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PICTORIAL SPACE IN RELATIONSHIP TO
BELIEFS AND COGNITIVE STRUCTURES

THE *LXION* ROOM
THE BARDI CHAPEL
THE *NYMPHÉAS*

Volume I

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in the History of Art

by

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It was a fascination with cognitive structures arising from my stint as an artist working with Richard Gregory that drew me to seek out Nycole, since I was aware of her reputation as a pioneer in the application of cognition to art historical inquiry. To my great excitement, she agreed to supervise my work as a doctoral candidate, and I'm certain she was the only person who had any idea as to the challenge I was about take on. I cannot thank her enough for her courage in embarking with me on this adventure. Her great intelligence and unshakable faith in my thesis – let alone her critical commentary – has been my lifeline, patiently keeping me from drowning until I finally found my footing. If the thesis has coherence, it is due to her diligent feedback and enlightening explanations and reservations over so many years.

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CHAPTER I

THE *IXION* ROOM

ILLUSTRATIONS

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Figure 1.112 The sensual and material presence of the decorations defines the philosophical character of the *Ixion* room.

Figure 1.113 Two actors in the north east corner of the *Ixion* Room

Figure 1.114 Two actors in the south east corner.

Figure 1.115 The space occupied by the actor is two rooms deep. (Taken from M. Krauss and von Matt, 1973.)

Figure 1.116 The position of the two actors is clearly a considerable distance behind Fortuna, emphasizing pictorial depth, which is also affirmed by their difference in size to that of Fortuna, who is seated and much larger at the front.

Figure 1.117 The representation of the various kinds of marble are richly coloured and textured.

Figure 1.118 The architectural projections, as in the case of the other two walls, have the effect of focusing attention onto the mythological scene, in this case Ixion tied to the wheel of fire.

Figure 1.119 Second Style wall decorations from the House of Augustus on the Pallatine in Rome. (Taken from Connolly and Dodge, 1998.)

Figure 1.120 Triton flanked by hippocampus emerging at the bottom edge of the red field that frames the Ixion myth on the east wall.

Figure 1.121 The head of Athena emerges from the blue field located beneath the naval battle on the north west corner.

Figure 1.122 Apollo located on the north wall, Upper Register, very badly degraded, only partial image.

Figure 1.123 Fortuna, best preserved of the three gods, Upper Register, east wall.

Figure 1.124 Dionysus, visibly sitting on a throne at centre in the Upper Register on the south wall.

Figure 1.125 Triads of gods as seen by the guests (A) as they enter the dining room.

Figure 1.126 A three-dimensional model of the *Ixion* room. The floor is divided into two equal parts constructed of more or less two equilateral triangles. The visitor enters from the open, or west, side.

Figure 1.127 An enclosed niche found in the Domus Aurea in Rome of a landscape with what appears to be either a model of the emanation of sunlight or vision as understood at the time of the Second Style. (Taken from Iacopi, 1999.)

Figure 1.128 A mosaic known as the *Four Seasons*, now located in the Glyptotek in Munich, Germany, that demonstrates the idea of constructing a deep space through projective, converging details of a frame. (Taken from Kern, 1938.)

Figure 1.129 *Four Seasons* mosaic: detail.

Figure 1.130 Perspectival diverging angles projecting from the eye(A) as vision was understood at the time of the *Ixion* Room decorations. Instead of thinking of architectural features *converging* from the point of the experience of the guest, they can be understood to *diverge* in the context of real space (B).

Figure 1.131 Representation of window seen from a reclining position. It connects lintel and jambs successfully.

Figure 1.132 Strings are attached to different points of termination on the architectural features. They are then drawn through a small hole in a piece of plastic as though the hole were the point of origin of sight in the eye. Therefore, the lines emanating from the eye construct the angles of the architectural representations, in this case the east wall. Along the vertical axis there are a number of points of emanation in order to construct all the architectural representations on all three registers.

Figure 1.133 The piece of plexi-glass with holes is perhaps more visible against the drawing of the north wall. It is quite surprising how well the emanating strings correspond to the represented angles. It is however, important to find the right points on the vertical axis.

Figure 1.134 The Vitruvian ideal for a man's height to that of the circle is approximately twice the diameter (87 cm) or 174 cm. As demonstrated, the height of the *Ixion* Room to the height of the third register is approximately three times a man's height. The actual dimensions of the *Ixion* Room are very close to the Vitruvian ideal. The arch completed, at its apex would be about 44 cm or about half of the diameter. The diagrammatic illustration (A) at the top is seen against the virtual reconstruction. Because of the problem of height in the photographic reconstruction (B), there are small discrepancies.

Figure 1.135 Equally spaced points along the vertical axis on the plexiglass take the place of the west wall or point of entry. From points (A), (B), (C) and (D) strings – like rays of vision – diverge to construct the angles of the architectural representation on the east wall.

Figure 1.136 Equally spaced points along the vertical axis of the plexi-glass take the place of the south wall. From point (A), (B), (C), (D) and (E) strings – like rays of vision – diverge to construct the angles of the architectural representation of the north wall.

Figure 1.137 Along the vertical axis of the three circles are six perforations. The first is at approx. 87.5 cm, the second at 175 cm, the third at 263cm, the fourth at 350.5 cm 438cm. This is only about 26cm from the measures given for the height of the room. How accurate the measurement is I could not verify. But I am satisfied with their proximity.

Figure 1.138 Illustration of Roman decorators at work, second century A.C.E., from a funerary relief. (Taken from L'Erma di Bretschneider, 2000.)

Figure 1.139 I propose the possible use of sight lines that the artists might have used to determine the construction of the architectural projective angles.

Figure 1.140 Strings are pulled taught to salient points on the outline of the architectural projective angles and correspond to the holes in the plexi-glass wall of the model.

Figure 1.141 I found this method to closely simulate the projective angles of this room. This is perhaps also the reason that there are no absolute convergent angles: they did not look for them.

Figure 1.142 Diagram (A) demonstrates the proposition regarding the triangulation of the gaze between the gods on the Third Register. Diagram (B) demonstrates the proposition regarding the triangulation of the gaze between the mythological characters of the Second Register.

Figure 1.143 My diagrammatic representation of Euclid's proposition # 27. When the

distance between the eyes is smaller than the diameter of a sphere, then that which is seen is greater than the sphere's diameter. Two divergent sets of rays from the eyes cover a larger field (A) bigger than the sphere and (B) again larger with binocular vision. On the right: a visual cone as understood in classical optics. (Taken from Edgerton Jr., 1991.)

Figure 1.144 (Below). Summary of pictorial space on the First, Second and Third Register of the *Ixion* Room.

CHAPTER II

GIOTTO CYCLE OF THE LIFE OF SAINT FRANCIS, THE BARDI CHAPEL

ILLUSTRATIONS

Figure 2.1 Basilica Santa Croce as seen from the side (Taken from Canali, 1954.)

Figure 2.2 Basilica Santa Croce; a contemporary view of the front facade. (Taken from Micheletti, 1998.)

Figure 2.3 A painting from 1718 shows the extensiveness of the complex of Santa Croce. (A) marks the unfinished front of the Basilica. (Taken from Canali, 1954.)

Figure 2.4 Interior view of the Basilica looking towards the Main Chapel with the smaller *Bardi* Chapel (B) adjoining it on its right. Please note that the fresco of *Saint Francis Receiving Stigmata* (B) is located directly above the entrance to the Chapel. (Taken from Micheletti, 1998.)

Figure 2.5 Plan of the Santa Croce Basilica Complex. (Taken from Canali, 1954.)

Figure 2.6 The arch that defines the *Bardi* Chapel at its apex is an example of squaring the circle and is typical of a Gothic arch.

Figure 2.7 Narrow tall stained glass windows at the rear of the *Bardi* Chapel representing the life of Christ.

Figure 2.8 Detail from the stained glass window illustrating the Annunciation by Jacopo del Casentino, 16th century.

Figure 2.9 View into the *Bardi* Chapel, where the stone altar is clearly visible.

Figure 2.10 Looking up at the quadrifid vault at the ceiling of the *Bardi* Chapel with four medallions representing the Franciscan virtues.

Figure 2.11 Detail of one of the Four Virtues, possibly poverty.

Figure 2.12 The pier buttress (A) is a painted trompe l'oeil.

Figure 2.13 Giotto, 1330's. Image of Saint Clair. (Taken from Canali, 1954.)

Figure 2.14 Giotto, 1330's. Image of Saint Louis of Toulouse. (Taken from Canali, 1954.)

Figure 2.15 Giotto, 1330's. Image of Saint Elizabeth of Hungary. (Taken from Canali, 1954.)

Figure 2.16 The right hand wall of the *Bardi Chapel* with three cycles from the life of Saint Francis. Giotto 1330's. (Taken from Canali, 1954.)

Figure 2.17 Left hand wall of the *Bardi Chapel* with three cycles from the life of Saint Francis. Giotto 1330's. (Taken from Busignami, 1993.)

Figure 2.18 Giotto, 1330's. *Saint Francis Renouncing his Worldly Goods*.

Figure 2.19 Giotto, 1330's. *Saint Francis Renouncing his Worldly Goods*. (A) Diagonal thrust of father advancing towards his son and (B) Vertical thrust of the folded hands and figure of Saint Francis.

Figure 2.20 Giotto, 1330's. *The Confirmation of the Rule*. Saint Francis presents the first rules on a scroll to the Bishop of Sabina.

Figure 2.21 Giotto, 1330's. *The Confirmation of the Rule*. (A) In the oculi, Saint Peter looking heavenward.

Figure 2.22 Giotto, 1330's. *The Confirmation of the Rule*. The centralized roof-lines lead the viewer's eyes upwards.

Figure 2.23 Giotto, 1330's. *Trial by Fire*. Saint Francis (A) challenges the priests (B) to walk through the fire with him.

Figure 2.24 Giotto, 1330's. *Trial by Fire*. The Sultan (A) looks at the priests fleeing on the left while pointing to Saint Francis on the right side of the fresco.

Figure 2.25 Giotto, 1330's. *Trial by Fire*. The Sultan becomes the focus of converging perspective.

Figure 2.26 Giotto, 1330's. *The Apparition of Saint Francis at Arles*.

Figure 2.27 Giotto, 1330's. *The Apparition of Saint Francis at Arles*. The central arch and the figure of the Saint with uplifted arms, forms a cross.

Figure 2.28 Giotto, 1330's. *The Death of Saint Francis and the Verification of the Stigmata*. Saint Francis laid in state in his monk's habit while (possibly) Lord Pontiff Alexander affirms the sacred Stigmata

Figure 2.29 Giotto, 1330's. *The Death of Saint Francis and the Verification of the Stigmata*. The imploding or divergent architectural extended perspective lines emanate out from the body of Saint Francis.

Figure 2.30 Giotto, 1330's. *Visions of Brother Agostino and Bishop Guido of Assisi*. Two events are portrayed here. Brother Augustine on the left and the Bishop of Assisi on the right.

Figure 2.31 Giotto, 1330's. *Visions of Brother Agostino and Bishop Guido of Assisi*. The figure at A forces the viewer to look upwards.

Figure 2.32 Giotto, 1330's. *Saint Francis Receiving Stigmata*. The circular marks that are painted on relief, I propose, represent nail-heads. (Taken from Peruzzo, 1986.)

Figure 2.33 Giotto, 1330's. *Saint Francis Receiving Stigmata*. Lines mark the connection between the wounds of Christ and the stigmata received by Saint Francis.

Figure 2.34 Giotto, 1297-1299. Border from *The Apparition of Saint Francis at Arles* from the Upper Basilica of St. Francis in Assisi. (Taken from Casa Editrice Francescana, 1987.)

Figure 2.35 *Saint Francis Receiving Stigmata*: detail of border. (Taken from a postcard I bought in Santa Croce bookshop; photo by Becocchi, Fierenze: no date.)

Figure 2.36 Giotto, 1330's *Saint Francis Receiving Stigmata*: an enlargement of a detail of the border to show the three-dimensional relief-like rendering of the nail-head.

Figure 2.37 Giotto, 1330's. The painting of the three saints is given the appearance of sculpted figures standing on a base in a niche integrated into the architecture.

Figure 2.38 Giotto, 1330's. The size of Giotto's figures is 140 cm, close to the actual size of an average person at the time.

Figure 2.39 The neutral coloured base underneath the frescoes measures 160 cm in height. The frescoes begin just above the eyelevel of the standing viewer, so that the viewer is compelled to look up while at the same time having the feeling of being able to participate in the activity of the scene.

Figure 2.40 Giotto, 1330's. *The Apparition of Saint Francis at Arles*. The lines that project towards Saint Francis also can act as his field of vision.

Figure 2.41 Giotto, 1330's. *The Confirmation of the Rule*. The projective lines of the

coffered ceiling project towards the disciples behind Saint Francis.

Figure 2.42 Giotto, 1330's. *Saint Francis Renouncing his Worldly Goods*. In the painting, light is represented as projected from the right side (A), simulating the light from the actual window on the right of the fresco.

Figure 2.43 Giotto, 1330's. *The Confirmation of the Rule*. Both the perspectival confluence and the composition of the figures in this fresco perpetuate a sense of pictorial convexity.

Figure 2.44 Convex and concave pictorial representations of gothic architectural details from the sketchbook of Villard de Honnecourt, 1225-1250. (Taken from Bowie, 1959.)

Figure 2.45 Giotto, 1330's. *The Confirmation of the Rule*. Planes diminish in size with distance and give through variable scaling a sense of depth.

Figure 2.46 Giotto, 1330's. *Saint Francis Renouncing his Worldly Goods*. The plane of the wall around the palace increases as the frontal leading edge while diminishing into the distance.

Figure 2.47 Giotto 1330's *Trial by Fire*. Planes diminish in size as they recede into the distance.

Figure 2.48 Giotto, 1330's. *The Death of Saint Francis and the Verification of the Stigmata*. (A) Light bathes the scene, nothing is hidden, all is visible. (B) The eyes are large with love, but the expression is reserved, filled with deep sorrow.

Figure 2.49 View (A) down the central nave towards the transept, at whose end it is possible to see flanking each side of the central main chapel a number of smaller chapels. (B) The Bardi Chapel is located to the right of the Main Chapel. (Taken from Micheletti, 1998.)

Figure 2.50 Giotto, 1330's. Reconstruction of left wall. (A) *Saint Francis Renouncing his Worldly Goods*. (B) *The Apparition of Saint Francis at Arles*. (C) *The Death of Saint Francis and the Verification of the Stigmata*.

Figure 2.51 Giotto, 1330's. Reconstruction of right wall. (A) *The Confirmation of the Rule*. (B) *Trial by Fire*. (C) *Visions of Brother Agostino and Bishop Guido of Assisi*.

Figure 2.52 Giotto, 1330's. *Saint Francis Receiving Stigmata*.

Figure 2.53 Giotto, 1330's. *Saint Francis Renouncing his Worldly Goods*. For the Franciscan Order the rejection of worldly goods, and of worldly emotive connection completely transferred to God, is the greatest sign of integrity.

Figure 2.54 Giotto, 1330's. *The Death of Saint Francis and the Verification of the Stigmata*. Compositionally, the emotional experience is centralized, and the downward slope gives it its

sorrow.

Figure 2.55 Giotto 1330's *Trial by Fire*. The Sultan abandoned in the middle also speaks of integrity in the face of abandonment.

Figure 2.56 Giotto, 1330's. *The Confirmation of the Rule*. The central group is charged with expectations and ambition, in contrast to the figures on either side that are silently witnessing the event.

Figure 2.57 Giotto, 1330's. *Saint Francis Receiving Stigmata*. The direct transmission of right hand to right hand, right foot to right foot.

Figure 2.58 Giotto, circa 1312, hanging in the Louvre. The transmission here is mirror-like. Right hand to left hand, right foot to left foot. (Taken from Cavazzini, 1998.)

Figure 2.59 This schematic model demonstrates the mirror-like relationship as represented in the Giotto's panel of *Saint Francis Receiving Stigmata*, c. 1300, hanging in the Louvre. A - B right hand to left hand; C - D left hand to right hand; E - F right foot to left foot; G - H left foot to right foot; I - J stigmata wound on the right side of Christ to the left side of Saint Francis. This mirror transference constructs parallel but not equivalent relationships.

Figure 2.60 This is a schematic of *Saint Francis Receiving Stigmata*, painted above the *Bardi Chapel*. A - B represents right hand to right hand; C - D left hand to left hand; E - F right foot to right foot; G - H left foot to left foot; I - J right side of Christ to right side of Saint Francis. The relationship between Christ and Saint Francis is duplicated through the dynamics of the intersecting diagonal lines that at the point of exchange vanish into the infinite (the yet unspoken of vanishing point).

Figure 2.61 Map (A), the extent of the Umayyad Caliphate Empire, A.C.E. 737. (B) Giotto, 1330's. The Christian conversion of the Arab invaders: the converted Sultan represented by Giotto in the *Trial by Fire*. (C) The receding Arab invasion by 1130 A.C.E., closer to the time of the life of Saint Francis. (The maps are taken from McEvedy, 1978.)

Figure 2.62 Giotto, 1330's. *Saint Francis Renouncing his Worldly Goods*, upper panel. *The Apparition of Saint Francis at Arles*, lower panel. There is evidence of Giotto valuing the idea of perfection in completing the circle through the composition in the second panel.

Figure 2.63 Giotto, 1330's. *The Confirmation of the Rule*, upper panel. *Trial by Fire*, lower panel. Evidence of the value of the idea of perfection can be seen as Giotto, through the composition in the lower panel, completes the circle.

Figure 2.64 Giotto, 1330's. The scene of *The Apparition of Saint Francis at Arles* is framed very close to the limits of the edges of the fresco, giving the appearance of being part of the real space of the chapel.

Figure 2.65 Giotto, 1330's. *The Apparition of Saint Francis at Arles* (A); *Visions of Brother Agostino and Bishop Guido of Assisi* (D); *Trial by Fire* (B); *The Death of Saint Francis and the Verification of the Stigmata* (C). The scenes of A and D take place inside, while the scenes of B and C are given outdoor settings.

Figure 2.66 Giotto, 1330's. *The Confirmation of the Rule*. The convergence points to receding planes in the architectural structure.

Figure 2.67 Giotto, 1330's. *The Death of Saint Francis and the Verification of the Stigmata*. The convergence points to receding planes in the architectural structure.

Figure 2.68 Giotto, 1330's. *The Apparition of Saint Francis at Arles*. The convergence points to receding planes in the architectural structure. In this panel there is a presence of the double infinity (A and B on the illustration.)

Figure 2.69 The *Cruxifix* of 1280 painted by Cimabue. (Taken from Micheletti, 1998.)

Figure 2.70 The Giotto *Cruxifix* painted in 1300. (Taken from Cavazzini, 1998.)

Figure 2.71 Giotto, 1312. *Saint Francis Receiving Stigmata*.

Figure 2.72 Illustration from a Latin manuscript of the 12th to 13th century showing the eyes (A and B) with their converging nerves (C) and attached cells (E, F, G, and H). The dwelling place of the brain, or reason, is D and E. (Taken from Marshall and Magoun, 1998.)

Figure 2.73 Roger Bacon's two models of vision. (Taken from D.C. Lindberg, 1996)

Figure 2.74 Giotto 1330's. A, B: View of left wall in the *Bardi Chapel* (Taken from Canali, 1954.) View of right hand wall of the *Bardi Chapel*. C through H: Schematic reconstructed frontal view of both walls: *Saint Francis Renouncing his Worldly Goods*, C; *The Apparition of Saint Francis at Arles*, D; *The Death of Saint Francis and the Verification of the Stigmata*, E; *The Confirmation of the Rule*, F; *Trial by Fire*, G; *Visions of Brother Agostino and Bishop Guido of Assisi*, H.

Figure 2.74.1 Left side of Bardi Chapel.

Figure 2.74.2 Right side of Bardi Chapel.

Figure 2.75 Giotto, 1330's. *Trial by Fire*.

Figure 2.76 Giotto, 1330's *The Apparition of Saint Francis at Arles*.

Figure 2.77 Giotto, 1330's. *The Apparition of Saint Francis at Arles*. Perspective lines of the roof converge at an apex but also emanate over the whole scene.

Figure 2.78 Giotto, 1330's. The circle at the centre follows the arch at the top, while also following his raised arms that encompass the sign of the Crucifixion. The halo around his head recalls the iris at the centre of an eye.

Figure 2.79 Giotto, 1330's. *Trial by Fire*. While in the original version there are clearly two doorways, only one is now visible – on the side of the viewer entering the chapel.

Figure 2.80 Giotto, 1330's. *The Apparition of Saint Francis at Arles*. Divine emanation falls over the whole scene.

Figure 2.81 Giotto, 1330's. *The Death of Saint Francis and the Verification of the Stigmata*. Converging perspective and linear elements simultaneously point to the stigmata wound on Saint Francis' side and Saint Francis rising up to heaven.

Figure 2.82 Giotto, 1330's. *Visions of Brother agostino and Bishop Guido of Assisi*. This scene shows both refracted and reflected light.

Figure 2.83 Giotto, 1330's. *Saint Francis Renouncing his Worldly Goods*. The scene is illuminated from the right, or window side, making the left side of the wall progressively darker.

Figure 2.84 Giotto, 1330's. *Saint Francis Receiving Stigmata*. The mountain becomes a stable solid background against which the exchange-change is taking place.

Figure 2.85 Giotto, 1312. *Saint Francis Receiving Stigmata*. The Christ figure appears to be supported and enfolded on wings.

Figure 2.86 Giotto, Legend of Saint Francis, Assisi Cycle, 1304. *Saint Francis Receiving Stigmata* (Taken from Casa Franciscana ed., 1987.) The Christ figure appears to be supported and enfolded on wings, which give the figure a strong sense of verticality.

Figure 2.87 Giotto, 1304. *Saint Francis Receiving Stigmata*. The mirroring of the reception of stigmata is the same as in the Louvre panel.

Figure 2.89 Masaccio, *Trinity*, 1427-1428. (Taken from Borsi, 1998.) Giotto and Masaccio share the assumption that physical truth is a precondition of their art. Measures that were implied before, now become systematic.

Figure 2.90 (Taken from Burke (trans.), Bacon's *Majus Opus*, 1962.) The Heavens are concave (B) and must be equally distant from the earth (A) on account of the equality of nature. Therefore, the heavens and earth must by necessity be a spherical form.

Figure 2.91 (A) The plan of the church is divided into 10 sq meter units. The transept is 11 units deep. Each chapel at the end of the transept is 4 m wide with a 1 m thick wall between

them. F, G, H, I, J equal 20 meters. A, B, C, D, E also equals 20 meters. The central chapel is 10 x 10 m. wide and 10 m deep.

Figure 2.92 Elevation of the *Bardi Chapel*. Starting at the top: the fresco of *Saint Francis Receiving Stigmata* is (B), 3.90 m wide with a height (C) of 370 cm., border not included. (D, E, F) are the heights of the three frescoes on each side inside the chapel at 280 cm. The borders that surround them are 40cm wide. The 160 cm of unpainted wall at the bottom of the frescoes (G) represents approx. the height of a man.

Figure 2.93 The plan of the *Bardi Chapel* can be rounded off to 5 meters deep, four meters wide inside, with 1 m for the width of the stonewall separating each of the adjoining five chapels. From my experience, the best viewing position to take all three frescoes on each side in at once is approximately 5 meters outside the chapel and one meter to the right or left of the entrance to the chapel: (L) on the left, (M) on the right, which creates a 5 meter square outside the chapel.

Figure 2.94 The diameter of the circle that constructs the Stigmata fresco (A) is the radius of the circles that are squared to construct the gothic arch of the chapel (B).

Figure 2.95. The intrados of the saints is one sixth's the diameter of the Stigmata fresco.

Figure 2.96 Giotto, 1330's. *The Apparition of Saint Francis at Arles*.

Figure 2.97 Giotto, 1330's. *Trial by Fire*.

Figure 2.98 Giotto, 1330's. *Saint Francis Renouncing his Worldly Goods*.

Figure 2.99 Giotto, 1330's. *The Confirmation of the Rule*.

Figure 2.100 Giotto, 1330's. *The Death of Saint Francis and the Verification of the Stigmata*.

Figure 2.101 Giotto, 1330's. *Visions of Brother Agostino and Bishop Guido of Assisi*.

Figure 2.102 Giotto, 1330's. *The Apparition of Saint Francis at Arles*.

Figure 2.103 Giotto, 1330's. *The Confirmation of the Rule*.

Figure 2.104 Giotto, 1330's. *Trial by Fire*.

Figure 2.105 Giotto, 1330's. *The Confirmation of the Rule*.

Figure 2.106 Giotto, 1330's. *The Apparition of Saint Francis at Arles*.

Figure 2.107 Giotto, 1330's. *Trial by Fire*.

Figure 2.108 Scenes from the life of Christ. Padua, Arena Chapel. (Taken from Bellosi, 1981.)

Figure 2.109 Giotto, 1330's. *Saint Francis Receiving Stigmata*.

Figure 2.110 Giotto, 1312. *Saint Francis Receiving Stigmata* does imply a diagonally receding plane, but in comparison with the *Bardi* version (Figure 2.111: Giotto, 1330's, *Saint Francis Receiving Stigmata*) it is not as fully articulated.

Figure 2.111 Giotto, 1330's. *Saint Francis Receiving Stigmata*. The diagonal plane is clearly and fully articulated and cuts into space diagonally.

Figure 2.112 Giotto, 1330's. *Saint Francis Receiving Stigmata* It is curious how the force-field set up by the lines between Saint Francis and the feet of Christ (A) reappears again in the construction of the cave (B) and the construction of the mountain-side. The relationship of the red line (D) in its relationship to the red lines forming angle (B) is identical to the relationship of green line (C) to the green lines forming angle (A).

Figure 2.113 Diagram A: First cell receives sensations from the body, the second cell is the site of judgment and reason, and the third cell takes care of memory. C is the location of the optic chiasma. (Taken from Clark and Dewhurst, 1972.) Drawing B is a thirteenth century drawing that seems to make a diagrammatic representation of vision, describing the optic nerve and the optic chiasma. (Taken from Sudhoff, 1908.)

Figure 2.114 Giotto, 1330's. *Saint Francis Receiving Stigmata* located on the right hand over the *Bardi* Chapel.

Figure 2.115 Gasparo Martinelli, 1837. *Dogma of the Immaculate Conception* (Taken from Canali, 1954.)

Figure 2.116 Giotto, 1330's. *Saint Francis Receiving Stigmata*. The construction between Saint Francis and Christ (in red) and the representation of both the figure of Christ and that of Saint Francis – as well as the architectural representations – are fully dynamically integrated.

Figure 2.117 Giotto, 1330's. *The Apparition of Saint Francis at Arles*. The presence of Saint Francis is rendered with the same sense of solidity as the group of friars experiencing their collective vision.

Figure 2.118 Giotto, 1330's. *The Apparition of Saint Francis at Arles*. The same gesture of open arms as in the apparition below (see Figure 2.117) is only slightly modified by the Saint, now looking heavenward..

Figure 2.19 Giotto, 1330's. *The Apparition of Saint Francis at Arles*. The lines of the roof converge strategically at the location of Saint Francis's heart.

Figure 2.120 *Saint Francis Receiving Stigmata*. The line that passes from the stigmatic wound on the side of Christ's body passes invisibly (drawn here in red for emphasis) through the hands and eyes of Saint Francis.

CHAPTER III

CLAUDE MONET THE NYMPHÉAS ILLUSTRATIONS

Figure 3.1 Exterior views of the Orangerie situated in the gardens of the Tuileries in Paris.

Figure 3.2 The Orangerie in the gardens of the Tuileries was located on the principle east-west axis of Paris that was centred on the Louvre – located at the east end – and the Arc de Triomphe at the west end. It is interesting to note that the layout of the *Nymphéas* decoration integrated this east-west axis into the actual disposition of its subject matter. The Orangerie is located on the south-west corner near the Place de la Concorde. (Taken from the Michelin Guide, 1981.)

Figure 3.3 Views of Monet's third studio at Giverny, 1917, where the *Nymphéas* installation can be seen in progress. (Taken from Wildenstein, 2003.)

Figure 3.4 Eugene Boudin, *The Beach at Trouville* 1864. (Taken From Sagner-Duechting, 2004.)

Figure 3.5 Monet standing in the garden in front of his house in Giverny. (Taken from Rachman, 1997.)

Figure 3.6 The Fresco depiction of *The Garden of Livia* from Prima Porta near Rome. Late first century B.C.E. (Taken from Wheeler, 1996.)

Figure 3.7 This is a view from Monet's second studio overlooking the garden and greenhouse, 1924. (Taken from Widenstein, 1978.)

Figure 3.8 Preliminary drawings made by Monet for the *Nymphéas* Decorations (sketchbook MM..5129,17 verso recto. and below MM. 5129,12 verso recto). Possibly drawn over other images sometime between 1887-1890. (Taken from Spate, 1992.)

Figure 3.9 This circular single room 18.5 meters in diameter designed by Louis Bonnier for the Rodin Museum was the first configuration for the water lily installation.

Figure 3.10 This design was the final configuration for two separate rooms to house Monet's *Nymphéas* project. Camille Lefevre, appointed by the Ministry, redesigned the long rectangular space of the Orangerie into two separate but interconnected oval spaces. The titles that are given in English on this plan are the titles by which I acknowledge the works. (Taken from Spate, 1992.)

Figure 3.11 A, Room One, is the smaller of the two rooms (here seemingly larger due to perspectival and photographic distortion). The length of this room is 20.3 meters and 12.30 meters width. B, Room Two, is 23.30 meters long and also 12.30 meters wide.

Figure 3.12 The full height of the rooms that house the *Nymphéas* installation is 4 m, the paintings are half that or 2 m in height and are hung 33 cm above the floor.

Figure 3.13 The ceiling of the original installation (A) was a false skylight following the natural curve of the rooms. This picture was taken in 1930. (B) is a view of the 1984 renovation with artificial illumination. (Both views taken from Rachman, 1997.) (C) This is the most recent ceiling (Taken by myself in 2007.) It is a return to soft filtered daylight, which Monet would have liked, since it simulates the daylight conditions in his studio, with its cloth-covered or filtered skylights.

Figure 3.14 The left hand entrance into Room One from the main entrance hall (A). The small space in between Room One and entering Room Two (B). This space in between Room One and Two is neutral and makes seeing Room Two the more impressive as an experience. (C) This is the right hand entrance into Room Two.

Figure 3.15 The relationship of the works in Room Two is laid out as in the plan of figure 3.10. *The Setting Sun* hangs on the west wall, *Clouds* on the north wall, *Morning* on the south wall and *Green Reflections* on the east wall.

Figure 3.16 The relationship of the works in Room Two is laid out as in the plan of figure 3.10. Also it is possible to see, looking at figure 3.15 and 3.16, the back-to-back relationship of the west wall in Room Two and the east wall of Room One. *Reflections of Trees* of Room Two hangs on the west wall, *Clear Morning with Willows* on the south wall, *Morning with Willows* on the north wall and *The Two Willows* on the east wall.

Figure 3.17 Claude Monet, *The Setting Sun*, 200 cm x 600 cm, completed around 1921,

Room One, west wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.)

Figure 3.18 Claude Monet, *Green Reflections*, 200 cm x 850 cm, completed between 1917-1921, Room One, east wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.)

Figure 3.19 Claude Monet, *The Clouds*, 200cm x 1,275 cm, completed between 1923-1924, Room One, north wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.)

Figure 3.20 Claude Monet, *Morning*, 200 cm x 1,275 cm, completed between 1921-1926, Room One, south wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.)

Figure 3.21 Claude Monet, *Reflections of Trees*, 197 cm x 850 cm, completed between 1922-1924, Room Two, west wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.)

Figure 3.22 Claude Monet, *The Two Willows*, 197 cm x 1,690 cm, completed between 1924-1926, Room Two east wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.)

Figure 3.23 Claude Monet, *Morning with Willows*, 197 cm x 1,277 cm, completed between 1916-1926, Room Two north wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.)

Figure 3.24 Claude Monet, *Clear Morning with Willows*, 197 cm x 1,277 cm, completed between 1916-1926, Room Two, South Wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.)

Figure 3.25 Claude Monet, *The Clouds*, 200cm x 1,275 cm, completed between 1923-1924, Room One, north wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.) The Line drawn across this painting indicates approximately Monet's own eye level.

Figure 3.26 A photograph of Monet standing in front of the uncompleted painting for the *Nymphéas* Installation, *Morning*. From this photograph, taking into account his distance from the work, and the fact that the work is positioned on supports – scaffolding – I conclude that

the horizon line in the painting is approximately Monet's own horizon line as drawn in figure 3.25 above.

Figure 3.27 Claude Monet, *Morning*, 200 cm x 1,275 cm, completed between 1921-1926, Room One, south wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.) The lines indicate the apparently converging grasses that simulate a sense of perspective.

Figure 3.28 Claude Monet, *The Two Willows*, 197 cm x 1,690 cm, completed between 1924-1926, Room Two, east wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.) In this work, the converging formation of reflected clouds helps to create a sense of depth to the field.

Figure 3.29 Claude Monet, *Clear Morning with Willows*, 197 cm x 1,277 cm, completed between 1916-1926, Room Two, south wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.) In this work, it is the foliage from the trees that creates a sense of convergence.

Figure 3.30 Monet's north and south wall on my studio wall to be inserted

Figure 3.31 Details of *Morning with Willows* showing the tree on the left of the painting (A) and (B) on the right of the painting. These trees and their branches have a real sense of volume and between them they set up a kind of stereoscopic field when looking at the whole painting from a distance. Please refer to figure 3.23. (Taken from Stuckey, 1988.) The installation view (C) was taken by myself and shows even more clearly the presence of the tree on the left.

Figure 3.32 Detail of *Clear Morning with Willows* has the same effect of volumetric presence of the trees and the mesmerizing stereoscopic focus of the field between the trees. Please refer to figure 3.24 for the full panoramic view of this painting. (Taken from Stuckey, 1988.)

Figure 3.33. This is a photograph of Monet taken in 1926 by Nicholas Murray. Monet appears to be wearing a pair of glasses whose right side is clear while the left side is dark and opaque glass. (Taken from Wildenstein, 1987.)

Figure 3.34 Claude Monet, *Green Reflections*, 200 cm x 850 cm, completed between 1917-1921, Room One, east wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.) The gradual diminishing (A), (B), (C) of the water lilies gives the appearance of a relatively short distance away from the viewer over the distance of the height of the painting, compared to *Morning*.

