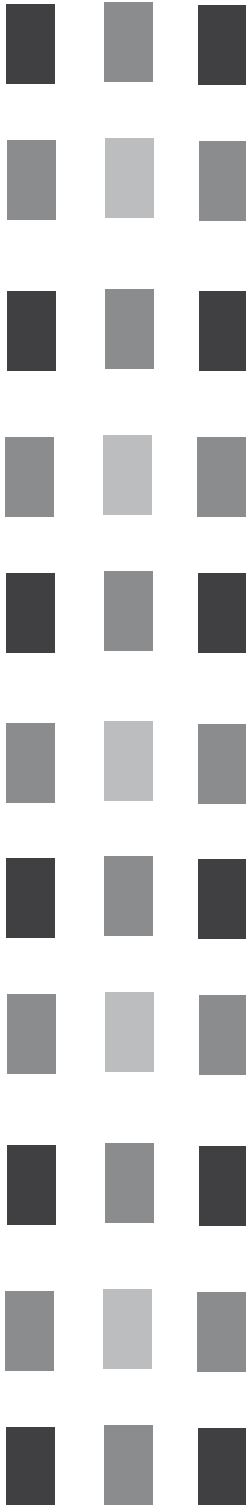# Building as Gesture, Building as Argument

Joseph Rykwert

Rhetoric has had a bad name among architects. Not just architects, either; ever since sentiment became the dominant mood in the mid-eighteenth century, all mediated, polished, socially attuned communication became suspect – and all 'artifice' with it. The ancient discipline of Rhetoric, the skill of persuasive speaking, had – with dialectic, that of deductive argument and grammar, the correct construction of discourse – been one of the three arts of the word, which – with the four of number – made up the seven 'liberal' arts, the basic teaching of what we now call 'humanities' in most European and many American universities.

Before its defeat by sentiment rhetoric was regarded as essential to the workings of society. Aristotle and Cicero were the most famous of many authors who provided it with manuals. As it lost prestige, so dialectic also assumed a restricted and specialized meaning with Kant and Hegel, while discursive argument became logic, and was harnessed to scientific method.

Gesture had been an essential part of rhetoric, but with its atrophy, it came to be treated as a symptom – something to be studied 'scientifically' not as part of composed speech – and empty rhetoric became a cliché.[1] In the twentieth century rhetoric has become associated with everything overblown, stuffy, grandiloquent – never mind pretentious – in the speeches of politicians and preachers as well as in building. Aristotle had taught that dialectic argument made much use of syllogism, an argument in which two premises are stated and from which a third proposition follows. However refined, syllogistic reasoning was important to the growth of dialectic. Rhetoric depended on the enthymeme, an incomplete syllogism that operated with probability and sign. Aristotle insisted in his Prior Analytics[2] that such forms of argument were useful in public speaking; they were especially popular with lawyers.

That kind of syllogism inevitably made much of metaphor, though metaphor was something with which architects have not been easy for a couple of centuries. Sentiment and the plainest speaking, they were taught, should govern their discourse, logic and scientific method should guide and restrain their fancies Having rejected any mediated and artificial speaking for direct expression, they had lost the skill of using or controlling metaphor.[3]

Meanwhile, during the half century just past, the philosophy of language has given rhetoric a new prestige, and metaphor with it. Architects have not caught up with the shift in recent thinking. Witness how the most 'scientific' and plain of recent styles, that called 'high-tech', having been derailed by various energy crises (so that it has lost some of its rationale) has now broken out in a plague of irrational and fanciful shapes. That reaction is symptomatic: excess of rationality has pro-

voked an appeal to fantasy and 'artistic' vision which now seems to determine what the artist 'puts in' to his design without any real awareness of context and response. Yet success in the public realm depends on a spectator response which is very much the same as that of any effective rhetorical statement. It has to depend on history and on memory. Interpretation may be unquantifiable but it is not arbitrary – nor can it be imposed on the observer.

Memory, even artificial memory, is an essential factor in Rhetoric. That a true orator memorized speeches is well-known, that he did so with the help of a building – the palace, castle or theatre of memory – is less evident. This is worth a little reflection, since theorists are always accused of structuring their arguments on the example of some other discipline – from cosmology to microbiology – while the mnemonic technique essential to rhetoric is based on building. In fact, its quasi-mythical founder, the poet Simonides of Keos (who died, an old man, in 468 or 7 BC and has been called 'the first public intellectual')[4] was once commissioned to chant a paean to a Thessalonian Olympic Games winner at his victory feast. He devoted so much of the poem to the praise of the heavenly twins, Castor and Pollux, that his patron only gave him half the promised fee and suggested he claim the other half from the Twins. Called out of the feast by a servant at the behest of two young horsemen, the poet escaped the fall of the banqueting hall roof which crushed the diners, so that their corpses were unrecognizable. But Simonides had remembered exactly where each of them sat and each mangled corpse could therefore be returned to the mourning family. According to Cicero and Quintilian, this fatality led him to devise the art of memory,[5] by which the image of a building, both in plan and volume, is the place or topos of any discourse. It has been a commonplace of Rhetoric ever since. The intimate connection between the invention of speech and of building, which Vitruvius describes at the beginning of his second book, is well known. Rhetoric, we might say, derives from architecture – not architecture from rhetoric.[6] But the comparison was much more commonplace: Cicero even makes a triple connection between a speech, the body and a building, fabrica.[7]

I propose to show – in three examples, taken a couple of centuries from each other – how metaphoric, even rhetorical procedures were successfully used by architects aware of the context in which they were working and concerned to use the design of their building so as to appeal to the users and the passers-by who are the real consumers of architecture.

