experience and practical responsibility can lead to addressing and finding solutions to problems before it is possible to formulate the corresponding conceptual system in the theoretical sphere]¹⁶.

Figs. 7a-c
Florence, Dome of Santa Maria del Fiore, details of the herringbone brickwork (spinapesce) in the space between the two shells of the Dome, October 1970 (photo by A. Bartolozzi). UNIFI|SBA, Photographic Archive of Restoration – Florence, S. Maria del Fiore, 794-12, 796-12, A141-8.

¹² The files of Sanpaollesi's monograph on Brunelleschi and the Dome are not preserved as a single volume, but are scattered across various inserts in the archive: the first task was therefore one of a material order, prior to being an interpretative one, aimed at reconstructing its structure through internal cross-references and working reference marks. To this difficulty is added another, chronological one: the typescripts almost never bear a date, and require dating by clues and minimal traces of revision; it is pre-

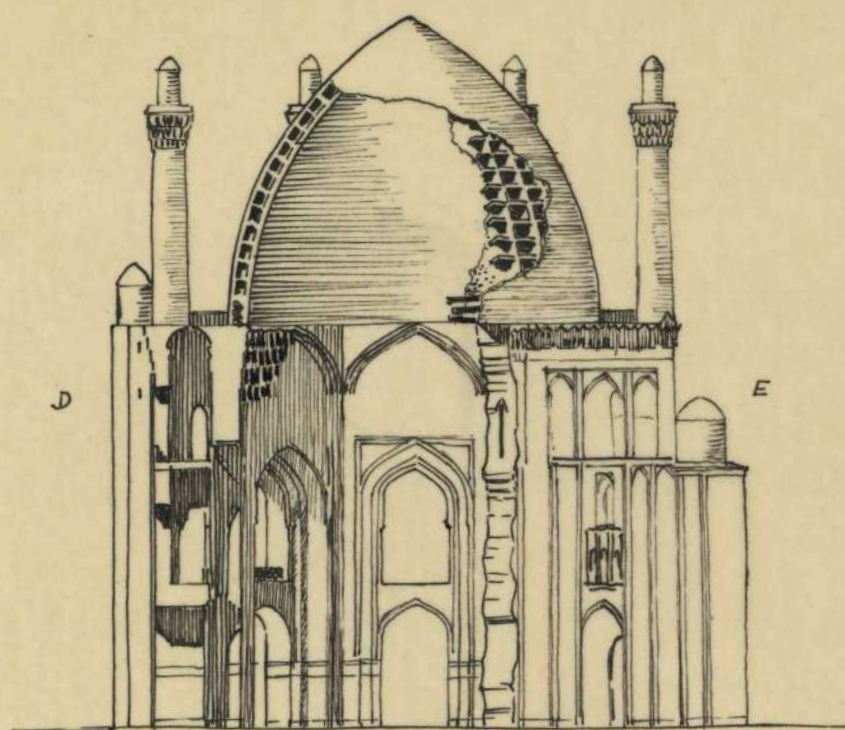


Fig. 8
Qazvin, Iran, Friday Mosque
[Moschea del Venerdì],
domes of the underground
hall, January 1977 (photo by
P. Sanpaolesi). UNIFI|SBA,
Photographic Archive of
Restoration – Iran, 1113-5.