Figure 3.35 Claude Monet, *Morning*, 200 cm x 1,275 cm, completed between 1921-1926, Room One, south wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.) In *Morning* there is a dramatic diminishing of the size of the lily pads, (A), (B), (C).

Figure 3.36 The tall grass on the left hand side in this detail of *Morning* appears very large compared to the receding small water lily pads on the top edge of the painting, exaggerating the sense of scale and distance.

Figure 3.37 Claude Monet, *The Setting Sun*, 200 cm x 600 cm, completed around 1921, Room One, west wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.) Note the consistently and slowly decreasing water-lily pads, creating a relatively shallow pictorial space. Monet, however, decreases the pad's obliqueness compared to three different images of the actual pond: (B) Full length of water-lily pond taken 1933; (Taken from Orr and Tucker, 1995.); (C) Actual state of pond in 1990. (Taken from Hoog, 1990.); (D) Actual state of pond in 1995. (Taken from Orr and Tucker, 1995.)

Figure 3.38 Claude Monet, *The Clouds*, 200cm x 1,275 cm, completed between 1923-1924, Room One, north wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.) The dark open oval water lilies barely diminish in size towards the top edge of this painting.

Figure 3.39 Claude Monet, *Reflections of Trees*, 197 cm x 850 cm, completed between 1922-1924, Room two, west wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.) The diminishing of the water lily pads and flowers is relatively small, giving the appearance of a shallow field.

Figure 3.40 Claude Monet, *Morning with Willows*, 197 cm x 1,277 cm, completed between 1916-1926, Room Two, north wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.) An abrupt diminishing of water-lily pads near the top of the painting gives this painting a sense of infinite space.

Figure 3.41 Claude Monet, *Morning with Willows*, 197 cm x 1,277 cm, completed between 1916-1926, Room Two, north wall, The *Nymphéas* Installation at the Orangerie, Paris, France. (Taken from Stuckey, 1988.) In this painting Monet uses the same scaling device as in *Clear Morning with Willows*, located on the opposing wall, achieving the same sense of infinity.

Figure 3.42 Claude Monet, *The Two Willows*, 197 cm x 1,690 cm, completed between 1924-1926, Room Two, east wall, The *Nymphéas* Installation at the Orangerie, Paris, France.

(Taken from Stuckey, 1988.)

Figure 3.43 Detail of *The Two Willows*. Here the size of the water lily pads diminishes dramatically, creating the perception of great pictorial depth.

Figure 3.44 A view of the installed east wall in Room One, showing *Green Reflections*. The surface of the pond, despite curving away, appears relatively close to the viewer.

Figure 3.45 Installed views of *Morning* (A) and *The Clouds* (B) in Room One.

Figure 3.46 Detail of *Morning* (A) and detail of *The Clouds* (B). Despite the shorter axis of the room, these surfaces in A and B create an expansive sense of pictorial depth.

Figure 3.47 An installation view of Room Two.

Figure 3.48 The corridors of trees on both the south and north wall guide the viewer's attention towards the expansive east wall of Room Two.

Figure 3.49 Monet's height is discernable from his relationship to the paintings in this photograph. The painting for the water lily series that he is standing in front of is known to be two meters in height. (Taken from Spate, 1992.)

Figure 3.50 (A) The water lily pond and the Japanese bridge circa 1895. (Taken from Orr and Tucker, 1995.) (B) View from the west towards the Japanese bridge, 1933. (Taken from Stuckey, 1985). (C) Photo of the pond, 1995. (Taken from Orr and Tucker, 1995.) The large tufts of grass at different locations on the pond can be seen in all three images above.

Figure 3.51 Detail of *Green Reflections*. The vertical marks are consistent and regular, and do not diminish in size

Figure 3.52 Detail of *Reflections of Trees*. The vertical marks are consistent and regular, and do not diminish in size.

Figure 3.53 Details of *The Clouds*. The sensation is of falling into but also simultaneously gliding across the surface of the water.

Figure 3.54 The water's surface flows and emanates light towards the room's centre, the exception being the east wall that flows in or out.

Figure 3.55 The viewer is transported outwards by the water's surface expanding away from the centre of the room.

Figure 3.56 (A) Claude Monet, *Self Portrait*, 1917. (Taken from Wildenstein, 1985.) (B) a detail of Monet's photograph of the water-lily pond. (Taken from Spate, 1992.) (C) Plan of Room One and Room Two. The shape of the water-lily leaf resonates with both Monet's self

portrait (A), and the combined shape of Room One and Room Two (C). It has always been impossible for me to see this cloud formation in *The Clouds* on the right side of the painting without considering it as a kind of portrait of the artist.

Figure 3.57 Claude Monet, *Camille Monet on her Death Bed*, 1879. (Taken from Wildenstein, 1985.) The distance between each stroke and the implied distance between the layers of these strokes suspends Camille's figure in a blue "world" space.

Figure 3.58 Details from Room One are: (A) *Green Reflections*; (B) *The Clouds*; (C) *Morning*; (D) *The Setting Sun*; Figure 3.107, Details from Room Two (E) *The Two Willows*, (F) *Morning with Willows*, (G) *Clear Morning with Willows*, (H) *Reflections of Trees*.

Figure 3.59 The details shown here (E, F, G, H) are of the most articulated representations of vegetation in Room Two. When comparing these to Room One (Figure 3.106: A, B, C, D), it becomes clear that the representations of vegetation in Room One have a greater sense of detail and three dimensional material presence, with the exception of the tree trunks on the north and south side represented in Room Two.

Figure 3.60 We can apply Goethe's colour theory of complementary shadows: 1) *Clear Morning with Willows*: orange-brown stem with blue edges; 2) *Morning with Willows* the stem is a lighter, brighter orange-brown on the edges against the bluish water; 3) this is also true although more subtle for *The Two Willows*: a yellow-orange on the left side of the tree's stem and edged with blue, its complementary colour, on the right side of the stem.

Figure 3.61 Monet painting by the water-lily pond, 8th of July, 1915. (Taken from Spate, 1992.)

Figure 3.62 Above left: detail from Room One, south wall, *Morning*; above, right: detail from Room Two, south wall, *Clear Morning with Willows*.

Figure 3.63 Detail from *The Two Willows*, Room Two.

Figure 3.64 Room One: (A) *Green Reflections*; (B) *The Clouds*; (C) *Morning*; (D) *The Setting Sun*.

Room Two: (E) *The Two Willows*; (F) *Morning with Willows*; (G) *Clear Morning with Willows*; (H) *Reflections of Trees*. A study and comparison of all eight paintings fails to show any overt horizon or clear evidence of a shore. The lily pads are in fact the most prominent defining features, marking an otherwise uncertain and intangible surface.

Figure 3.65 Monet in his third studio, surrounded by panels of his large Water Lilies series, 1920. (Taken from Wildenstein, 1978.) Three views of the third studio, Giverny, in 1917. (Taken from Stuckey, 1985.)

Figure 3.66 (A) Detail of installation view of *Green Reflections*, Room One;

Figure 3.67 (B) Detail of installation view of *Reflections of Trees*, Room Two. Both are located on curved walls that essentially back onto each other like inverted C's, each drawing or 'funneling' the viewer in.

Figure 3.68 (A) The grey-blue of *Reflection of Trees* is typical of early morning. There is not sufficient light at this time of day to give more saturation to the colour of objects and consequently define their specific shape.

Figure 3.69 (B) *The Setting Sun* has all the characteristics of the warm, spectral quality of evening light.

Figure 3.70 This is a view looking towards the west end of Room One with *Morning* on the left, *The Clouds* on the right, and *The Setting Sun* at centre. It is also this view that the visitor experiences as they leave the installation. Overall, the quality of colour in this room is more saturated than in Room Two.

Figure 3.71 The quality of the colour in Room Two is, overall, the less saturated colour of morning. A primarily bluish cast typical of morning light pervades the room.

Figure 3.72 Installation view of *Green Reflections*, located on the east end of Room One. This is the pond at the darkness of dusk, with the water lilies illuminated by the last rays of light.

Figure 3.73 It is possible here to compare the saturated colour of *Green Reflections* in Room One, representing the last light of day, with (see above in Figure 3.85) *Reflections of Trees* and the least saturated colour of the first light of day.

Figure 3.74 (A) *The Clouds*, north wall in Room One, have a more yellowish cast when compared with the warmer rosy cast of the clouds represented in *Morning with Willows* (B) on the north wall of Room Two.

Figure 3.75 *The Clouds*, north wall, Room One. Figure 3.76 *Morning*, south wall, Room One. The placement of the paintings on north and south walls reflects the different effects of light that one would experience of evening light in the landscape. This is directly determined by the sun's relationship as it changes to these absolute directional markers in the course of the year, at times being nearer or further away.

Figure 3.77 Faraday's delineation of lines of magnetic force by the use of iron filings (1852). (Taken from Harman, 1982.)

Figure 3.78 Details of *The Setting Sun*; (A) The horizontal marks reinforce the sense of surface. On the other hand, in (B) the vertical marks penetrate the surface of the water.

Figure 3.79 Details of *The Clouds*; (A) is *on* the surface. (B) is *through* the surface into undefined territory. In Monet's *Nymphéas* paintings, the material – plant life and water – are visually modified by the immateriality of light. Yet both can only be spoken about through the materials of painting. It is the transmission of movement through the brushstroke that translates back into the immaterial energy of light to the viewer.

Figure 3.80 Detail of *Morning*. While light is technically reflected, nevertheless – due to layering – the darker marks on top of the lighter coloured blue surface of the water creates the impression that light emanates and oscillates both from below and on the water's surface.

Figure 3.81 Details of *Green Reflections*. The dense vertical marks are interrupted by the lily pads, which are painted with quick circular brushstrokes. The repetitive vertical gesture and the repetitive horizontal gesture set up two distinct and contrary fields of energy in motion.

Figure 3.82 Three details from *The Two Willows*. The left detail is from the left of the painting, the middle detail from the centre, and the right detail from the right hand side. All the brushstrokes are soft and follow a circular movement.

Figure 3.83 Detail of the pictorial field of *The Two Willows* on the east wall. (A) The painting is curved in two ways: by the shape of the trees on either side, and by the pictorial concavity or convexity formed by the clouds at the top edge and the lily pads on the bottom edge – as well as by the perspectival suggestion created by the falling willow branches. (B) The lily pad that is discernable in the distance appears to correspond to the viewer's eye level – the horizontal line indicated on the illustration.

Figure 3.84 (A) Photograph taken from the north bank of the water lily pond at Giverny in 1900. (Taken from Wildenstein, 2003.) (B) View towards Monet's house from the water lily pond, 1933. (Taken from Wildenstein, 1978.) (C) Full length view of the water lily pond. (Taken from Orr and Tucker, 1995.) The smoothness of the water's surface in the photographs gives a singular spatial surface continuity to the location of the water lily pads. This contrasts with the variety of spatial locations of the lily pads in the paintings – in this case *Green Reflections* (D) of the *Nymphéas* paintings. My first hand observation of the paintings suggested to me the experience of an activated surface due to the subtle but strong sense of individual spatial dislocation of each lily pad, quite unlike a continuous smooth surface.

Figure 3.85 The lily pads mark not only the surface of *Green Reflections*, but also lead the eye in a circular motion across it, propelling the viewer to its outer or upper-most edge and coming back to the bottom-most edge only to continue this movement around the least dense lily pad at its centre.

Figure 3.86 The contrast between the scale of the lily pads (B) at the centre of *The Clouds*, and those at both the left (A) and the right edge (C) (all kept in scale to the over all painting) emphasizes the sense of material proximity (A) and (C) compared to the sense of distance indicated by the lily pads in (B).

Figure 3.87 In *Morning*, on the left side as shown in the detail above, the large scale of the lily pads gives this area of the painting the greatest sense of proximity.

Figure 3.88 The physical presence of the tree trunks in the *Morning with Willows* not only lends an implied reference to a shore and becomes a device for framing the scene.

Figure 3.89 Compare the full *Clear Morning with Willows* (A) with the cropped version (B). The central space between the willows in (A) when compared to (B) appears much flatter than the central space of (B) that curves out towards the viewer.

Figure 3.90 *The Two Willows*. Shape is bent where the trees are close to the outer edge, and as a result things seems simultaneously coming towards the viewer's space and moving away

Figure 3.91 G.G. Zumbo (18th century), (A) *Triumph of Time*; (B) *The Plague*; (C) 18th century wax models of a woman's body. All models are made of wax. (Taken from Poggesi and Duering, 2001.)

Figure 3.92 These details of the right and left side of *The Clouds* show dense thick murky vegetation both below and above the water's surface

Figure 3.93 The centre of *The Clouds*: fluffy, light, and translucent, it is in stark contrast to its edges (above).

Figure 3.94 Details of *Morning*. Monet provides startling contrast on the edges between dense thick primeval vegetation and clear clean cleansing infinite water.

Figure 3.95 The centre of *Morning*, when isolated from its edges (above), has the appearance of crystal clear water.

Figure 3.96 The pictorial construction of *Morning* carries the water with its vegetation towards the viewer.

Figure 3.97 The pictorial construction of *The Clouds* and the embracing dark edges carries the water's surface towards the viewer.

Figure 3.98 In *The Setting Sun*, the intensity of the sun's reflection its relative light hue value moves the surface of the water towards the viewer.

Figure 3.99 Because of the apparent proximity of the water lily pads at the top edge of *Green Reflections*, the viewer is pulled towards this edge – creating the sensation of moving

both inward and outward towards Room Two.

Figure 3.100 The elliptical, loopy, diffused edges in the rendering of the reflected clouds in *The Clouds* permits the viewer to willingly fall into and be embraced by their softness.

Figure 3.101 In *Morning* the elliptical half-open, half-closed marks define the water's surface by skidding horizontally across it, creating the impression and sensation of undulating wavelets that activate this surface.

Figure 3.102 The marks that define *The Setting Sun* are horizontal, vertical and diagonal – pushing against each other elicits the memory of the power of the presence of the sun even when, and perhaps especially when, reflected.

Figure 3.103 Everything about *Reflections of Trees* is uncertain and dreamlike. The colour is between blue-red and violet, the marks are feathered and undefined in that it is difficult to discern their beginning or end.

Figure 3.104 Image (A) on the right: *Morning with Willows* on the right of the doorway is a transition of tonal values with respect to *Reflections of Trees*.

Figure 3.105 Image (B) on the left shows the transition of *Clear Morning with Willows* on the left of the doorway with *Reflections of Trees* on the right.

Figure 3.106 Photo-montage of Room Two, looking towards *The Two Willows* as it wraps around the east wall, while *Morning with Willows* on the left wall with *Clear Morning with Willows* on the right together create the corridor effect I speak of.

Figure 3.107 Above, *Morning with Willows*: detail to the right detail to the left of painting.

Résumé

Ma recherche consiste à examiner l'espace pictural de trois oeuvres provenant de trois périodes distinctes de l'histoire de l'art afin de démontrer que l'art participe, d'une part, d'un modèle culturel spécifique et, d'autre part, de données perceptivo-spatiales universellement partagées qui relient entre eux des individus soumis à des expériences historiquement très distinctes. Le corpus se compose de la salle dédiée à *Ixion* datant de la fin de l'empire romain, vers le premier siècle après Jésus-Christ.; des fresques de Giotto exécutées pour la chapelle Bardi au début du XIV^e siècle, donc à la fin du Moyen-Âge et au début de la Renaissance; et des *Nymphéas* de Monet, œuvre commencée à la fin du XIX^e et terminée au début du XX^e siècle.

La méthodologie utilisée dans la présente thèse pourrait être qualifiée d'*analyse multiple niveau* des éléments suivants de la perception : 1) les catégories de croyances de premier ordre, ou croyances *primaires*, qui sont sous-jacentes à toutes les autres croyances et jouent un rôle important dans la production de toutes les œuvres d'art. Les croyances primaires comprennent les croyances *physiologiques* et *perceptuelles*, et la sous-catégorie des croyances *multi-sensorielles*; 2) les catégories de croyances de second ordre ou croyances *conceptuelles*; les croyances philosophiques, spirituelles et religieuses, les croyances scientifiques (relativement au système optique), les croyances mathématiques et les croyances médicales (relativement au corps humain) sont des croyances conceptuelles. Les croyances conceptuelles peuvent englober un domaine de la connaissance, ce qui est le cas pour les cinq croyances qui servent ici d'arrière-plan à l'analyse des trois œuvres d'art choisies.

J'avance que la production et la réception des oeuvres d'art, et dans ce cas particulier de l'espace pictural, supposent non seulement un rapport multi-sensoriel, mais qu'elles sont également liées à l'acquisition de croyances qui influent sur la formation et la réception des représentations de l'espace pictural qui s'opèrent conjointement avec la navigation du corps humain dans l'espace du réel. Les représentations étudiées ici ont été intentionnellement choisies parce qu'elles étreignent de façon manifeste la structure architecturale qui les soutient, et à cause de leur intégration dans cette structure de soutien aux fins d'étendre la dimension spatiale et les processus par lesquels nous nous situons dans cette dimension.

La présente thèse vise à démontrer que *perception et conception sont, dans un sens, le miroir l'une de l'autre*, un miroir qui existe chez l'artiste et chez le spectateur. C'est la base même de leur cohérence, ou *commensurabilité*, et le moyen par lequel la signification que nous pouvons attribuer à une œuvre donnée réussit à nous convaincre de son autorité.

J'ai cherché à démontrer que la représentation de l'espace pictural n'est pas une simple affaire de conventions, ni une histoire quelconque de progrès, et certainement pas une question de style. Elle repose en fait sur les croyances, ces fragiles mais tenaces éléments qui s'associent à l'occasion à ce que nous considérons comme un *savoir* convaincant. L'artiste et le spectateur fusionnent sur l'axe de la croyance, et un acte de persuasion devient un acte d'interprétation.

Mots clés : histoire de l'art – peinture; espace pictural; perception; conception; croyances.

Abstract

The nature of my research is to examine pictorial space in three different artworks from three distinct art historical periods in order to demonstrate how an artwork functions, on the one hand, *within* a specific cultural matrix, and on the other hand *across* the deeply shared perceptual responses to spatial dimensions that link individuals in widely separated historical experiences. The Corpus consists of the *Ixion* Room from the late Roman period of the first century A.C.E.; Giotto's frescoes for the Bardi Chapel executed at the beginning of the fourteenth century in the late Medieval to early Renaissance period; and Monet's *Nymphéas*, begun at the end of the nineteenth and completed in the early twentieth century.

In this thesis, the methodology can be described as a *multilevel* analysis of the following components of perception: 1) First order belief categories or *primary* beliefs – which underlie all other beliefs – and are important to the production of all works of art. These include *physiological* and *perceptual* beliefs, with its sub-class of *multi-sensorial* beliefs; 2) Second order, or *conceptual* beliefs: philosophical beliefs, spiritual/religious beliefs, scientific beliefs (concerning the optical system), mathematical beliefs, and medical beliefs (concerning the body). Conceptual beliefs can comprise a field of knowledge, which is the case for all five beliefs employed here as a background for the analysis of these three art works.

I propose that the production and reception of art works, and in this case specifically pictorial space, involves not only a multi-sensorial relationship, but also is connected to belief acquisitions that impact on the formation and reception of pictorial spatial representations operating in conjunction with the body's navigation of real space. The representations examined here are intentionally chosen for their clear embrace of the supporting architectural structure, and their integration into that support for the purpose of extending spatial dimension and the processes involved in locating ourselves within it.

This thesis attempts to demonstrate that *perception and conception are, in a sense, a mirror of each other* – a mirror located within both artist and viewer. This is the basis of their coherence, or *commensurability* – and it is the means by which the meaning we can ascribe to a given work achieves the power to persuade and convince us of their authority.

The representation of pictorial space, as I have tried to demonstrate, is not a matter of simple conventions, nor in any way a story of progress, and hardly a question of style, but a matter of beliefs – those fragile but tenacious attachments to what – from time to time – we trust is some form of persuasive *knowledge*. Artist and viewer merge along the axis of belief – as an act of persuasion becomes an act of interpretation.

Key words: art history – painting; pictorial space; perception; conception; beliefs.

INTRODUCTION

No matter what we do, the visual system tries to find a single coherent conscious interpretation at any given moment. Concepts and percepts both need to be internally consistent.

Bernhard J. Baars¹

On my motivation for this dissertation

The Title of my thesis is *Pictorial Space: a Matter of Beliefs*. My initial curiosity in the investigation of pictorial space came from an early encounter with writings of the eminent art critic Clement Greenberg (1906-1994)², who had a great influence on painters of his time both in North America and Europe. As is well-known, he believed that the painter must refuse, and the viewer must ignore, all perceptual illusion, that painting's painted surfaces should have as their objective the flatness of pictorial space in order to acknowledge the essential two-dimensional character of painting – whether grounded in the experience of colour, shape or texture – in order to maintain the integrity of what he termed *the picture plane*. Greenberg argued that otherwise the practice of painting would be corrupted, its claims to having its own essential area of competence rendered empty, and it would risk being assimilated into other activities or practices – in a word, rendered incompetent. It would, that is, become simply an entertainment, inauthentic as a legitimate experience of moral dimension and compass. In this, as is also well-known, Greenberg was applying Kantian concepts as both his model and critical methodology³.

Since, as a student of painting, I intuited a serious discrepancy between my experience of a painting and Greenberg's ideologically modernist position, I questioned such oppositional and incongruent proclamations and was subsequently curious about the manifestations particular to pictorial space in painting.

As a woman, I also felt I had not – for my own part and in terms of the history of painting – sufficiently defined for myself and through myself what the limitations of painting might be with respect to my experience in the world through both my own physical body and my sociological circumstance as a woman. Perhaps Greenberg in that sense had a positive affect on my growing conviction: my desire to define pictorial space through my own

experience, however filled with contingent and malleable elements it might be, in order to give meaning to my practice. I came to realize, in other words, how inadequate Greenberg's thesis seemed to be in light of all the other references that he eliminated – namely my social and biological formation. Greenberg, ironically, forced me to remember the specificity of my body, and placed that specificity on the doorstep of those limitations in painting that had been my as yet unformed concern. Unformed, perhaps, but not without reference⁴. My pictorial perception saw any stroke or area of colour or a combination of both as exploding into spatial sensations of one kind or another that could not be converted into any assertion of flatness. And at the time I was not convinced by Greenberg's *suppression of the difference between painted and unpainted surfaces causing pictorial space to leak through – or rather, to seem about to leak through – the framing edges of a picture into the space beyond*.⁵ I was aware that paintings in the 60's grew in scale, as did my own too, in the late eighties. But while Greenberg wanted the painting to take over, *to suppress*, real space so as to become the totality of the sensory experience of the viewer, I – on the other hand – wanted the painting to *acknowledge* real space as part of the totality of the sensory experience of painting. I simply refused to separate the wall and floor of the room from the picture in the room. In an intuited strategy, I wanted to acknowledge my body claiming *physical space* in its movement within the space of the room, while *at the same time* experiencing the *projective space* afforded by pictorial representations. There came to me, one might say, an epiphany as the flatness of Greenberg's Kantian mind collided with the multidimensionality of my bodily experience of space. My experience of space is one of a sense of continuity, or – I would even claim – a *coincidence* between the space I physically navigate and the space my mind apprehends when engaged in the observation of a pictorial projection. This is, in fact, how the concept of *installation art* became meaningful to me.

While my first motivation for this thesis was therefore located in questioning modernist-essentialist ideological parameters pertaining to the limitations of pictorial space imposed on painting, my second motivation was formed through an observation I made in the course of writing my masters thesis – *The Camera Obscura: a Paradigm*. Central to my investigation into the phenomenon of the camera obscura, was the discovery that the mere awareness or recognition of the camera obscura's projected image does not in itself produce

an instant paradigm for pictorial representation, but that other conditions need to be present for the observation to have relevance and meaning – to become, practically speaking, a model for picture-making. This followed on research into observations of its phenomenon of projection made in the sixth century B.E.C. by a group of Chinese scientists known as the Mohists, in the tenth century by the Arab Scholar of optics, Alhazan, and in the middle of the thirteenth century by the Franciscan friar Roger Bacon. I understood from this study that certain beliefs, *perceptual* and *conceptual*, had to be in play to give meaning to the observed phenomenon in order that it be considered and accepted as a paradigm for pictorial representation. I further came to understand that all beliefs are an intimate part of our cognitive processes.

To summarize: if *my first motivation* comprises a determination to investigate pictorial space specifically to consider the simultaneity of navigating real and pictorial space in order to account for the physical presence of the body, *my second motivation* is to make a link to cognitive and belief structures through which to understand the formation of *propositions* concerning pictorial space. To approach this project, I have chosen pictorial representations that are located not only as autonomous objects in the context of an architectural space, but representations whose pictorial space is defined by, and is part of, that space. It is my understanding of the implications arising from such a condition that I wish to bring to this thesis and, ultimately, to my practice as an artist.

Corpus

For purposes of this dissertation, I have chosen three paradigmatic works that I have considered for the following reasons. Through the research conducted for my Masters thesis, I observed the importance that belief plays in the apprehension of visual phenomena. I began to wonder if beliefs also play a role in how pictorial space is represented. It is for this reason that I wanted to examine the importance that beliefs play in the construction of pictorial space, and especially pictorial space that interacts with the experience of real space. The importance I attached to this has to do with the significance of the viewer to the artwork. This significance has been emphasized in recent theory, but

in my own practice I had come to the realization that the physical existence of the body – its location in space as well as in time – played a part in my production of representations. I therefore narrowed my choices down to paintings conceived and executed within the context of an architecture, whether pre-existing as a *given*, or anticipated as a *component* – and, moreover, because beliefs about the world can change from one culture to another, paintings that span historical periods.

With these two criteria in mind, I chose to examine three artworks that were rooted in three historically distinct periods, each with its own set of beliefs while remaining part of the same cultural complex: the *Ixion* Room from the late Roman period of the first century A.C.E.; Giotto's frescoes of the Bardi Chapel executed in the late medieval to early renaissance period of the beginning of the fourteenth century; and Monet's *Nymphéas*, begun at the end of the nineteenth and completed in the early twentieth century. I was initially prepared to include a room from the Bonampak Myan civilization to test the matter of radical cultural difference. On reflection, however, my increasing realization of the complexity involved in the subject led me to limit my review to a continuous cultural frame.

To summarize: there are two important reasons for choosing artworks that have a relationship to the architectural setting: firstly, the body responds to beliefs but also generates beliefs that interact with the body's simultaneous navigation of real and projected space; secondly, the architectural setting – the support for the artwork – is itself also the result or construction of particular beliefs.

Architectural space and the pictorial space of painting converge in the *Ixion* Room decorations, where the frescoes cover the entire interior walls of the dining room in the Roman House of the Vettii. More subtly, the frescoes of the *Cycle of the life of Saint Francis* are inserted into the architectural character of the intimately scaled Bardi Chapel, while signaling their narrative on the wall above the chapel's entrance. The *Nymphéas* paintings, on the other hand, are installed in two oval rooms of the Orangerie in a spatial configuration designed in collaboration with the artist to respond to the conception of the work.

However conceived, the viewer in each case is obliged to navigate the physicality of the architectural environment and simultaneously engage in the pictorial dimensions of the projective space of the representations. I visited each site three times – in 1999, 2001, and although in 2003 I could only visit the Bardi Chapel and Pompeii (the Orangerie in Paris was closed for renovations), I did manage to return to the Orangerie in 2007. In chronological order, then, those three works are as follows:

- i. The Frescoes in the *Ixion* Room (fig. 0.1) of the Casa dei Vettii (The House of the Vettii) 79 A.C.E. Pompeii, Italy;
- ii. *The Cycle of the Life of Saint Francis* (fig. 0.2), the Bardi Chapel, Giotto (Ambrogio Bondone, detto), 1337, Basilica di Santa. Croce, Florence, Italy;
- iii. *The Nymphéas* (the Water-lilies) (fig. 0.3), Claude Monet, 1924, at the Musée de l'Orangerie, Paris, France.

Historical Position: the problematic – what is to be achieved?

Western Thought has long been distorted by the putative wisdom of the aphorism, "Westerners draw what they see while others draw what they know." It is time for western thinkers to relinquish their dubious hold on the secret of visual information and acknowledge its common ownership by all makers of successful representational art. An open-minded exploration of the world's art styles, extant and past illuminates not only the complex character of representation, but also the nature of visual perception itself.

Margaret Hagen⁶.

Traditional Western art historical assumptions have presumed that visual art – painting and sculpture – is about visual perception alone. In this thesis I propose that the production and reception of art works and in this case specifically, pictorial space, is not only multi-sensorial but also connected to belief acquisitions.

In the introduction to her *Faire Comme Si ...* (2003), the art historian and visual semiologist, Nycole Paquin⁷, immediately engages her reader with the concept of multi-sensorial experience, also known as *synesthesia*. She does this by describing through language the experience she is having of a small artefact that can be held in the palm of her hand. We, the reader, imagine its size, weight, colour, the touch of its surface and the

form of its topology, and follow at the same time the path of her mind wandering through comparisons to other objects and historical antecedents. She achieves this through the potential of language, stimulating in us not only the object's perceptual and conceptual multidimensionality, but also evoking a multi-sensorial empathy so as to re-enact or *faire comme si* the experience she was having while holding and observing the object. The result is that inevitably we bring our own associations and experience to this object, enabling us to empathize with it. In short, the object held in her hand appears, so to speak, in the palm of *our* hand and enters our physiology and psychology through perceptual (size, weight, etc) and conceptual (comparisons, historical antecedents, etc) empathetic responses.

Paquin's art historical inquiry in *Le Corps Juge*⁸ (1988), by applying cognitive parameters to articulate the principle features of aesthetic judgment through the complex biology of the totality of the body – body *and* mind, was an important influence on my being able to conceptualize the possibilities inherent in this thesis. Central to my proposition is the awareness that experiences we have can be individual, i.e. perceptual, while other experiences, like concepts, we share. Further on in the section titled *Theories of Belief* I have gone into detail both about defining theories of belief and belief categories such as perceptual – multi-sensorial beliefs and similar shared beliefs, philosophical beliefs, religious beliefs, scientific beliefs, mathematical beliefs and medical beliefs which I have applied to the interpretation and analysis of the three art works.

This acknowledgement that aesthetic judgments are not – *cannot* be objective, or totalizing – but must be individual and therefore different from one person to another is already reflected in the writings of the art historian Jacob Burckhardt (1818-1897)⁹. In the middle of the nineteenth century, in his book *The Civilization of the Renaissance in Italy*, Part I: *The State as a Work of Art*, he wrote: *to each eye, perhaps, the outlines of a given civilization presents a different picture; and in treating of a civilization which is the mother of our own, and whose influence is still at work among us, it is unavoidable that individual judgment and feeling should tell every moment both on the writer and on the*

reader¹⁰. Although he recognizes the partiality of experience, Burckhardt had at the time no clear tools by which to build upon this insight. Today, however, Nycole Paquin in *Le Corps Juge*¹¹ can draw on a large body of research that articulates the field of neurophysiology and the cognitive structures of the body underlying individual aesthetic judgments. It is this combination of the body's physiology and cognitive abilities that constructs our contemporary understanding of the breathing, perceiving, feeling, thinking, conceiving and judging body.

While Burckhardt's acknowledgement of the subjectivity of individual judgments was interesting and important, it remained tentative. A more confident approach to the inclusion of cognitive structures directing both the viewer's and producer's responses with respect to artworks needed to wait until the psychology of perception developed enough information and became more accessible to the general public. The British cognitive scientist, Richard Gregory¹², produced and narrated a BBC television series in the early nineteen sixties that popularized cognitive research specifically concerned with visual perception, *seeing*. This series became the well-known book, *Eye and Brain*, first published in London in 1966. Gregory had worked as well with Ernest H. Gombrich on *Art and Illusion: a study in the psychology of pictorial representation* (1960), the first book of art history dedicated to analyzing an artwork in the context of the psychology of perception and – importantly – incorporating cognitive processes experienced by the viewer that led to a misreading of visual cues and the prompting of perceptual illusions.

In any analysis of an artwork under consideration, the viewer – the artist being the first viewer – is inseparable from the production and reception of an artwork. Since the time Gombrich opened the door for art historians to pursue this line of research, the latest cognitive research continues to elaborate the understanding we have of the production and perception of an artwork and, in the context of this thesis, in particular pictorial space.

While my interest in pictorial space is not about a history of perspective designed to demonstrate some sort of progression in sophistication of pictorial representation over the centuries, I am interested in how pictorial space – perspective being only one aspect – has been deployed in different ways throughout history, and how in each instance a different

story emerges – one not of teleological significance, but, rather, offering up a picture of multi-sensorial perceptual and intercultural comprehension. Hubert Damisch¹³ and David Summers¹⁴, both art historians, take this position in their recent books. They too have greatly helped me to think about my own problematic and have informed my approach to this thesis.

Hubert Damisch, in his *Origin of Perspective* (1995) writes: *One always comes back to the question, formulated by Émile Benveniste concerning language: "If History there be, of what is it the history?"*¹⁵ For Damisch, it was not to write a singular history of perspective, but to write a *set of perspectives stories*¹⁶ that were not about progress. His stories of southern or Renaissance perspective intertwine and show how very differently a concept can be interpreted when another ideological position re-interprets the same optical principle. In this case, Albertie's perspective schema becomes inversed by Jean Pèlerin Viator¹⁷ (1435-1532), a Flemish theoretician of perspective. The fixed point of Divine Infinity in Albertie's Italian perspective becomes for Viator the more secular point of the subject¹⁸. This positioning of the subject gave northern perspective a very different ideological meaning. For Damisch, each one of these perspective stories is an interconnected paradigm embedded in an intricate network. He is also aware of significant points that intersect at the boundaries between discourses. In my thesis, by including interdisciplinary belief structures, I have become appreciative of the inter-relational importance of multidisciplinary references that as artists we absorb, both consciously and unconsciously, and whose experience we can share with the viewer. I have also observed paradigm shifts due not to the change in subject matter, but in belief content.