My first exemplar, Francesco di Giorgio Martini of Siena, lived from 1439 to 1501; my second,

Francesco Borromini, was born in Bissone near Lugano in 1599 but lived most of his adult life in Rome where he died by his own hand in 1667. The third, Walter Gropius, born in Berlin in 1883, died in Cambridge, Mass in 1969. If you want to label them stylistically, they belong to the Tuscan Renaissance, Roman Baroque, German Early Modernism. In spite of these very different labels, all three used procedures which are in some ways analogous – and which were intended to buttonhole and persuade members of the public: they must therefore be considered rhetorical in intention.

Francesco di Giorgio, my earliest model, produced a manual – of which two somewhat different versions exist – about the end of the fifteenth century. Although it was not printed (and then only in part) until 1840, it was known in Italy, Spain and France through manuscript copies.[8] He was one of the great fortification engineers of his time and he designed a number of prominent civil buildings where his contribution is not always documented. Yet, like his predecessors, Vitruvius and Alberti, Francesco regarded the church or temple (he used both words) as the most exalted kind of building. And as Vitruvius explicitly put it, so he, too, regards the homo bene figuratus, the 'well proportioned human figure' as the model which the church building must follow.[9]

Francesco knew full well that Vitruvius geometrized the body, whose pose and articulation referred to the square and the circle, but he himself was more interested to show his readers how the measurements of the human body could be used as a guide to the design of contemporary churches, and thus lead him to an interpretatio Christiana of the Vitruvian rule. The idea that the cruciform church 'incorporated' the perfect body of Christ was discussed through the Middle Ages, and Francesco takes up the cruciform body as a guide to the plan as well. But – more originally – he also moved the human figure to the facade.[10]
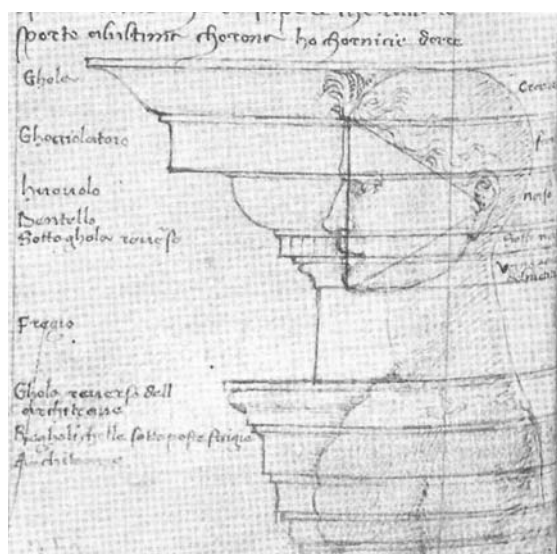
The particular stance of the figure that Francesco drew, so different from Vitruvius', recalled the image of the Madonna della Pietà. Stretching
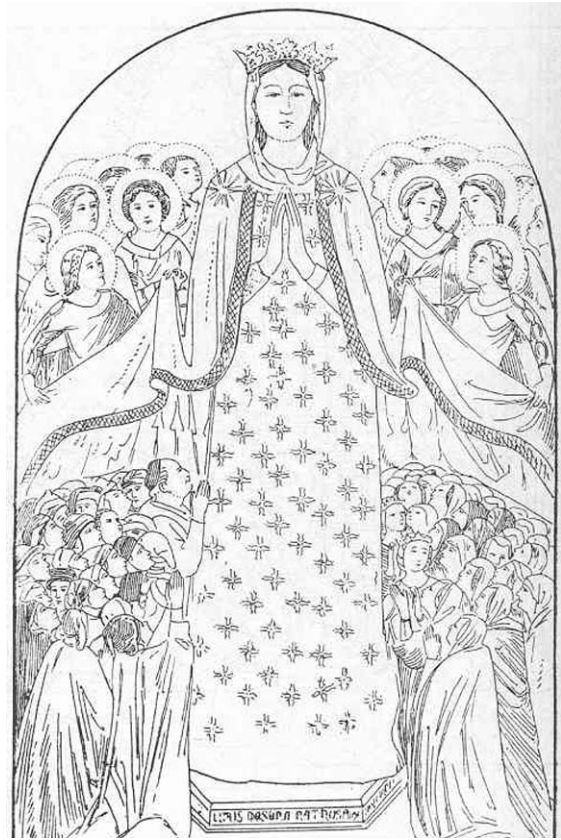
3 | *Madonna della Misercordia, Lippo Memmi, Orvieto, Chapel of the Sacrament*
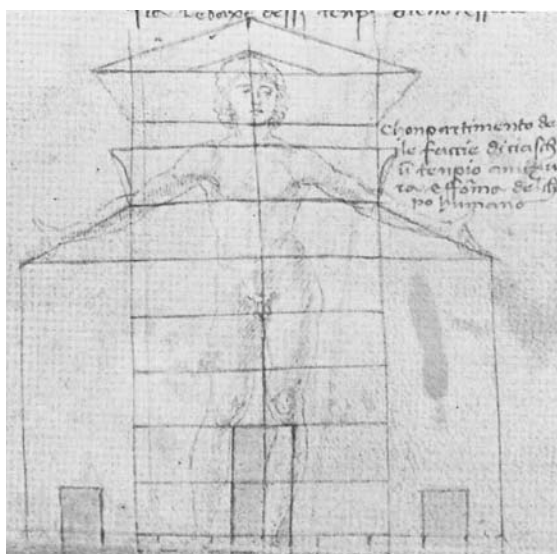
1 | *'Misura dela faccia del tenpio hovero basiliche'*

2 | *'Misure e partimenti della chornice fregio he architrave'*

her arms to hold her cloak, she held it up so as to protect a group of her faithful at her feet (or over a church dedicated to her). It is a commonplace of late medieval and Renaissance imagery which must have been well-known to Francesco, as it was to most of his contemporaries.[11] Having established that familiar image as his prototype, he later applied a similar – though not quite so generous – figure to a simple nave as well as to the more elaborate cruciform, domed church.