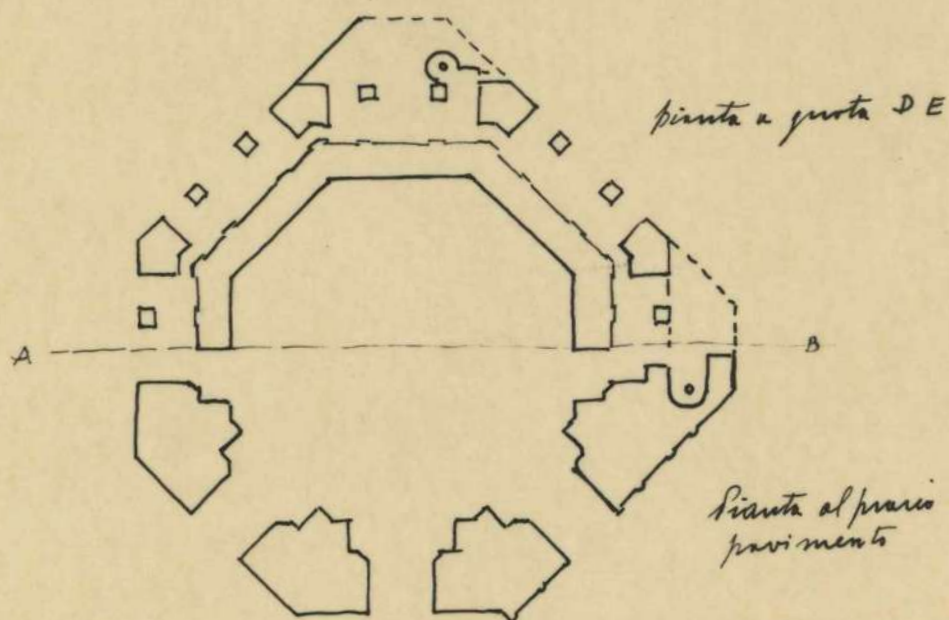
opposite page

Fig. 9
Piero Sanpaolesi, Mausoleo
del Sultano Mohammed
Uldjaytu Codabende –
Sultanieh [Mausoleum of
Sultan Muhammad Öljaytū
Khodabandeh – Soltaniyeh].
(University of Florence,
Department of Architecture,
APPS, Minor Works, Faldone
1, Le cupole [The Domes],
Inserto I, allegato.)

It is difficult to imagine a clearer formulation of the principle that underpins the entire trajectory: technique is not the secondary application of an already given theory, but the site in which knowledge takes shape in confrontation with matter, with risk, with the constructional problem. It is precisely on this terrain that the late papers acquire a further significance, because they make it possible to read Sanpaolesi's openness to the relationship between West and East with greater continuity. In the published texts of the 1970s this openness emerges above all through the question of the herringbone brickwork [*spinapesce*] and the comparison with the Persian area; in the papers, by contrast, it is rooted more deeply in the very way in which the technical problem is framed. What interests Sanpaolesi is not the identification of a univocal derivation or the replacement of one genealogy with another, but the possibility of reconstructing the historical circulation of constructional experiences beyond the boundaries of a national tradition or a linear genealogy. From this perspective, the Dome no longer appears as the self-sufficient culminating point of an entirely Italian continuity, but as the site in which multiple technical traditions may have met, overlapped, and transformed one another. The Roman matrix of the double shell and the Persian hypothesis of the herringbone brickwork do not exclude one another, but coexist within a vision of the monument as the outcome of a long mobility of constructional



0 10 20 30 m.