In his book *Real Space* (2003), David Summers writes a history of art that is inclusive of intercultural conversations. Incorporating their mutual awareness *not of what is different, but of what histories, lives, and values they had in common*¹⁹. My approach – like Paquin, Damisch and Summers – has no intention of dealing with notions of histories as progress; on the contrary, because of our awareness of the determinations exercised by the individual and the collective social body, each case has its own legitimacy. The three that I am presenting

suggest that particular beliefs invested in representations determine their pictorial formation and individual legitimacy.

Methodology

This dissertation employs two intersecting methodological approaches for the purpose of demonstrating how an artwork functions, on the one hand, *within* a specific cultural matrix, and on the other hand *across* the deeply shared perceptual responses to spatial dimensions that link individuals in widely separated historical experiences.

The methodology can be described as a *multilevel* spatial analysis in which a hierarchy of beliefs encouraged by the work of art demonstrates how cognitive structures – perceptual and conceptual beliefs – impact on the formation and reception of pictorial spatial representations operating in conjunction with real space. These representations are, in other words, not autonomous from the architecture and its support – such as might be the case with a framed painting hanging on a wall – but are integrated with the surfaces of the architectural support and are intended to create the illusion of extending pictorial space into the real space of the architecture.

As listed above in the Corpus (0.2), the three artworks chosen are: the frescoes in the *Ixion Room* (fig. 0.1) of the Casa dei Vettii in Pompeii, Italy (79 A.C.E.); *The Cycle of the Life of Saint Francis* (fig. 0.2) painted by Giotto (Ambrogio Bondone, detto (1337) in the Bardi Chapel of the Basilica di Santa Croce, Florence, Italy; and the *Nymphéas* (the Water-lilies) (fig. 0.3), painted by Claude Monet (1924), at the Musée de l'Orangerie, Paris, France. Each work is the subject of one of the three chapters – arranged in chronological order – comprising the body of the thesis. The analysis of each artwork is first given a general historical context. This is followed by first outlining perceptual beliefs. Perceptual beliefs are multi-sensorial, related to the senses: sight – which includes elements such as *framing*, *slant* and so on, touch, smell, taste, touch and hearing, and among others, motion. Visual beliefs are a sub-category of perceptual beliefs, but are the primary belief in the context of visual art, and therefore primary for the investigation of pictorial space. However, visual belief can potentially also be influenced by all other

perceptual beliefs, as for instance touch when observing a thickly painted surface in the *Nymphéas* paintings by Claude Monet. A pictorial strategy designed to create visual belief respecting pictorial depth – for example a line suggesting perspectival *depth* – can contradict the sense of *proximity* resulting from a thick surface of paint, and consequently create a sense of perceptual paradox. In other words, visual beliefs can be influenced by other perceptual beliefs. The observations and connections I have made to perceptual beliefs are grounded in contemporary theories of cognition, which inform us about the potential for individual responses to an artwork. The outline of *perceptual beliefs* becomes *the first screen* through which each artwork is analyzed. This is followed by a historical outline relevant to each artwork – Pompeii towards the end of the first century A.C.E., Florence in the fourteenth and fifteenth centuries, and France in the nineteenth century – in each of which I proceed by outlining five *conceptual beliefs*.

As this thesis will demonstrate, conceptual beliefs are a response to the primary perceptual beliefs. How we perceive can be said will become how we organize thoughts, form social values, make objects, in fact what we will conceive. Therefore, looking at *five conceptual screens* that constitute the body of knowledge associated with philosophy, spirituality, mathematics, science, and medicine, it becomes possible to see clearly the relationship between perceptual beliefs and how they are converted into conceptual beliefs. Finally, when all three art works have been analyzed through all six belief structures (perceptual beliefs and the five conceptual beliefs), I provide in the conclusion to the thesis a comparative analysis in relationship to hierarchies of beliefs and a summary of the significance of belief structures to the formation of pictorial space.

Theories

The following section of the introduction begins with *the representational nature of thought*. This is followed by concepts of real and pictorial space, and their cognitive structures relevant to the apprehension of real space and pictorial spatial representations, after which theories defining belief and belief categories follow. Each artwork will be analyzed through six belief structures that were carefully selected for their relevance to all

artworks. It is important to realize that the information presented in the following section applies to all artworks under examination. Having an introduction to these theories and concepts will familiarize the reader to assist in understanding the problematic.

The Representational nature of thought

In order to perceive, conceive, and receive spatial propositions – real or represented – I would like to define what we know about the representational nature of thought. The neuro-philosopher, Patricia Churchland (1995), points out that human beings can think or project into the future and past and can have improbable ideas, such as the *impossible* perpetual-motion machine. Our thoughts, as A.R. Sharp²⁰ writes, also have an inherent capacity to deceive ourselves. We can construct any combination of scenarios, as we will see in the three art works under consideration, and these scenarios, pictorial and otherwise, are always constructed in the presence of the self, a self that is aware of having perceptual experiences. The neurologist Antonio Damasio²¹ has developed a hypothesis about this capacity for knowledge in his writings on the nature of feeling and consciousness. While sensory images of what is external, and related images in memory that are recalled, together give us the impression these are the totality of our experience, there is always another presence – the automatic owner of any mental properties – the self as observer, perceiver, knower, thinker, and potential actor or *mythmaker* whose intentions and motives as beliefs are the product of a collective desire to create personal or communal myths that present a particular self-image. They are therefore ideological, and are mechanisms of power or survival strategies, even if, and especially if, they are self-deceiving.

How then, does an organism create the mental patterns in any of the sensory modalities we call an image-object, and how do we create these mental representations that Antonio Damasio²² calls *movies in the brain*? How, in this mental pattern of objects, do we also construct that sense of self-in-the-act-of-knowing so important to the construction of intentional relationships of which beliefs are one? This proprietary knowledge of the complex self is shaped in a particular perspective – that of the biological

individual inside of whom it is formed. As a *biological* perspective, the *image* of self and the *object* of self are inseparable entities. Therefore, Damasio posits that the movie creates within the same frame the seen and the seer, the thought and the thinker, Damasio summarizes this:

Objective brain processes are knit out of the subjectivity of the conscious mind that is made out of the cloth of sensory mapping, which pertains to body states, that is then imagined as feelings in which the sense of self-in-the-act-of-knowing emerges as a kind of special feeling, the feeling of what happens in the act of interacting with an object or experience²³.

The significance this holds for interpreting art objects and, in particular painting, is considered by both art historians, Nycole Paquin²⁴ and Barbara Maria Stafford²⁵ who writes in her recent book, *Good Looking*:

The images should be freed from the idealist identification with *trompe l'œil*, the contemptuous judgment that they always pretend to fool the viewer into thinking that unreal things are real...Developing an integrated non-polarized view of the varieties of visual experience means that the good, bad and mixed properties of imaging would never be a foregone conclusion²⁶.

Concepts of real and pictorial space and their cognitive structures relevant to the apprehension of real space and pictorial spatial representations

A common belief is that pictures are simply slices of reality, peeled from an imaginary window and fixed to paper or canvas. It is at least, a common aesthetic belief that they should look as though they are. Surely, then, any theory that explains how we perceive the world has also explained how we perceive pictures.

Sheena Rogers(1996)²⁷.

My primary sources for concepts of real and pictorial space include the philosopher John Campbell and the experimental psychologists David Rose, Richard L. Gregory, and Margaret Hagen, as well as Sheena Rogers and Joseph S. Lappin.

Phillip W. Rosemann²⁸ writes in his book, *Understanding Scholastic Thought with Foucault*, that for the medieval mind *God is quite literally the author of reality. Reality is a text copied from the book of life*. This bookishness initiates what becomes modernity's dualism, namely text verses reality, individual–translator versus the community²⁹. Today, cognitive and psychological considerations define our relationship to concepts of reality –

whether real space or projected pictorial space. To define this relationship it is important to understand the relationship between knowledge of one's physical characteristic and knowledge of one's psychological characteristics in order to appreciate the causal or intentional construction of our relationship to space. John Campbell³⁰, in his book *Past Space and Self*, outlines two spatial considerations – space as being either *egocentric* or *allocentric*. These are both self-consciousness frames, or spatial experiences, which are constructed by the subject or self in order to relate to the world. The egocentric frame, or egocentricity, is a conscious construction of one's own position as centred on the body, which is – moreover – also related to gravity. It is a short-term body image that permits the subject to have a practical grasp of possible movement and how to act in the *real world*³¹. In ego-oriented perspective, or *inside perspective*, the object is therefore seen as affiliated with the ego. On the other hand, in allocentric-oriented perspective, or *outside perspective*, the object is affiliated with the other³². Allocentricity involves being centred on something other than the body, the picture one has of the world independent of needing to make one's own position part of the thought: one looks out into the world and the world out there at all points becomes the centre. In terms of action, egocentric space can also be defined as *things that need to be done in that space*, while allocentric space can be defined as *things that need to be done generally*, as for instance *in theory*³³.

David Rose³⁴ writes that it was believed in the 1980's within a neuro-biological context that the representation of space central to art showed curvature and distortions from linear perspective, for example in paintings by Vincent Van Gogh. This would suggest awareness on the part of the painter that visual space is not necessarily Euclidean, in that *near* space conforms to Euclidean geometry but that *distant* spaces became compressed. Richard Gregory's view on perceived space holds that it is a hypothesis about the layout of *real* physical space from which cues that are present in the environment are interpreted. David Rose³⁵ writes that we can accept Richard Gregory's theory that *perceived space is a hypothesis about the layout of physical space* and does not deny, but rather confirms, that perception is a matter of interpreting visual cues such as texture, size, and so on that are present in the environment. Neither denies the fact that painters always make compensations

in pictorial representations. It was therefore very important to find a coherent system in order to evaluate these compensations.

Margaret Hagen³⁶, an American psychologist interested in the geometries of representation that contribute to the production and reception of pictorial space, has developed a coherent perceptual geometric system that constitutes systemic structures for comparing pictorial perspectival propositions. Her system, working from the relationship between real light and its optic array in the real space occupied by the viewer, takes into consideration two aspects of vision: one, that visual perception is structured and informed by light; and two, that its perceptual properties—response is subject to transformations. Each visual moment apprehended through light has a unique set of reflectance properties of surfaces – colour, textures, relative angle of light and its source, shadows and shading – and all are relative as to the position of the observer³⁷ with respect to the representation.

Since I have chosen to a great extent to adopt Hagen's approach in my analysis, I should summarize the main elements she has developed. The basic premise of Margaret Hagen's hierarchy of geometry with respect to visual perception can be understood through Hermann von Helmholtz's³⁸ observation that relations of time and space, as well as those of mathematical relationships – for instance size, regular intervals and even the coexistence of sequences – are part, not only of the external world, but have found their equivalences in the mechanisms that have evolved for receiving them. While the geometry of visual perception has an equivalence in physical optics and light, it also interfaces with the geometries of the receptacle, the curved retina. Since retinas are not all identical, there are deformations and individual differences that are irrespective of the image. My desire to introduce this concept here is related to the conviction that perception and conception are interrelated in the apprehension of the image. Although I make only general observations, understanding the formation of images through this analysis has contributed to understanding at least aspects of commensurability through the necessity for perceptual structures congruent with the perception of the external world

The angle at which light properties reflect off surfaces affects the response we have to our angle of vision, and this also contributes to visual information. The model of *natural*

perspective is understood as having a singular point or apex in one eye, in other words, *monocular*. Hagen, on the other hand, considers visual information to be *binocular* and inclusive of the *optic array*, which is grounded in the geometric principles of *natural perspective*. The properties of light in the *optic array* correspond to the persistent perceptual visual properties to which we respond – such as size, shape, distance, slant, colour and composition of surfaces, and objects in a changing environment. These visual properties, under certain conditions, are subject to change. They undergo a process of becoming either *variant* (they change) or *invariant* (they don't change) at any given moment. The theoretical model of the ambient *optic array* – first conceptualized by James J. Gibson³⁹, subsequently applied and enlarged by Hagen in the late 1980's, and then most recently further extended by Sheena Rogers and others – is grounded in the geometric principles of *natural perspective*, where (as noted above in the case of Van Gogh) distant spaces become compressed, and only near space conforms to Euclidean geometry⁴⁰. Hagen's model takes into account a larger perceptual phenomenon, for instance the moving viewer, and multiple viewpoints that would have been the case in, for example, the experience of the original guests of the Ixion Dining room as they walked, stood about or reclined at dinner – as well as for us, the contemporary visitor, though in our case the experience is mediated by the near-hegemonic anticipation of Renaissance perspective. The movement of the eyes⁴¹, head, or the whole body in locomotion affects the perceptual transformations of the optic array⁴².

How the perceptual variant or invariant combine is what evokes in the viewer different interpretations of the character of any pictorial space represented. Hagen calls this the *special feeling* that different pictorial properties provoke in the viewer⁴³. The persistent properties of the human environment such as space, size, shape, slant, colour, or distance of objects in representations is always to be considered from the inevitable location of the observer. Usually this references the ground upon which the viewer is standing, a ground associated with gravity⁴⁴, and is an important contribution to the perception and orientation of visual information. Hagen simplifies this potential complexity by differentiating between four different mechanical generations of projective perspective systems. These are given in a hierarchical order that encompasses perspectival systems with the *least* complex set of transformations or changes in visual properties of size, shape, slant, colour, distance and so

on to the *most* complex in which the maximum amount of transformations are possible⁴⁵. It is important *not* to imagine this hierarchy as implying a hierarchy indexed to the notion of cultural progress, but rather as one adapted to eras with different belief structures whose requirements for visual realization favored one pictorial projective methodology over another, each one being as legitimate as the other in the construction of pictorial spatial propositions. It is also important to realize that there are cases where pictorial propositions do not require a correspondence to simply one or the other projective spatial systems, but instead reveal a hybridity in combining different propositions – although in general one system usually dominates.

Hagen's approach to pictorial projective systems thus takes into consideration the body – its motion and binocular vision – in relationship to the pictorial surface. The four basic projective systems that Hagen outlines are *metric*, *similarity*, *affine* and *projective*. Each artwork will be examined in relationship to these projective systems. I will now summarize their basic characteristics and, for purpose of clarity, I will use the projective aspects of one of the works under consideration namely the *Ixion* (dining) Room from the House of the Vettii to illustrate the projective systems where necessary.

The *metric* system features planes that are parallel, as in orthogonal projection⁴⁶. This system is defined by planes and projection lines that are parallel with a distance and area of 1:1 (the appearance is that of a flat diagram). Here shape, size, angles, distance, and parallelism, length, and straightness are preserved and therefore *invariant* or stable. The plane or figure can also be rotated from a fixed centre or flipped over through a line or point. However, the metric figure is displaced in the plane – either up, down or sideways – and therefore position and orientation can change.

The second rung in the hierarchy of complexity is *similarity*. It has more transformations and fewer invariants. Parallel surfaces to the image plane are preserved, but the projection lines converge to a point. Shape is invariant, but there is a change of area, size, length and parallelism, and perpendicularity. There are changes in angles, spatial divisions increase or decrease, and the spaces between coexisting lines are also subject to change. In the similarity system, if a viewer is facing a symmetrical surface, it will expand or contract

depending on distance from the observer; as the viewer gets closer to a pattern, it appears to be rushing towards them. The rapid rate of change is linked to distance and time. This transformation, however, is reversible and while optical textures are all invariant, a change of scale has taken place and the image is identical but smaller. The horizon parallel to the ground is always at eye level, leaving visible as much below as above for any object. For example, in the Upper Register of the *Ixion* Room, the architecture is relatively smaller than the room-scaled architecture of the Middle Register. The *aediculae* and *excedra* in the upper register are proportionally smaller, but the relationship between the figures and the architecture is the same as in the middle register. While this could be construed as projective perspective decreasing in size with distance, the projective lines do not converge to a single point, giving this the appearance and characteristics of similarity perspective⁴⁷. In similarity projection, shape, angle, size and parallelism, and perpendicularity are all invariant – but the image has undergone a scale change and is smaller in size than the original.

Hagen's third projective system is *affine*, which has no scale change from the original, as demonstrated by the size of some of the representations in the *Ixion* Room. For example, the entablature and the painted windows are scaled to the room itself. In *affine* perspective projection lines are parallel. However, size shape and angle are different. It should be remembered that angle, shape, and size always change together despite the *invariants* of parallelism from the original. The *Ixion* Room has primarily an *affine* geometrical perspective system. Because *affine* perspective usually deals with larger surfaces in the world, light on the surfaces of planes are parallel to the viewer and are reflected from a large source, like the sun, that reflects off a variety of different surfaces. The *Ixion* Room decorations seem to be lit by ambient light, that is, a general light source like the sun, which bounces off many different surfaces illuminating the environment with ambient light. Every *affine* transformation of a plane, including motion, is the result of parallel projections⁴⁸.

The final system Hagen lists is *projective* projection⁴⁹. This has projection lines (linear perspective) that converge to a point, replacing parallelism with convergence. The *Ixion* Room has aspects of *projective* perspective properties. Unlike *affine*, the face of the represented plane in projective projection is not parallel to the original picture plane. The

image converges to a progressively smaller size as the distance from the picture plane increases, resulting in scale changes. Shape, planes, and objects succumb to projective distortion, which is also synonymous with spatial relations. The ground plane and the picture plane are at right angles to each other. Objects in a projective scene sit either on the ground plane or on a surface parallel to that plane, but occupy the space at various angles to the picture plane. In the *Ixion Room*'s projective characteristics, the vertical planes forming part of the architectural features, which are perpendicular to the horizontal planes incline towards the centre and become progressively narrower. The angles successively become steeper as they approach the centre of the wall. This does not result in a single vanishing point when these projective lines are extended, but rather in several points along the vertical central axis of each wall, where the projected perspectival lines in some cases appear to come together, though in other cases they do not quite meet.

Seven factors in perception

There are seven specific factors in perception – horizon line, scale, frame, colour, texture, perspective, and mirroring. Each Artwork under consideration will be examined in relationship to these. Our navigation of both three dimensional space and pictorial space depends on the presence of a *horizon line*⁵⁰ that is always relative to our own position. Related to horizon is our ability to judge the *scale*, not only of objects, but of distances as well, so scale is a fundamental locating device. Thirdly, the impact of the *frame* enables spatial play, and while the *Ixion Room* (fig. 0.1) is a particularly interesting example that presents a number of them, framing is a significant factor in both the *The Cycle of the Life of Saint Francis* (fig. 0.2) in the Bardi Chapel and in the *Orangerie Nymphéas* (fig. 0.3). Two other visual characteristics – *colour* and *texture-gradient* (contrast, and shape through shading) – influence our perceptual experience as well, and their impact depends upon the character of a particular work. Then there is of course the central matter of *perspective* systems, as outlined by Hagen, since they offer many alternative means by which to establish pictorial space. Indeed, the application of different theoretical models of perspective enables us to cohere through it other factors under consideration into a more cohesive structure for comparative purposes. Finally, there is *mirroring*, which is linked to stereoscopic vision.

The spatial paradox inherent in any two-dimensional representation is the *perceptual ambiguity* arising from the problem of integrating a spatial representation into a spatial dimension so as to *pictorially* extend real space. Dimensional space, or more correctly the images we accept as true representations of it, has been shown to be *systematically distorted*. That is, representations routinely constrain the perceptual aberrations that would make literal copies of spatial dimension appear untrue to our conceptual expectations. This is the case for all three artworks under discussion. Nenad Miscevic⁵¹, in his article *Intuition as a Second Window*, speaks of these constraints on perception and the compensations they require as part of a process he calls *mental happening* directed at a belief-producing response that is accompanied by a feeling of obviousness and certainty. This understanding led him to suggest that our *intuition (unconscious perception)* is a state that gives us conscious access to some sets of representations and rules that guide our mind. In effect, our intuition provides a *second window* on reality and compensates for its apparent distortions by constantly painting – even re-painting – a picture of reality for us as we prefer to see it in any given situation. In this manner, we can see that if our dealings with reality are in a sense pictorial, dealing with pictorial representation as such involves the same interface, though one might say in reverse⁵²: we navigate a pictorial space from our experience of being in the real world.

With respect to our experience in the real world, Joseph S. Lappin, in his article on *Spatial Resolution and Description of Form*, points out that the physical dimension of a space cannot be perceptually specified, as for example the sensation of something heavy or the direct sensation of force on one's body. What is required is a correspondence between two related structures, surface space – for instance the floor or walls – and image space – the table in the corner for example, as well as a calculation involving the relative positioning between the motion and position of the viewer and objects in a space at a given moment. In contrast to this experience of real space, our navigation of a pictorial representation set within this space is similar to that of any other object we would encounter⁵³. What happens, however, when that pictorial representation is in direct competition with real space for our acceptance of reality? In effect, we perceive two different spatial dimensions simultaneously, and so long as the relationship remains negotiable, we willingly enter into that suspension of

disbelief that lies at the core of all forms of representation. In this negotiation, the observer's movement in real space influences how pictorial space will be perceived⁵⁴.

For this, associative memory is important, and it is believed to contain representations of where the eyes were looking at each point in time⁵⁵. These representations stimulate the mechanism that organizes the appropriate image sequence. In other words, visual perception, according to our current understanding, depends on spatio-temporal optical structures, rather than – as previously thought – on retinal image, in which the camera was assumed as a model for the eye. Gibson in the 1970's termed these spatio-temporal optical structures *optical array*⁵⁶, and Sheena Rogers, who with others has expanded on his theory, more recently writes: *Pictures remain static while the optic array not only surrounds the perceiver, but is continuously transformed by the perceiver's activities*⁵⁷.

We have exchanged the model of retinal vision for a more performative model, and that is because the conventional line of separation between objective reality and our subjective experience of it has been dissolved into a convergence that is marked by a reconstructive process of intersecting mental manipulations. The complexity of interpreting the pictorial space of the *Ixion* Room, for example, rests not only on the paradox of representing two dimensionally a three-dimensional space on another's actual surfaces, but also on the perceptual paradox involved in the possibility of our accepting such an illusion as convincing. Submitting to the *Ixion* Room's pictorial illusion has the potential of differentiating between, as Anthony Pitson⁵⁸ writes, perceptual belief and perceptual experience, and I have taken the position that they are intimately linked – if not interdependent – in consciousness. Each of the works examined provides an opportunity to examine perceptual models that take the viewer's own mobility and intentions into consideration when discussing the nature of image transformation.

Theories defining belief

My primary sources for the definition of belief are: John Searle, linguist and philosopher; Patricia Smith Churchland, neuro-philosopher; Daniel C. Dennett, cognitive scientist;

Antonio Damasio, neurologist; as well as Ben Saler, cognitive scientist and Anthony Pitson, philosopher.

To summarize very briefly their positions: Searle⁵⁹ maintains that mental states are biological phenomena, that consciousness is intentionality, subjectivity is mental causation, and that unconscious belief is unconscious intentionality or perceptual belief. Churchland⁶⁰ also links intentionality and belief, and Dennett⁶¹ posits that belief, for example, permits us to invent an imaginary space. Damasio⁶² elaborates on Dennett's Cartesian theatre as the site not only of perception and conception, but also the self, whose beliefs about experience also must include the belief in the perceiving and judging self. Benson Saler⁶³ believes that the cognitive and the epistemic can be rendered complementary. Finally, Anthony Pitson⁶⁴ suggests that perception, while inseparable from belief, must include experience that carries both the *modality* of the experience and of that which is perceived.

Nycole Paquin⁶⁵ suggests in *Le Corps Juge* that perception is a new adaptation each and every time in the act of experience, whose continual ruptures are innate shifting *aesthetic* judgments understood and described as a *catastrophe* – which is the tension between that which is being seen and that which is already known. While the eye is only one stage in the perception of an image, it is reasonable to expect that the entire organism of the whole body has evolved in all of its complexity in response to everything within its purview. The thought then arises that this would include the organism's own *self*, its body, since there is no reason to draw a line between the interior *mechanism* and the external *projection*. The organism reacts with a constant complex of individual adaptations or reactions to itself, as well as to the environment beyond, as its total experience. The formation of perceptual and conceptual belief acquisitions are the result of the interaction with the self and the environment. A good example of this is the visual perceptual experience of the diner in the context of the *Ixion* Room decorations which is complemented by the sense of taste and touch and the presence of the mythic and religious beliefs invested in the *hortus* or garden that makes up the external view of the diner. It is also important to remember that, while humans are capable of perceiving

something outside of their body, the viewer or producer of perception or beliefs is always positioned at the aperture between them, at the ever- fluctuating (*verge*).

While the body directs and makes judgments, they are inevitably based on incomplete mechanisms undergoing at any moment of experience new perceptual acts grounded in belief propositions, which feed into new conceptions or concepts that have a shared referent and may become part of the pool of collective beliefs. "*Beliefs are propositions, or a function of meaning constructed out of internal representations that are interdependent as to sensory input and behavioral output*"⁶⁶.

Because I speak about these beliefs as being generated by the whole body, I would like to apply the evolutionist Konrad Lorenz's⁶⁷ central thesis that categories of knowledge that can be shared between individuals are not mysteriously predestined. Rather, they result from evolutionary processes that select those ideas or images of the world that are closest to the nature of *true reality*. The science writer, John Barrow⁶⁸, elaborates further by observing that the whole organism evolved synergistically. For example in the case of the eye, this would be in response to the energy spectrum of light, a physical reality in the world. This posits that living organisms can be seen as theories not only concerning themselves, but also about their environment in which an accurate reading of reality has selective advantage.

Before examining belief categories individually, I want to consider the components of belief in general. Benson Saler⁶⁹ writes in his article "On What We May Believe about Beliefs" that the attempt to define the nature of belief can be first attributed in Western thought to Plato. Plato distinguished belief from knowledge and associated belief with opinion, and with the *sensibles*, unstable transitory particulars of experience that we bring into awareness through the senses. With these reflections, Plato established the privileging of knowledge over belief. In contemporary thought, however, knowledge becomes *identified with* beliefs. It was the British psychologist, Alexander Bain (1818-1903)⁷⁰ who first wrote that men naturally (like a blank slate or *tabula rasa*) lack in the beginning any belief. That makes the original state *passive*. In contrast, Charles Sanders Peirce (1839-1914)⁷¹ defined the passiveness of the natural non-belief state as an *active* psychological

state. He writes: "*The feeling of believing is a more or less sure indication of there being established in our nature some habit which will determine our actions. Doubt never has such an effect. Doubt is a an uneasy and dissatisfied state from which we struggle to free ourselves and pass into a state of belief*"⁷². Peirce goes on to say that we are determined to cling to the action of believing, while also believing what we already believe.

What, then, do we believe regarding knowledge that we have? Searle⁷³ writes that belief is an active agent of intention that plays a role in conscious (conceptual) and unconscious (perceptual) knowledge. He proposes that intentional states can be associated with hope, fear, desire, expectation, and belief, and that these are *intentional* mental states⁷⁴. Mental states can be conscious or unconscious. Conscious states are psychological, while unconscious states are neuro-physiological, and both are caused by the behaviour of the mass of neurons in the brain. The brain generates *conscious* states (actions that are always informed by perception – for example, intentionally crossing the street) out of *unconscious* states. However, not all unconscious states become conscious; for example, the beating of the heart or even drawing in breath is unconscious action. In order to describe the field out of which might emerge the possible mental states of conscious thoughts and behaviours and the network of unconscious intentionality, Searle came up with the a neutral concept of *background* due to its lack of metaphysical association. Basically the *background* is the site where the flow of action and perception – within which intentionality occurs – takes place. The *background* or mental capacity, he writes, is the condition of possibilities of the forms taken by the flow. The *background* itself is not intentional, but it must be present and play a part, whether intentionality is conscious or unconscious. Importantly, the idea of *background* is a *feature of our representation of reality and not a feature of the reality represented*. Features of this *background* that are common to the physiology/body of all human beings he names the *deep background*. Features of this background that are informed by local cultural practices he terms *local practices*. Understanding the character of this background makes it easier to understand how perception (unconscious) and conception (some perceptions converted to the consciousness) demonstrate that the intentionality of unconscious perceptual beliefs (deep background) interacts with the intentionality of conceptual–

shared beliefs, as Searle calls local practices. Having an unconscious belief occurs at the neuro-physiological level and it is its dispositional capacity that determines whether it moves from the unconscious into a conscious state or not. Cognitivists, writes Daniel C. Dennett⁷⁵, *apply a special non-ordinary sense to belief*, using belief as a *generic* term for the idea of a *cognitive state* because they feel it is a definition that least compromises the term cognitive state. Therefore, whatever information directs an agent into actions can be encompassed under the definition of belief. The characteristic of belief as an active agent is very different from the passive notion of the institutionalized religious belief of faith – faith must not question the fundamental premise of religious beliefs⁷⁶.

The philosopher, Anthony Pitson⁷⁷, in his article "Perception: Belief and Experience", speaks of sight as pure physiology, independent of concepts and belief. However, *seeing* is not only a visual experience, but is also informed by belief acquisitions and cannot be reduced to either sight or belief. Belief acquisitions are multi-sensorial and can describe sight as touch, for example. If you take two different perceivers and they both see the same image or scene, each will have a different experience of that scene. Pitson writes that each perceiver depends on *how what is seen* is taken, which *depends on the beliefs each one has acquired*. That is to say that the formation and possession of a concept requires the capacity to acquire beliefs. The conclusion, then, is that visual experience – while it cannot be reduced to beliefs – is inseparable from this notion. Seeing something is most often a conscious experience that reflects both the mode in which perception occurs and the subject's belief about what is perceived. Perceptions, as Gregory⁷⁸ has said, come from useful predictive hypotheses that – I would add – are formed by beliefs, and which create the perceptual realities of the object world for us.

I will conclude this section with Baars' comment: "*No matter what we do, the visual system tries to find a single coherent conscious interpretation at any given moment. Concepts and percepts both need to be internally consistent*"⁷⁹ and I wish to add that these are always mediated by belief, whether it is a state of disbelief, a failure to believe, or a suspension of belief.

Belief categories

Beliefs are unconscious or conscious assumptions or hypotheses about the world – for example, its objects, its physical states, the physiological and psychological state of organisms and their narratives. Beliefs that underlie choices are necessary for intentions to be acted upon, and consequently are the cause of human perceptions, actions and behaviours. One such instance is that perceptual beliefs are important to convince the viewer of an artwork that *it really exists in front of them*. Once the viewer is convinced of that, the viewer must believe that there is more to the artwork than, say, pigment on the surface of a painting. The artist-producer invests an artwork with a set of signs (a figurative element, possibly) that they believe will convince the viewer of their intention. For the viewer to believe that the work of art is more than pure materiality, the body of knowledge the viewer holds that can be shared with the producer as similar beliefs is brought to bear on the viewing experience. Opinions and judgments are made about knowledge we hold – whether disbelieving or believing in it. In the production and viewing experience, the relevant available knowledge, and the beliefs it generates, are brought to bear on the production and interpretation of an art work.

This thesis shows the relationship between a set of individual and potentially or sometimes shared beliefs and its consequent actions in making pictorial choices, showing how beliefs play a role in both the *construction* and *reception* of pictorial space.

First order beliefs – physiological beliefs are automatic and perceptual beliefs –are unconscious subjective multi-sensorial responses by the body . A physiological belief includes such actions as breathing or even keeping one's balance on a ladder, while perceptual beliefs include experiences such as the perception of the colour red or the softness of the touch of an object, and are always multi-sensorial. Physiological and perceptual beliefs never stop and are always present. Consequently, in the act of

interpretation required by an image, these beliefs simultaneously combine and remain active throughout the interpretive process.

Conceptual, or second order, beliefs that depend on a different category of knowledge, outside the body – for instance mathematical beliefs – will be considered here and have been selected for their special relevance to each of the works under examination. Due to the limitations of focus demanded by this thesis, I have chosen only five categories of conceptual beliefs out of potentially many others, eliminating those categories that would be only tangential to this discussion. I want to explain that conceptual beliefs can be shared amongst a group of individuals, but each of those individuals can only ever have *similar* beliefs since each individual has his or her own opinion and judgment regarding knowledge and beliefs. Therefore, despite the fact they are shared, they are still always also individual.

To summarize: in the interpretative process, perceptual and conceptual beliefs combine almost simultaneously and remain active throughout the act of interpretation. Conceptual beliefs, while they too are individual, can be shared but only ever as similar beliefs since the interpretation of, for example, an artwork will vary also not just due to different opinions and beliefs already held that each viewer brings to the interpretation but the beliefs that are encouraged by the signs that constitute the artwork.

I would also like to stress once again that I have spent considerable time with each work *in situ*, and that my analysis of their properties necessarily includes my own visceral exploration of their dimensionalities. Let us now return to a simple assertion: in order for an observation to be productive, beliefs must be present. I speak about *First Order beliefs*, and *Second Order beliefs*,

First Order: physiological and perceptual (individual) beliefs

First order belief categories are *primary* beliefs – they underlie all other beliefs – and are important to the production of all works of art. These include *physiological* and *perceptual* beliefs, with its sub-class of *multi-sensorial* beliefs.

Physiological beliefs are fundamental responses of a living organism to itself and in response to its environment. These responses occur as cerebral activity generated by a highly organized responsive neural network that evolved as an adaptive survival strategy over time, and are expressed as automatic responses that are part of the unconscious body processes; for example, automatic eye movement, body movements such as turning the head walking and keeping the body in a posture to maintain equilibrium in the presence of gravitational forces, as well as establishing and defining a relationship between the body and objects encountered in the world. These physiological automatic responses depend on a set of *physiological beliefs*, unconscious intentions or persuasions without which it would be impossible for the body to function or indeed to exist. The unconscious nature of *physiological beliefs* can be illustrated by the time lapse between stimulus and its perception. In other words, the finger moves before we perceive it is moving, giving us the false impression that we consciously command it. The automatic nature of our physiology is primary to all other perceptual beliefs⁸⁰.

Perceptual beliefs are always *multi-sensorial* and are always subordinate to physiological beliefs. Multi-sensorial perception – touching, tasting, hearing, smelling and seeing, to name some – are always in a state of adaptation to the received perception. In the process of adaptation, a hierarchy of which sense is the most appropriate decoder becomes established. For example, in the act of viewing a painting in a public space one can hear other peoples voices, feel the heat of the sun coming through the window, the scent of perfume wafting through the air, and so on. But of course it is the visual sense that one selects as the most important one required to interpret the reception of a painting, however elaborated and modified it might be in the presence of other sense perceptions and their associated beliefs. What this means is that perceptual beliefs are not a priori, but are active and responsive to the perceived reception at all times, and establish a hierarchy depending on the need. Automatic unconscious physiological beliefs and perceptual multi-sensorial unconscious beliefs continually and almost simultaneously play a part in conscious conceptual beliefs – and vice versa. One could say that what aids consciousness in acquiring intelligibility in the experience of an artwork is the dominant visual beliefs modified by engaged ancillary multi-sensorial perceptual beliefs. It now becomes clear

why in *perception*, the direct result of the process of sensory signals needs to work very fast, using limited information; perceptions make assumptions that continue through data gaps, and in that way are *new* at each instant⁸¹.