Francesco assumes a 'normal' church with a high nave and lower aisles. The articulation of the facade, according to a nine-face high human figure (Vitruvius' is ten-faced), shows the head enclosed in the cornice proper; the edge of the architrave corresponds to the nipples. The elbows of the figure mark the points at which the nave breaks from the aisles. Lower on the facade, the knees provide the height, and their stance the width of the main door. Francesco also applied such rules to parts of buildings – to columns and capitals, even to mouldings, exploring the configurations of the human figure (particularly of the face) as a critical standard for the details of his design - such as the calibration of a cornice. Francesco's method was taken up by a Spanish admirer, Diego de Sagredo, who reduced his rather delicate drawing to a rather coarse woodcut. Diego's book, Las Medidas del Romano, 'the Roman's (i.e. Vitruvius') Rule'[12] was taken up in France, and Francesco's face-cornice analogue reappears in an amplified form two hundred years after its publication in the Cours d'Architecture of Jacques-François Blondel, the most influential teacher of architecture in mid-eighteenth century France and – until his death in 1774 – a frequent contributor to the great Encyclopédie.[13]

Another Francesco, Borromini, was invited to design a new building type, the Roman Oratory for the disciples of St Philip Neri, who had organized themselves into an order in 1575, taking over a small parish church, Sta Maria in Valicella – now just off the Corso Vittorio Emmanuele. A number architects (the project was by the older Martino Longhi, the travertine facade finished by Fausto Rughesi in 1605) had built an opulent church over the old parish, and were working on a monastery on the roughly rectangular site adjoining it.[14] When Borromini took over in 1637, his main problem was how to provide an exterior for the hall in which the new kind of literary-musical devotions (now called 'oratorio' after the order which devised them) were to be held. The hall occupied the width of the monastery towards a new little square, Piazza della Chiesa Nuova. The hall (and the library over it) were therefore at right-angles to the church. The primary planning move was to create a lobby between church and oratory – and give the oratory its individual dignity. In elevation – as Borromini describes it – the greatest difficulty was to make a facade for the Oratory, since the real front is joined to the rest of the building within, and it only has one long side onto the square. Yet it was considered necessary, the congregation being called the Institute of the Oratory … that this place should be the most conspicuous and have its own particular facade … I therefore decided to deceive the onlooker's gaze and make the facade to the square, as if the Oratory opened there and had an altar opposite the door.

Nevertheless the Oratory should not be equal to the Church, since, as Borromini put it himself, the Oratory is the child of the church … it was resolved that the facade of the Oratory should be, as the daughter of the Church facade, smaller, less ornate and of inferior material … Where the church was of travertine it was resolved to make it (i.e. the Oratory) of brick. Where the first is of the Corinthian order, the other should only have the skeleton of a good order, and only indicate the
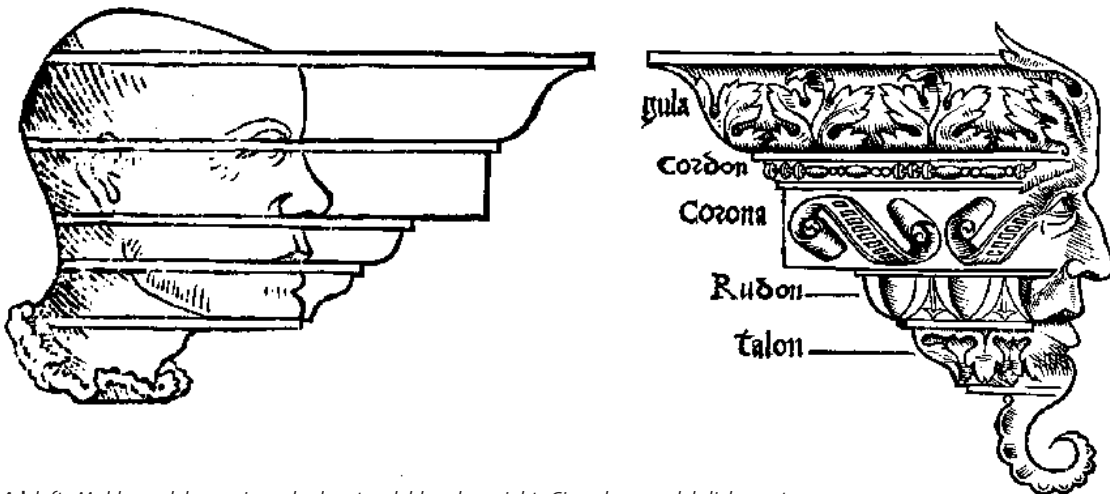
4 | *left: Molduras dela cornixa sobrel rostro del hombre; right: Cinco lugares del dicho rostro*
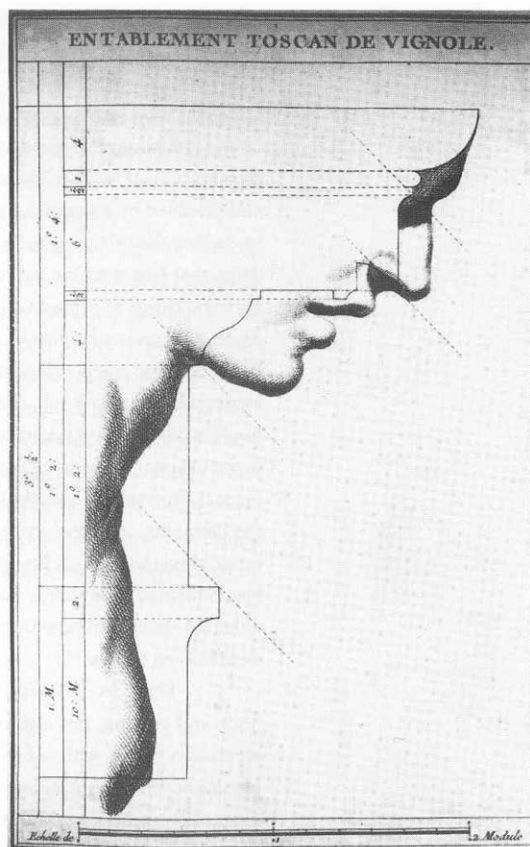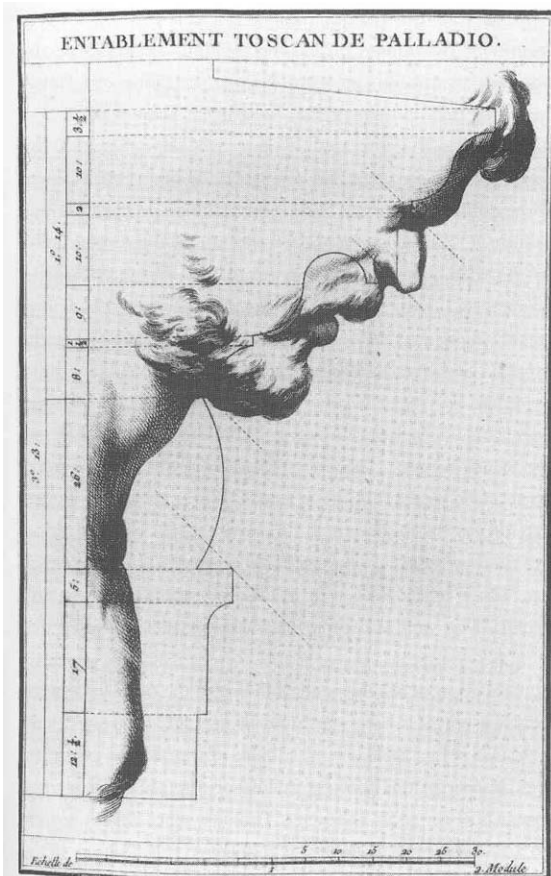
5 | *'Incoherent' profile imposed on Palladio's Tuscan cornice*   *'Incoherent' profile imposed on Vignola's Tuscan cornice*