Mangor del Sultan Mohammed Wdsciatin - Cordobense - Sultanich

1304-1316

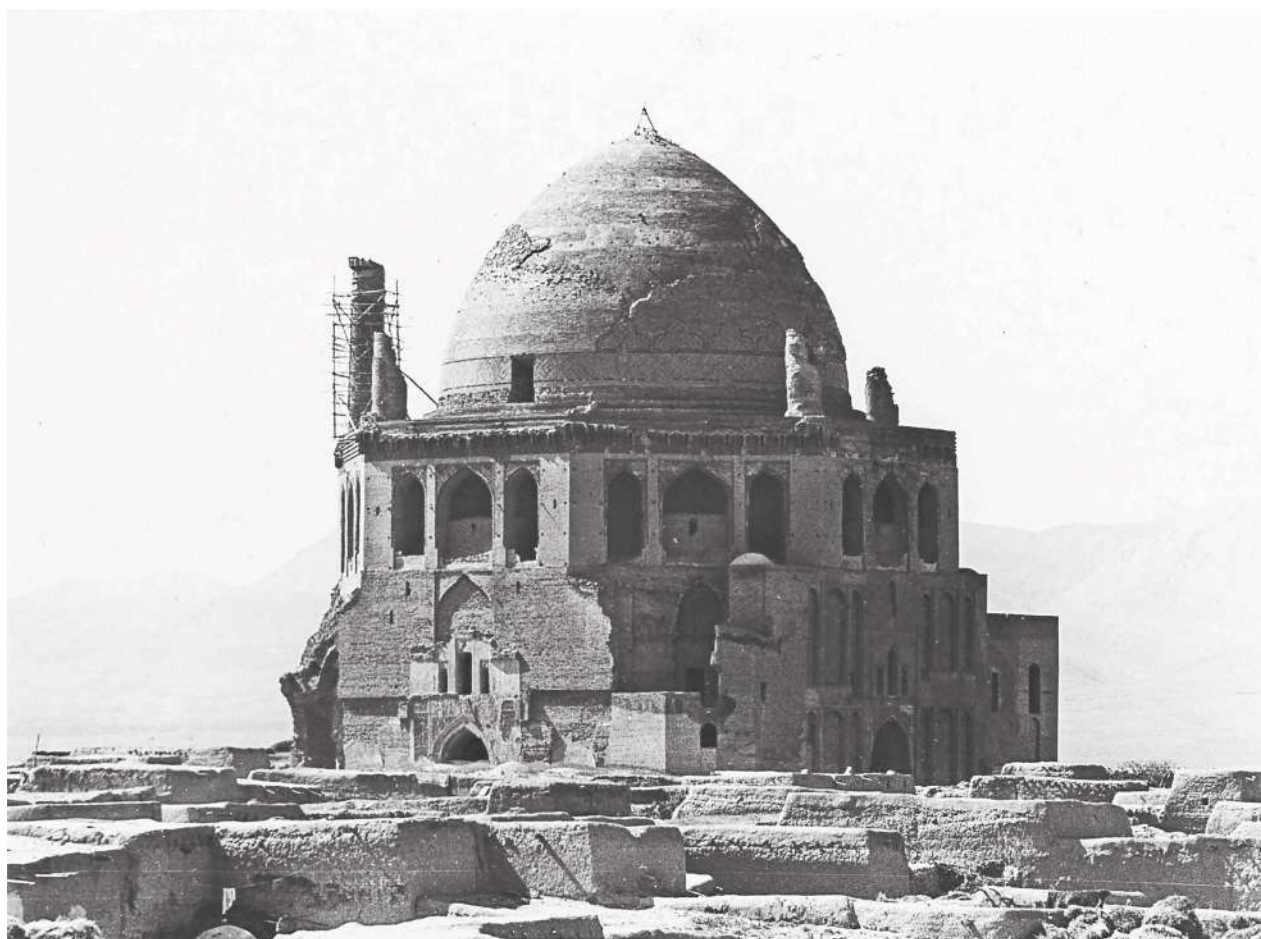
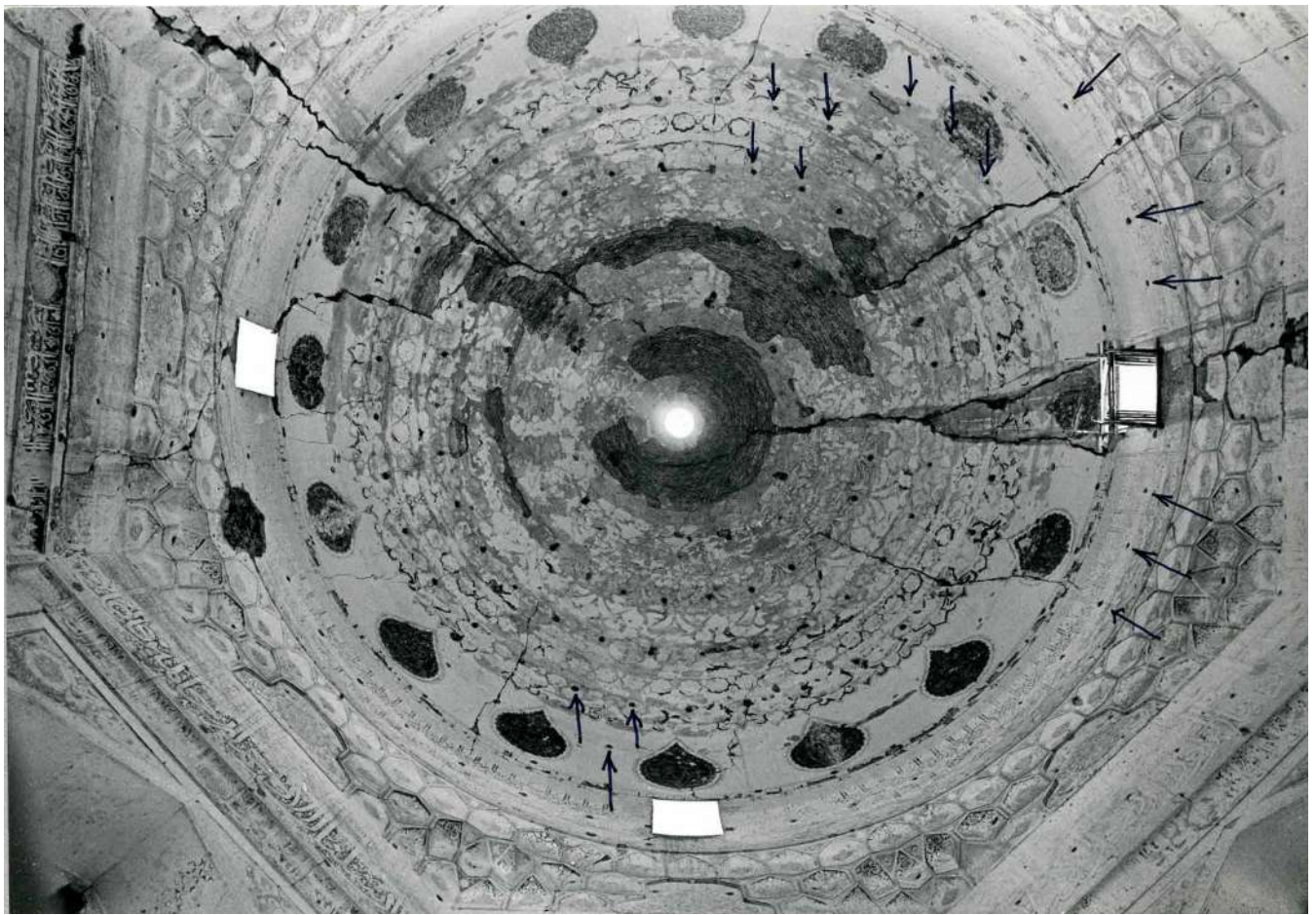