Visual belief informs us not only about what we are looking at, but the belief in its credibility. For example, the representation of a room needs to have sufficient credibility that one could virtually place or project oneself into it. In that sense, *visual belief* is a projection of the self into the image. Without *visual belief* there is no possibility of making pictorial evaluations of depth or sense of motion, both of which are necessary for the viewer to virtually relocate himself or herself in the image. *Visual belief* is the primary decoder in the reception of a visual artwork. In the case of the paintings dealt with in this thesis, visual beliefs give authority to the evaluation of the paintings' internal elements of composition, relationships between forms, line and colour – and in turn their relationship to the pictorial space of the representation as well as the context in which the painting is located. Visual beliefs are influenced by, and in that way encompass, all other sensory ancillary decoders, amongst which is the sense of touch required to decode in a painting the texture or thickness and viscosity of the painted surface and or the volume of a painted form. *Visual beliefs* can be said to be influenced by more than one sensory input linked to visual recognition, and can also be modified by other beliefs, including empathy or morality⁸².

Second Order: conceptual beliefs, similar and sometimes shared

These are important in understanding how we objectify – within the triadic relationship of the viewer's *internal imaginary* space – the *external real* space occupied by the viewer and the painting (and the painting's pictorial space) in order to locate objects, construct projections, and even locate ourselves. For analysis of the three art works under consideration, I have chosen the following five Second Order belief categories because after much reflection, keeping in mind the artworks under consideration, out of all the possible conceptual belief categories they seemed to be most relevant to all of them for the purpose of analyzing pictorial space. The five categories are: Philosophical beliefs, Spiritual / Religious Beliefs, Scientific Beliefs (concerning the optical system),

Mathematical Beliefs, and Medical Beliefs (concerning the body). Conceptual beliefs can comprise a field of knowledge, which is the case for all five beliefs employed here as a background for the analysis of these three art works.

Let me add here a note about establishing a field of knowledge. An individual can accumulate knowledge about a field of interest – religion, science, optics and so on over a lifetime. No single individual possesses all the knowledge of any single field. Only some of this knowledge is accessible at any given moment, and normally when needed for encouraging interpretations, as is the case with an artwork. I consider this field not an explanation of the artwork, but a background or *potential*. Interpretation is an intentional act in which opinions and judgments about knowledge persuade an artist – or a viewer in the case of this thesis – to disbelieve, suspend belief or believe in the knowledge that is presented. It is therefore belief in knowledge we hold that provides the fulcrum by which we can be persuaded that a particular knowledge is believable. In this thesis I have followed a pattern of laying out a field of knowledge with respect to a given subject as assembled in a particular historical moment; my objective in this is not only to suggest the proximity of that subject to the artwork, but also to model a potential network through which to observe the increments of knowledge that become decisive to the persuasion of beliefs in that knowledge. Just as no single viewer can know the whole field, no artwork guarantees that all possible interpretations will be realized. The competence of the producer and viewer, depending on their knowledge base, determines the extent of the representation and its reception.

A field of knowledge, for instance, religion, science, or mathematics, is the culmination at any one point of changing knowledge and beliefs that define any field over time. Belief is a way of belonging to a community where each member identifies with some of one another's similar beliefs. Artworks can be interpreted because they carry a number of signs that can be shared by both the individual and community, placed there consciously and unconsciously by the artist – signs that can come from different types of knowledge. Because each artwork is a commentary by the artist on a context that can be described as a field of beliefs, the artist judges the knowledge that is carried by these

fields and forms his/her own beliefs and – as we have seen – chooses signs to persuade the interpreting viewer of these beliefs.

It is important to realize that the totality of each field of knowledge that I outlined, with its associated beliefs, persuaded me – in interpreting the signs given to me by the artists or artist – to believe that a relationship could be formed between the signs contained in the artwork and the beliefs that are recorded in the history of a subject. Reading these fields simply as a history lesson would be to miss the point of this thesis. The field of Roman philosophical beliefs, for example, was written in the presence of the images of the *Ixion* room. To begin with, I had certain intuitions about the art work, and as the history of philosophy unfolded through my research, frequently it was not only one specific event but the cumulative ambience of certain *recorded* beliefs – the documentary knowledge – that persuaded me, *made me believe*, that particular signs offered up by the work that the artist had incorporated in their representations, consciously or unconsciously, related back to this field that I call philosophical beliefs.

Philosophical Beliefs

Philosophical beliefs are concerned with questions of origin affecting humanity and the nature of things. Philosophical methodologies include a concern with structures and principles of reasoning and the nature of knowledge: how can we possibly have knowledge of the world, and what is the nature of our senses by which we know the world? From Epicurus through Kant to the present the answers change, yet in each case the nature of the senses by which we know the world has to be taken into account. For instance, Epicurus believes that because the body is an aggregate of heat and breath, it houses the soul and is responsible for sense perception. The frescoes of the *Ixion* Room with their complex and diverse and emotively charged subject matter and warm-cool colour combinations as well as terrestrial and celestial references persuade this viewer of a multi-sensorial aggregate reality. Philosophical questions, in other words, have to come to terms with the nature of perception, and therefore perceptual beliefs.

Religious Beliefs, Spiritual Beliefs

Of the three pictorial examples central to this thesis, the subject matter of two are signs with respect to religious beliefs and their associated rituals. Roman religious belief constructed a very orderly and ritually determined relationship to world space, recognizing and acknowledging the differences of defined space, while at the same time unifying these different spaces by assigning a different god to each one. This kept both the gods and Man in an enclosed relationship. In the Bardi Chapel *The Cycle of the Life of Saint Francis* as a representation of the transcendental significance of Divine Order similarly provides interpretable signs that index Christian religious beliefs. On the other hand, Monet's representation in the *Nymphéas*, while located in the context of a Christian society, does not persuade me of Christian religious belief. The images of nature – the pond at Giverny with its lilies and surrounding trees and so on – as a set of signs persuades us of Monet's spiritual impulse, objectified as *Nature*. Spirituality can be understood as a subjective impulse that fills the void left by unanswered, indeed unanswerable, questions. Spirituality itself may not yet be a belief, but one can say it is the antecedent to its objectification and institutionalization as religion. Whether it is Roman acceptance of defined order, Giotto's medieval transference between the Divine and the Material, or Monet's modern personal desire for communion with Nature through his own nature, religious-spiritual beliefs concerning space and time underlie in different ways the formation of pictorial beliefs contained in the images.

Scientific beliefs (concerning the optical)

Scientific beliefs concerning the optical are formed by systems with which to apprehend visual experiences. Beliefs concerning the optical have varied from one historical period to another. For instance, in the Ancient world, beliefs about the optical system explained vision as a geometric proposition of fire emanating from the eye and illuminating the objects seen by means of straight diverging geometric rays refracting off the surface of the object and returning to converge through the lens onto the retina. In the Middle Ages, light was considered a divine emanation from God, with a belief that the physical property of light had a monocular source. In *The Cycle of the life of Saint Francis*, architectural

representations and emanations from the sky are some of the signs that persuade the viewer that beliefs about optical properties associated scientific with religious beliefs. In the nineteenth century, with the impact of innovative optical technologies and theoretical physics, optics came to be understood as waves reflecting off surfaces to cause colour sensations in the structure of the eye. The close connection between optical theories and visual beliefs is easy to understand, and is discussed at some length in the thesis.

Mathematical beliefs

Mathematical beliefs are based on an anticipation of rational relationships, and seek out affinities between figure and form, and relationships between quantities – additions, subtractions, or multiplications – that develop into more complex operating systems like geometry, algebra, or principles of quantum mechanics. But mathematical beliefs have also been adapted to demonstrate the legitimacy of other beliefs – for example, religious beliefs in the Middle Ages – proposing mathematics as underlying all other realities. This led to the view that mathematics could demonstrate through geometry the emanation or presence of the Divine, or Divine Order, a view widely held in the Middle Ages. The geometry of the layout of the Basilica of Santa Croce and within it, the Bardi Chapel, is based on a mathematical principle, as are the exterior dimensions of Giotto's representations and the interior pictorial constructions of the compositions of *The Cycle of the Life of Saint Francis*.

Medical beliefs (beliefs concerning the body)

Medical beliefs are concerned with the body's physiology or psychological state. If in the medieval period the heart was considered the site of the body's purification, the heart became synonymous with love and purity. The tendency to see the body as inferior, as well as a lack of any real experimental knowledge concerning it, ensured that the body was vulnerable to disease and suffering. The representation of Ixion on the wheel of fire opened up for the Roman viewer an empathetic relationship to their own body's pain, just as the representation of Saint Francis's stigmatic wound in Giotto's *Cycle* provides the ground for the Friars empathetic witnessing. These representations as pictorial signs of the suffering body persuade the viewer of their own belief in the suffering body. By the time

of the *Nymphéas*, it was understood that psychological unconscious states were influenced by external controllable forces or circumstances, making the membrane between the body and the world permeable. In Monet's work, the use of colour, scale, texture and visceral subject matter, as well as the purity of his colours, encourage in the viewer the anticipation of – and desire for – a pure, multi-sensorial and self-identifying embodiment.

Summation

In this introduction I have attempted to establish my reasons for undertaking the thesis, my selection of artworks for examination, my general methodology in approaching them, as well as the various theories that have contributed to my understanding of the subject, and which inform that methodology.

CHAPTER ONE

**The Frescoes in the *Ixion* Room of the Casa dei Vettii (The House of the Vettii)
in Pompeii, 79 A.C.E.**

1.1 Pompeii – The House of the Vettii (79 A.C.E.): general context

The wall paintings under consideration embellish the *Ixion* Room (fig. 1.1), identified by William Archer among others¹ as a combined reception (oecus) and dining room (triclinium). My purpose is to speak of these paintings from the point of view of the implications to be derived from their construction of pictorial space. But first it is important to have an understanding of the Roman house, in this case the House of the Vettii, and its primary visual axis from the entrance to the garden. It is useful to think of this passage to the *Ixion* Room as offering a rehearsal by which to orient us to its complex pictorial characteristics and underlying beliefs².

Roman houses as seen in Pompeii are adjoining buildings that could only expand by incorporating adjacent properties. The Peristyle House of the Vettii can be found at the intersection of the Via dei Vettii and Vicolo dei Mercuri in the ancient Roman Campagna town of Pompeii (fig. 1.2, 1.3). Its interior sub-division adhered generally to classical Vitruvian proportions in accordance with the social station and aspirations of the owner of the house. In his ten books on architecture, the Roman Architect Vitruvius calibrated and set down certain parameters as idealized architectural proportions and spatial dispositions (fig. 1.4). Deviations from the Vitruvian conventions in the House of the Vettii can be attributed to changing ideals rather than to merely practical decisions.

From the Vicolo dei Vettii one enters directly through the front door into the *fauces* (literally “jaws”) or passage into the house³ (fig. 1.2, 1.5). From here a vista directs the visitor’s gaze across the *atrium* (fig. 1.6) towards the large colonnaded peristyle garden (fig. 1.7) that eliminated in this house the traditional *tablinum*⁴; it is believed that the triclinium and oeci facing onto the *peristyle* in this house have taken its place⁵. As one enters the peristyle on its east side, two *oeci* or reception-dining rooms (p and n on the plan) (fig. 1.5) are in parallel configuration on each side of the entrance. On the north side and closest to the *Ixion* Room (p on the plan) is an entrance to a small apartment built around a courtyard. It has been suggested that this was the women’s quarters. Private rooms – such as bedrooms, dining rooms, bathrooms and all other private accommodations – Vitruvius informs us⁶ were

off limits to visitors without an invitation, while in the case of other rooms considered public, anyone had the right to enter even without an invitation. With respect to the latter, the primary objective of a formal visit to the house was an audience with the *dominus*, who – in the conventionally designed house – held audience on the *tablinum* or elevated platform as a daily civic ritual and obligation to the citizens for whom he was responsible, or for others that came to consult with him. Significantly – and I will be discussing this later in relationship to the iconography of the *Ixion* Room itself – the *tablinum* is believed to have had its origins in Roman temple architecture⁷. What most distinguished an ancient Roman house from a contemporary western home was its dual function as a place of business and as a residency. The primary interior axis of a Roman house was designed to control the social and hierarchical relationship between the visitor and the *dominus*. For a more detailed understanding of this axis I will give an account of how the House of the Vettii⁸ confirms but also deviates from convention. On this point, both William Archer and John Clarke more recently made studies of the House of the Vettii, with Archer cataloging and thoroughly describing the paintings while Clarke investigated its relationship to the general character of a Roman house⁹.

The primary axis of the house is approximately east-west (fig. 1.5). We enter on its east side directly from the street (fig. 1.8) and up a couple of steps to arrive in the passageway or *fauces* (2.39 m x 2.79 m) (fig. 1.9) that opens onto the large primary open space or *atrium* (8.42 x 11.13m). Two adjoining identically sized rooms on its right and left served as the porter's gate-room and food storage or pantry (fig. 1.10). From here, on the right or north side of the atrium, one can catch a view into the kitchen quarters with a small minor atrium at its centre and servants' accommodations just beyond. The activity in the principle atrium was integrated into the domestic activity of the household and was also an important place of ritual and worship (fig. 1.11) that centred on the cult of the ancestry or genus of the family. It was also here that either portable or permanent shrines were employed for *sacra privata* rituals of ancestral veneration. Images of the *familia*, ancestors in the form of masks cast from wax¹⁰ or – later during the time of the Vettii – plaster or metal, frequently adorned the atrium walls. On the flanking right and left or east and west sides of the atrium, and

mirroring each other, are another two sets of identical rooms on each side. These rooms have been identified as daytime resting rooms, possibly bedrooms or *cubiculum*¹¹. An opening or *compluvium* (fig. 1.12) at the centre of the atrium's roof functioned originally as the principle source of light, but also to facilitate telling time and supplying water to the reservoir¹². Elaborate sculptural projections decorate the edge of the *compluvium*, guiding rainwater into a rectangular catch basin or impluvium (fig. 1.13) sunk into the atrium floor directly below. The impluvium also acted as one point of focus on the visual axis, and in the House of the Vettii had functioned previously as a fountain: the lead conduit pipe that fed the fountain is still visible. From the atrium the visitor could be directed to move either to the right or left of the impluvium. In the conventional house, a number of steps led up to the *tablinum*, which was also occasionally employed to hold formal gatherings or meals, while to the rear of the *tablinum* the garden or *hortus* (fig. 1.14, 1.15) acted as a backdrop and vista to further extend the primary visual axis for the visitor upon entry to the house¹³. In the House of the Vettii, however, the *tablinum* was eliminated, and in its stead an architectonic device employing pillars was substituted not only to create an unimpeded visual axis into the peristyle (17.82 x 28.08m), but also to foster an illusion through their graduated spacing that suggested a much increased vista (fig. 1.16). This can be found starting with two large columns defining the western end of the atrium and which possibly mark the threshold of the eliminated *tablinum*. Beyond this threshold another two sets of columns on either side of the *hortus* (now located at the centre of the peristyle)¹⁴ (fig. 1.17), have been more narrowly spaced than those surrounding the peristyle¹⁵. While this discrepancy became obvious to me during my own investigations of the site, Lise Bek must be credited with first noticing this element of theatrical illusionism¹⁶.

The preoccupation with vistas in a Roman house might be attributed to two major objectives. The visitor's ascending trajectory, entering a few steps up from the street level towards the *tablinum*, constructs a physical topography that reflected Roman social hierarchy. By the same token, from the position of the master or *dominus* standing on the elevated platform of the traditional *tablinum*, the descending vista facilitated an overview that contributed to a sense of control. Vistas, as John Barrow suggests have "*clear adaptive*

advantages, choosing or constructing environments that combine places of security with clear unimpeded views of the terrain"¹⁷. With the elimination of the *tablinum* and consequently the elimination also of direct visual access to the *dominus*, the larger luxurious expanse now given over to the *peristyle* (which includes the garden or *hortus*) as the central focus is an observable architectural and organizational revision of the conventional Roman house, effectively conflating *tablinum* with *hortus*. The *peristyle*, with its extensive eighteen-column colonnade supporting the roof and surrounding the garden, carries an corresponding significance with the traditional *tablium*¹⁸. In this regard, Andrew Wallace-Hadrill's conclusion seems convincing: competitive representations celebrating the grandeur of the ruling class were meant not simply to "convert financial muscle into social muscle"¹⁹, an index therefore of wealth and status, but rather should be seen as a carefully crafted set of visual patterns that speak of the owner's commitment to shared cultural and social beliefs. Furthermore, as Wallace-Hadrill also points out, they should be read "as making maximum impact at the point of maximum effectiveness". In this way one might see the primary axis in a Roman house like the House of the Vettii as exercising signs of a social language influenced by the influx of secular Hellenistic trends. Among these were a multiplicity of conflicting philosophical ideologies that stretched from the rational and moral ordering of the Stoics to the pursuit of freedom-from-pain-by-pleasure of the Epicurians, and even to the still more radical Skeptics whose belief in the uncertainty of knowledge or its origin as truth resulted in a complete suspension of judgment. This diversity of views, which influenced the Roman world from the second century B.C.E. on, brought dramatic revisions to Roman life that can be seen in the House of the Vettii. Taking up John Clarke's reference²⁰ to the *tablinum* as a quotation of the elevated platform of the Etruscan shrine which defined the *templum* (or boundaries) of the Etruscan sacred space, and on which was drawn the Circle of Divination (fig. 1.18), it is possible to line up the cardinal points of the Circle with the principal axis of the House of the Vettii. The *Pars Familiaris* hemisphere (region of the celestial gods and gods of nature) faces the *atrium*, while the *Pars Hostilis* hemisphere (region of terrestrial gods and gods of fate and the underworld) faces the *hortus*. What was therefore previously an interdependent relationship in the primary axis of the Roman house, situating the *dominus* at the *tablium* between the *atrium* and the *hortus*, between the known

and the unknowable, is – with the removal of the tablinum – broken. To put it another way, the historic connection between religious and domestic order, with the tablinum as the fulcrum linking the social order before it with the natural order of the *hortus*, or garden, behind it, can now be observed to have been eliminated, and to have consequently recast the character of the traditional Roman house in a secular mold²¹.

It is very important in all of this to appreciate the complex set of relationships responsible for the original inclusion and subsequent disappearance of the tablinum. Clarkee's comparison between the tablinum of the *domus* and the *templum* of the Etruscan shrine is extended by Brendan Nagle²² as a comparison between the tablinum and the *templum* of the Roman temple. Clarkee and others have compared the *dominus* to the Roman soothsayer (*haruspices*) who stood at the centre of the Circle of Divination. A crucial point to bear in mind is that the presence of the priest or soothsayer standing at the centre of the Circle and facing south constructs a posterior region given over to the infernal and celestial deities, while the anterior region before him is occupied by terrestrial gods and gods of nature. It is this latter realm upon which the soothsayer is able to pronounce, while the posterior remains the realms of fate, the celestial deities and the gods of the underworld. Clarke's suggestion that the Circle is inscribed into the plan of the Roman house requires noting that while in the temple the priest faces south, in the Roman house the tablinum orients the *dominus* to face east, which is also the primary wall that the guest faces upon entering the *Ixion* Room. The posterior region behind the priest becomes the realm of the *hostilis*, that of the unknowable or uncontrollable world of sensation and mortality requiring appeasement, while before him lies the region of the *familiaris*, the known phenomenal world requiring recognition, and subject to explanation, influence and transcendence²³. There is surely a geopolitical cause for these orientations, since for the Mediterranean peoples east and south were familiar terrain, while north and west remained obscure and impenetrable. But the most important point with respect to the Roman house is that with the tablinum in place there was a clear correlation between the dichotomous body – split front to back between knowing and unknowing – and a dichotomous universe of recognition and appeasement. With the removal of the tablinum, the clarity of this dichotomy, and the

mediating position of the *dominus*, is eroded or at least complicated by the sweeping vista of atrium to peristyle that succeeds it. The result is an ambiguity of position as this passage declares itself public while relieving itself of confrontation. There is only the passage. The passage is the message, and the message of this passage is a hierarchical social, political, and religious *triade* whose visual axis was a two-way conduit. The visitor encountering the various degrees of grandeur of these vistas was given a measure of the significance and status of the *dominus* while simultaneously the political and social responsibility of the *dominus* was implied by this submission to public scrutiny. The elimination of the tablinum served to compound this uniquely public character of the Roman house, a role given visual effect through its symmetrically framed primary axis its mirroring employing evenly-spaced doorways, rooms and columns which, as Wallace-Hadrill points out, was not simply an architectonic device but was designed to evoke familiar signs. With its episodic punctuation of pictorial events along its central axis, passage along this vista contributed to the construction of a visual primacy that as we shall see becomes part of the vocabulary of the pictorial space echoed in the *Ixion* Room²⁴.

1.2 The *Ixion* Room in the House of the Vettii: stylistic history of the murals

The House of the Vettii (Pompeii Electa Napolip A.59)²⁵, on evidence from electoral propaganda and two signet rings found in the house, is known to have been owned by two freed-men: Aulus Vettius Conviva and Aulus Vettius Restitutus (fig. 1.20). Their flourishing trading business had bought them their freedom and, through enormous financial donations towards public works, considerable status. This also bestowed on Vettius Conviva the title *servus augusti*, the highest civic office given to a freeman and one which was generally held only by a freeborn aristocrat. In many ways their house was typical of Roman houses in its reflection of the status and aspiration of its occupants. Due to the earthquake of 5th of February, 62 A.C.E., it underwent some minor repairs both to its structure and its interior wall decoration.

To the right of the central axis at the entrance to the peristyle, and facing into the *hortus*, a large entrance previously outfitted with doors leads to the *Ixion* Room. This *oecus*,

or reception-dining room, was architecturally appointed in its proportions and location on the east-west axis at the north-west corner of the *peristyle*. Its proportions and location in the Roman house followed the guidelines set down by Vitruvius²⁶.

[...]Winter dining rooms should have a south-west exposure for the reason that they need the evening light, and also because the setting sun, facing them in all its splendour but with abated heat, lends a gentler warmth to that quarter in the evening²⁷[...]Dining rooms should be twice as long as wide. Their height should be calculated by adding length and width and dividing it in half. Picture galleries should be constructed of generous dimensions. In the case of a reception room or oeci using the corinthian model it should have single tiers of columns, set on a podium and coronea of stucco with a carved vaulted ceilings above the coronea to give the impression of walking under an open sky²⁸.

The principal activity of eating and talking was carried out while reclining on upwardly slanting couches, generally of wood and covered with thick mattresses and changeable sheets. The normal dining room with three couches (*triclinium*) could accommodate nine to ten people. These couches faced onto a round or square table on which the food was served from the fourth side, which was left open for that purpose²⁹. It was tradition that the most important dinner guest was always given the privileged position of having a view onto a vista or garden.

The wall paintings, technically frescoes, that embellish the room are considered a classic example of Roman Fourth Style wall decoration of the *Neronian*, 54-68 A.C.E., and early *Flavian*, 69-96 A.C.E. period, and were first defined by August Mau, the nineteenth century art historian³⁰. He described the Fourth Style as an aggregate of the Roman First, Second and Third style, each with a set of distinct stylistic characteristics. These are clearly outlined by John Clarke in his book *The House of Roman Italy*. The First Style decoration, 100 B.C.E. -250 A.C.E.³¹ (fig. 1.21), affirms the physical integrity of each wall. Simple geometric patterns imitated stucco and brickwork that followed the structure of the wall and became a pictorial device to unite what might otherwise have seemed like a set of rooms each with their own vocation. The layout of the Roman house made each room subject to a greater sense of order. It could be said that the first style was a kind of democratizing act and imposed a blue print for an abstract order, religious, social and philosophical, that was superimposed over the simple physical organization of the Roman house.

The Second Style (fig. 1.22), on the other hand, inverts this trend by placing the emphasis on pictorial rather than architectural unity so that the presence and actual physical position of the individual viewer becomes central to the illusionary construction of the arcade-like projection. Second Style decorations frequently included vistas of gardens or landscape views. Here the two-dimensional perspective of Greek theatre set design is overlaid onto the three-dimensionality of the room's architecture³². A single point on the room's end wall determines the pictorial construction of, for example, the representation of a colonnade on each of two adjoining walls that is continued on the end wall facing the viewer. Since all such perspective illusion is constructed from the point of entry into the room, columns, railings, and arcades converge their projected lines towards that one centrally located point on the end wall, forming in this way a symmetrical mirroring³³. The problem arises, however, that the illusionary projection of the early second style collapses as a physical experience not only at the corner where the two walls meet but also in its inability to accommodate the movement of the viewer, as Clarke points out. This composition presumed a fixed and idealized view for the visitor echoing the overarching symmetry in the architectural layout of the Roman house as *faucea-atrium-tablium-hortus*.

It should be noted, incidentally, that this difficulty was ingeniously solved in the *Ixion* Room, as will be discussed later. It should also be noted that this incongruity was solved in the later part of the second style by treating each wall as having its own vanishing point. This has become known as symmetrical perspective, permitting the viewer a singular line of entry but also permitting the viewer to develop an intimate relationship to each wall. In the *Ixion* Room this development is evident in that each of its walls, while decorated at its centre with mythological scenes of moral and metaphoric value, nonetheless overall adheres to a pictorial structure that conforms with a number of what points of convergence, or near convergence not to be mistaken for Renaissance vanishing points – and the fact that there are several is significant – on the vertical central axis. This had the effect of redirecting the viewer's gaze away from the single-view landscape or 'garden-scape' of the earlier Second Style to a more complex play of mirror images and illusionary architectural constructions that focused attention on thematic mythological narratives. This therefore extended Roman

imaginative experience beyond the physical world into a projected world of genealogical and poetic narratives based in religion and mythology.

The Third Style (fig. 1.23) was consequently less concerned with the illusion of architectural conceits, and instead simplified architectural illusion in order to draw the viewer's attention to mythological and still life scenes, or to small landscapes. Of principal significance is the division of the room into separate registers or zones floor to ceiling – in the *Ixion* Room there are three – in which architectural embellishment was primarily reserved for the upper zone where, within a set of aediculae and entablatures, muses and protective gods took their place (fig. 1.24).

1.3 General layout and iconographic description of the frescoes in the architectural context

The principle disposition of the triclinium (*p*)³⁴ (fig. 1.5) room could be said to exist subsequent to major renovations at the House of the Vettii sometime in the second century B.C.E.³⁵. The triclinium is 3.63 m wide, 6.32 m long and 4.64 m in height. Vitruvius, as previously noted, prescribed the proportions of a rectangular dining room: its length was to be twice its width and its height to be an addition of its length and its width divided by two. The *Ixion* Room is, as it turns out, only 4.65 m to the top of the third register, less than the expected 4.95 m. This may be due to the original ceiling being a vaulted arch that would have been 5.50 m at its apex³⁶. The west wall, location of the principal entrance from the peristyle, is constructed of large basalt slabs and stands 3.3 m in height and 3.55 m in width. The threshold reveals the previous existence of both an interior and exterior set of double doors that closed the room off from the peristyle³⁷. Perhaps these had seasonal functions. The floor was laid in closely spaced small stones set in mortar³⁸. As one enters there is almost immediately to the right in the west corner of the south wall another smaller doorway that leads to the *atrium* (fig. 1.25). The three walls, south, east and north, are elaborately decorated. As mentioned earlier, the plan of the Roman house was symmetrically divided both axially and bilaterally. In the *Ixion* Room the formal elements on the south and north wall, each approximately 4.64 m in height by 6.32 m in length, are axially symmetrical mirror images of each other in all but iconographic detail (fig. 1.26). There is also a bilateral

symmetry (fig. 1.27, 1.28) from left to right on each wall since the right wall mirrors the formal elements of the left wall. The end wall, 4.64m in height and 3.63 m in width – a little wider than half the length of the room³⁹ – also bilaterally divides down its central axis so that right side mirrors left side (fig. 1.29). Despite small variations in the proportions of details in the south and north wall, this decorative continuity and integrity is preserved through similar subject matter providing an echo effect. Finally, all three walls and their decorations are visually unified by division into three horizontal and abutting registers (fig. 1.30, 1.31). For the iconological identification I have depended heavily on Karl Schefold's iconological inventory⁴⁰ of the *Ixion* Room. At times I have contributed some new insights and also confirmed my own interpretation with William Archer et al.

1.4 The North, South and East Walls: First (Lower) Register; Second (Middle) Register; Third (Upper) Register

1.4.1 The North and South Walls: First (Lower) Register

The First (Lower) Register, or socle, on which the other two superior sections visually rest, is .87 m tall and can be associated with First Style pictorial conceptions and painting techniques. That is to say, it is rendered illusionistically to portray slabs of exotic imported and costly marbles – pavonazetto, a speckled peacock-blue, and giallo antico, a dark brown – making up its panels and borders (fig. 1.32). The relatively wide dark green plinth in *verde antico* supports, on the north and south walls, four peacock-blue bordered horizontal rectangles symmetrically interrupted by two smaller vertical rectangles inlaid with large circular brown disks. In the centre of the socle of the south and north wall is a narrow vertical panel surrounded by a slender edging imitating dark brown marble. The central or east wall at the rear of the room has as its socle one bordered and centred rectangle which is flanked by panels on which the light disk of dark marble is a reversal of the north and south walls. These conclude at the outermost edges with the same bordered rectangle as found on the south and north wall. The upper section of the socle consists of a white slender, illusionistically rounded dark gray veined marble.

1.4.2. The North and South Walls: Second (Middle) Register

Above this the Second Register begins. In the centre of the south (fig. 1.33, 1.34) and north walls are the largest separately defined sections, the entablature supported by a colonnade consisting of architrave frieze and cornice⁴¹ traversing the entire 2.45m height of the second register. The upper section of each the illusionistically gilded entablature whose projecting cornice and horizontal frieze is supported on each side by columns of unfluted gilded *colonnettes*, the architrave. At their top the entablature is joined to the frieze above, while ionic capitals become its base. These *colonnettes* are decorated with a vertically winding vine scroll pattern and, according to William Archer⁴², in the upper portion of the *colonnette* shaft six tiny figures in combat, representing three crouching giants below and three gods above, are preparing to discharge their weapons. This detail was less visible when I researched and recorded this site in both 2000 and 2001. Again according to Archer, writing in the late seventies, each of the four *colonnettes* on the opposing wall depict three different gods. These *colonnettes* are connected to the illusionistic backwall by the representation of a low, narrow and inclined wall section. A coffered soffit underneath the gilded entablature completes the pictorial illusion of both depth and space, and has been frequently characterized as reminiscent of a stage setting⁴³. John Clarke mentions⁴⁴ the *Ixion Room as the prime example of the baroque aspect* of what he calls the Theatrical Manner of the Fourth Style. While I take this term to be generally applied by him because of the fusion of the first three styles, I will later relate it to the pictorial illusionary constructions of the theatre.

Suspended beneath the entablature and between the architrave on the rear wall is a black-bordered red panel-curtain attached from its triangular top edge by two points to the coffered soffit. Three festoons of fragile vines descend into the upper part of the red panel and are also attached by two points. Two peacocks are perched on the central festoon while a single goat stands on the right and left draped vine. In the centre of the red field on each of the north and south walls, mythological scenes are presented. While each scene is of a particular subject matter, their size varies only slightly. On the north wall, the painting of *Daedalus and Pasiphae* is enclosed by a narrow border measuring 1.18 m x 1.07 m, while on the south wall *Dionysus Discovering Ariadne* measures 1.8 m x .97 m (fig. 1.34, 1.35).

On the bottom edge and central to the red panel, a trio of *hippocampi* or sea horses with serpentine tails and two curving fins have a plant ornament sprouting from their midst (fig. 1.36). This extends on each side with delicate acanthus festoons to the outer edges of the red panel. Zeus in the form of a spotted panther faces outwards, crouching on sides of the centre of this vine. Four vertical rectangles, each with an architecturally complex pictorial space in its upper half, are painted symmetrically on either side of the architrave on both the north and south walls. Extending the full height of each wall's central zone and enclosed on the inside by a pair of *colonnettes*, as already described, another but even more delicately conceived pair of *colonnettes* completes the framing on the outside. These *colonnettes* are decorated with a doubled scroll of intertwining gilded vines around a central blue-gray shaft⁴⁵ with a vegetal Corinthian base. The width of each of these rectangles matches the width of the narrow panels in the socle of the First Register directly below. Aligned with these, four blue rectangles with a pedimented top edge and a central panel painted in a bas-relief illusion extend up from the first register each framed by a wide black border. A head (identified by Schefold as Minerva but I agree with Archer) of Athena⁴⁶ (fig. 1.39), an identification corroborated by William Archer⁴⁷, is painted in three-quarter view facing inward in the centre of each panel. On her head is a plumed helmet and around her neck she wears a wreath, according to Archer, of acanthus leaves. The contours of this linear drawing are rendered in light and dark blue, with white for highlights.

Directly above each of these four panels on both the north and south walls, and of the same width, is a horizontal panel framed in a sequence of first red, then gold then black borders picturing four warships with armed soldiers holding vertical lances and round shields. Taken together, these four symmetrically positioned battle scenes read like an animation of an invasion and defense (fig. 1.38, 1.39, 1.40, 1.41). The narrative appears to start from the south-west corner immediately to the right of the west entrance. The first scene has four single-oared ships of two different kinds (let us call all them type A and B) crossing each other. Filling the frame, A seems to be cutting off B's progress. In the foreground a rock or cliff offers a viewing position for someone observing from the shore. In the second scene on the south wall in the southeast corner all four ships appear closer to the imaginary

viewer and are perhaps continuing the previously described action or may be locked in battle at the central point of the picture. In the third scene on the northeast corner two ships in close proximity can be seen moving away from a harbor. A is moving outwards to the left side of the frame while B is moving outwards to the right, while a distant harbor is evident⁴⁸ in the background. This could be a view from a third boat closer to the shore. In the last and fourth sequence, the type A ship has turned towards type B and with dynamically angled lances is actively pursuing type B, chasing it out of the harbor. The painting of these four panels is loosely gestural and its impressionistic rendering imparts a sense of urgent movement to the scene⁴⁹.