members and the parts of architecture, not orna-
ment and perfect them. That is why the columns
only have a bell of a capital without any of the
leaves and the base has fewer mouldings.

Another device (that he does not mention) was
to omit the attic separating the lower and upper
orders of the church facade, so that although the
lower cornice of both oratory and church are at
the same level and the columns of the orders in
both are the same height, the crowning element of
the oratory is much lower than the pediment of
the church. The piazza side of the oratory hall and
the splendid library over it are given a skin-deep,
concavely curved facade on their long sides which
makes the two very different halls correspond to
its two orders. Borromini explains it thus:

To give form to the said facade I imagined a
human body with its arms outstretched as if it
would embrace everyone who comes into it.
Which body is in five parts: that is, the trunk in the
middle and the arms joined by pilasters in two
pieces …

Much in the way Francesco di Giorgio had
explained it a century and a half earlier, Borromini
sets the intermediate columns at the elbows; this
is important because the Congregation must be
seen as opening its arms to the visitor in a wel-
coming gesture of embrace. To make that meta-

phor even more explicit, Borromini makes the cen-
tral bay swell into a convex shape against the con-
cavity of the facade, as an oval cylinder that signi-
fies the legs and trunk of the body. And he
compounds this by playing, as he says, a joke on
the passer-by:

In (these drawings) the joke I made is very
obvious. Where the lower half of the middle (sec-
tion) represents the trunk which comes forward in
a bay, the centre of the facade above the first cor-
nice bows inward, curving in the opposite direc-
tion to leave an oval space for the balcony of the
library …

At the top of the first cornice, he has cut the
central cylinder representing the trunk in half, so
that it makes a deeper hollow in the shallow curve
of the facade. He makes his joke in order to sharp-
en the passer-by's awareness of his metaphor, as
the masters of rhetoric had suggested. He could,
of course, only operate at this level of complexity
because he is indeed invoking a commonplace – or
topos to use a rhetorical term.