Fig. 9
Soltaniyeh, Iran, Mausoleum
of Öljaytū, June 1969 (photo
by P. Sanpaolesi). UNIFI|SBA,
Photographic Archive of
Restoration – Iran, 623-2.

opposite page

Fig. 10
Soltaniyeh, Iran, Mausoleum
of Öljaytū, intrados of the
dome, June 1969 (photo by
P. Sanpaolesi). UNIFI|SBA,
Photographic Archive of
Restoration – Iran.

knowledge. The file dedicated to the building site brings this approach to its most concrete consequences. Here Sanpaolesi insists that “capacità pratiche e realizzative” [practical and executorial capacities] are “sostenute e accompagnate da robuste cognizioni teoriche che si alimentano e si affinano a contatto dell’esperienza maturata nella sperimentazione” [supported and accompanied by robust theoretical notions that are nourished and refined through contact with the experience gained in experimentation]¹⁷, and that “la prosecuzione del lavoro chiede adattamenti ed accorgimenti spesso più importanti, tecnicamente, della progettazione iniziale” [the continuation of the work demands adaptations and expedients that are often, technically, more important than the initial design]¹⁸. The building site of the Dome is not, therefore, the linear execution of a finished design, but the site in which theory and experience mutually correct one another, and in which construction assumes the form of an open process, capable of modifying itself in response to the problems it encounters. It is precisely in this dynamic reading of the building site that one understands why the relationship between West and East, in Sanpaolesi’s papers, does not remain confined to a question of external comparisons: it enters into the very heart of the research as a problem of technical transmission, of adaptation, of the operative reformulation of knowledge. Seen within this framework, the recapitulation offered by the unpublished monograph does not simply add new data to Sanpaolesi’s profile, but clarifies his intel-