Above each of these naval battle scenes sits a woven basket seemingly on the sill of a window-like arched opening that extends the remaining height of the Middle Register above⁵⁰. The window-like illusion is created by a painted coffered lintel at the top and a slender jamb on each side. A head in the form of a theatrical mask leans against the basket in each window, facing towards the centre of each wall of the room. All four baskets contain what appears to be a severed phallus, according to William Archer, wrapped in a deep red cloth. Along with the phallus are two silver vessels – drinking cups perhaps, or in the case of the two scenes on the east end of the south and north walls, possibly trumpets or hunting horns, or cornucopias.

On the west end of the south and north wall are two identical scenarios (fig. 1.42, 1.43). In each the mask represents a youthful *Silenus*, identified by his snub nose and thick lips, posed in a dramatically exaggerated profile. The mask leaning against the basket on the east end of the north wall is that of a maenad, a Dionysian priestess with ivy and flowers wound through her hair (fig. 1.44). A maenad, when possessed by the wine god, sacrificed and ate her victims. Hence perhaps the severed phallus in the baskets, and it is important to remember that the phallus was a sign of power and fertility – and good fortune – in Pompeian culture⁵¹. Finally, opposite on the south wall, leaning against the basket, is a mask of an old sleeping satyr with closed eyes and open mouth (fig. 1.45).

These scenes on each of the four windowsills are framed against overlapping architectural structures that fill each alcove/window. Within each window (fig. 1.46, 1.47,

1.48, 1.49), a two-story arcade-like open structure is painted against a white background, reversed in the windows on each side of the architrave on both north and south walls so as to form a mirror image that faces inward on either side of the architrave. The architectural illusion of space, even in this case, employs for the meeting of the converging lines a vertical line through the centre of each architrave. A number of different points of convergence or almost convergence are located above or below the centre of this vertical axis in order to achieve a variety of acute angles that approximate and define planes of different pictorial depth⁵². The symmetrical nature of the architectural illusion on each side of the architrave permits each converging line to construct the mirror image. The two-story colonnade is only partly visible as it is cut off by the window frame on both sides at the top and below by the windowsill. Each tier is of equal height, and as Archer describes it, consists of two perpendicular entablatures – architrave, frieze and cornice, supported at their juncture by a narrow wall and slender *colonnnette*.

On either side of these architectural illusions, and extending the full height of the central zone of each wall, are three large white panels with broad red and narrow black borders (fig. 1.50, 1.51, 1.52) that culminate in a pediment⁵³ at the upper edge. Three floral festoons suspended at two points symmetrically decorate the pediment while a vertical border runs down on either side. A symmetrical horizontal and centrally spiraled festoon links the vertical floral wreathed border. Due to the existence of the secondary entrance, possibly for the servants, at the southwest corner, the fourth white panel is interrupted and its central image, common to the other three, is different and accommodated in the upper part of the remaining panel. In the centre of each of the three complete white panels there is a couple which includes a floating female figure – interpreted by William Archer as possibly a maenad – and a male figure, possibly a satyr reinterpreted by me as the goddess Feronia and her son. They appear to represent intimate companions with a flowing green garland rising from around their waist to above their heads. The satyr is always on the side facing the centre of the wall while the female companion seems to be dancing. Primarily because of their dress and the objects they carry as well as their disposition in space, William Archer believes these couples represent three seasons: spring, summer and winter (fig. 1.50, 1.51, 1.52). The

female figure (Feronia) and the satyr (Erylus) are dressed differently and hold different objects in each panel. At the northeast end the female figure is dressed in a long yellow garment with a light blue border holding a snake in one hand and a large sickle in the other. Possible the Roman goddess Ceres is intentionally invoked⁵⁴. The satyr in this panel is nude⁵⁵ except for a blue cloak draped through his legs, and is carrying a shepherd's staff in one hand and on his shoulder a basket filled with grapes. While the fourth panel (fig. 1.53) around the doorway has kept all the same floral motives where possible, the figures have, however, been replaced by a Hermaphrodite reclining on the ground and leaning on a tambourine while partly draped with a blue *stola* and wearing a delicate necklace of red stones. In the background a tree can be seen at a distance. Accompanying the figure on the left, and slightly at a distance holding a long *pedum* or shepherd's hook⁵⁶, is the figure of Pan. His hand is raised in a gesture of anticipation, attention or alarm.

While a large part of the Upper Register no longer exists, it is possible to reconstruct its main features due to the mirror symmetry, both laterally and from the north and south wall. William Archer has helped to corroborate my own observations and fill in some of the gaps because since his observations twelve years ago some of the upper zone has markedly deteriorated.

1.4.3 The North and South Walls: The Third (Upper) Register

In the Upper Register, beginning at 3.32m above ground level and reaching approximately 1.32 m in height, are three adjacent and symmetrically organized aediculae⁵⁷, two at each end and one in the centre, mirrored on both south and north wall and resting on the gilded upper zone border (fig. 1.54, 1.55, 1.56). They are of equal width and height and painted on a white neutral ground. Each aedicula has a pedimented roof structure (fig. 1.57, 1.58), as does the central aedicula (fig. 1.59, 1.60), which has two lower non-pedimented pavilion-like structures that extend it on either side. This divides the upper register-zone into nine separate but interconnected structures. The central aedicula has a wide gilded base, not unlike the base that supported Athena of Parthenos by Phidias⁵⁸. The central base is represented as completely frontal (fig. 1.61). A lower pavilion-like structure, with a base of a similar height,

is painted in three-quarter profile in a mirror formation on each side of the aedícula and facing towards the centre of the wall. The vanishing point of these bases and all other architectural features in this upper zone is once again located along the central vertical axis of each wall (fig. 1.62).

Alternating with the gilded bases, but nearly twice as high, are red panels with wide blue borders that support the aedículae above them. And at both extremities of the north and south wall, adjoining the eastern and western end-walls, is a representation of a taller wooden structure like a second-story balcony common to Roman houses. This balcony, unlike the other aedículae, is enclosed. Each aedícula in the Upper Register has a pedimented roof supported by two or three *colonnets* on either side (fig. 1.63, and see also again fig. 1.54). Between the lower parts of the illusionistically receding *colonnets* is a wall section supporting a deep red or blue partition above. While each of the spaces of these aedículae is relatively shallow, together they are part of a larger lateral continuous space represented by a two-tiered entablature consisting of perpendicular and horizontal beams apparently supported by small *colonnets*.

On the south wall, and positioned in the central aedícula seated on an elaborate throne, is the largest most visible and prominent figure of five figures that originally animated this wall's upper zone (fig. 1.64). I would like to suggest that this bare-chested and red draped figure is the equivalent of the Roman god Liber Pater, associated with Dionysus, the god of wine and the mystic ecstasy. Dionysus, also known as the *Lyaeus* or Liberator, sits with his foot on a low stool holding perhaps a cluster of grapes in his hand and supporting a long vertical staff, a thyrsos, a long staff tipped with a pine-cone and twined sometimes with ivy and vines, the symbol of Dionysus that is identified with him. His female counterpart Ceres, in Latin mythology, is identified with Ariadne⁵⁹. It is interesting to take note that this figure is placed over the centre of the mythological panel below of Dionysus rescuing Ariadne.

The figure on the North wall is no longer identifiable. William Archer who made his study in the late seventies mentions four figures as being preserved on the north wall. Now there are only three figures preserved on either wall⁶⁰. Archer suggests that the central figure

of the north wall is that of Apollo, son of Zeus born at Delos-Delphi. According to his description he is wearing a blue mantle draped over his legs.

This is another case of a red/blue contrast, with Dionysus in red on the other side. Apollo was also wearing a small brown cap with a golden lyre held by his left hand resting on his thigh, parts of which are just barely recognizable now. Apollo oversaw the pastime of the muses and his oracular pronouncements in the form of verse gave inspiration to clairvoyants and poets (fig. 1.65). Even though Dionysus and Apollo shared this station, Apollo was less mischievous and more evenly tempered than Dionysus and his demon entourage. Apollo was also well known for his many passionate and sometimes disastrous love affairs with gods, young men and women. I also believe it is worth mentioning that in this room he is centrally positioned over the mythological panel of *Daedalus and Pasiphae*⁶¹, and that in the legend Pasiphae mated with the sacred bull to give birth to the Minotaur⁶² (fig. 1.66).

Opposite each other on the north and south wall in the alternating and flanking aediculea are female figures standing on the edge of the illusionistically projecting bases. The figure on the left of centre on the south wall has one of her feet raised while she stands on a small footstool wearing a sleeveless palla with a blue tunic that covers her head and is also draped over her elevated left knee. In her left hand she holds a thyrsos. She is probably also a maenad⁶³, one of the followers of Dionysus. On the north wall opposite is a female figure in a long and overhanging palla belted at the waist and looking towards the central figure of Apollo on the same wall. She is holding a short torch in her right hand with a red ribbon falling from her left hand (fig. 1.67). Augustus claimed that his mother conceived him through the instrument of the god as she slept one night in the Temple of Apollo. Is there a relationship between the female figure with the torch and the mother of the emperor Augustus⁶⁴?

The representation of the balcony adjoining the south and east wall has a male figure facing towards the centre of the east wall wearing a green wreath and a blue mantle (fig. 1.68). The other figure on the north wall, also on a balcony adjoining the east wall, appears despite being badly damaged to face into the east wall. They visually shift the focus from the

centre of the north and south wall to that of the east wall. The only surviving figure at the extreme west end of the north wall is seated and barely visible, but clearly looking towards the centre of the room.

1.4.4 The East Wall: First (Lower) Register

Since there are no murals on the west wall, which is entirely given over to the entrance, the final wall to be described is the east wall (fig. 1.69), 4.64 m in height and 3.55 m approximately in width. It continues a division into zones or registers identical to those on the north and south walls, with the same combined height of the First and Second Registers being 3.32 m, and an upper register rising another 1.32 m.

The socle at the bottom has all the same characteristics as the longer north and south walls except that the proportions of the central panel are narrower and the painted circular decorations on the socle are inverted in that they are rendered as light marble within dark brown marble rectangles.

1.4.5 The East Wall: Second (Middle) Register

The central zone (fig. 1.70) also features an entablature (fig. 1.71) supported by an architrave supporting a slightly narrower red panel with a central mythic scene of Ixion, after whom the room has been named, tied to the wheel of fire for eternity after having seduced Zeus' sister, Hera, who in phantom form bore him a son, Centaurus, father of the Centaurs. It is worth comparing this to the Minotaur legend of Pasiphae's coupling with the sacred bull described above. Its entablature also has a coffered soffit (fig. 1.72) and is supported on either side by only one *colonnette*. This *colonnette* is also connected to the illusionistically painted wall behind with a low wall supporting a blue panel. The decorations on the large central red panel are identical to those on the other walls, with the exception that at the top of the festoons two birds are perched on the central loop while a panther is poised on the outer loop. On the bottom of the red panel a small deer stands symmetrically on either side at the edge of the festoons, while from its centre three sea bulls with curving fins make up the triad from whose midst a bare-torsoed triton – son of Poseidon – sprouts (fig. 1.73). On either side of

the architrave a blue panel, also with a pedimented edge and executed like that picturing the Athena, is framed in red. On its central and illusionistically recessed panel the image of a sea horse – *hyppocampus* – has its head turned away towards the edge of the wall. Above a gold border on either side is a horizontal panel framed with green representing still lifes (fig. 1.74, 1.75) instead of warships on the north and south wall. Left of centre the still-life represents two dead birds lying on their backs with a yellow quince on either side. Three others are sitting on recessed shelves and at the bottom right what appears to be a *pendum* or thyrsos, wrapped and decorated with a blue ribbon, cuts diagonally across part of the picture. The painting to the right has a goat standing on its left while on the bottom shelf a bound sheath, possibly grain, lies diagonally in the foreground. Near it, tipped over on its side, lies a brown cup with its white content spilling onto the shelf. Two identical-looking full cups sit on a sill.

Directly on top, and in the centre of each still life, is a conventional theatrical female mask of a tragic actor with an elaborate woman's hairstyle or *onkos* gathered and ribboned at the top of her head (fig. 1.74, 1.75). A thyrsos, as noted above a wand and symbol of Dionysus carried by his followers, diagonally projects out behind her head. Above, a red wall panel is pierced by an illusionistically constructed window (fig. 1.76, 1.77) like an alcove whose view is of a series of interconnected two-story high lintels and jambs situated against a white background. The perspective construction of these architectural details on the east wall in the windows, as in each wall, is aligned on the central vertical axis of this wall. The colonnade construction in its foreground features an roofed gateway or entrance on which two golden horses appear to be prancing, facing away from the centre, and is mirrored in an identical manner on the other side above the still life. While this window is similar to those on the north and south wall, its frontality also incorporates a column and lintel construction that is perpendicular. The intention appears to be to visually connect these lintels and jambs seamlessly to those appearing in the windows/openings of the north and south walls (fig. 1.78, 1.79, 1.80). (Here the problem involved in solving the distortions experienced at the beginning of the second style in the corner of a room is minimized by the restriction of the illusion to the windows alone.)

1.4.6 The East Wall: The Third (Upper) Register

In the Upper Register of the east wall (fig. 1.81), a central aedicula is flanked by two others on each side. The interior architectural constructions in each aedicula also appear to be connecting to the adjoining ones on both the north and south wall with their receding sides. This sense of continuity persists as the farthest aedicula connects behind the central semicircular colonnade or exedra⁶⁵ in front of which a figure is seated.

On the lower frontal plane of the left and right aediculae are red-framed green panels with low pedimented borders supported by columns, which in turn support a roof. These aediculae are two rooms deep, with each room defined by an open or atrium-like roof structure. In the second room on the left of centre looking towards the seated figure at centre is a male figure situated in the second or rear space holding a thyrsos with the left hand against his chest and a theatrical mask in his lowered right hand. Also a figure on the extreme right aedicula in the same spatial position appears to be holding a thyrsos in his right hand and a mask at waist height with the right hand. Both sides of the balcony facing the centre of the east wall include a gilded socle supporting a lower light-blue wall and an upper curtained or paneled side. This whole side illusionistically projects out and the side of its roof merges with the roof of the atrium-like opening covering the central aedicula, paradoxically giving it the appearance of being recessed.

The seated figure at the centre is identified as Athena or Fortuna (fig. 1.81 A) with a cornucopia or rhyton (drinking cup) in the left hand and what is probably, I believe, a disc in her right hand. The question is if it is a disk, why, and what function would it represent? (Archer describes this as a dish for pouring libations or offerings, but why would Athena be pouring libations?) At the north and south ends of the east wall actors appearing in the recessed rooms wear laurel leaves in their hair as a reminder of Apollo's lost love. Visible on the extreme end of the flanking aediculae, a red column has a large vertical representation of a thyrsos. In the centre, the figure of Athena/Fortuna is separated from the central space by having a narrow aedicula as part of the frontal support, giving the appearance of a recessed balcony with its own roof at whose centre is also an impluvium. Behind Athena/Fortuna is a semicircular colonnade including two entrances with steps and an elevated two-story

structure behind it. (These doors are symbolic representations of the open doors of the temple so that Janus, the most significant founding god of Rome could come to the aid of the Romans in time of need)⁶⁶. Finally, the central balcony has a narrow green horizontal panel at its midpoint, while four blue panels framed in red are located symmetrically on the bottom of the far balconies and to the side of the central balcony, each one bearing a scene with figures.

1.5 Belief categories: Perceptual Beliefs, Philosophical Beliefs, Religious Beliefs, Scientific Beliefs (concerning the optical system), Mathematical Beliefs, Medical Beliefs (concerning the body)

1.5.1 Perceptual Beliefs

This section examines the perceptual beliefs underlying the pictorial decoration of the *Ixion* Room. The wall decorations consist of representations of walls with windows and complex architectural features. These representations are attempting to be integrated seamlessly into the already existing architectural features of the room. The problem with two overlapping realities, the three dimensional real space within which the viewer is mobile and the superimposition of fixed pictorial space of a three dimensional representation inevitably causes pictorial ambiguities. The encounter between the perception of real space and the perception of represented space creates these ambiguities that involves the artist to make pictorial compensations in order to ensure commensurability with the dominant belief about the experience of lived space; and the rules by which these compensations may proceed.

The *Ixion* Room, like any other, inevitably offers up latent spatial ambiguities to any superimposition of pictorial space. The artist – who is after all the first perceiver or producer – makes compensation for these ambiguities in the execution of the decorations. As John R. Searle informs us, the artist's perceptions are moved by his or her intentionality⁶⁷, in this case the desire for commensurability of the lived experience of space, to conceptions of pictorial compensations, guide the conscious decisions behind the room's grand design. This section will therefore concentrate on the visual beliefs, physiological and automatic beliefs, that it should not be forgotten become complemented by other multisensorial perceptual beliefs,

and become converted - into the conscious conceptual beliefs that form our general visual awareness.

On a technical point, it is important to note that some of the representations on the Upper Register are incomplete, and have become further degraded since being uncovered. My understanding of them therefore is based partly on what I saw and recorded on my four separate visits in the summer of 1999, 2001, 2003, 2007, and partly on information obtained from historical photographic documentation. Additionally I have of course learned and understood much from written accounts that have helped to further describe the decorations as they were found in their original state. Nonetheless, as it is possible to see from my documentation, the room is still to a very large extent intact.

In his chapter *View from Below*⁶⁸, John Baird suggests that sensory perceptions is a very complex physiological state that depends on moment to moment judgments that also depend on a particular set of perceptual mechanisms already in place. (this would also include neural mechanisms – sending information.). Imagine an object moving away in the distance, these perceptual mechanisms need to co-ordinate several kinds of information in order for the viewer from a stationary position to perceive the event as a smooth *believable* transition – judgments are made very quickly to adjust relative size, relative distance and relative motion/speed. Perceptual judgments are in a constant state of re-evaluation. Physiology as fast as it is able to respond and as flexible as it is nevertheless has its limitations and has developed a set of perceptual mechanisms and strategies that make up the perceptual experience. When performing a complex task like perceiving from a stationary position a moving object at a distance all of those perceptual mechanisms and their strategies come into play. In this case the perception of relative size judgment is made in respect to near by objects. However the object does not shrink as rapidly as it is moving away according to the visual angle and this means that the receding object is perceived or judged to be greater than expected from its visual angle, and less than expected from its metric size. Therefore the perception of size is a compromise between the object's proximal and distal values. Baird suggests that perception of size-at-a-distance is assessed by sensory transducers, but distal size is assessed by contextual constraints on judgment process. From

this example it is possible to see how we really live in two worlds. The world according to a metric measure and synthetic perspective and the perceived world with its *natural perspective* that is in constant process, made by constant judgments that depends on all perceptual mechanisms.

This perceptual input when it becomes converted from perceptions to conceptions in consciousness, draws on all we know and believe at any given moment. Concepts while they can only ever be similar however can be shared and judged in accordance with a cultures beliefs and constitute conscious memory, conscious judgments and conscious reasoning⁶⁹.

In the case of the *Ixion Room*, we are considering the particular visual question of an authored pictorial space, one that has both a producer – an artist – and a viewer. Given Baird's analysis, for both artist and viewer and both are subject to beliefs, the roles of producer and receiver differ, however. Although the process of producing images and the process of receiving perceptions rely on the same mechanisms, those mechanisms are not used identically. Images are constructions of information previously internalized by the producer and organized into perceptual units that have been already interpreted. In contrast, perceptions must be organized by the viewer from scratch and matched to stored representations external to the images viewed; there is no advance idea concerning the object of perception⁷⁰.

But who conceived the decorations of the *Ixion Room* in the House of the Vettii? Was their author one or both of the Vettii brothers? Or were the decorations authored by someone else? It was most probably an experienced artist whose workshop of assistant painters, students and supporting labour pool was capable of undertaking such complex commissions? The question is significant for the degree of interpretation involved in the production of the images, and here I would just briefly like to clarify the position I assume on the creative input of the Pompeian artist.

According to Roger Ling and others, it seems that most artists, if not all, were connected to workshops to which they would bring their particular expertise, be it rendering the figure or decorative painting, and that while they worked as a team, there was a certain hierarchy amongst them⁷¹. While accepting the existence of such workshops, Ling and others

believe that ultimate authorship of this or that decorative scheme was vested in "pattern books" available to the patron or client for their selection and choice, leaving the artist little creative input into the over all scheme of the decorations. As a result, the conclusion is that the well-known stylistic shifts of the period were the result of changes in the prevailing tastes of the patrons themselves. Two problems emerge with this conclusion. The first is that an emphasis on style, while legitimate to the extent that rhetorical skill was appreciated as a mark of authority, runs the risk of ignoring the complicated belief structures of the time. The concept of the pattern book rests on the idea that style can be formulated and copied, or simply purchased like wallpaper by a client. There may in fact be built into the apparently futile search for these alleged pattern books a late-modernist bias familiar with the rotation of styles that constitutes the conventionalized history of art in our time. The second and related problem is that, as Ling himself admits, these decorations are far more complex and varied from one to another than the use of pattern books would suggest.

[...] Despite the use of pattern-books and the striking similarity between decorative motives and figure compositions in far-flung regions of the Empire, hardly any two decorations are identical. Even among the hundreds of wall-paintings known from Pompeii the degree of repetition is extraordinarily small, being confined in most cases of the odd figure-subject or a handful of ornamental motifs...Moreover, where repetition does occur, the motif or motifs in question are often used in a different way or in a different position, or the basic colour scheme is changed⁷².

It is therefore likely that if pattern books did indeed exist⁷³, their utility would have been limited to examples of work already done, and offering to a client suggestions or precedents by which to judge the worth of the artist seeking the commission. The historical record itself reveals that they would have been of little use in coordinating such visual complexities as are found in the *Ixion* Room, a skill not unlike an orator's that would have taken an experienced artist many years to develop. This is not to say that the patron might not express a general idea, just as is the case now. The point rather is that the artist was employed for the production of an original and inventive conception for a spectacle, one that would astound the patron and more importantly perhaps impress the patron's circle of influence. The point is borne out by the fact that the visual solutions to some of the pictorial problems in the *Ixion* Room are far more sophisticated than they may at first appear. And if

we consider the dramatic evolution of wall decoration over a short period of one hundred and fifty years from the first style to the *Ixion* Room's fourth style decorations, there is no doubt that artists at the time freely understood and elaborated the significance of originality. I would think that for them it must have been in a way no different than our own contemporary model that both relies on and challenges the images available to artists through the international art magazines.

Consequently, I am going to assume that the Pompeiian artist conceptualized the room as a totality, and that the responsibility for which they were commissioned was to take, as we will see, every aspect of the room's decoration into consideration. In the case of the *Ixion* room, this included also the room's purpose as a dining room with specific spatial locations of the guests along with the metaphysical implications of the patron, his family and friends breaking bread with the ancestors and the gods. For this, the artist was clearly expected to be not only a master of painting as a craft, but like the architect also to be familiar with the thematic structures threading through such important constituents as philosophy, religion, mathematics – especially geometry – and science. It now becomes possible to understand the artist's complex level of engagement mediating perceptions and conceptions in the production of the *Ixion* Room's decorations.

Mediations are central to the complex web of intersecting pictorial spaces in the *Ixion* Room. Paintings are by their nature invested in spatial paradox, but spatial paradox becomes perceptual ambiguity when faced with the problem the Pompeiian artist took on of integrating a spatial representation into a spatial dimension. As outlined in the introduction, the subtlety required is made all the more impressive from our contemporary understanding of perceptual mechanisms. It is clear from the Pompeiian wall decorations that the artists had recourse to compensations by which to resolve pictorial ambiguities so that the image would conform with the collective beliefs – the cognitive conceptions – embraced by their society. If the artist's task was to find visual solutions to picturing their world and themselves within it, that task required frequent compensations and camouflage⁷⁴. In the case of the *Ixion* Room decorations, the viewer is caught in various states of belief⁷⁵, disbelief or suspension of their (perceptual and conceptual) beliefs.

1.5.1.1 Seven sensations in perception: horizon line, scaling, framing, perspective, colour, texture, and mirroring as applied to pictorial space.

The analysis that follows applies seven aspects of perception – horizon line, scaling, framing, perspective, colour, texture, and mirroring – defined in the introduction. I introduce my analysis of the *Ixion* Room by first defining the relationship of the horizon line to the wall decorations. Since horizon plays an important role in our ability to judge the scale not only of objects but of distances as well, how scale is employed is therefore taken up next. I then outline the impact of the frame as a device. There are many different kinds of frames in the *Ixion* Room on all three walls, and they constitute a play of shifting spaces. The horizon line, scale and the various framing devices all have impacts on our perception of pictorial space in the room that are particularly significant. While other visual characteristics like contrast and shape through shading influence our perceptual experience as well, their impact is not sufficiently important to discuss here. More vital is the matter of perspective systems, since they offer the possibility of organizing pictorial space in more than one way. The fifth and sixth factors include colour and texture, while the final factor is the element of mirroring we find on all three walls, including within this the matter of stereoscopic vision. Following the discussion of these seven aspects, I will turn to the internal pictorial spatial logic of each register, starting with the Upper or Third Register, followed then by the Middle or Second Register before finishing with the First or Lower Register, the socle. The section will conclude with a summary of beliefs of the *Ixion* Room.

The horizon line

To enter the *Ixion* Room (fig. 1.1) is to enter into a space divided horizontally into three distinct registers, and three distinct narrative space. All three registers are divided by the iconographic content. The Upper Register is the domain primarily of the gods. As we lower our gaze, we encounter in the Second Register a hybrid terrain, a domain encompassing both the earthly domestic and the ambiguously mythological. Lower still, and we find ourselves in the Lower Register surrounded by marble, the material aggregate of the earth itself.

These iconographic divisions do not, however, override the discreet or implicit horizon line that is broadcast by the physical eye level of the viewer entering this room. Sedgewick,

writing in 1973, states that as a general rule any horizon is unique in that it never changes its projective location⁷⁶. The horizon is always 'horizontal', lateral, and always at eye level. A vertical shift of the horizon will establish therefore a new position of the viewer. Determining the scale of things relative to the horizon line in both real and pictorial space has focused on what Rogers calls *intrinsic units of measurement*. The relative height of the viewer's eye level from which they are able to develop a sense of scale, a gradient of texture, size information, slant and direction of objects and surfaces. Also it gives information about the angle of the visual ray that intersects with either the ground plane or the defining planes above eye-level. This is as true for the experience of three-dimensional space as it is for pictorial space⁷⁷. Roger quotes Sedgwick (1980) who suggested that viewers might be able to recover an implicit horizon from geometric features of a representation⁷⁸.

In the *Ixion* Room just such an implicit horizon line can be detected on all three walls (fig. 1.82, 1.83, 1.84), one that would be consistent with a viewer of the period as they enter the room. The average eye level according to Vitruvius' measure would be close to about 136 cm⁷⁹. This is calculated by taking a man's height of 145 cm or 4'9" and subtracting 9 cm to find eye-level at 4'5" or so, bringing the horizon line to approximately the bottom of the mythological scenes⁸⁰. This horizon line is not a clear and continuous linear division, though the horizon line divides the room neatly so as to emphasize the shallow flat planes that then fall below it. These shallow planes are found in the lowest register and extend up to the bottom of the mythological scene in the Middle Register, partially including the still life renderings and warship seascapes that are situated just below the *trompe l'oeil* windows.

But along the horizon line itself our sense of space becomes uncertain. Gregory (1966, 1970) has shown that when flatness cues are eliminated – as occurs when for example an image remains unframed – the illusory effect is greatly increased and the perceiver can read the appearance of depth unencumbered. When however, as is the case with the *Ixion* room, a relatively flat pictorial area is *adjacent to* areas of deeper pictorial projections, and therefore acts in a similar way to a frame or border, a flattening out or compression of perceived depth results in considerable spatial ambiguity⁸¹ (fig. 1.85). Ambiguity is also emphasized by the transitional mediation of elements along this horizon line. The merging of the shallow or flat

spatial depictions below the *Ixion* Room's horizon line with the deeper spaces above is effected by the small framed scenes at the lower edge of the Middle Register. These include the entablature and the mythological scenes at each wall's centre, the panels with still life libations and offerings on the east wall and the naval battle scenes on the north and south wall, as well as the window alcoves of the Middle Register.

If all of these appear to be located in an indeterminate space along the horizon line, above that we can see that the lines of perspective are inclined downward, signaling to us that we are looking up. We feel the pull of the determined architecture of spatial planes, with their strong descending perspective lines, lifting us up towards the atmospheric lightness of the heavens in the Upper Register.

That pull, nonetheless, is not directing us towards one vanishing point, as we will see described in detail in the discussion of optical beliefs, and is not therefore inclined towards an essence that is locked within a single authority, whether transcendental or human. The lines of perspective that inevitably situate the position of the viewer are themselves ambiguous, mobile (fig. 1.87). Given the symmetrical formulation of perspective in the room, the projected lines of the architectural planes of the middle register 'windows' on the right move left only, while the projected lines on the left move right only (fig. 1.88). The projected lines in the upper-most section of these window representations incline to intersect on the horizon line, or eye level of the viewer, at the centre of the mythological scene, while those projection lines that define the lower part of the architectural features of the windows meet near the top edge of the lower register, a horizon line consistent with the reclining guest at dinner (fig. 1.89). This mobility suggests a mobile viewer, one who will occupy several positions in the room. Most obviously, they will move in the *Ixion* Room from door to 'table', from standing to reclining at dinner, and in a sense the play of spatial depth must follow them, aligning itself with their positions of significance. The lower the eye level, the sharper the perspective projection must be⁸² (fig. 1.82, 1.83, 1.84).

This principle of the mobility of the viewer, can be traced in the architectural detailing of the upper register, where more of the sky is made visible than in the middle register window/alcoves, an effect manifested by a more widely sloping horizontal plane that results

in the perception of deeper space. The intersection of the perspective lines extended from the extremity of this plane coincides approximately with the top of the entablature. On the other hand, the horizontal plane that can be constructed between the sides of the aediculae in the centre of the Upper Register has its projected lines extending to coincide with the centre of the seated figure of Fortuna (fig. 1.90).

In each of these instances noted above, the viewer's eye level is shifted to a new horizon. Bear in mind that eye level and horizon line are synonymous with viewer position; the horizon is the point zero of a calculation by which we estimate spatial depth, and the establishment of an horizon line in any representation is a means of shifting the position of the viewer. In the case of the represented *windows* on the north, east and south wall, there are two horizon lines, one, at the bottom of the mythological scenes when the guest enters the room, and one for the eye level of the reclining guest lying on couches located on the north wall looking at both the east and the south wall at the representations of the windows and the reclining guest on the south wall looking at the east and north wall at the window representations; in the case of the perspectival intersection at the top of the entablature, a horizon line is established that implies for the viewer elevation to a different and higher position. Finally, in the case of the aediculae, a fourth horizon line implying an even more elevated viewing position is set for the centre of the seated figure of Fortuna on the Upper Register.

It is the potential of the infinite distance of the ground plane that always positions the horizon at eye level. In the *Ixion* Room the only ground plane *visible* is the one the viewer is standing on; there are no ground planes visibly rendered in the wall decorations. Because there are multiple horizon lines – according to the various incline of the projective angles of the representation, an imaginary series or maybe even a mobile ground plane is implied. It remains, however, virtual and unrepresented. Not only does the occlusion of the ground plane reduce both depth and height calculation of the pictorial plane, but the denial of any perspective lines projected up towards a horizon line that would position the viewer's height from the ground plane destabilizes the horizon line's relation to the ground plane, rendering the viewing position indeterminate and unresolved, doubly mobile (fig. 1.91).

As Hagen emphasizes, the projective characteristic of the horizon is that it acts as a stable reference in the optic array because it never changes its projective location⁸³. Hagen reminds us in her book *Varieties of Realism* that while laboratory tests have greatly contributed to our understanding of perceptual mechanisms, they are often so particular that they do not incorporate perceptual stabilizers, like the horizon or the ground plane, that are part of the greater complexities of the world. The perspectival mobilities evident in the *Ixion* Room demonstrate the significance of attending to the architectural envelope to which the viewing subjects physical engagement, their position in space and time becomes only the point of departure – and in virtual space re-establishing their position with the various implied virtual ground planes each making equivalences between them and the subject represented, giving them temporarily access to the world of myths and the world of the gods. Interestingly, we as viewer out of *our* time can follow the guests in the *Ixion* Room encountering a fluidity that reflects *their* time and space, the time and space of a first century Roman citizen.

Scaling

Scaling of real or pictorial space is a matter of having some *metric*, or measure – whether eye level, horizon or known objects – that can give a cue of size to the perceiver⁸⁴. This is true whether scaling real or pictorial space. It is important to emphasize that despite the undoubted fact that the decorations of the *Ixion* Room are fictional representations and not based upon any actual scene, our scaling of pictorial distance or size is related to the experience we have in the world.

We all have experienced ambiguities of scale when the cues we depend upon are absent or ambiguous – for instance the distance to the horizon across a calm sea. Most often the cues are present. For example, our close experience of the physical dimensions of the *Ixion* Room provides a scale by which to allocate a relationship between the individual decorative details and figures provided and the space of the room itself. However, ambiguities of scale arise when we are faced with iconographic elements that are of different metric orders⁸⁵. Consider on the one hand the still life paintings, and on the other the naval scenes underneath the *trompe l'oeil* windows in the Middle Register. Both are approximately the same size

while their subject matter, referring to completely different real spatial situations, is not. We as viewer must scale these representations in two ways: one is to note the relatively similar size of each representation within the broad context of the *Ixion* Room decorations; the other is to recognize the internal scale in each that is appropriate to the subject matter⁸⁶.

But even within these we find scaling ambiguities. An example is the still life/offering consisting of shelves, tabletops and objects normally associated with each other supporting fruit and cakes and tableware. In the still life to the right on the east wall the presence of the goat on the top left creates an incongruity in our reading of relative size or proportion⁸⁷. Consider also that while the internal scale cues within the naval scene provide apparently coherent relations between the shore, the ships and the distant harbor, yet even this coherence is subject to the influence of external factors. Here the truncation of the scene's foreground by the frame interrupts or obscures part of the potential visual field that could provide further depth cues, and our ability to scale objects becomes limited. This leads to a compression of the pictorial space perceived⁸⁸. In this regard, it has been shown – if it weren't intuitively obvious – that object information on a ground plane greatly increases the ability to judge depth⁸⁹. This is because we use objects and surfaces for scaling the rest of the scene and determining our perception of spatial dimension. The only ground planes that are visible in the *Ixion* Room decorations are those seen in the mythological scenes.