Borromini goes on to detail the various contin-
gencies which his rhetorical devices allowed him
to meet, such as allowing a balcony for the library,
or creating a buttress to help carry the large spans
and weight of the library above the oratory where
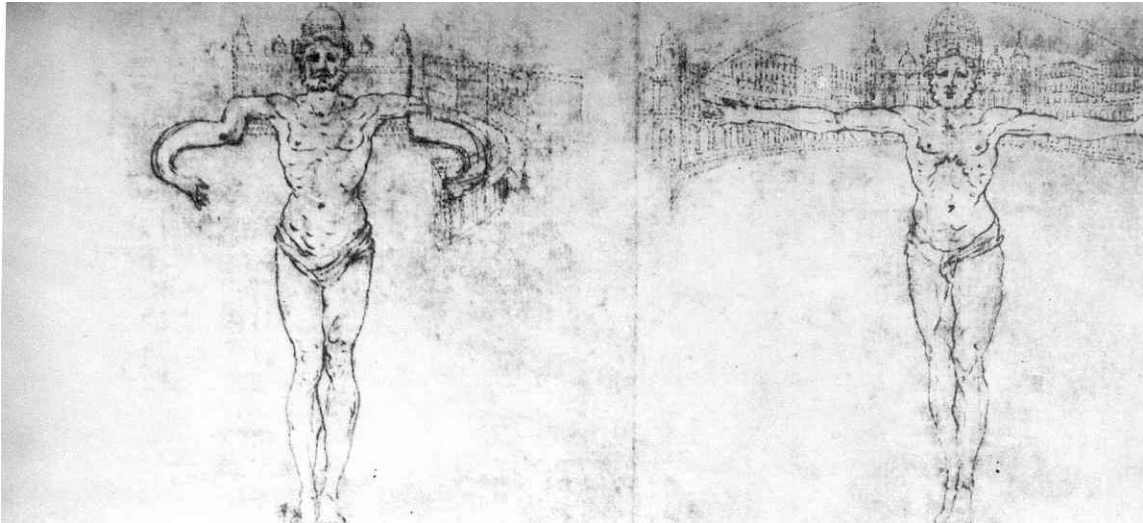the curved part of the facade juts out of the
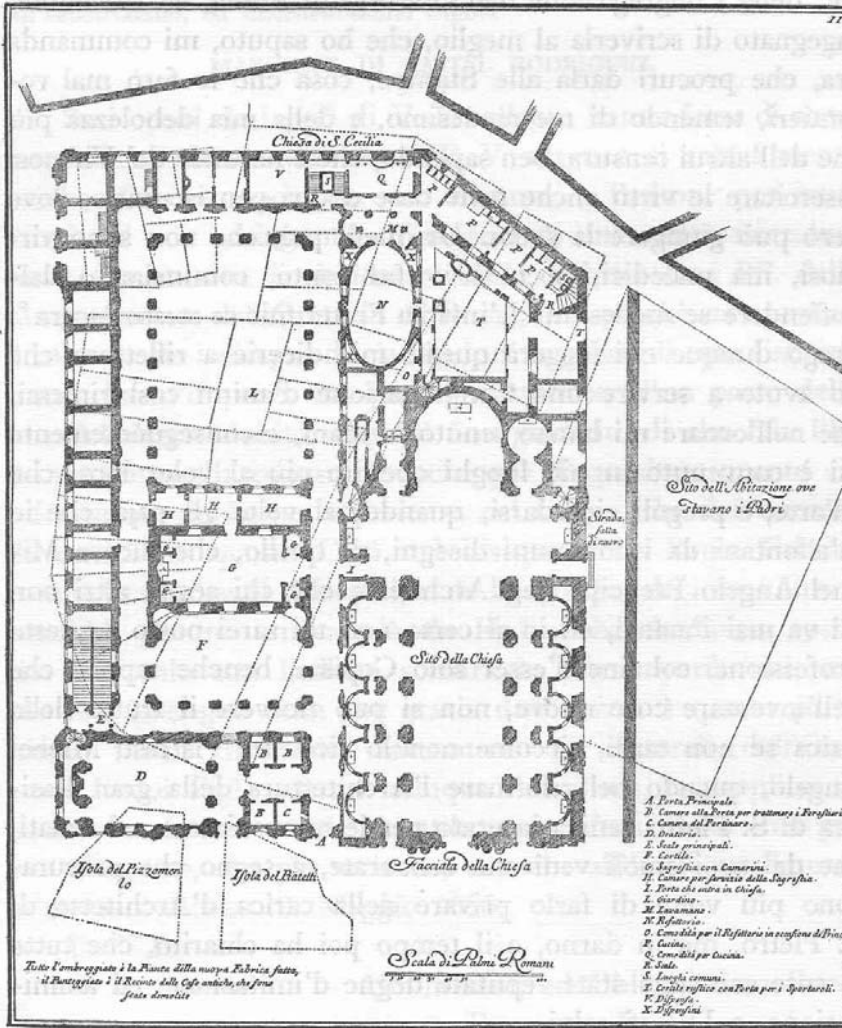
6 | *Plan of Sta Maria in Vallicella, the Oratory and Convent; the dotted lines indicate previous property lines*

7 | *Facade of the Oratory and Library*

8 | *The Oratory, Library, Convent and Sta Maria in Vallicella from the Piazza Monte Giordano*

9 | *The caricature of Bernini's project and counterproposal of 1659*

straight. What in later – perhaps more sober – ages would appear as willful, even capricious, can therefore be seen as quite sober, too rational almost – if always rhetorically argued.[15]

That the topos was indeed a commonplace of his time can be inferred from a much more famous instance, the elliptical colonnades which Borromini's first Roman employer and great enemy, Gian Lorenzo Bernini, began to build in 1656 as a narthex to the Vatican basilica of St Peter. Since the mid-fifteenth century St Peter's had been regarded – de facto – as the Pope's cathedral and had attracted great crowds of pilgrims as well as of Romans. The oval shape of the colonnade invoked that of an amphitheatre, while the statues of the saints and martyrs – one over each column – seemed to join the congregation in the open space below. Because of the unfortunate perspectival effect that Carlo Maderna's westward extension of St Peter's (about 1610) produced, which obscured the approaching pilgrim's view of Michelangelo's mighty dome, the oval amphitheatre had to be distanced from the facade of St Peter's by two 'arms' – blind arcades. One of Bernini's (several) enemies attacked the project in caricatures in which the dome is identified with St Peter's bald pate, while his arms, extended to welcome the approaching visitor, are made to seem broken when scribed over the mixed straight and oval lines of the design. An alternative open semi-circular arcade, with St Peter comfortably extending his arms, justifies the objection. Although the caricature did not dissuade Pope Alexander VII from building the arcades, yet the way it was used testified to the general acceptance of the metaphor.[16]

For another century or more that metaphor retained its power, though when Jacques-François Blondel invoked it, it was already being questioned and the positivism of the next generation

obscured it. The study of bodily organization and of proportion fascinated many-nineteenth century theorists and artists and was reaffirmed as a prime factor in architectural thinking by Le Corbusier with his Modulor. Yet an appeal to the human figure was no longer the topos, the ground for the universally valid metaphor.