lectual posture. The principal hypotheses concerning the Dome – the critique of the Brunelleschian myth, the centrality of technical knowledge, the building site as the locus of constructional intelligence, the openness to a broader geography of techniques – no longer appear as successive and separate acquisitions, but as co-present aspects of a unified thought. It is in this sense that the papers of the Archivio Privato Piero Sanpaolesi confirm, with particular clarity, that the document-monument-building site triad is not a retrospective formula, but the actual structure of his scholarly practice; and that it is precisely from this structure that a reading of the Dome was able to emerge, capable of transforming itself, without any break in continuity, into a culture of architectural restoration.

From the History of Architecture to the Culture of Architectural Restoration

Reconstructed in its entirety, Sanpaolesi's trajectory on the Dome shows how historical research, progressively deepened through the documents, the reading of the building fabric, and constructional analysis, ultimately comes to assume a function different from its initial one. What in the early contributions was aimed above all at freeing the Dome from the rhetoric of genius and restoring it to its historical and material reality is transformed, in the later writings, into a form of knowledge that measures itself directly against its conservation. It is in this passage that one of the most original aspects of Sanpaolesi's trajectory can be discerned.

cisely these traces, however, that make it possible to place the final revision of the manuscript between 1979 and the early months of 1980, shortly before Sanpaolesi's death – a sign that these papers do not restore a merely unfinished work, but a building site still open. The same condition of dispersion affects the notes, often preserved in truncated form or separated from the page to which they refer, and the iconographic apparatus, for which it has not yet been possible to find a complete list: in the archive one encounters relevant images, but lacking a stable placement. It is precisely this condition – fragmentary and yet strongly oriented – that makes these papers not the residue of a book that failed to materialise, but the site in which Sanpaolesi's long work on Brunelleschi and on the Dome can be grasped in its final settlement. APPS [Archivio Privato Piero Sanpaolesi – Piero Sanpaolesi Private Archive],

Faldone Opere Brunelleschi 3, Inserto 5, fols. 139-235. The four files are structured as follows: I) Gli antecedenti: il tamburo. I concorsi [The Antecedents: The Drum. The Competitions] (fols. 139-168); II) Le conoscenze di statica e di meccanica del Brunelleschi e del suo tempo [Brunelleschi's Knowledge of Statics and Mechanics, and That of His Time] (fols. 169-206); III) La tecnica del Brunelleschi e dei suoi tempi [Brunelleschi's Technique and That of His Times] (fols. 207-217); IV) Il cantiere della Cupola [The Building Site of the Dome] (fols. 218-235). The index of the volume, in the file Generalità e altro [General Matters and Other] (APPS, Faldone Opere Brunelleschi 1, Inserto 1, Fascicolo 1), places the Dome as the fourth chapter of the planned monograph, the only section articulated into four sub-divisions.

¹³ APPS, Faldone Opere Brunelleschi 1, Inserto 1, Fascicolo I, c. 2.

¹⁴ APPS, Faldone Opere Brunelleschi 1, Inserto 1, Fascicolo I, c. 2.

¹⁵ APPS, Faldone 3, Inserto 5, Fascicolo III, c. 207.

¹⁶ APPS, Faldone 3, Inserto 5, Fascicolo III, c. 208.

¹⁷ APPS, Faldone 3, Inserto 5, Fascicolo IV, c. 219.

¹⁸ APPS, Faldone 3, Inserto 5, Fascicolo IV, c. 225.

The point emerges with particular clarity in the 1977 essay *Der statische Zustand der Florentiner Domkuppel* [The Static Condition of the Florentine Cathedral Dome], in which Sanpaolesi addresses the question of the state of conservation of the Dome at a moment marked by alarmist readings of its historical cracks. His thesis points in the opposite direction: the fissures are not read as the symptom of an imminent structural failure, but as the trace of a long process of settlement, within which the building fabric has manifested, over time, its own resistant coherence. What matters, consequently, is not to record mechanically the presence of the cracks, but to understand their nature and to distinguish their physiology from any potential pathology.