While cues are valuable, it is also important to realize that perceived space has been shown to not in fact match the actual measure of real space in any given scene⁹⁰. Even while standing within a landscape, depth estimates by the viewer are usually underestimated. Rogers, speaking about the *veridicality property* in the representation of spatial relations, points out that this is because what we are attempting is not a matching of objective measurements to real space, but rather the matching of our spatial *perceptions*, or assumptions, to real space – assumptions consistently shown in experiments to be underestimations.

Finally, it should be noted that there are two other significant forms of assigning scale. One is to use the metric of gradient cues, such as texture gradients that show a regular change in density and spacing of the ground⁹¹. In the *Ixion* Room, texture gradients are most evident

in the diminishing detail of the architectural elements as they recede. A second important scaling effect involves the use of reduction, as is visible in the reduction of scale in the upper register as a distance cue to give a sense of greater height.

Framing

Framing is essentially the operation of assigning boundaries or establishing perimeter reference points. The frame may take a number of forms. The narrative separation of all three registers is a form of framing, as is the entablature framing the mythological paintings. The white panel tapestries frame the two dancing figures internally through festoons, and the deities and actors are framed by the aediculae. The *trompe l'oeil* windows become frames for the faux architectural details. Even though each frame appears to be different, their perceptual impact on the pictorial spatial reading is similar to the perceptual effect of an *extrinsic frame* autonomous from the intrinsic content of the decorative paintings. In the *Ixion* Room frames are occlusions and truncations that limit the pictorial information separating it from adjacent visual information⁹².

Then there are also the spatial frames that help us locate ourselves in space, and which require establishing a correspondence between the various perceptual mechanisms that link our perception of the environment and our knowledge concerning it. These can take two forms. There is the *egocentric frame*, in which the visual features of the environment are preserved – including both the objects that are situated within it and the position of the producer or idealized viewer. Alternatively, there is the *exocentric or allocentric frame* in which objects are located independently of the producer or perceiver⁹³. In the *Ixion* Room both of these two maps exist: on the one hand there is the physical map of the space where the dinner guests are moving, the egocentric frame. On the other hand, there is the imaginary or 'theoretical' map provided by the pictorial space presented to the guests, the allocentric frame. Difficulty arises when the 'maps' provided by these frames are both present and do not correspond, making it difficult for the navigator to find the assigned destination or to find their way back from them⁹⁴. It is this difficulty that requires of the painter-designer a defined choreography for the viewer's location. In the *Ixion* Room, as an example, the rendered architectural projections visible through the faux windows on the east wall are convincing

only from our position as we enter from the west entrance or from the low position of a reclining guest at dinner.

Framing can also act, as Pierce proposes, to limit possible choices, to reduce complexity, in this case pictorial spatial complexity⁹⁵. Each of the framed events becomes a separate episode that contains within it different pictorial spatial propositions, each provoking a different emotive state. Similarly, Nycole Paquin speaks about two factors that are simultaneously intentional and are overlaid on the perceptual experience – namely the perceptual effort and the emotive framing of our encounter with any [situation] or object⁹⁶.

Perspective

As I have outlined in the introduction, the central axis of the Roman house sets a condition on how both the visual and physical penetration of space is directed for the visitor. For example, the mirroring and parallel recession of rooms – including the tablinum and the *hortus* – in a successive rhythmic orderly repetition establishes a social hierarchy to which the whole body responds in the passage from entrance to interior. Joseph Lappin points out that our contemporary conception of describing images involves the conception of space, and rests on the idea that visual spaces are derived from both objects and motion – rather than from a fixed extrinsic frame⁹⁷. What is involved is a three dimensional relationship in which image information is different from that which would be the case given a concept of description that includes only the continuous single surface. Image information, that is, rests on a correspondence between an object and its environment, and considerable latitude of form can be entertained as a consequence of allowing for the changes that motion produces. This is as true for our encounter with two-dimensional representations as it is for our three-dimensional encounters. In the case of two-dimensional representations, the observer may not be specifically aware of irregularities, automatically assuming the constancy of the representation⁹⁸. However, if the viewing angle of a representation is too near, too oblique or too distant, there will be a uniform distortion of the representation given the visual angle – and the represented object will appear to be equally distorted on its two dimensional plane. In the *Ixion* Room, due to the superimposition of the virtual onto the real architecture, there are

a number of instances in which distortions occur as a result of the viewer's angle of vision or displacement, and the representation becomes a failed illusion.

David Rose, investigating the reason for our belief in perspective, suggests that the operating system for processing sensory signals and knowledge is responsible for producing the rules of perspective that then apply virtually to all objects. However, despite these rules, our *perception* of perspective, or projected space, is influenced by such agencies as colour⁹⁹, motion, distance, direction and shape, and depends on cues like haze, perspective, stereopsis, texture, gradient and shading. When these mediating agencies are applied inappropriately, they produce in us inappropriate perceptions of perspective, and systemic errors such as distortions of size and distance. Curvature and departures from linear perspective, Rose suggests, stems from an awareness of space that is not necessarily Euclidean, since according to empirical evidence distant spaces appear compressed – with only near-space conforming to Euclidean metrics in our human perception¹⁰⁰. Perceptual spatial evaluation in which surface tilt – the direction in which a pictorial surface points away – is not affected by perceived depth, whereas slant – *how much* it points away – is affected¹⁰¹.

The original viewer would probably approach the *Ixion* Room, walks about it however briefly, and eventually reclines on a dining couch. In the process, as his or her gaze rests on the north, south or east wall, its painted representations would have been seen from a number of different positions in space. Even though empirical evidence suggests that perceptually speaking pictures bear close structural resemblance to the real scenes they represent, Rogers proposes that because we see pictures other than from the intended ideal singular position however, the result is that pictorial spatial perception is *subject to change* whether we choose to acknowledge it or not¹⁰².

Margaret Hagen writes that representational art essentially is about the depiction of images and their surfaces in the world transferred to an image plane, or support. But the *Ixion* Room decorations are neither veridicalities – mimetic depictions – nor yet entirely fictional representations. Damasio writes that images that are seen by us in our mind – as would have been the case with the pictorial conception of the *Ixion* Room – are ultimately not facsimiles of particular objects; rather, they are images interacting between us and the world we know.

Objects or object ideas engage our perceptual mechanisms, and are constructed in neural patterns formed according to the organism's design. This makes the object real, the interaction real, and the images that are constructed real¹⁰³. And I quote Damasio:

There is no picture of the object being transferred from the object to the retina, and from the retina to the brain. There is rather a set of correspondences between physical characteristics of the object and modes of reaction of the organism according to which an internally generated image is constructed. And since you and I are similar enough biologically to construct a similar enough image of the same thing, we can accept without protest the conventional idea that we have formed the picture of some particular thing¹⁰⁴.

It is important to appreciate that there are constraints to the ground-plane observer's visual world, one of which is – as I have already indicated – the ground or surface from which the observer and objects in the environment directly or indirectly must find support¹⁰⁵. The transliteration from one dimension to another – real space to representational space – also implies that the artist, as the first viewer, develops a position in relationship to the subject within the spatial representation, no matter whether it is a real or fictive scene. The *Ixion* Room in fact has both: it is a representation of a room to the same scale as the room within which it is being represented. There is the *physical* position of the viewer in relationship to the projected plane, and there is the *conceptual* positioning of the viewer requiring a decision on just how to enter this projective space. Margaret Hagen¹⁰⁶ echoes Damasio, the premise of her thesis being that it is not good enough to construct a linear perspective that according to some rule might be a correct projection; it must also generate a certain cultural constraint in order to look correct to the intended viewer¹⁰⁷. By analyzing the perceptual experience that the contemporary viewer has of the *Ixion* Room, and by observing the compensations made by the Roman painter, it becomes evident what was perceptually important to the Roman viewer – for example, perspectival compensations that would be viewer-relational. Since perceiving a pictorial representation is more complex than had previously been understood, accounting for both the producer's and perceiver's context and activities more adequately completes the analysis of the perceived experience.

As discussed in the Introduction, Hagen outlines four basic perspective projective systems. Of these, three are applicable to the *Ixion* Room: similarity, affine and projective systems (fig. 1.92).

Perspective: Similarity

The second rung in the hierarchy of perceptual complexity, after metric, is *similarity*. As previously described, in similarity projection, shape, angle, size and parallelism, and perpendicularity are all invariant – but the image has undergone a scale change and is smaller in size than the original. In the similarity system, if a viewer is facing a symmetrical surface it will expand or contract depending on the distance from the observer: as the viewer gets closer to a pattern it appears to be rushing towards them. The rapid rate of change is linked to distance and time. This transformation, however, is reversible and while optical textures are all invariant, a change of scale has taken place and the image is identical but smaller. The horizon parallel to the ground is always at eye level, leaving visible as much below as above for any object. In the Upper Register of the *Ixion* Room, the architectural representations are relatively smaller than the room-scaled architectural representations of the Middle Register. The aediculae and exedra in the Upper Register are also proportionately smaller, but the relationship between the figures and the architecture is larger than in the Middle Register. While this could be construed as projective perspective decreasing in size with distance, the projective lines do not converge to a single point, giving this the appearance and characteristics of *similarity* perspective in which shape, angle, size and parallelism and perpendicularity are all invariant but the image has undergone a scale change, being smaller in size than the normal scale of the room¹⁰⁸. As a result, the viewer interprets the representations of the Upper Register to be at a greater distance – further away – than they actually are and the relatively large size of the Gods and their attendants gives them the appearance of grandeur and power. The viewer experiences an equality between their lived space and that of the representation of the architectural elements and mythological characters and scenes in the middle register – like in a theatre, the stage and its actors – However the Upper Register appears to be much farther – out of their reach, and inhabited by powerful giants or their gods, Apollo to the north, Fortuna to the east, and Dionysius to the south.

Perspective: Affine

According to Hagen, the third projective system is *affine*; it has no scale change from the original, as can be seen by the size of certain of the representations in the *Ixion* Room. For example, the entablature and the painted windows are scaled to the room itself. In *affine* perspective projection lines are parallel. However, size shape and angle are different. It should be remembered that angle shape and size always change together despite the *invariants* of parallelism from the original and every *affine* transformation of a plane, including motion, is the result of parallel projections¹⁰⁹. The *Ixion* Room has primarily an *affine* geometrical perspective system. Because *affine* perspective usually deals with larger surfaces in the world, light on the surfaces of planes are parallel to the viewer and are reflected from a large source, like the sun, that reflects off a variety of different surfaces. The *Ixion* Room decorations seem to be lit by ambient light, that is a general light source like the sun, which bounces off many different surfaces and illuminates the environment with ambient light. This is true in the case of the ambient light cast on the architectural features of the representations, the aediculae and the colonnade, of the Upper Register on the north, south and east walls. This is equally true for the architectural features seen through the window representations. The impression given to the viewer is that the architectural representations are an extension of the real space, and that creates for the viewer the illusion that the representations of the window are real windows looking out into a sunlit exterior space. This further creates the illusion that the room, although windowless, is flooded by sunlight. The eternal illumination reinforces a sense of constancy of the presence of the Gods and the eternal moral tales of the mythological scenes

Perspective: Projective

The final system Hagen lists is *Projective* projection¹¹⁰. This has projection lines or linear perspective that converges to a point, replacing parallelism with convergence. The *Ixion* Room has aspects of *projective* perspective properties in which, contrary to *affine*, the face of the represented plane in projective projection is *not* parallel to the original picture plane. The image converges to a progressively smaller size as the distance from the picture plane increases, resulting in scale changes. Shape, planes, and objects succumb to projective

distortion, which is also synonymous with spatial relations. The ground plane and the picture plane are at right angles to each other. Objects in a projective scene sit either on the ground plane or on a surface parallel to that plane, but occupy the space at various angles to the picture plane. In the *Ixion* Room's projective characteristics, the vertical planes that are part of the architectural features that are perpendicular to the horizontal planes incline towards the centre and become progressively narrower. The angles successively become steeper as they approach the centre of the wall. This does not result in a single vanishing point when these projective lines are extended, but rather in several points along the vertical central axis of each wall, where the projected perspectival lines in some cases appear to come together though in other cases they do not quite meet. The consequence is that the viewer experiences the representations in the *Ixion* Room much as they would experience the real world. Even though there is no singular point of convergence, projective projection gives the appearance of depth for example the representations of the windows and the aediculae at the centre of all three walls, as well as the architectural representations in the Upper Register.

Colour

The decorations of the *Ixion* Room are dominated by red (fig. 1.31). It is a shade of red that Vitruvius calls both vermillion and cinnabar. The second most important colour is blue, then ochre or gold, and finally a black is used as an outline or framing device¹¹¹. Colour sensations are totally subjective and depend on the way the visual system interprets different wavelengths of light as they are reflected from an object. By striking the eye, each wavelength – whether reflected off a painted surface or a coloured filter – initiates in the visual system colour sensations. These colour sensations are only generated by the perceiver – whether that is the artist or the viewer¹¹². That does not mean that one person cannot match a particular colour made by another person, in terms of value and hue; but colour sensations are, nonetheless, loaded with particular *affective* sensations that may differ substantially in their reception. For example, the short wavelength that makes up the spectral band of red is experienced as a physiologically *exciting* sensation, loading this colour with particular associated emotive characteristics. Colour is also an important primary affect directly connected to the ecological importance of survival strategies. It is useful, for example, to be

able to differentiate between close objects and distant objects, solid forms from empty forms, living matter from dead matter, dry surfaces from wet surfaces, and the colour for a food to be eaten or – if the colour seems wrong – to be avoided. It has been suggested that the colour red may have *an anatomical functional connection between the category red and a particular balance of neurotransmitter production in those regulatory brain systems of emotion that modulate attention, consciousness, and remembering*¹¹³. These characteristics of colours can be identified with the intentions served by the decorations of the *Ixion* Room. Colour also plays an important part in our ability to focus. Shapes can be differentiated or recognized by colour contrasts (red on blue, for example); they can also be contrasted by light and dark value contrasts (yellow shape against a dark red shape). Details can also corroborate the legitimacy of the big picture¹¹⁴. The use of local (or *natural*) colour – a banana is yellow, not blue – establishes also an equivalence between representation and object experience.

The *Ixion* Room primarily has this local colour designation, but only because the object world of the Roman is already indexed with symbolically charged colour choices. Moreover, the wavelength composition of light that enters the eye changes brightness from one point of the scene to another. The brain has developed a mechanism that calculates these brightness differences to the extent that the brain simplifies this otherwise complex perception, assembling the appearance of uniform brightness¹¹⁵. This impulse to simplify complex visual information is also assisted by having a limited number of colours – in the case of the *Ixion* Room hues of red, blue, yellow and black. Seen in another way, red yellow and blue are primary colours. The warm ochre (light orange) against the cool blue fields, and the vermillion (orange-red) frames against the cool greenish-blue fields define each other through complementary contrasts. Colour has been used optically to maximize its total effect in the *Ixion* Room. As has been proven, colour provides additional cues to light and dark-only resolution, and aids in a quicker object or situation recognition¹¹⁶. Bornstein¹¹⁷ has shown that the meaning – and therefore significance – of colour is also strongly influenced by culture. This can, and has, subverted totalizing assumptions concerning universal values – ecological or interpersonal – associated with colour. For instance, both black and white,

depending on cultural references, can be associated with mourning. The colours used in the decorations of the *Ixion* Room can be viewed as being both ecological/ interpersonal and culturally indexed.

Texture

Properties of surfaces and texture gradients help to distinguish between one object and another, but also – in terms of relative size of texture – they can signal close proximity on the one hand (large can suggest coarse or detailed) and distance on the other (smaller can suggest the loss of detail) relative to other surface properties. Texture recognition is secondary to colour or shape recognition, but plays an important part in spatial relations identification. What this means for the reception of the *Ixion* Room is the difference between the very rich textures of the representations of the first and second register, giving an appearance of proximity, compared with the relatively minimal amount of texture information in the upper or third register, giving the impression that this register is further away from the viewer.

Mirroring

The mirroring of the wall decorations on each side of the entablature or on each side of the central figure in the Upper Register constructs a bilateral vertical symmetry. Kosslyn¹¹⁸ suggests that symmetrical figures have fewer properties to encode, and mirrored parts are easier to organize. As for Merzenich and Kaas¹¹⁹, they have observed that a split representation permits a second-order representation to wrap around the first-order transformation, permitting short interconnections between paired representations. Patricia Churchland¹²⁰ also suggests that this wrap-around design, together with expanded representation of the visual field's centre, may be what has engendered our ability for stereoscopic vision¹²¹. While obviously stereoscopic vision and topographic mapping depend on the overlaying of two visual fields originating simultaneously in both eyes, it has an echo in the mirroring elements in the *Ixion* Room, acting as a reflection of topographic mapping by which to extend the perceptual depth of the pictorial plane¹²². For the viewer, this mirroring – most particularly through the representation of the window openings – constructs the illusion of parallax convergence as would be experienced in viewing the real world.

1.5.1.2 Analysis of pictorial space in the First (Lower), Second (Middle) and Third (Upper) Registers

Approaching the *Ixion* Room upon arriving at the peristyle, we are confronted by a very large entrance twice the height of a person and almost the full width of the triclinium. Walking towards the doorway, now permanently open, it is possible to take in the whole room at a glance. Scanning the north, east, and south wall decorations from the first or lowest register up to the Middle Register and further up towards the Upper Register, an intricate pictorial complexity impresses itself on the viewer. Because these registers offer separate 'narratives', it is useful to treat each separately, beginning with the Lower and then treating the Middle Register and the Upper respectively.

First (Lower) Register

The first register, in imitation of marble stonework suggests weight and solidity as a dense foundation for the depiction of architectural play in the upper two registers. The greatest perceptual spatial differentiation in this register is the advancing warm and receding cooler colour contrasts. While there is also a perceptual difference between circles, rectangles, and squares – and the differently sized marks that give texture to the marble are mimetic so is the use of colour which is local – nonetheless each form is further embedded in a frame that forms part of a geometric pattern which, much like the material aggregate of marble itself, keeps this pictorial space very shallow.

Second (Middle) Register

As will be suggested, there exists between the Upper Register and the Middle Register a dialectic between the appeal to moral authority in the Upper Register and the moral fallibility operating in the Middle Register. The Second Register on the east wall is most marked for its direct relationship to the architecture of the room and the scale of the viewer. Because pictorial space in this register is more varied than in the Upper Register, it is good to remember that pictorial invention of space is not arbitrary but is based instead on the perceptual stimulus that is equivalent to features in the visual system (Hochberg 1970)¹²³. In this register, flat planes are butted up against deep pictorial spaces that are intended to virtually extend the room. Each pictorial space is defined and limited, either by an

architectural conceit and a border, or in other cases by a frame. There are five distinct areas on each wall. The largest is the entablature that acts like a frame surrounding – on its back wall – what is either a red panel or hanging drapery, an *aulea*, with the representation of a large mythological scene at its centre. The second largest are the two white *aulea* on each of the north and south wall, each framed against a red panel. Each of these *aulea* holds small floating figures framed near the edge by festoons. Thirdly, flanking the entablatures and the mythological scenes on each wall are the trompe l'oeil windows, their view virtually extending the room beyond its actual wall surface. The fourth area, the blue panels that contain the seahorses on the east wall and the head of Athena on the north and south walls, have above them the smallest framed areas: the still lifes of the offerings or libations on the east wall and the naval battle scenes, both being about the same size.

Entablatures

In detail, and starting with the largest fields – the entablatures – what we have here is defined as a horizontal structure carried by a colonnade, consisting of architrave, frieze and cornice. The frieze and cornice at its top has a coffered soffit. Each unit of the coffered ceiling recedes perspectively on the right side of centre from right to left and on the left side from left to right. These perspectival lines do not, however, meet at one point on the central axis. Instead they form an alternate herring-bone pattern along the central axis beginning at Hera's robe and proceeding to the top of the mythological scene. They give a sense of depth to the entablature, as do the receding perpendicular white walls that mark the entablature's sides. If extended, they intersect on the central axis at the edge of the first and lowest register. While both the top and sides of the entablature establish a sense of depth, the absence of a ground plane and its occlusion by the Lower Register give this near stage-like setting with its suggestion of depth a relatively shallow pictorial space. However, the cornice and frieze of the entablature appear linked to the bottom of the Upper Register (fig. 1.71).

Koenderink and van Doorn (1993, 1994) reflected on the invariants of pictorial relief and *consider the [perceptual] depth dimension as a bellows that can be stretched and compressed under certain viewing conditions*¹²⁴. An example of this is the perpendicular displacement of the viewer in relationship to the surface of the representation, as when

shifting from a standing to a reclining position. On the east wall, the ambiguity of the upper register and the movement of the viewer in space has an effect on the variable depth perception of its entablature.

Before discussing how the mythological scenes on the entablatures contribute to the perception of pictorial space, it is important to consider the pictorial space of the *faux* windows that flank the entablature on each side since they also are influenced by the movement of the viewer¹²⁵.

The trompe l'oeil windows

I would like to start out with Richard Gregory's idea that perceptions are hypotheses based on experience¹²⁶. As I move towards the *Ixion* Room, I am aware of the fact that I am looking at a wall, the east wall. Yet I am simultaneously aware of looking through the 'windows' of the Middle Register on this same wall at a view of the extended architectural 'structures' of the north and south walls. In effect these two sets of awareness are in contradiction. A proposition by J.M. Hinton¹²⁷ explains that a perception illusion disjunction neither negates nor necessarily endorses distinctive assumptions. This applies if having an unambiguously perceived experience, for example between the architectural limits and the representation of a *window with a view* – as on the north, south and east wall, because it can induce the belief that a perfect illusion is at play. The windows of the east wall promote the belief, then, that the architectural elements seen through the windows extend the north and south wall. Because the viewer is moving within the actual three-dimensional space, which appears to be extended through this window, the experience of the *actual* wall feeds into an explicit memory of both the personal world and the world of which we have conscious knowledge – and informs our recognition of visio-spatial configurations.

However, our conscious recognition comes *after* it has been driven by implicit memory, which is itself driven by perception¹²⁸. Gazzaniga, in his book *The Mind's Past* (1998), explains that there is a time lag between an actual stimulus, the stimulus response, and the *raw feel* of the sensation we experience¹²⁹. Considering this sequence of delay, there is also time to project predictions and Romi Nijhawan demonstrated that what we see compared to what is on our retina are not the same. "*Some system in the brain takes old facts*

and makes predictions as if our perceptual system were really a virtual and continuous movie in our mind"¹³⁰. We are not consciously aware of how the real wall's limits and the representation of the wall's continuation become one in our mind because conscious judgment, based on explicit memory, is in fact based on conceptual belief structures and occurs after perceptual evaluation. Ralph Norman Harbor underlines that "*perception of pictures follow the same rules and process as the perception of three-dimensional scenes*"¹³¹. The illusion of a continuation of the north and south wall's architecture suggested by their representations in both windows of the east wall is vulnerable to collapse as the viewer moves. This is particularly true the closer one moves to the corner of the windows, since the lintel's horizontality becomes skewed and no longer makes a smooth and convincing transition with the horizontality of the lintels of the windows on the north and south side. As Rogers writes, orientation judgments are explicitly observer-relative and are readily noticeable¹³². Even though there is considerable tolerance for shape distortion, if the viewing angle is smaller than 21 degrees or if it is larger than 41 degrees the distortion of the picture plane's relative shape becomes very marked¹³³. *Distortions or irregularities in the visual space will have little effect on perception if the observer assumes that regularity in fact exists in the environment*¹³⁴. Since "regularity in the environment" of the frescoes is sacrificed to selected viewer positioning, the representations they convey work only in a 'shift' from one position to another, and this can be seen as a specific calculation by the artists. In other words, once the dinner guest enters the room, the illusion of continuity falls apart to be again corrected, once more made believable, from the reclining positions that the dinner guests assume during the meal on the sofas that would have been located on the south, east and north wall (fig. 1.92, 1.93).

Besides offering the illusion of transparency and continuity, the windows bring into play stereoscopic perception, and I want here to consider the configuration of the two windows on either side of the entablature framing the mythological panel that treats the story of Ixion. Both the north and south wall have similar configurations, and the mirroring of the windows is the same on each wall. While it can be said that the windows serve a pragmatic purpose – to 'light' the *Ixion* Room, psychologically if not actually – their consistent

mirroring disposition and spatial illusions construct a kind of pseudo-stereoscopic effect on the viewer. There is no obvious necessity for the architectural detail of the windows to be identical and in mirror reversal unless somehow they are intended to appear to intersect with one another. That intention would appear arguably to be based on a recognition of stereoscopic vision, since only in that case would it be urgent that they be identical: there is a significant collapse of conviction if the differences between what the right and left eye are seeing is dramatically different, and the parallax too far apart¹³⁵. The windows as such will not, of course, produce stereoscopic vision; what is required is a combination of two identical images at a set distance from one another¹³⁶. Looking at the east wall, or at the north or south wall, the mirroring of the windows directs and keeps the viewer's eyes focused steadily on the mythological panels, as if each window helps to confirm its pictorial depth. Although it is not possible to see the continuation or totality of the architectural structures glimpsed through the windows, they clearly continue behind the central mythological panel. This illusion or assumption is possible because perceptual hypothesis is capable of sustaining continuity through data gaps, as Richard Gregory¹³⁷ explains. That is equally true for the north and south walls, in which large white panels on each side of the windows extend the symmetry to maintain focus on the mythological panels. This focusing device, however, becomes increasingly peripheral the closer one moves towards the wall.

Mirror images, like shapes that are similar, bind visual representations and facilitate our belief that a spatial depiction, like a real space, holds continuity – in this case an architecture behind the central mythological scene (fig. 1.94). We often combine perceptual and conceptual experience in what appears to be a seamless flow. This is because perceptual interruptions are camouflaged by short-term memory responses as the viewer moves from one spatial proposition to another¹³⁸. Implicit memory is driven by interpreting ambiguous combinations of the real and illusory, since memory is a fundamental cognitive process for acquiring information about the world.

The representations of the two windows that give so completely the impression of piercing the east wall seem at first awkwardly placed by their abutment right up against the north and south walls. The intention is clear, however, that this proximity with the

architectural details of columns and lintels (fig. 1.95) on these two walls most successfully carries the virtual extension of the north and south walls. And the profusion of detailed ornate surfaces, highlighted in a lighter value, gives these architectural extensions illusionistic credibility. Through shading, colour, and their consequent texture, a strong sense of the materiality of the architectural representations is provoked, enforcing assumptions about what is present on a multisensorial level of acceptance.

The naval scenes and the offering or libation still life scenes

The independence of spatial presence in the red-framed naval battle scenes and the blue-framed still life scenes is maintained through the strong presence of their frames. Two perceptual effects result. The frames permit the internal spatial integrity of each image to stay intact by having its own frame of reference. Kosslyn writes that we frequently encode patterns relative to a frame of reference that is not fixed on the pattern observed, but – as in this case – surrounds a pictorial narrative. This does not mean, however, that the stored representations in memory are viewer-centred; rather, it seems that the input is organized into perceptual units that depend on the orientation of dominant planes of the image, one aspect in the definition of the pictorial space¹³⁹. The still life paintings (fig. 1.97, 1.98), for example, are spatially organized in successive horizontal planes and construct a shallow pictorial space that is made even shallower by the occlusion of the blue frame. This successive organization of space is similar to that in the Ixion mythological scene on this wall (fig. 1.99). The wide red vermillion or cinnabar frames of the mythological scenes can also be associated with rituals of libations, echoing sacrificial offerings¹⁴⁰.

This is not the case for the naval scenes on the north and south walls, where the ships cut diagonally into the picture plane and converge at the centre of each scene (fig. 1.100, 1.101, 1.102, 1.103). This diagonal cutting into the pictorial space corresponds formally or strategically to the mythological scenes on the north and south wall. The narration of the seascapes provides depth cues that give these small scenes great illusory depth from a distance, though paradoxically the employment of relatively large and loose brushwork confounds the illusion of depth so that as one moves closer their pictorial space flattens out.

As discussed earlier, the wide red and black frame around the narrative also occludes a potentially larger scene and further contributes to this flattening effect.

Just below eye level there is an intermingling of receding cool blues or water abutting and defining the advancing cinnabar hot blood red field framing the mythological scene. On the north and south walls, the white fields of the *aulea* with their floating figures mark this section adjoining the north and south wall with the east. The white fields also offer a transition to the white background of the windows on either side. Above the blue fields, the architectural details represented in the *faux* windows arrest the eye and prevent us from gazing passively into the distance. These white fields insinuate an architecturally undefined amorphous space, an effect strengthened by an internal framing of garlands on all sides. Every element of the second register has our attention framed, often through the limitations of a frame, as in the blue panels with the floating head of Athena (fig. 1.104) on the north and south walls, or in the case of the sea horses on the east wall flanking the lowest part of the entablature. In the blue panels the pictorial space is reduced due to the absence of other references to give a sense of scale and depth. The white outlines that highlight the seahorses on the east wall represent the image as parallel to the picture plane, whereas the head of Athena is positioned diagonally, facing on each side into the centre of the picture plane. This continues the theme of successive spatial depth – both horizontal and lateral – on the east wall, and the consistent divergent elements on the north and south walls.

The gaze of the figures

The relationship between the cast of characters that participate in the myths, their gaze and pictorial location, directs the viewer's own location and gaze (fig. 1.106). In the *Ixion* Room it appears as though Fortuna gazes on Dionysus – giving Dionysus a presence – and Dionysus at Apollo, giving Apollo a presence. It is possible, though impossible now to say for sure, that Apollo is looking down at the guests to give them a presence as well. The two actors gazing at Fortuna give her a presence. And the same relationship can be established amongst the characters inside each of the mythological scenes. For example, the gaze from Nephele towards Hermes gives Hermes a presence and confirms the pictorial space that

exists between them. On the other hand, there are as well those figures that appear to be simply looking out across the space.

J. Michael Walton¹⁴¹ writes about the triangulation in Greek or Roman theatre where the actors, the chorus, and the audience confirm each other's presence by empathizing or contradicting the plight of the actors through action and reaction. Richard Latta¹⁴² informs us that facial expressions and body posture are part of low-level visual forms, whose characterizations represent emotions responsible for aesthetic experience. These low-level visual forms, however, establish important relationships between high-level neural processes and the human body. In Greek and Roman theatre each character is defined by a mask with a constant facial expression, and cannot be given more than one presence. Even Aristotle, in his time¹⁴³, relates how artists specialized in particular human characteristics. He recorded that Polygnotus paints figures that are better than we are, while the painter Pauson represents those that are worse than we are, or like Dionysus are just like ourselves. What Latta is suggesting is that each emotive state can also fulfill a different pictorial state.

The mythological scenes – The story of Ixion.

All mythological scenes are framed by a wide cinnabar (red) border. This colour according to Pliny is the result of the battle between two forces of nature - the dragon and the elephant. When they both die in the battle their blood mingles and results in this colour of red¹⁴⁴. Each mythological scene is a morality play between forces of desire and consequences. The cinnabar frame not only by its powerful presence frames but also lifts the mythological scenes of the wall and provides symbolic meaning to this frame. This frame and the mythological scene is given further focus by the converging symmetry of the windows on each wall. The viewer finds themselves confronting the iconography of each of the mythological scenes at the centre of their given entablature. The pictorial space of the mythological scene of Ixion on the east wall is not a space of convergence (fig. 1.107). It is primarily, rather, a parallel plane projection¹⁴⁵ with a successively receding spatial depth configuration. This permits more than one position for the viewer and accommodates the view of guests on both sides of the room. All the figures in this narrative are parallel to the picture plane, as are the architectural elements. The exceptions are Hera's throne that sits

obliquely on a platform parallel to the picture plane, and the wheel to which Ixion is tied, which is on the very edge of the scene and appears to cut just barely diagonally into the picture plane. Overlaid are two pictorial organizations: an oblique projection¹⁴⁶, with a parallel plane projection permitting entry from the front and from the sides. In this mythological scene a receding ground plane is visible on which each figure marks off a specific distance. According to Hagen's projective models, the Ixion scene also has an *affine* projection: parallelism. One also notes that the scale of the figures is one half human scale and equal to the height of the lowest or first register.

Sitting in the most frontal and central position at the bottom of the Ixion panel, and on the same platform as Hera's throne, is the figure identified as both Nemesis – spirit of punishment – and more likely Nephele, Ixion's lover, the *phantom* of Hera¹⁴⁷. Nephele appears with her right knee to touch the surface of the picture plane. Her head is raised in a pleading gaze towards Hermes, the messenger of Ixion's fate, who stands just slightly back on her right. His right arm rests on the foreshortened section of the wheel to which Ixion has been tied. Ixion's back, paradoxically, appears to be pressing against the picture plane. Behind Hermes on the left is the figure of Hephaestus, god of fire, reaching out towards the spoked wheel on which Ixion is tied. On the right side of the painting is the goddess Hera sitting on her throne just a short distance behind Hermes and Nephele. Standing behind to her right is a childlike figure sometimes identified as an incarnation of Zeus but more likely Iris, Hera's messenger or rainbow who travels between heaven and earth, men and gods¹⁴⁸. Behind Iris is a rectangular, diagonally positioned column that rises to her right and almost exactly divides the painting in half. Its shaded side suggests that light falls from the left to illuminate this scene¹⁴⁹. This is consistent with the shadow cast by Hermes' right side and foot and Nepheles body, as well as the right side Hera and her throne. In the rendering of Hermes, Nephele and Neptune, a thin white or black line is painted along the outside edge of the figures. The resulting optical phenomenon is a simultaneous brightness and contrast setting up vibrations at the edge between lightness and darkness¹⁵⁰. On the left, the pictorial space behind the figures is undefined by other objects. The white surface makes this half of

the background appear paradoxically limitless and flat, while the throne and the columns exactly define the limits of the space on the right.