My last example comes from the first decade of the last century, and invokes, perhaps not quite so consciously (and therefore also less rationally) a somewhat different rhetorical technique. It is a factory – one which made shoe-lasts as well as shoe-trees. Commonly these were made of beech - the botanical term is fagus selvaticus (hence the name of the factory, Fagus-Werke, at Aalfeld-an-der-Leine in Braunschweig). In 1910, its enlightened owner commissioned the rising young architect, Walter Gropius, to design a new factory for him. It was Gropius' first independent building and to do it, he took Adolf Meyer into a partnership which lasted until Meyer's death in 1929. Both had been working for Peter Behrens, the most successful architect and industrial designer of the time. As chief designer for AEG, the Allgemeine Elektrizität Gesellschaft, the biggest industrial undertaking in Europe, he designed all their products, their graphics, as well as their factory, office and exhibition buildings. The best known was the Turbine factory of 1908/9 which was also one of the earliest steel and glass buildings in Europe, sited on a corner of the AEG complex, with a small square in front of it:[17] 'The Cathedral of Labour', Le Corbusier (still Charles-Edouard Jeanneret) named it.[18]

Although he was still relatively inexperienced as an architect, Behrens had, with his engineers, designed an 'advanced' structure, an asymmetrical three-hinged steel frame for the main manufacturing space. To the little square, it presented itself
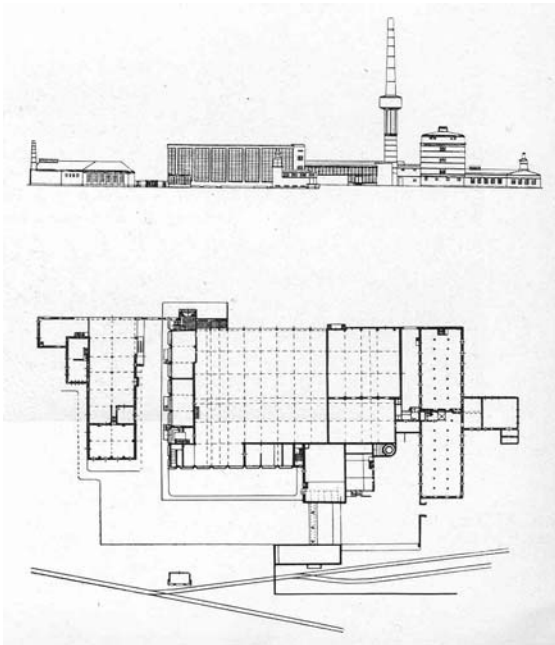
10 | *Walter Gropius and Adolf Meyer, The Fagus-Werke at Aalfeld an der Leine, Side Elevation and Plan*

11 | *Walter Gropius and Adolf Meyer, The Fagus-Werke at Aalfeld an der Leine, Main Entrance*


12 | *Walter Gropius and Adolf Meyer, The Fagus-Werke at Aalfeld an der Leine, Main Entrance and flanks*

nevertheless as a symmetrical hall. Although the main load was carried by the steel frame, Behrens considered it too slender visually. He therefore 'completed' the building at the corners by giving it mass-concrete piers which have no weight-bearing role in the structure. Their notional power is emphasized, more or less 'traditionally', by rustication, scoring them with deep horizontal grooves to make them look as if they were piled up of very large blocks. Their visual – not their physical – role was further emphasized by tapering so that the roof, which by implication is a vault, overhangs them deeply. The two pylons flank a large, full-height metal window to the square, flush with the tympanum, so that the taper of the concrete walls is clearly visible as a joint between the pier and the metal surround of the window, while the 'cornice' casts a deep shadow. On the long elevation, the metal frames and their hinges are obtrusive features of the building. The large glass windows which span between them slope in line with the inner edge of the frame, which is tapered, so that the outer, orthogonal edge also aligns with the roof-line. A deep overhang throws its shadow over the long side as well, emphasizing the apparent weight of the vault – though it is in fact a light infill of the frame, and is, in any case, pierced by a large skylight, screened and invisible from the ground.

I describe the AEG Turbine factory at such length, though it is not one of my examples, because Gropius' and Meyer adopted the well-known rhetorical procedure of inversion at Aalfeld.[19] Where Behrens presented the 'main facade' of the AEG Turbine hall as a central window flanked by recessed, rusticated corner piers, and secreted the entry at the back of the building, Meyer and Gropius cut the main door of their building through a heavy, rusticated pylon flanked by light windows which broke and turned the corner. Their lightness emphasizes another inversion: where Behrens had the external faces of the structure orthogonal with the ground and the rusticated corner-piers tapered, Gropius and Meyer have rusticated the entry pylon, which is orthogonal, as are all the windows which project beyond the structure and provide much light while seeming to defy gravity since the thin, brick-faced piers between them slope up to the flat cornice just like the non-structural pylons of the Turbine Factory. Where Behrens sought solidity and power Gropius and Meyer showed lightness and grace. In fact Aalfeld is one of the first buildings in which the corner window becomes a programmatic and obtrusive element. The scrupulous accuracy of the inversion may not have interested even such admiring and attentive observers as Sigfried Giedion, who was concerned more with the break Gropius made with Behrens' approach than with any continuity between them
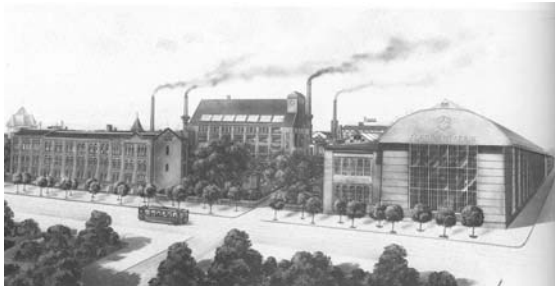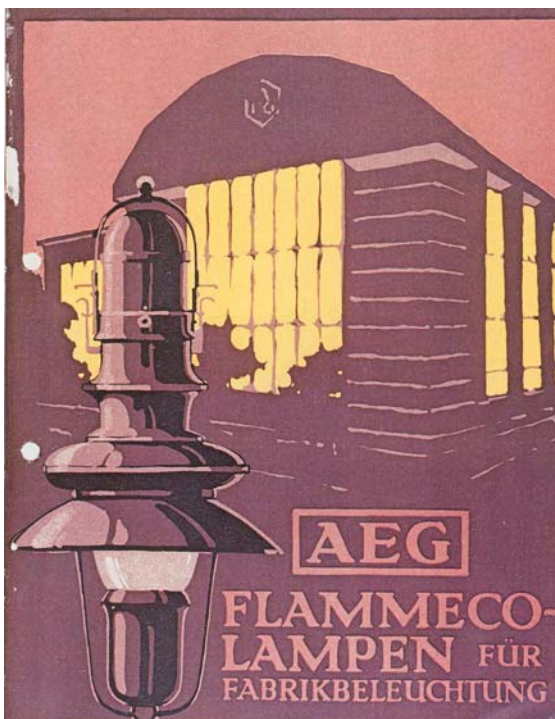
13 | *The AEG factories on the Huttenstrasse, anonymous Watercolour*