The reflection on conservation does not constitute, in Sanpaolesi's trajectory, a separate chapter with respect to historical research, but rather its operative outcome: to understand the constructional logic of the building fabric, its structural history, and the way in which it has reacted over time to the stresses to which it has been subjected already means laying the foundations for any credible intervention. Knowledge of the monument does not simply precede conservation: it grounds it. The Dome is, in this sense, the monument upon which architectural restoration, as an intellectual practice, was built. Its building fabric imposed the necessity of a method capable of holding together document, monument, and building site – not as slogans, but as complementary ways of taking seriously what the monument is and what it asks of us in order to continue to keep it among us; its history has revealed the limits of any purely stylistic approach; its material condition has required a knowledge sufficiently deep to distinguish what in the monument is life from what is alteration. Sanpaolesi's work on the Dome is therefore not merely a contribution to Brunelleschian historiography, but one of the most coherent twentieth-century attempts to make the history of architecture coincide with the culture of architectural restoration.

The rereading of this work, also in light of the papers of the Archivio Privato Sanpaolesi, restores a figure at once less isolated and more demanding than a certain textbook tradition has led one to believe: less isolated, because embedded in a close dialogue with the European historiographical debate; more demanding, because always oriented towards referring every element back to an order of historical intelligibility in which the monument is, at once, witness and problem. A modern culture of architectural restoration does not arise from the proclamation of general principles, but from the long exercise of a knowledge of the monument that does not stop at its own first result: it is in this sense that Sanpaolesi's work on the Dome still retains its force – not because it has explained the monument once and for all, but because it has shown how knowing it is already, in itself, a form of care.