While it is possible by the dispositions of the figures to draw a number of diagrammatic and geometric configurations that can connect them, I would like to take another approach to understanding the spatial disposition of the figures and their gestures: I suggest that they should be linked to the audience. For this purpose I refer to Bernard J. Baars' study *In the Theatre of Consciousness*¹⁵¹. He applies the notion of the theatrical stage as a metaphor for the experience of consciousness, and speaks of convergent input and divergent output. He writes that on stage there is a convergence of the actors, their positions, their speeches, the scenic design, and the supportive entourage of the playwright and directors – all fusing what is compatible and leaving out what is not. Even though the message the play delivers is broadcast to all present, it is interpreted locally in the mind for each member of the audience. There is a massive *convergence* from the audience back onto the stage, from which it returns once again to the audience as a *divergence*.

Each figure represents a particular part of the cognitive process. Hera's intention is focused on punishing Ixion. She sends her messenger Iris, the furthest back in pictorial terms, to send a message to Hepheastus, who acts on her command and ties Ixion to the wheel, setting it in motion by fire. Hermes – messenger of consciousness – announces the fate to Ixion, while Nephele – Hera's phantom – displays a state of disbelief. The question arises: why have two messengers? The answer would appear to lie in the act of consciousness itself. What this theatrical narrative demonstrates through the mythological theme is the process of becoming conscious. While each figure is presented in a frontal pose, Hermes alone is fully exposed, a naked presence. He holds onto the wheel of *mis-fortune*, potentially with his hand setting it into motion. And he stands in front of the *tabula rasa*, or white space, to which Iris is gesturing. There is an obvious intersection between the scepter Hermes holds leaning back over his shoulder and the hand Iris is pointing into empty space. One could even say that on the right side of the picture, and set back, Hera's face is in a state of contemplation, hand to her head. Iris takes a neutral role, apparently expressionless as she simply passes something on. Hepheastus leans forward with a look of intention and purpose,

while Hermes bears an expression of conscious recognition and Nephele of disbelief. Ixion, tied to the wheel with his back to the audience, is in a somatic state. In short, it is not just a story about Ixion that is the message here, but the whole layered process of consciousness that is being demonstrated.

The importance of representing old and familiar themes is to engage not the conscious but the *unconscious* processes that control most of the activities performed by the body. Baars writes:

[...] Most of the business of the body and brain is conducted with great skill by unconscious processes without moment to moment conscious control. Consider how many ordinary actions are run by automatic components of actions: talking, listening, viewing a scene, reacting emotionally, interpreting a social situation, relating to others [...] dancing walking arguing [...] Automatism can be invoked by a distinctive stimulus, such as the reading habits that fire quickly when you see any known word, the gestures of a friend, a familiar face from ten years ago, a signal of instinctive danger¹⁵².

Similarly when a familiar mythological scene that is well integrated into a culture is presented over and over again it triggers a deep automatic recognition. The cognitive linguists George Lakhoff and Mark Johnson found that many cultures have a limited number of metaphors that help them think about *self, other space and time* (1980)¹⁵³. The advantage is that an abstract concept, such as in the case of this painting of the Ixion narrative's moralistic tale, becomes grounded in reality as the pictorial spatial clarity of each player is crafted to reflect a different aspect of the self. This makes it clearer in moving from one abstract concept to another, each expressing a different point of view. The reading therefore offered by this myth is not intended to be simply a linear narrative, but to take a form – such as a formalized theatrical setting – by which the perceptual mechanism, here a mythic narrative, re-enacts through the position and the gestures of each figure the mechanisms of becoming conscious. Each member of the audience *diverges* with the *converging* output of the play, and through this process each viewer confirms their own depth or state of consciousness.

The mythological scenes – Daedalus and Pasiphae

The spatial organization of the scene *Daedalus and Pasiphae* (fig. 1.108) nearest its pictorial surface has Icarus, a childlike figure at bottom left, carving what appears to be a flute. Just behind Icarus at centre stands the dark male figure of Daedalus with his back turned to the viewer. In his right hand he is holding the plan of deception, resting his hand on top of the cow he constructed for Pasiphae. His left hand is raised, and his face is in profile, looking intensely off into the distance and avoiding the gaze of anyone else in the cast of this narrative's characters. Pasiphae, sitting diagonally on her throne with her hand raised, seems oblivious to these circumstances. She is under the spell of Poseidon, who might be the male figure standing behind her on the right pointing and guiding her gaze towards the false cow. On the left behind Pasiphae's throne is the figure of a woman in a gesture of anxiety, her hands raised to her mouth. This scenario takes place in a room in which the wall on the right converges left to join the back wall. The figure of Icarus at bottom left brings the viewer back to the front of the picture plane. Each figure occupies its own space between the picture plane and the rear wall parallel to it.

The figure of Icarus is parallel to the picture plane. Daedalus, planner of the deception, cuts diagonally into space that spans between him and Pasiphae. Neptune drives the plot as he reaches out from behind Pasiphae, pointing her gaze towards the false cow. The obliquely constructed scenario moving from right to left seems counter-intuitive to the tradition of reading, but would be appropriate to a reclining dinner guest on the east or south side of the triclinium. The guest's gaze enters the converging side and is punctuated by the dark figure of Daedalus at the centre. The figure of Pasiphae, who is central to this controversial act, seems oblivious, but the other woman in the background is uneasy, or perhaps here again in a state of disbelief, while everyone around her reveals some form of intention in carrying out this act. Baar's metaphor also applies here. This is a subjective and internalized space in which unconscious deep desires construct an act of self-deception. Like the windows it converges from one side only. The interior configuration of the cow, Daedalus, and Pasiphae all diagonally cut into the picture plane, as though accommodating the reclining viewer's position. Only Icarus, his work-bench, the female figure and the rear wall are parallel to the

picture plane. The cut off at the left of this scene stops the view from continuing further to the left.

The mythological scenes – the Ariadne and Dionysus

In this third panel (fig. 1.109), a childlike *maenad* lifts the veil that covers Ariadne to reveal only to Dionysus, though of course also for us – the privileged viewer – her nakedness in all her beauty. Standing behind her, Hypnos the god of sleep, with his right hand sprinkles her with water from a golden dish, inducing sleep. Dionysus gazes at Ariadne, his body positioned frontally and his head in three quarter view. Not unlike Hermes, his vertical pose is emphasized by the staff he holds in his left hand, while his gaze amplifies his presence and aura of full consciousness. Asleep on a leopard skin, Ariadne's exposed body occupies the ground from left to right at the bottom of the scene. An undulating landscape stretches upward towards a light tower that sits near the endless horizon of a vast ocean on which we see Theseus' ship sailing away, abandoning Ariadne. Of all three mythological panels, this one has the greatest sense of infinite space. The figure of the sleeping Ariadne gives a firm location to the ground plane. The diagonal cut of her body into this space permits the reclining guest at dinner on the east or north side to enter it from their right. The vertical staff that Dionysus holds guides the viewer to the top of the painting. The sweep of Ariadne's figure to the right is continued upward by Hypnos behind her, and continued by the hill's diagonal sweep up to meet the light tower. This prevents the viewer from going outside or beyond the frame, but unlike the other two panels, with their interior architectural spaces, a vista opens up at the top of the panel to bring this composition closest to the open spaces of the Upper Register.

The mythological scenes – conclusion

Each of the mythological panels is particular in the thrust of its narrative and its relationship to the audience. The horizontally organized space of the Ixion tale's depiction of crime and punishment within the circles of the gods is dramatically different from the terrestrial drama of sexual lust that lies at the root of the cow's construction in the painting of Daedalus and Pasiphae. And the truncated and oblique space we find here differs again from the oblique but open space of innocence and love that is the subject of Ariadne and Dionysus. Spatially,

the *Ixion* Room's triadic narrative – Divine Punishment on the central east wall, flanked by Perversion on the north wall and Innocence on the south – offers a central horizontal flanked by two different obliques. Baars¹⁵⁴ describes how information in representations is either processed along horizontal, vertical or diagonal spatial relations, to which Kosslyn adds that time is also an element in the perceptual measurement of projected depth.

[...] If visual mental images are patterns in a functional space, then more time is required to shift attention farther distances across imaged objects; using scanning as a kind of tape measure to show that distance is in fact embodied in mental representations¹⁵⁵.

The Ariadne and Dionysus narrative takes the most time to read, followed next by the converging space occupied by Daedalus and Pasiphae. The frontal composition of the *Ixion* narrative presents the shallowest pictorial space, and is also the furthest from the viewer as they enter the *Ixion* Room. Here the face of each figure is clearly directed to look across the space at the viewer, a maneuver familiar to us as the perceptual constancy of a painted portrait's gaze as it follows the viewer that Gombrich has mentioned¹⁵⁶. Jacques Aumont has observed that while "*the spectator constructs the image, the image also constructs the spectator*", holding them in their gaze. Myths make us aware of our unconscious desires, in which somatic states and phantoms rise to consciousness.

The separate pictorial spaces in the Second Register depend on the perceiver's ability to hold paradoxical depth cues simultaneously in mind. The viewer is also assisted in minimizing spatial incongruity or conflict through the framing elements that surround each variable pictorial field in this register, aided by our grasp of episodic memory¹⁵⁷.

Summation of the Second (Middle) Register

In summary, the Second Register has the characteristic of both *affine* projection and *projective* projection systems. There is no scale change – it is the same as the room itself. On the east wall, the receding planes – including the ground plane of the mythological scene – are horizontal and all parallel to the pictorial surface, leading to compression of the pictorial space. The windows as well as the mythological scenes have converging sides, and if extended do not necessarily coincide with each other, relating to more than one vanishing

point along the central axis. Because the architectural detail seen through the windows changes scale, and the column and lintel are treated as an aerial perspective, the mirroring converging sides appear to extend those details deeply into pictorial space beyond the surface of the east wall. This same phenomenon occurs on both the north and south walls, creating the impression of an open roofed continuous colonnade or arcade surrounding the outside of the room. This confirms and affirms the solidity, verticality, and limited depth of all three walls in the middle register compared with the openness and transparency of the upper register. Textural gradients in the receding architecture, and the figures represented in the mythological scene, contribute to depth perception. The shallow blue receding walls on the side of the red frames on the rear wall of the entablature as well as the coffered lintel at the top also suggest depth. This sense of depth is, however, contradicted by the other red fields that frame the windows and the white panels that appear closest to the pictorial surface. Another pictorial ambiguity is the lowest wall of the entablature. It appears to become a side to the libation still life paintings, giving their shelves the perception of actual depth and further extending the red surface around the window forward.

The play of pictorial space in this register telescopes the viewer's vision to converge onto the mythological scenes in a play of oppositions pitting deep space against shallow space, warm red fields against cool blue surfaces, successively receding and obliquely converging. For this to work, it seems self-evident that a critical priority for the designers of these wall paintings *remained the position of the viewer*, that through their design we can appreciate how conscious they were at all times of this necessity. The framing device around each pictorial episode becomes a catch and release mechanism that permits the viewer to believe in each instant, in which the transition from one moment or episode to another is a moment in which ambiguity permits the shift of perceptual variants to invariants or visa versa. Belief, disbelief and suspension of belief are all part of the belief-forming strategies that move perception to conception. I would like to conclude with Baars' comments:

[...] In sum, sensory consciousness seems to be special. It gives us our most vivid moment-to-moment experiences. Mental images seem to be faint copies of sensory events, generated from within the brain itself. As far as the brain is concerned sensations and images belong together. Abstract ideas, on the other hand, allow us to transcend the limitations of the perceptual world in time and space, to enter the many realms of abstraction. Concepts do not have the same compelling sense of conscious reality as percepts do because they have no qualia – reds and greens, no stubble and wetness, no smell. The parts of the human cortex *that* support abstract thinking seem relatively recent on an evolutionary scale, and may ride on the older functioning of sensory cortex¹⁵⁸.

Summation of the Third (Upper) Register

From the entrance the Upper Register is panoramic. Representations of pavilion-like distant structures, the aediculae – modeled on temple fronts – are open on all sides. Those positioned at the corners of the wall appear to have a ceiling with an ornament suspended from its centre. Between these projecting aediculae at the north and south corners of the east wall is an open-roofed peristyle, and below and at its centre the goddess Fortuna Augusta sits on a throne. All the other architectural details – of lintels and columns, on the east, north, and south walls also have no roofs and are open to the sky, an exception to this being the colonnaded exedra on the east wall.

The panorama is complicated, its apparent reality more apparent than real. The architectural structures of the third register do not appear to be connected with the architectural structures visible through the trompe l'oeil windows on the Second or Middle Register. This makes their relationship ambiguous, because the architectural elements on the Second Register are open to the sky, an impossibility if indeed these architectural structures were in fact below the structures in the third register. This ambiguity, in which normal visual perception is challenged, goes against our common sense. Gregory identified perception as a hypothesis or assumption based on past visual experiences¹⁵⁹. If the assumption we make is contradicted, as is the case here, it is an act of imagination that fascinates the mind in attempting to make sense of something that goes against experience¹⁶⁰. This contradiction between hypothesis and stored memory draws attention to the separation between the Second and Third Register, between the aim for veridicality of the Second Register and the appeal to the imagination of the Third.

If it is the imagination that is set into play, this play is extended to a phenomenon familiar to us when we see a three-dimensional image as simultaneously advancing and retreating. The aediculae of the Upper Register are horizontally all interconnected uninterruptedly with columns and lintels on all three walls of the room. Facing the corners of this register where the east wall meets the south wall, the connection of the horizontal lintel and the mirroring architectural features in the corners plays with perspective illusion cues, or what is known as the Ponzo illusion¹⁶¹ (fig. 1.110). This corner reversal at times folds the corner in – becoming concave, or projects it out – becoming convex. False distance cues permit the reversal of the aediculae of the east wall to flip the adjoining aediculae on the north or south wall to become its divergent side. This play of divergence and convergence exists also in other Pompeian wall paintings¹⁶². From the entrance, there are other similar pictorial contradictions on the east wall as well. The aediculae, with their projecting sides on either sides of the central figure of Fortuna, are supported by scenes framed in red borders that act like pedestals or bases. There is a contradiction between the projecting sides of the aediculae and the location of the pedestals, which seem to be simultaneously projecting in front of and behind the leading edge of the portico. This flipping back and forth between the symmetry of the framed pedestals and the projecting aediculae actively pursues the construction of space and virtual movement. This apparent movement is exploited by bringing two different spatial cues side by side. The east wall's Upper Register appears simultaneously to be advancing and receding with respect to the picture plane of the entire wall. The merging of incompatible depth cues within the total configuration produces a spatially impossible construction, yet perceptually achieves an *activated space in the process of perception*¹⁶³.

It is well to clarify a few of the components contributing to this question of depth perception, and we can note at least six. Atmospheric gradation – the thickness of the air itself – is one: the architectural representations of the exedra and its adjoining aediculae are primarily painted a bluish gray. This choice of colour is associated with *aerial perspective*, a phenomenon in nature in which the density of the atmosphere casts a bluish tinge over objects as they recede further into the distance¹⁶⁴ – and one incidentally recognized by

Leonardo da Vinci¹⁶⁵. The colour enables the artist to imitate the effect of atmosphere and produce a sense of deep space. In abandoning the mapping concept of space, in other words, clear distinct outlines are substituted by more optic and painterly – or “impressionistic” depictions, so that of course in comparison with our normal viewing of an architectural scene this gradation seems exaggerated.

As a point of interest I’d like to note that the atmospheric bluish quality is also, as da Vinci points out, a consequence of the morning east light¹⁶⁶, and so in the *Ixion* Room’s east wall we are treated to the morning of the day – the sensation of a new beginning!

A second component of depth perception is lies not so much in a matter of seeing three dimensionally as it lies in making judgments on surfaces and their texture¹⁶⁷. Therefore as the texture becomes less defined, which is the case here, it is assumed that the objects are further away. Rogers, writing in 1995, states that gradient textures alert us to distance, since the angle at which visual rays fall from a stationary point intersects with a surface in an effect called the *optical slant*. This effect is equally important in pictorial representations as a means of informing us on the distance at which we perceive an image, as already mentioned relative to the horizon line¹⁶⁸. Instances of this can be seen in the detail of the robe, or palla, of Fortuna as well as in the diminished detail of the actor’s toga (fig. 1.111).

Then there is also how distance is marked off. Increasing our sense of greater perceptual depth, Kosslyn writes, is not so much the number of objects that are scanned, but the number of objects that mark off a distance¹⁶⁹. Particular structures mark off the upper register’s depth: Fortuna on her throne; the flanking aediculae and porticus; the actors at middle ground, and the semicircular colonnaded exedra at the centre.

A fourth cue in depth perception is light gradient, which is not to be confused with atmospheric presence. The porticus, rendered in the darkest and most saturated colour, signals an interior space. This then becomes a foreground through which is seen the exedra, which is on the other hand rendered progressively lighter on either side as it recedes further into the distance and encircles the figure of Fortuna, giving the perception of a brightly illuminated exterior element behind her. Fortuna herself is, of course, therefore propelled towards us by virtue of the darker colour of the nearer features of the exedra.

Two final cues are important to depth perception. For one thing, it is not simply receding objects or colour gradient that constructs depth perception (fig. 1.111): there is the relative size of objects, as in the figure of Fortuna against the smaller figures of the actors, or the exedra scaled against the porticus and aediculae; even empty spaces are scaled, like the distant openings that frame the actors. Even more important is the sixth and last cue, the orientation of surfaces or planes, such as we have here with the walls of the aediculae that recede obliquely into space. The projecting aediculae appear in front of the picture plane, jutting out into the space of the room. The throne is positioned on a lower pedestal below the porticus. In projective perspective those planes that are closer to the viewer are lower and slant upwards away from the viewer. This gives the appearance of Fortuna's pedestal being advanced beyond those flanking her on both sides, and also gives a momentum suggestive of her being slightly lifted from behind. Yet there is a pictorial paradox when studying the sides of the porticus: Fortuna's knee breaks the pictorial surface of the picture plane, while the two actors occupy a middle ground between Fortuna and the exedra. Also, because the figure of Fortuna is framed with a small porticus, it is the most frontally present element. McCarley and Zijiang suggests that objects that are placed above eye level and higher in the visual field could be said to dominate that field, as well as frequently guide behavior and assist in forms of navigation¹⁷⁰. Fortuna, as a central element of the east wall, is a case in point. Since the floor of this register is not visible, and only the framed pedestals imply it, the planes of the ceiling cum sky are important depth cues. Bear in mind that – due to the body's response to gravity¹⁷¹ – planes above eye level, when lacking any connection to the ground, recede away. The ceiling of the porticus and the empty spaces, or sky, both slant away from the viewer.

There is a general principle that when a wall's junction with the ceiling includes a projecting overhang, for the viewer the wall will slant away at the bottom into receding space¹⁷². The presence of a floor is affirmed by the repetitive acknowledgement of the framed pedestals. As McCarley and Zijiang concluded, the more grounded a surface is, the more likely we can identify its content¹⁷³. To give a sense of presence to both floors, the red borders that frame the pedestals form a visual connection, like a frieze, around the room on all three sides, and are grounded by the red border framing the faux windows as well as the

large red border surrounding the mythological scenes of the Second Register. The pedestal, however, on which Fortuna's throne is positioned, is rendered in a yellow gold and appears to float in between the flanking pedestals. The Roman artists succeeded in maintaining the vertical integrity of the walls' surfaces by a compensation in which the projected architectural elements – the overhanging aediculae and pedestals with the architectural elements that recede into space – are cantilevered in front of the picture plane. Fortuna, on the other hand, at the centre on a lower pedestal, is independently cantilevered by the two actors positioned in the middle ground. The sides of the flanking aediculae project diagonally into spatial depth, while the semicircular colonnade of the exedra located behind Fortuna defines the space in front of it. If depth perception, as we have shown, is especially significant in the construction of pictorial space, continuity is significant as well.

Bozkov, Bohdnecky and Weiss in their research on scanning images concluded that when the eye scans geometrical elements, these elements take on meaning only as the information they contain is absorbed by the scanning eye – rather than instantaneously as some might imagine¹⁷⁴. In other words, we *read* a picture. In the *Ixion* Room, our scanning eye, perceiving the curved space of the exedra, is guided to continue this contour towards or between the apparently projected aediculae on either side of Fortuna. This contributes to bringing distant elements into contact with the picture plane, establishing a perceived sense of continuity or *linking features* joining related elements. Livingston and Hubel¹⁷⁵ define *linking features* as having common movement – contours moving in the same direction – the velocity of movement identified belonging to the same element. The eye keeps moving around the apparent curved surface despite a lack of common depth. Contours that are of the same depth from the observer are assumed to belong to the same object co-linearity. Even if a straight line or curved contour is occluded by an object – as here with the architectural elements and the seated figure of Fortuna in front of the exedra, we perceive them as continuous. It is the luminance contrast, lightness not colour, that primarily links parts together. The velocity set up by the curved exedra continues to co-join with the left and right side of the protruding aediculae. There is a linkage established here between shape and shading. Ramachandran investigated the problem of shape from shading and discovered that

it occurs very early on in the visual system. It is an important part of the mechanisms used to recover from images the third dimension¹⁷⁶. The contour of the exedra is relatively light, while the architectural elements nearer to the picture plane are darker. This graded luminance contributes to the sense of three dimensionality and continuity of this curved central space.

In conclusion, the Upper Register can be defined as a *hybrid* of projective systems. Of the systems previously enumerated, there is the presence of *similarity projection*. Unlike the Middle Register, it is scaled differently from the room or its occupants and while it has the same overall proportions, it is rendered at a smaller scale. Secondly, there are aspects of *projective perspective* properties¹⁷⁷, its perspective lines alluding to convergence. As opposed to the operation of *metric projection* – the least complex of the projection systems, having only one variant, the relocation of the image – *projective projection*, on the other hand, contains the most variants; those relationships that change during movement of the observer in real space. *Invariants* include harmonic divisions, co-linearity, straightness, regularity of *between-ness*, and textural gradients.

Thirdly, as in *affine geometrical* projective systems, the face of the represented plane is parallel to the original picture plane. While the projection lines converge, making size, shape, and angle variable, all horizontal planes are invariant¹⁷⁸. These horizontal planes are also present in the north and south wall decorations, and give in this register a strong sense of frontality, further emphasized by the frontality of the figures of Fortuna and the actors flanking her. As in *projective perspective*, the ground plane and the picture plane appear to be at right angles to each other, and objects sit either on the ground plane or on surfaces parallel to that plane though occupying the space at various angles to the picture plane. The vertical planes that are part of the architectural features incline towards the centre and become progressively narrower. The angles successively become steeper as they approach the centre of the wall. The image converges to a progressively smaller size as the distance from the picture plane increases, resulting in scale changes. Shape, planes, and objects succumb to normal projective distortions. This does not result in a single vanishing point, but instead several points along the vertical central axis of each wall when the projected

perspectival lines are extended. In some cases they appear to come together at the centre; in other cases they do not quite meet.

Another striking aspect of the upper register is that the illumination of the scene appears to be reflected from above. It is probably intended to be that of the sun illuminating the scene by reflecting off a variety of different surfaces to produce ambient light, allowing for a definition of the texture and details of surfaces without the intrusion of large cast shadows.

The Upper Register's pictorial ambiguity is most present in those elements closest to the picture plane. The architectural elements in the background bring the viewer always back to the pictorial surface, with its visual paradoxes of projecting or receding planes, a push-pull whose movement is strictly parallel to the picture plane and linked to the paradoxical corners, which respond by appearing to fold in or out in an affirmation or contradiction of the room's architecture.

I want to finish this examination of the Upper Register by proposing that what we have here is a play – a spectacle that plays with the perceptions of what is real and illusory. I suggest that the contemporary Roman viewer would have delighted in this play, and compared it to the perceptual shifts that occur as the movement of the viewer changes position in the real world.

1.5.2 Philosophical Beliefs

1.5.2.1 General context

Roman philosophical beliefs, concerned with the structures and principals of reasoning defined the world through oppositions and limits. The decorations of the *Ixion* Room are dominated by the opposition of Epicurean, Stoic and Skeptic philosophical beliefs regarding their several relationships to the body and the world. The ubiquity of the frame as a pictorial device separating the various narratives is an important organizing principle that affirms the Roman philosophical belief in the necessity of limits, and frames are therefore an important pictorial device in the *Ixion* Room decorations.

As the Hellenistic world became an increasingly cosmopolitan heterogeneous environment, philosophy took on a correspondingly important role as a means of finding a way to fold this complexity into its classical *polis* or city-state roots. With Rome's ever expanding empire, while the more abstract problems that philosophy treated were not unfamiliar, Roman philosophical speculation in the period 100 B.C.E. to 100 A.C.E. was directed more to questions of ethics and religion, rather than to pure philosophical method, theory and speculation. This does not mean, however, that knowledge gained from such speculations did not play an important role in the aesthetic judgments, decisions and construction of the *Ixion* Room. The deep underlying history of natural philosophy, reaching back to its first appearance with the pre-Socratics, is at the core of the physical, rational, and ethical beliefs held by Roman philosophers associated with the philosophical schools of the Epicurean, Stoic or Skeptic persuasion.

Without a basic understanding of this fundamental structure of beliefs it is impossible to appreciate the subtle influences of philosophical history on the *Ixion* Room paintings, and I will therefore first outline the fundamental premises of the pre-Socratic philosophers, beginning with the School of Miletus¹⁷⁹ and followed by Socrates, Plato and Aristotle; I will then define and give examples of the Epicurean, Stoic and Skeptic schools of thought whose ethical formulations and *Weltanschauung* dominated the period in question.

Pre-Socratic Philosophers: development of natural philosophy

Briefly then, philosophy as distinct from mythic beliefs was initiated by the so-called pre-Socratic philosophers in as much as they can be credited with first providing a framework for methodology by breaking away from mythological modes of understanding the world, seeking instead to construct a theory of knowledge by way of simple physical hypotheses. The practice of natural philosophy begins with a simple physical theory by Thales of Miletus around 600 B.C.E., who proposed that water was the physical substratum to all material reality in that it was capable of transforming itself into the different components of the universe¹⁸⁰. While this form of natural philosophy ventures beyond myth, there is nonetheless still an overlap between mythic and scientific modes, as seen in Thales' inclusion of both a single unifying primary substance and a divine omnipresence: "*All is*

water and the world is full of gods"¹⁸¹. The gods occupied all the spaces into which the world space was divided, and this is reflected in the *Ixion* Room decorations.

In the later part of the 6th century B.C.E., another group of philosophers, the Pythagoreans¹⁸², a religious brotherhood founded in 525 B.C.E. in southern Italy and known to Aristotle as the Italian philosophers, developed an even more primary and abstract theory in developing the concept of mathematical principles as an underlying explanation for the physical world, and consequently for all material causation¹⁸³. For the Pythagoreans, it was by judgments of scale and calculation, the ability to enumerate, that we recognize resemblances and therefore experience knowledge. For the purpose of resemblances, they developed ten principles of cognate oppositions: limited and unlimited, odd and even, one and plurality, right and left, male and female, resting and moving, straight and curved, light and darkness, good and bad, square and oblong.

Up to this point in pre-Socratic philosophy significant theories of causation have depended on oppositions or numbers. This changes with Heraclitus¹⁸⁴ of Ionia around 500 B.C.E., whose fundamental disagreement with principles that concentrated on the nature of primary substances led him to propose a theory of *pervasive flux* that made the process of *transformation* (which we eventually see as pervasive in Roman painting, an example of which is the transformation of vine into column in the representations of the *Ixion* Room) more important than the transformed substance.

This concept of transformation went on to play a prominent role in the philosophy of the Athenian, Cratylus, who developed a radical Heraclitean doctrine in which he maintained that since everything was in flux, accordingly nothing could truly be known, and to have certain knowledge of the world was impossible. This extreme nihilism became a cornerstone for the later Skeptics, whose challenge was the demand to know on what basis could one specify how and what one knows.

Cratylus' nihilism was itself quickly challenged by his near contemporary Parmenides, who rejected its implication of non-being. Parmenides' account of creation credits a divine but not omnipotent craftsman, who by divine will transforms the chaotic material of the

universe, “*apeirons*”, into a harmonious cosmos by “looking” into the unchanging forms as paradigms and creating constantly fluctuating images of those paradigms¹⁸⁵. These views profoundly influenced the views that Plato, writing around 427 B.C.E., took of the sensible world, since he believed it to be in a constant state of flux and not therefore dependable as a concrete form of knowledge. The result of this dramatic reassessment is that subsequent philosophers, in an effort not to transgress Parmenides’ logic, developed a position of plurality within the restrictions of unchanging natural phenomena as a strategy by which to continue developing natural philosophy. The freedom with which the *Ixion* Room decorations are inclusive of religious, mythical and historical subject matter reflects a comfort with the simultaneous representation of pluralistic narratives.

Ethics

There were implications that the concept of uncertainty or flux held for the attempt to answer the question: How should one live one’s life? Natural philosophy itself, while it tried to explain physical material causes, could not explain how human knowledge could come to be, or in fact change and evolve. Heraclitus argued that the principle of *logos* – or ‘the word’ – by which he meant thought and speech leading to action¹⁸⁶, frames the order of knowledge and reason shared by all. *Logos* both transformed and affected all things, thereby making *logos* also the expression of change. As if to prove this point, Heraclitus wrote his thoughts in epigrams designed to reveal nature’s reality with oracular and riddling language. This form of communication, similar to visual allegories, constructs an iconographic play in the *Ixion* Room that not only reveals narrative riddles, but can also be decoded, as will be seen, through unraveling pictorial paradoxes.

Ethical positioning is further advanced with Democritus. His elaboration of a theory of properties and substances in the universe are constantly rearranged in a space that is infinite and void, empty, nothingness and limitless.¹⁸⁷ Democritus suggests that our world of experience involves the movement of atoms within a void so large that whole worlds come and go as the result of shifting agglomerations of these atoms¹⁸⁸.

If the pre-Socratic philosophers succeeded in developing a cohesive unifying theory of nature and natural events explaining systematically the Universe from within, “*in a single set*

*of terms and by a single set of method [...] without any arbitrary intervention from without*¹⁸⁹, and if in doing so they found themselves developing as well a concept of causation, they nonetheless failed to convincingly develop a consistent ground for a personal morality enabling action based on choice and responsibility.

Stoicism, Epicureanism, Skepticism

While Stoicism and Epicureanism both share the centrality of ethics staked out by Plato, one of the fundamental differences between them, as noted by MacIntyre¹⁹⁰, is that for the Epicureans morality exists in a Universe alien to them, while for the Stoics, on the other hand, this universe is its highest expression: one can either dissent or assent from the divine law and escape determination, or the predetermined course set by the nature of their physical behavior, but any such assent or dissent will inevitably conform to divine law. Epicurus' theory of a blind physical determination whose moral consequence is that the gods are uninterested in human affairs, living apart in an alien world, is inherited from Democritus and passed onto Lucretius¹⁹¹. The Gods will only be present if they are hailed or invited. Their presence in the Upper Register of the *Ixion* Room accounts for that. A second fundamental difference between the Stoics and Epicureans is that while the Stoics argue for virtue indifferent to pleasure, the Epicurean argues that freedom from intense desire is a condition of pleasure, the giving over to pleasure.

It is appropriate to examine individual examples of both these schools. Epicurean and Stoic philosophers divided philosophy into three areas – namely ethics, physics and logic – and both physics and logic they made subordinated to ethics, which ultimately was a map or guide for personal conduct. Because I am discussing the impact of philosophy on the decoration of a private dwelling, I will examine ethics as a system or guideline for personal behavior. The *Ixion* Room can thereby be treated as a paradigm, a three-dimensional model, by which the owners, the Vettii brothers, could demonstrate their ideals with respect to personal behavior and their responsibilities to the state.

Founded by Zeno of Citium¹⁹² around 300 B.C.E., Stoicism was fundamentally pantheistic, deterministic, and self-governing. Based on Platonic ideals, with Socrates treated as perhaps the only example of a Sage, a being possessed of a rational intellect consistent

with the divine cosmic plan, Stoicism perceived reality as suffused by an intelligent divine force, a divine *Logos* available to all and in which universal reason ordered all things. In this scheme of things, well-being and happiness was a matter of attuning one's character to an all-powerful providential wisdom, thus permitting one to live in conformity with God's will. For the Stoic, this was the only certain way to achieve true freedom. What ultimately really mattered, then, was to be judged by the quality of one's soul – a soul that in its natural state was otherwise conflicted – and not one's station in life. Naturally, these beliefs could be quite appealing to recent freedmen like the Vetti brothers.

I suggest that not unlike the Vettii, patrons of the *Ixion* Room, is the Stoic Epictetus, also a freedman, whose time-frame 50 A.C.E. – 138 A.C.E. – more or less coincides with the time of the *Ixion* Room's decoration¹⁹³. Epictetus transformed Stoicism into a way of life and advises the reader that it is not the part you are given, but the way you play it that is important, and that:

[...] Part of right thinking entails knowing how to distinguish that which we can change from that which we cannot. Our lives are subject to many intractables: the vagaries of health and fortune, and, finally, death. But we retain the power to control our thinking, passion, and decisions. In this way we can come to terms with our environment, and thus free ourselves from a world of chance and dependencies¹⁹⁴.

As we will see, the painting of the *Ixion* Room can be said to reflect many of these aspects in both the choices of the decoration and in its pictorial organization.

Seneca, the preeminent Roman Stoic whose dates, 3 B.C.E. – 65 A.C.E., also coincide with the *Ixion* Room, writes in a letter (XLVIII) to Lucilius¹⁹⁵.

[...] I shall tell you what philosophy holds out to humanity? Council. One person is facing death, another is vexed by poverty, while another is tormented by wealth – whether his own or someone else's; one man is appalled by his misfortune while another longs for to get away from his own prosperity; one man is suffering at the hands of men, another at the hands of the gods. What's the point of concocting whimsies for me of the sort I've just been mentioning¹⁹⁶?

Seneca is referring to the *abstract game* of logic as practiced by Greek philosophers unduly influenced by the Socratic tradition of definitional truth.

An ethics nevertheless depends not only on an argument for a universal collective human community sharing a belief in the same spiritual value, but also, realistically, must argue as well the fate of the physical potential of the person. Stoicism's transcendentalism positioned the body as indifferent to its own fate. Epicurus, writing between 341-240 B.C.E., developed a different system of ethics. In the eighty-six preserved maxims, Democritus sums up his understanding of the material and divine worlds: "*the world is change [...]; there is a necessity to take a position towards this change, and for Democritus [...] life is opinion*". And "*if you believe that the gods, (although they are indifferent to regulating man's affairs) observe everything, you will do wrong neither in secret nor openly*"¹⁹⁷. For Democritus, the gods are always present, but are neither anthropomorphic nor predictable, and remain indifferent to human affairs. Somewhat consequently, Epicurus saw no pre-ordained role for man, and offered only the idea that [...] *The world is a stage, life is our entrance: you came, you saw, you left*¹⁹⁸. In this he echoes Democritus:

[...] We in reality know nothing firmly but only as it changes in accordance with the condition of the body and of the things which enter it and of the things which resist it... That in reality we do not understand how each thing is or is not ...a man must recognize by this rule that he is removed from reality... this argument too shows that in reality we know nothing about anything, but our belief in each case is a changing of shape¹⁹⁹.