14 | *The Turbind factory, early project for the factory: print signed by Behrens and dated 1908*

15 | *Publicity for arc-lamp (Flammeco is the trade name) with the Turbine Hall, illuminated at night as background; brochure (using Behrens type-face) attributed to Lucian Bernhard*

or the modalities of their breach. Irony, in any case, is not a form of humour usually associated with the deeply-earnest Gropius, so it is perhaps out of character to find his first major work so marked by detachment.

Behrens believed that the AEG could lead in unifying the German people. By their participation in such an enterprise, they would achieve a higher sense of community through art and design, so that industrial work would be a form of religious worship. The cathedral image was essential to his conception. The business of making shoe-lasts was puny for the German economy, while that of the AEG was crucial. Gropius' and Meyer's aim on the other hand was noticeably gentler – to raise the status and morale of the Aalfeld workers by providing them with a palace that would cheer and enlighten rather then sacralize their labour. The friendly palace was an inversion, feature by feature, of the solemn temple - and if contemporary accounts are to believed, fulfilled the architects and their patron's declared aim.[20]

I have described the rhetorical procedures in four buildings primarily in terms of metaphor which is, in a sense, the basic rhetorical trope. It does not seem to invite the suspicion which often meets any architectural appeal to linguistic phenomena when justifying a critical-theoretical account of buildings. It is building, after all, that has provided the first model for rhetorical procedure, as I suggested at the beginning of this paper.

The first two metaphors draw on the human body and belong to a time when parlare figurato was regarded as a high ideal. The second belongs to a period when parlare piano was the only respectable form of discourse, and the human body had lost its microcosmic power. Nevertheless, in both episodes metaphor was the means. It seems to me that such an understanding of the formal procedure allows a discussion of building beyond the vagaries of taste – and what goes by the name of aesthetics.

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Notes:

1 I have dealt with this matter elsewhere: *The Dancing Column*, Cambridge/Mass. 1996, pp. 41 ff. When Peter and Alison Smithson called their 'theoretical' book *Without Rhetoric* (London 1973), they seemed unaware of the American consumer advertising which had, over the past decade, offered a spectacle of unfamiliar plenty in austerity Britain; what they took as a populist answer to the refinements of 'classical' rhetoric in fact relied for its appeal on the ancient techniques – as was shown, brutally, by Vance Packard in *The Hidden Persuaders*, New York 1957, and more subtly by Reuel Denney in *The Astonished Muse*, Chicago 1957.

2 *Rhetoric* (techne retorike) I 2 viii; 1356 a ff. Prior Analytics (analytika protera) § xxvii.; 70 a 10.

3 Although it was always taught, even if only nominally, in certain universities (Edinburgh, for instance, founded the chair late, in 1762 for Hugh Blair; Giambattista Vico held the chair of rhetoric in Naples from 1697 until his death in 1744 – he did hope to be promoted to the one of jurisprudence which was better-paid) and was in any case a recognized part of any linguistic practice. It was reconsidered philosophically by nineteenth-century thinkers who were interested in language, such as Charles Saunders Pierce. A turn in its fortunes was marked by the publication of the *Philosophy of Rhetoric* by I. A. Richards in 1936; and since the nineteen-forties and fifties it was central to the interests of the Chicago circle, while Kenneth Burke made it the centre of his teaching at Berkeley. The most important single book to bring it to general attention was the *New Rhetoric, a Treatise on Argumentation* (Notre Dame, Indiana 1969; the original French edition in 1958), by Chaim Perelman and L. Olbrechts-Tyteca. Its importance for the complementary art of interpretation is underlined by Hans-Georg Gadamer in *Philosophical Hermeneutics*, Berkeley and Los Angeles 1976, pp. 21 ff. A recent sign of the change in its fortunes is the reprinting – as a cheap paperback – of Pierre Fontanier's *Les Figures du Discours, Manuel Classique pour l'Etude des Tropes* (published in two parts, 1821–1830 – and long out of print), with an introduction by Gérard Genette, Paris 1977. A brief summary of some of these discussions by Terence Hawkes in *Metaphor,* London 1972. It became an important theme in the studies of what is now called 'Aesthetics of Reception'.

4 Several of his poems – epigrams, epitaphs, signatures of sculptures – are preserved in the Greek anthology, of which the most famous one is the epitaph on the Spartans whom the Persians killed at Thermopylae: Stranger, testify to Lacaedemon that we lie here, obedient to their laws (Greek Anth VII, 249; also 248; and in Latin Cicero Tusc. Quaes. I,22.) On his public figure Cicero, *De Natura Deorum* I, 22.

5 Cicero de Orat. II, 86; Quintilian De Inst. Or. XI, 2.

6 The most famous recent account of the whole subject by Frances Yates is *The Art of Memory*, London 1966. But there is a vast older literature of the subject: the Anonymous English version of Gregor von Feinaigle's *The New Art of Memory* (London 1812) lists some 70 (practically all printed) works. The Vitruvian passage on fire, speech and the origin of building in his II, 1 i.