Bibliography

- BAROCCHI P., BETTARINI R. (eds.) 1966, *Le vite de' più eccellenti pittori scultori e architettori*, Sansoni, Florence.
- CACCIA GHERARDINI S. 2025, *L'eccezione come regola: il paradosso teorico del restauro*, 2nd ed., Florence University Press, Florence.
- COOLIDGE, J. 1952, [Review of] Sanpaolesi, Piero: *La cupola di Santa Maria del Fiore: il progetto, la costruzione*. - Rome: Istituto Poligrafico dello Stato, 1941, «The art bulletin», vol. 34, n. 2, pp. 165-166.
- DI PASQUALE S. 2002, *Brunelleschi: la costruzione della cupola di Santa Maria del fiore*, Marsilio, Venezia.
- DOREN A. 1908, *Das Florentiner Zunftrwesen vom vierzehnten bis zum sechzehnten Jahrhundert*, series Studien aus der Florentiner Wirtschaftsgeschichte, Stuttgart.
- FABRICZY C. VON 1892, *Filippo Brunelleschi: sein Leben und seine Werke*, J.G. Cotta'sche Buchhandlung, Stuttgart.
- FABRICZY C. VON 1907, *Brunelleschiana: urkunden und forschungen zur biographie des meisters*, «Jahrbuch der Königlich Preussischen Kunstsammlungen», vol. 28, pp. 1-84.
- FERRI W., FONDELLI M., FRANCHI P., GRECO F. 1971, *Il rilevamento fotogrammetrico della Cupola di «S. Maria del Fiore» in Florence*, «Boll. di Geodesia e Scienze Affini dell'I.G.M.», vol. 30, pp. 158-184.
- FONDELLI M. 1972, *La curva attuale della Cupola di Santa Maria del Fiore. Risposta ai professori Piero Sanpaolesi e Giuseppe Birardi*, «Arte Viva», vol. 11, n. 5, pp. 85-86.
- FONDELLI M. 1973a, *Testimonianze storiche e ricerche sperimentali sulla curvatura della cupola di Santa Maria del Fiore in Florence: replica ai professori Piero Sanpaolesi e Giuseppe Birardi con le due relative risposte*, «Antichità viva», vol. 11, n. 2, pp. 73-76.
- FONDELLI M. 1973b, *Nuove considerazioni sull'attuale curvatura della cupola di S. Maria del Fiore in Florence: ulteriore replica ai prof. Sanpaolesi e Birardi*, «Antichità viva», vol. 12, n. 5, pp. 76-77.
- GIARI G. (ed.) 2021, *Notizia di Filippo di ser Brunellesco, ovvero Vita di Filippo Brunelleschi*, Mandragora, Florence.
- GUASTI C. 1857, *La cupola di S. Maria del Fiore illustrata con i documenti dell'Archivio dell'Opera secolare*, Barbera, Bianchi e comp, Florence.
- LAGANI P. 2025, *Gli studi di Piero Sanpaolesi sulla Cupola di Santa Maria del Fiore tra gli anni '30 e '60 del Novecento*, in CACCIA GHERARDINI S. (ed.), *La genealogia del restauro. La conservazione dei monumenti dalla Conferenza di Atene alla Carta di Venezia (1931-1964)*, Edizioni ETS, Pisa, pp. 235-244.
- LUPORINI E. 1964, *Brunelleschi: forma e ragione*, Edizioni di Comunità, Milan.
- PISANI F. (2023) *L'archivio privato di Piero Sanpaolesi: una fonte per la storia del restauro del Novecento*, PhD thesis, Architecture: Design, Knowledge, and Safeguarding of Cultural Heritage, University of Florence (supervisor Susanna Caccia Gherardini).
- PRAGER F.D., SCAGLIA G. 1970, *Brunelleschi: studies of his technology and inventions*, The MIT Press, Cambridge.
- RAGGHIANI C.L. 1977, *Filippo Brunelleschi: un uomo un universo*, Banca Toscana, Florence.
- RESOCONTI DELLE SEDUTE DEL CONVEGNO 1938, in *Atti del 1° congresso nazionale di storia dell'architettura: 29-31 ottobre 1936*, Florence, Sansoni, pp. V-XVII.
- SAALMAN H. 1980, *Filippo Brunelleschi: the cupola of Santa Maria del Fiore*, Zwemmer, London.
- SANPAOLESI P. 1936, *Il concorso del 1418-20 per la cupola di S. Maria del Fiore*, «Rivista d'Arte», vol. 18, pp. 321-345.
- SANPAOLESI P. 1941, *La cupola di Santa Maria del Fiore: il progetto, la costruzione*, Istituto poligrafico dello Stato, Roma.
- SANPAOLESI P. 1951, *Ipotesi sulle conoscenze matematiche, statiche e meccaniche del Brunelleschi*, «Belle arti: rivista bimestrale d'arte», pp. 25-54.
- SANPAOLESI P. 1962, *Brunelleschi*, Edizioni per il Club del libro, Milan.
- SANPAOLESI P. 1971, *Strutture a cupola autoportanti*, «Palladio: rivista di storia dell'architettura e restauro», vol. 21, n. 3, pp. 3-64.
- SANPAOLESI P. 1972, *La cupola di Santa Maria del Fiore ed il mausoleo di Soltanieh. Rapporti di forma e struttura fra la cupola del Duomo di Florence ed il mausoleo del Ilkhan Ulgiaitu a Soltanieh in Persia*, «Mitteilungen des Kunsthistorischen Institutes in Florenz», vol. 16, n. 3, pp. 221-260.
- SANPAOLESI P. 1977, *Der statische Zustand der Florentiner Domkuppel*, «Kunstchronik», vol. 30, n. 8, pp. 333-337.
- SANPAOLESI P. 1980, *Le conoscenze tecniche del Brunelleschi*, in *Filippo Brunelleschi: la sua opera e il suo tempo*, Centro Di, Florence, pp. 145-160.
- SANPAOLESI P., BIRARDI G. 1972a, *Vecchie e recenti ricerche sulla cupola di Santa Maria del Fiore e la interpretazione di un nuovo rilievo fotogrammetrico*, «Antichità viva», vol. 11, n. 2, pp. 39-52.
- SANPAOLESI P., BIRARDI G. 1972b, *La curva attuale della cupola di Santa Maria del Fiore: risposta al Prof. Mario Fondelli*, «Antichità viva», vol. 11, n. 6, pp. 75-76.