7 Cicero, *De Natura Deorum* II, 53 ff.

8 See Gustina Scaglia, *Francesco di Giorgio. Checklist and History of Manuscripts and Drawings …,* London 1992.

9 Vitruvius, III 1 I.

10 There are some fifteen complete or fragmentary versions of the treatise. Two (Turin Saluzziano 148, Florence, Ashburnham 138, Siena S IV 4 and Florence Magliabecchiano II 1 141 have been edited by Corrado Maltese and Livia Maltese Degrassi (Milan 1967). The plans of the cruciform church in Francesco di Giorgio (1967). The facade drawings are on pl. I, 18; II, 236. The facade of the nave-and-aisles church on I, 38; nave only, II, 228. Francesco often quotes Cicero, and the text quoted in n. 7 was part of normal school curricula since the Middle Ages.
The most recent monograph on his architecture is the Catalogue of an Exhibition in Siena by Francesco Paolo Fiore and Manfredo Tafuri, *Francesco di Giorgio Architetto,* Milan 1994, but a formal and iconographic analysis of his buildings remains a desideratum.

11 Neri de'Bicci, Engerard Charenton, even Fra' Bartolomeo painted versions of it, though perhaps the best-known is Piero della Francesca's for the Confraternita della Misericordia of Sansepolcro (now in the town gallery). The emblem of the building committee of Milan Cathedral, reproduced in several reliefs, showed the Madonna extending her mantle over the cathedral. Several such plaques from the mid-fifteenth century (the earliest with the facade of old Sta Maria Maggiore, which preceded the duomo on the site) are in the museum of the cathedral.

12 Diego de Sagredo, *Medidas del Romano*, Toledo 1526; Lisbon 1541, 1542; Toledo 1549 (edition chosen by Fernando Marias and Augustin Bustamante – for a number of reasons listed on p. 6 – for the facsimile ed. Madrid 1986). There were several other editions and a French translation (without the author's name), *Raison d'Architecture Antique extraicts de Vitruve …*, Paris 1539.

13 Jacques-François Blondel, *Cours d'Architecture*, Paris 1770–1777, vol.I, pp. 258 ff. (where he quotes 'Sangredo – sic – Auteur Espagnol'). The engravings which compare faces to the cornices of Palladio, Scamozzi and Vignola (who wins) are plates x, xi, xii of the first volume of illustrations (1771). P.

14 For the building history, see Joseph Connors, *Borromini and the Roman Oratory*, Cambridge/Mass., 1980. The details of the ousting of the previous designer, Paolo Marucelli and the appointment of Borromini in 1637 are told on pp. 23 ff. Borromini's own account of the work was given in his *Opus Architectonicum*, Rome 1725 (republished, ed. Paolo Portoghesi, Rome 1964), though the dedicatory letter is dated 1656.

15 Francesco Borromini, *Opera del caval*. Francesco Borromini, Rome 1964, pp. 38 ff.; cf p. 35.

16 The batch of some 25 drawings (now in the Vatican library) were attributed to Bernini until Rudolf Wittkower identified them as a 'Counter-Project' in Heinrich Brauer and R. W. *Die Zeichnungen des Gianlorenzo Bernini*, Berlin 1931, pp. 66 ff. His attribution of them to Papirio Bartoli is not relevant here. The rectangular and circular pre-projects are discussed by Timothy K. Kitao, *Circle and Oval in the Square of Saint Peter's*, New York 1974; his plates 39, 40.

17 Tilmann Buddensieg and Henning Rogge, *Industriekultur, Peter Behrens und die AEG*, Berlin 1979, pp. D 12 ff; Stanford Anderson, *Peter Behrens and a New Architecture for the Twentieth Century*, Cambridge/Mass. 2000, pp. 134 ff.

18 Charles-Edouard Jeanneret, *Etude sur le Mouvement d'Art Décoratif* en Allemagne, La Chaux-de-Fonds, 1912, p. 44. He was in fact quoting a general view; in German: *Die Kathedrale der Arbeit*.

19 On the factory and on Gropius' soliciting the commission, his displacing the architect who began it, as well as the partial text of his lecture on the nature of factory building, see Reginal Isaacs, *Walter Gropius, Der Mensch und sein Werk*, Berlin 1983, vol. I, pp. 106 ff.

20 Sigfried Giedion, *Walter Gropius*, New York 1954, pp. 23 ff.
Carl Benscheidt, the owner of the Fagus-Werke, was in sympathy with the ideas Gropius had formulated at the time: DER ARBEIT müssen Palläste errichtet werden, die dem Fabrikarbeiter, dem Sklaven der modernen Industriearbeit, nicht nur Licht, Luft und Reinlichkeit geben, sondern ihn etwas spüren lassen von der Würde der gemeinsamen grossen Idee, die das Ganze treibt… Dieses Bewusstsein im einzelnen Arbeiter geweckt, könnte vielleicht eine soziale Katastrophe, die bei der Gärung des heutigen Wirtschaftsleben ja täglich droht, vermeiden… This Morris'ian insight is unusual for Gropius. Quoted by Reginald Isaacs (1983) p. 106.

Credits:
Fig. 1: Codex Torin; Saluzziano 148 folio 21 verso
Fig. 2: Codex Torin; Saluzziano 148 folio 21 recto
Fig. 3: Signed on the base of the throne Lippus de Sena; after Salomon Reinach (1907), II, 536
Fig. 4: Diego de Sagredo (1549) fol b ii recto, verso
Fig. 5: From *Cours d'Architecture* Plates to Vol., I, (1771) pls. XI, XII
Fig. 6, 7, 8: From *Opus Architectonicum* (1725)
Fig. 9: After Andrea Busiri-Vici, *La Piazza di San Pietro nei secoli III, XIV, XVII*, Rome 1893
Fig. 10, 11: After *Jahrbuch des Deutschen Werkbunds*, vol. II, 1913
Fig. 12: After Sigfried Giedion, *Walter Gropius*
Fig. 13, 14, 15: After Tilman Buddensieg and Henning Rogge, *Industriekultur*