Despite his awareness of a lack of absolute knowledge, Democritus locates a happy life in the knowledge of things, and seeks "*his inquiry into nature to put him in a good frame of mind, making no moral judgment on their truth or falseness*"²⁰⁰. Democritus claims that the highest good in life is contentment and imperturbability, or a mind free from fear (Cicero, *On Ends* V xxix 87)²⁰¹.

Epicurus developed his physical doctrine as a system by which to grasp the study of nature. This is to be done by one's *sense-perceptions* and in accordance with feelings as signs, so that inferences can be made not only about things that can be confirmed, but also about those that are non-evident because nothing comes into being from nothing.

For Epicurus, sense perception and feelings manifest the presence of the soul, a body of a particular aggregate of heat and breath, and this makes the soul ultimately responsible for

sense perception. Because inconsistencies – perceptual errors or unpredictability – produce the greatest stresses on the body's ability to form correspondence and therefore disturb the soul. Better, therefore, that one should attend to one's feelings and sense perceptions in the present.

[...] For if we attend to these things, we will give a correct and complete causal account of the source of our disturbance and fear, and (so) dissolve them by accounting for these causes of meteorological and other phenomena which we are exposed to and which terrify other men most severely²⁰².

Applying his theory of possibilities he describes that,

[...] The cosmos is a circumscribed portion of heavens which contains stars and an earth and all the phenomena, whose dissolution will involve all the destruction within it; it is separated off from the unlimited and terminates at a boundary which is either rare or dense; it is either revolving or stationary; it has an outline which is either round or triangular, or some shape or other. For all of these are possibilities. For none of the phenomena in this cosmos testifies against it since here it is not possible to grasp a limit²⁰³.

These beliefs, then, mark a radical departure from the traditional regime of a transcendent physicality elaborated through mythic structures, with their theologically deterministic moralizing, and the canon of bodily proportions, with its two principles of *rythmos* or composition and *symmetria* or commensurability. This understanding by Epicurus not only of the immediacy of phenomenal experience, but also of image-formation and reception as dependent *on the body* as a sensing, feeling organism is directly counter to the idea that images bear only a relationship of measure and scale *to the body*, and would inevitably influence modes of representation, such as painting, that are so dependent on perceptual phenomena. The pleasure of *the physical act of eating* in the *Ixion* (dining) Room engages the multi-sensorial experience of the body (vision, taste smell and touch) with the *representations* of the act through the philosophical belief in the body as a sensing device.

If Epicureanism's formation is coincident with Stoicism, its most articulate exponent in the period that sees the end of the Roman Republic and the beginning of the Empire is Lucretius, writing between 100-55 B.C.E. The influence of Lucretius, and later the writer-satirist Petronius who died in 66 A.C.E., testifies to the passionate embracing and popular elaborations of Epicurean philosophy in Rome near the time of the *Ixion* Room decorations

(Fourth Style, between A.C.E. 54 – 68). Distortions of Epicurian philosophy naturally abounded, and the notoriously parodic *Trimalchio's Feast* in Petronius' *The Satyricon* book XV, is a portrait of the heedless hedonism, of pleasure over pain at all cost with no thought to the consequences of tomorrow, that re-interpretations of Epicurus' could produce²⁰⁴.

After Stoicism and Epicurianism, the third powerful philosophy dominating the Hellenistic period was Skepticism, developed at Plato's Academy in the third century A.C.E. as a rival to Stoicism itself. If the Stoic was optimistic in the potential that human beings were capable of change, the Skeptic took a more pessimistic view. Skepticism applied a theory of cognitive disengagement, in which it was argued that the degree of happiness, a positive force, or unhappiness, a negative force, is determined as a result of our *belief* or *disbelief* in favouring or disfavouring a particular matter²⁰⁵. The Skeptics thus developed influential arguments that argued against all claims of absolute philosophical knowledge, employing Zeno's argument of infinite regressions against any criteria as inevitably appealing to further criteria, *ad infinitum*²⁰⁶. Although they were not paralyzed by superstitions causing fear, they were paradoxically paralyzed by fear of making an error in judgment. If the Stoic, in avoiding unhappiness, forfeited a corresponding – sensory – possibility of happiness, the Skeptic, in avoiding error, on the other hand forfeited a corresponding possibility of truth²⁰⁷.

Bearing this in mind, we can delineate more clearly the various ethical arguments in the period of the *Ixion* Room. The Stoics defined themselves through a set of moral virtues that framed their ethical arguments on the basis of oppositions between that over which we have power and that over which we do not. Their rejection of the body and distrust in its perceptual sensory experience form part of their belief that we have no power over our own body²⁰⁸. While Stoicism subscribed to traditional religious beliefs, it emphasized moral virtue and the world-governing Logos that existed outside sensory experience in the realm of the greater divine order. If both the Stoics and the Epicureans occupied firmly held if somewhat oppositional positions, Skepticism on the other hand offered a sober leavening criticality that helped to keep these ethical positions open to further elaborations. Cicero's *De Natura*

Deorum (The Nature of the Gods) and later Saint Augustine's *Contra Academicos* (Against Academics) are two such examples.

In short, philosophy by the second century B.C.E. and to the time of the eruption of Vesuvius in 79 A.C.E. was no longer a purely theoretical pursuit attempting to develop methodologies of enquiry, but rather had become a practical tool that helped to navigate a politically complex and often irrational and paranoid social, political and theological path toward which philosophy acted not only as a personal guide of conduct, but even more frequently as an essential recipe for survival.

1.5.2.2 Analysis of pictorial space in the First (Lower), Second (Middle) and Third (Upper) Registers

"The world is a stage, life is our entrance: you came, you saw, you left" – Epicurus

A profound metaphor for the passage of life; a life that was then much closer to the possibility of being prematurely extinguished than we are, accustomed to today. When life may be brief, life and death become substantively linked in the imagination, with an effect familiar to us as the *memento mori* of the medieval period: an intense interest in the possibility of eternal salvation on the one hand, accompanied by an enriched and ambivalent sensuality concerning the material possibilities present in the material world on the other. Both effects are strikingly apparent here in the *Ixion* Room (fig. 1.112). As we enter, we glance up to find ourselves transfixed by the august figure of Fortuna on her throne of judgment. And as our gaze inevitably follows hers to fix on Dionysus, it is as though the entire volume of the room opens up to us as a volume indeed: a richly textured book whose complex text, folding out from the figure of Fortuna herself, invites us into a public reading, a sermon almost, whose enterprise it is to remind us as we break bread that life, be it ever so short or long, filled with happiness or pain, must be measured against the ambiguities set by responsibility and desire. What is it, then, that we actually encounter here, in this "text"?

Let it be said that the division of the room into three levels has many references in Roman theatre²⁰⁹. But while that may explain formally and conventionally this kind of division and hierarchy, it does not reveal its underlying motivations. We can begin, for

instance, with the suggestion that the intricate and richly coloured imagery is secured in the Epicurean insistence on the value of sensory awareness rooted in the present and its richly diverse encounters. Yet in placing the most engaging and provocative imagery – the mythological scenes with their stories of human emotional vulnerability – at the centre of the Second Register and in close contact with the viewer, the room's text issues a homily on the dangers awaiting the unwary who would tempt fate and venture too far. One can see that in this context the Skeptics would avoid any claim to absolute knowledge, preferring an infinite deferral of judgment that appealed to the revelation of further criteria. Zeus tied Ixion alive for eternity to the wheel of fire defining eternity as a place for eternal discussions and gathering of more evidence. The representations of the myths on can say represent the eternal arena for dialogue and argument which would be appropriate in the context of the dining room the most social and intimate place for these kinds of discussions where. After all, Ixion's fate is there to see, and this reminder of his fate seems a calculated appeal to the disposition of the Stoic, for whom such a warning acts to reference the higher authority and terrible justice meted out to hubris.

The room, then, is a merged text embracing the two dominant philosophical perspectives of the time. As such, the decorative ensemble has been carefully orchestrated in order not to cause conflict to the soul or conflict amongst the guests, who might likely be of either Stoic or Epicurean conviction. For both there are clear pictorial signs that relate to their respective beliefs, and this would seem strategically appropriate; but additionally the merger undoubtedly reflects the Vettii brothers' own ambivalent position: on the one hand, an attachment to the Epicurean's inclusive, even democratized world view that celebrated freedom and material accomplishments as a virtue, while on the other hand a regard for the Stoic's sense of virtue and modesty, the emphasis on traditional values celebrated and promulgated by Augustus, something they would be inclined to practice as a mark of their adopted nobility.

While the decorations of the *Ixion* Room are thus a hybrid of signs that could readily be interpreted as calculated subscription to both sensibilities for various reasons, they are despite this hybridity quite classical in their structural mirroring and typically pluralistic in

their inclusion of mythological, theological, ethical as well as secular subject matter. On this latter point, the decorations as a moral guide lay bare the ambiguity between the secular and divine elements within Roman cultural expression. Like the riddles in the epigrams that characterized Roman discourse, the room's visual iconography reflects their recognition of language's capacity to shift meaning, to leave itself open to interpreting content. Divinely ordained and fundamental though moral principles might be in their origins, their interpretation remained a rich ground of discrete possibilities. Epicurus speaks about the necessity of fixing the denoted meaning of words so as to ensure the dependability of meaningful signs in relation to the sense perception of objects given the fluidity arising from a universe in which matter is understood to be in constant movement. This preoccupation with framing as a consequence of understanding reality as episodic or incident-ridden is clearly evident in the approach to pictorial space that places each element within a frame or, one might say, frames each element within a slightly variant perspective. In this respect, one might even speak of the iconographic plurality of the *Ixion* Room as *epigrammatically* episodic. If it is Epicurus that speaks such, the point is not limited to an Epicurean position; the Roman Stoic, from the position of moral virtue, could just as easily relate to the value of framing – if from a different perspective. In the second register, for example, the greater order glimpsed through the open alcoves intermingles episodically or epigrammatically with the mythological panels and their tales of conflicted virtue.

Indeed, the very division into three horizontal registers clearly denotes a separation of terrestrial and celestial domains, and this raises the question whether the spatial separation was ideologically and philosophically important to the Roman mind, or whether it was simply the architectural continuation of a narrative tradition illustrating the realms of heaven and earth derived from the traditions of theatre. After all, the classical concept that the nature of space was an empty or undifferentiated receptacle offered no definition by which it could be organized – in contrast with the spatial dimension of modern perspective in which everything is held firmly in its assigned place.

Third (Upper) Register

We can probably start by admitting to the theatrical tradition standing behind the room's conception, and as a viewer entering this theatre we immediately encounter, as we have remarked, the realm of the gods – who may from a Stoic reading be sitting in judgment, or from an Epicurean position simply be a *presence*. In this uppermost register, the Third (Upper) Register, the gods are placed in a neutrally designated white monochrome space that can be paradoxically read as having the properties of either blank flatness (*tabula rasa*) or infinite space. Because space is defined as place – albeit a place of emptiness or void where change occurs – its *whiteness* can act also as a reference to Jupiter's domain, a place of light, life and the virtuous. It is a mark of this register that it is defined primarily by this designation of space. To be sure there are decorative elements present: the architectural elements, the posed gods and numina, and the loosely painted miniature figures of the gods in heroic battles painted on the front edges of the pedestals supporting the four vacant aediculae. There are two of these each on the north and south wall in which scrolled vines wind around lintels and columns. This plant life motif appealed to the Stoic's pantheistic beliefs, which were never far from associating nature with the celestial order. Apart from these, the white background that dominates the upper register lacks sensory or emotive details that would later be found in Renaissance painting, as for example a clouded sky, thus avoiding any insinuation of the body's sensory experience that would be appropriate to terrestrial space. If this white space is in itself indeterminate, the presence of the architectural details, which symbolizes divine order, also renders it finite; and here something curious occurs, because in relation to these details the gods seem awkwardly posed, poised and fused as though suspended between the architecture as a theatrical backdrop and the real space of the room. More curious still, at least from the modern point of view that would require coherence, this artificiality is not extended to the other significant elements to be found in the register. Where the east wall meets the south and north walls at the corners, four male figures, actors, are placed quite securely within deeply rendered architectural spaces, while at the corners (fig. 1.113, 1.114) of each of the south and north walls we find described matching wooden latticework balconies typical of the standard Roman house. The

paradoxical nature of these relationships is extended by virtue of the fact that the two actors on the north and south walls, who are in profile, appear to be looking towards the central figure of Fortuna Augusta, both within the pictorial space they occupy and as well diagonally across the real space of the *Ixion* Room. The improbable space of the god meets the very possible space of the actors.

This curious play of spatial reality can be seen as well in the two figures (fig. 1.115) on the east wall, who stand within an architectural space clearly two rooms deep. Mirroring each other, they are depicted holding the Dionysian symbol, a thyrsos, in one hand pressed against their chest – possibly in a Roman salute – while the other arm holds a theatrical mask in its lowered hand. They are turned to look towards the central figure of Fortuna Augusta, but they appear to be looking only through the architectural illusion painted on the east wall. Together, these four figures can be seen as affirming the act of seeing caught as a two-dimensional depiction within the illusory dimension of the surface while affirming as well a three-dimensional engagement with the act of seeing across real space²¹⁰. As Epicurus in Text 2. 40 and 2.63 – 64 writes:

[...] And if there did not exist that which we call void and space and intangible nature, bodies would not have any place to be in or move through, as they obviously do move. Beyond these two things (viz. Bodies and void) nothing can be conceived [...] The soul, as long as it is in (the body) (the four figures caught within their enclosed spaces) will never lack sense-perception even if some other part has departed [...] Further one must hold firmly that the soul is most responsible for sense-perception²¹¹.

Since the Epicureans considered the soul as requiring the enclosure of the body, it can be seen that these deep pictorial spaces make not only an allusion to terrestrial and domestic spaces but also can be interpreted as enclosures around the human soul. Perhaps what one can recognize in the complex pictorial spatial articulation of the Upper Register is that space is not conceived here as being coherent, or singular, but rather, one might say, disputable. And while space is clearly a necessary adjunct to the existence of objects, closed or enclosing space in the context of classical thought gave presence to the soul, which Epicurus credited with both sense perception and feeling, arguing that all – *all* perceptions are *true*.

[...] The philosophy of materialism states that everything in the world is made of matter and that nothing can exist which is non-material except the vacuum of empty space. Now if that is true than all our perceptions must be some sort of material effect caused by some sort of material cause: all perceptions are therefore in some sense real, even imagined sensations without any obvious external stimulus²¹².

On this matter of truth, or singularity, it is worth noting that on the question of space and time, Epicurean concepts held to the idea of minimal parts, a sort of particle theory, while Stoic thought viewed space-time as a continuum, or continua, an approximation of wave theory²¹³. Bearing this in mind, it is possible to suggest that the Upper Register (fig. 1.116) may reveal the intersection of two versions of space, the Stoic or divine space, empty and undefined, and the Epicurean space of the corners, defining, definable and somehow material, real and emotively charged. This acceptance of an abstract versus a material duality is echoed in the central figure of Fortuna's multiple identities or incarnations²¹⁴, among them Fortuna – psyche-soul, anima-spirit – as one of the Fates, and Minerva of the ancient order of the primal terrestrial or nature part of the Roman trinity. Fortuna's position is depicted here, as Vitruvius stipulated, on the very highest point commanding a view²¹⁵. She is seated also at the centre in front of a semi circular colonnade with two open doorways (fig. 1.116), recalling the two faced Janus²¹⁶. Moreover, this theme of oppositional pairs includes the ethical opposition of the Virtuous verses the Non Virtuous, and this opposition is evident in the Upper Register with Apollo representing Virtue – easily embracing Stoic thought – while its opposition is represented by the mischievous Dionysius, the sensual pleasure seeker, similarly aligned with an Epicurean bias²¹⁷.

In painting, the picture-plane carries the prevailing concept of space-time. If we look at how the positions of the three principle gods – Apollo, Fortuna and Dionysus – are represented, we find them poised apparently on the edge of their seats while flanked by two female figures on each side similarly perched on the edge of bases that appear to sit beyond the picture plane²¹⁸. In the case of Apollo and Dionysus on the north and south wall, we notice that the pictorial illusion positions them *beyond* the picture-plane and within the physical space of the *Ixion* Room. In contrast, on the east wall the four figures that animate the northeast and southeast corners are deliberately depicted within a deeper space beyond

the physical limitation of the *Ixion* Room's architecture. On the other hand, the fact that the architectural depictions appear to continue the north and south wall beyond the physical limitations of the east wall lends to the pictorial space a sense of continuity. Within this contradiction, space, the universal container, is not thereby singular in its universality. It is not a *unified* picture-plane but rather one that can be said to be wrought by the influence of both Stoic and Epicurean beliefs that simultaneously affirm and reject its pictorial surface. In this manner, contrasting philosophical beliefs provoke a reading whereby the meaning of space in the *Ixion* Room resides not in an argument but in a rhetorical *debate* in which a concept of space as undifferentiated flows into and connects with the concept of perceptual experience as originating in the soul. It is within this debate that the concept of space thereby assumes a level of the Real²¹⁹ a concept perhaps implicit in Vitruvius: "*the appearance of buildings might be given in painted scenery, so that, though all is drawn on a flat facade, some parts may seem to be withdrawing into the background, and other standing out in front*"²²⁰.

In any case, this debate would have been one in which each guest was free to choose what to see. The Epicurean guest would see the gods in the Upper Register (fig. 1.64, 1.65, 1.81a) simply as present and in harmony with those sharing in the feast, and would identify with Dionysus on the right and Minerva at centre while being relatively indifferent to Fortuna (Minerva's other identity) and the concept of future that this would entail. The Stoic would, of course, identify with Apollo and Fortuna (instead of Minerva).

First (Lower) Register

Again, the Epicurean would find a connection in the lowest, or First (lower) Register (socle), whose shallow picture-plane depicts the tactile material density of marble symbolizing earth as alchemical presence (fig. 1.117). Here, a pictorial demonstration of the aggregation of material oppositions signals the *potential* for material transformation not in the context of deep space but rather in the oscillation between warm and colder hues. Square, rectangular and round marble panels of warm-brown, and cold-blue hues are interlocked or positioned side by side. These flattened dense representations of marble slabs act against the suspension of disbelief that the illusions created by the paintings might generate, and place the guest

frankly against the depiction as though secured within the material reality of painting itself. All illusions designed to construct volumetric depth occur above the first register.

Vanishing points

In the middle and upper registers, where illusion is constructed, all the angles are set above the horizon line and recede from top to bottom, positioning the viewer looking up and registering never the *entire* cone of the visual ray – if we adhere to Euclid's theory of vision – emanating from the viewer's eye, but only the upper semicircle of vision. This emphasis can be interpreted as reinforcing the unresolved definition of real and imagined spatial propositions with respect to the terrestrial and celestial spheres. But since the Epicurean version of perception differs from the Euclidean, how would an Epicurean understand vision operating within this pictorial representation? The Epicurean conception of vision and image formation is passive, involving literally the re-presentation of images to the viewer through fine films that are continually released from each object, and not from empty space, moving at the speed of perception towards and into the eye. This does not lend itself to constructing a cohesive pictorial projection that can be bound by a vanishing point, even if Epicurus considered the possibility of an infinite universe beyond the heavens – as Aristotle discusses and argues against in *Physics* Book III Ch 4²²¹. While there is no explanation as to how these thin films of images take on deflected shape in accord with the position of the viewer, it is possible to follow the argument that objects take on meaning as a result of being perceptually charged with a quality that the soul, or as we would say mind, can correspond with; clearly by this is meant that meaning is produced by association. Therefore pictorial space for the Epicurean becomes meaningful by association with feelings, and not by virtue of some grand abstract design as favoured by the Stoic, and so we can see that Epicurean space can be conceived *and rendered* pictorially as shallow – or not – irrespective of any indication of transcendental significance. From the position of the Epicurean picture-plane, in other words, spatial distance as indexed by perspective rendering requires no consistency or grand cohesion; indeed, one might even say that the depiction of deep space would then seem to be of interest only in so far as it would suggest a particular mood or feeling, and would therefore

be entertained as an enjoyable episodic experience rather than a motivating or embracing one.

While perspective lines are one major strategy in the schematizing of pictorial space, colour selection and shift represents another (fig. 1.112). In the Second Register a deeply emotive rich vermillion dominates all three walls. Vitruvius chastises this colour choice: *"For example, which of the ancients can be found to have used vermillion otherwise than sparingly, like a drug? But today whole walls are commonly covered with it everywhere"*²²².

Second (Middle) Register

For Vitruvius, this misuse of colour is a sign both of a contemporary extravagance and of untempered sensuality, not quite a rejection of colour per se, but cautious as to its implications when used too prevalently. Certainly in the Middle Register the allusion to deep space in the windows through the use of perspective lines is counteracted by the strong red hue that excites and even dominates the viewer's visual attention, redirecting it to concentrate on the mythological scenes (fig. 1.118), with very different effects depending upon whether read from a Stoic or Epicurean position. Moreover, the vermillion panels suspended in the entablature further flatten out what appears already from the perspective lines to be a shallow pictorial space. In other words, through the use of colour and its relation to perspective lines there is a play with different spatial illusions, a play that can be seen, in another example, in the Second Style wall paintings from the house of Augustus on the Palatine in Rome²²³ (fig. 1.119), where on one of the walls there is a representation interpreted as a theatre stage. Everything about the painting promotes the illusion of enabling the viewer to suspend their disbelief and enter the *scenae*, despite its being positioned on a raised pedestal, with the perspective illusion placing the viewer as though at normal eye-level gazing at the interior of the stage. That is to say, the lines of sight at the base of the depicted walls angle in and up. However in the same room on the other wall, a similar stage setting is depicted flattened out, as though addressing it *only as a painting*, or one could say a *sign* for the stage. Similarly, in the *Ixion* Room, the entablature – while alluding to the convention of theatre – refers us from a stage set to a method of framing. Such a referential shift from

illustration to quotation involves recognition of the frame as signaling a connotation, or conventionalized meaning. This paradigm shift is significant.

On this basis it is possible to see the Second, or Architectural, Style as more than simply an eclectic combination of three earlier styles, as suggested by August Mau²²⁴, but in fact reflecting a sophisticated culture that has become self reflexive to the point of parody, a culture in which everyone is an actor rather than an authentic subject. This is borne out by Vitruvius' dismissive reaction towards the prevalence of vermilion, in this light understandable since he is looking for pictorial representation to soberly reflect the fact that architectural authenticity, as he sees it, is a consequence of its purpose – the veneration of real ancestors as part of the natural order who, it must be remembered, were for an older generation of Romans considered to be just as individual, and every bit as present in the house as those who still lived and dined in the *Ixion* Room. While the House of the Vettii retains this sense of veneration, as we have discussed it in the general context at the head of this chapter, the *Ixion* Room's pictorial architectural space, like that in the house of Augustus, nonetheless complicates this adherence to the natural order in its epigrammatic celebration of what we would call the primacy of the signifier. Vitruvius is shocked by this development, which has its parallel in the trend towards substituting a generalized mask as a stand-in for the individual mask of the real ancestor. Signifier, and hence inevitably style, erases the referent. And shocking or not, this trend can be seen as another instance of the Stoic's contempt, or at the very least, anxiety over the implications of Epicurean thought: Stoic authenticity versus Epicurean pleasure in the sign. And this tension of *opposing views is*, as has been suggested, evident in the decoration of the room.

In the organization of a Roman house, including that of the Vettii, Roman tradition – which clearly would favour the Stoic tradition – is interested not in the frame but in what is being framed; it has an investment in looking past and through the given style as simply a passage, as allegorized in the orchestrated manner in which the visitor to the Roman house is escorted towards the tablinum or altar. In the *Ixion* Room, the Stoic's eye is similarly escorted towards the transcendental moment of essence – the apprehension of virtue – through the moral tale as vehicle to be found in the content of the mythological scenes. If the

form is assuredly important to a Stoic like Vitruvius, the appreciation of form and order is grounded in respect for the deep space of tradition and history, a respect that an untraditional misuse of colour in dazzling and flattening out perception appears to void.

For the Epicurean guest, however, the contrary holds true. As Epicurus is quoted, it is not the part that you are given which matters, but how you play it, and from this humanist position it is the framing that matters, not the raw content; the dancer, not the dance. And as for the use of colour, the Epicurean's involvement in the sensations of the human body, its submission to style and to the sheer presence of the forms of the image, ensures the simultaneous importance of both the vermilion and the play of forms, formally as well as erotically, within the mythological scenes.

The play between perspective line and colour is more complex than simply the pervasive use of vermilion, however, and it is useful to pursue this complexity further as it in unfolds here in the *Ixion* Room's Middle Register. The pictorial elements are depicted in contrasting colours of primarily red and blue, inferring warm versus cold, light versus dark. Then there are submerging and emerging iconographic elements – triton and the hippocampus see (fig. 1.120) emerge from a red field while the floating head of Athena appears to submerge into a blue (fig. 1.121). A wide red border on two sides of the alcoves or windows appear to be positioned in front of the larger red panels that are pictorially recessed at the back of the entablature. Except for the alcoves, the pictorial space in this Second Register is shallow and paradoxical as though in the presence or even within the process of material transformation. Ionic columns supporting the entablature at their base that start out as geometric are transformed into plant life – vertically winding vine scrolls supporting six tiny figures of gods in combat. For the Epicurean this unreality can be accepted without judgment as to whether true or false because reality is held in all that can be perceived – in the act of perception itself and not in this or that presumption as to what is real. The sign itself is real, an unfolding of possibility, starkly in contrast with Stoicism's view of reality as ethically loaded with the task of striving for truth or virtue, in order to mirror the transcendently authentic. The unfolding of possibility is, one might say, positively rampant in the mythological scenes, which quite apart from whatever their moral tales of virtue might

convey include a dizzying array of transformations, variations, and hybridizations in the forms of Pasaphea mating with the sacred bull and giving birth to the Minotaur, or Ixion mating with Jupiter's phantom Hera to conceive Centaurus – father of the centaurs, or Dionysus transforming Ariadne into a goddess.

On the other hand, transformation can also serve a transcendental agenda, and in the First Register the presence and transformation of the primary elements, namely earth – alternatively brown and blue (hot or cold) square or rectangular or square and round – and water and fire which potentially mix with air in the Middle and Upper Registers, establishes a hierarchy that moves from the lowest register of earth to the Upper Register of air in confirmation of Stoic aspirations.

Central to concepts of transformation is ambiguity, and spatial ambiguity is nowhere more evident than in the depiction here of three large white panels²²⁵, two on the north and one on the south wall, the centres of each of which are occupied by the figure of a numen or spirit, possibly Feronia²²⁶, a goddess of springs and woods often associated with the cult of Libertas, whose temples were a sanctuary for slaves seeking their freedom. The spirit is pictured seemingly gaily walking arm in arm with a male figure who could be a wood spirit, but is more likely her son Erylus, a figure of ambiguity in his own right²²⁷, having three separate lives and bodies²²⁸. But the important point is that these panels, while introduced into the wall surrounded by garlands, themselves hover in the space without reference to any architectural depictions. They describe a blank space wherein an entirely different episode can take place unencumbered by the depictions that swirl around it. This is significant because it therefore also reflects Roman understanding of space, in its inheritance from Pre-Socratic philosophy, as a place of transition, an arena for change, a *container* for change or *change chamber* whose necessity, one might say, rests in the restrictions and proscriptions that so dominated life at the time, restrictions that required philosophically the possibility not of progress – a later concept – but of a transforming release into paradox²²⁹. The urgency that can be associated with these panels, then, can be linked to the climate of fatalism, here symbolized by Fortuna representing the Fates, and the concept that space-time, or we could say History, enables Goodness or alternatively Badness to follow its allotted course.

Transformation provides an opening but not a point of arrival; it is essentially not teleological, and as we have seen in discussing optics, divergent rather than convergent. Roman fatalism is such because it registers either Stoical subservience to a larger order or Epicurean subjection to a miasma of shifting perceptions.

The conclusions we may draw from the *Ixion* Room's picturing of space suggest that with space understood as the Universal container, void or emptiness was not yet thought of as being organized into coherence, but was seen instead as a receptacle, a container for ethics. The question was not where is the object located but rather what is my opinion of the object. To put it another way, mimesis in this period was directed to our beliefs concerning objects, not to the verity of measured spatial relations. And it is for this reason that no systematic rationale for projected pictorial space was conceived! Material origins may be reasoned, or material stability, how different objects come to be and how they can change may be reasoned. How we are, and how we can control our emotions may be reasoned in relation to the appearances of objects, and therefore our perceptions may be reasoned. Even our physical, mental and spiritual aspects can be reasoned. But while all this is happening, there is no rational system or belief concerning the nature of space itself. What is important only is that pictorially we get sufficient information to recognize the object and some information about it, but nothing concerning the significance it might hold in relation to the continuity of space and time. We can correlate this to what we have discussed under mathematics, and the primacy of the point over the line.

While to the modern eye the architectural elements may seem fascinating simply as decorative elements, they become under investigation philosophically meaningful as allegories for the framing of thought, whether linked to the importance of defined meaning – as advocated by Socrates and Plato – or to the necessity, as advocated by Epicurus, to speak about the play of sign-objects exposed through one's sense perceptions, where the merging of matter and movement account for the world we experience²³⁰.

While Plato's assumptions that *human beings could improve and that the intellect was supreme* offered an exit to the classical world's fatalistic perspective, Roman thought at this time was dominated, as we have seen, by philosophical options – Stoicism, Epicureanism

and Skepticism – whose predilections disposed them to the acceptance of existing realities, however understood. A person's part in the divine plan was predetermined, and freedom, such as it was, lay not in metaphysical structures but in personal ethical choices²³¹. The *Ixion* Room's pictorial space reflects, whether wholly intentionally or not, certain assumptions on existence implicit or explicit in the dominant ethics of the time along with certain exigencies arising from the circumstances of the Vettii brothers themselves.

1.5.3 Religious Beliefs

1.5.3.1 General context

[...] A fatal malaise has taken hold of the arts, and since our minds cannot be portrayed, our physical features also are neglected [...] It was quite different with our ancestors. In their halls portraits were objects to be admired [...] when someone died, all the members of his family who had ever existed were present [...] (A wax mask was made from the dead person's face) [...] The family tree was traced by lines connecting the painted portraits²³². – Pliny The Elder

[...] The banqueting couches gleam high on golden pillars, and the feast is set before his face in kingly luxury; but, couches at his side, the eldest of the furies forbids him lay upon the board, and starts erect with torch uplifted and thunder on her lips. Here dwell they do while life endured had hatred for its bretheren, a blow for a parent, or the toils of fraud for a client; who found wealth and brooded thereover alone, nor shared it with their kin, who where slain for adultery, or who followed unrighteous war [...] agony cries warning to all [...]

Behold, and learn to do justice and condemn not the gods²³³!

Given the tendency of mythic and religious beliefs to converge with one another, I would like to clarify the understanding I have of their difference. Mythic belief structures are grounded in narrative stories and are made tangible by art and literature. Religious belief structures, on the other hand, are based on a commitment to abstract relationships and ideas that cannot be literally illustrated²³⁴.

Roman religion with its many cults, gods and their assigned and complex rituals envelop the contemporary scholar in something near-metaphorically akin to an echo effect. Overwhelming and claustrophobic to the contemporary mind, it becomes difficult to imagine that individual Romans could have had a clear sense of place or an independent sense of

action. Saint Augustine in *The City of God* gives us a fairly accurate reading, and though he speaks of course with a biased heart, he nevertheless presents us at least with the image of a physical object whose weight underlines Roman religion's complexity.

The present task, however, is not to address the vast range of Roman religion. For one thing, even living contemporaries like Saint Augustine had trouble assembling the entire panoply of their ever-increasing gods and goddesses:

[...] But how can I give a list in one passage of this book, of all the names of their gods and goddesses? The Romans had difficulty in getting them into the massive volumes in which they assigned particular functions and responsibilities to the divine powers²³⁵.

Instead, the purpose here is to concentrate on those aspects of Roman religion that most directly impact on the construction of pictorial space in the *Ixion* Room frescoes. My sources include much from Pliny's accounts, since he was writing up to the time of his death in Pompeii's destruction. While it is worth noting that his attitude towards Roman religion is skeptical and critical, one could even say anti-religious²³⁶, the profusion of visual and written evidence suggests that a standard set of religious beliefs held more or less in common infused the most intimate to the most public acts of Roman, and specifically Pompeian cultural life at the time of the *Ixion* Room's conception around 63 A.C.E.

The primary relationship that dominated Roman religion from early Etruscan times through to the time of Pompeii's demise was the assembly of gods into a triadic constellation²³⁷. The principle force within this triadic constellation in early Roman religion was the feminine, in the form of the earth goddess Tellus Mater (related to Ceres and eventually Fortuna, as will be noted later) who could also invoke the powers or numina, or gods of special function. It is my understanding that these numina become the basis on which a hierarchy of value differentiates aspects of the originating singular entity of the earth goddess, initiating the hierarchical distinctions that inform such fundamental aspects of society as, for instance, genealogy and the lines of family descent which played such a significant role in Roman tradition. Numina *numeninis* can be correlated with the notion that fertility resides in the head. Its Latin root means to nod, to give consent or agreement – to have will or divine power.²³⁸ In time, some of the numina relating to certain operations

proved to be ideal candidates for an evolution into anthropomorphic beings, male, female, or hermaphroditic, since unlike their Greek counterparts they did not originally have legends constructed around them²³⁹.

Layered as Roman religion was, it is best to start with the earliest of the Roman triadic constellations of gods: Tellus Mater-Janus – one of the ascribed founders of Rome itself, Mars, and Jupiter. With the earth goddess Tellus Mater as the binding principle of origin through the numina or aspects she could invoke, Janus, at first a numen, gained status as a god of beginnings and spirit of the door, later represented as having two faces looking both ways²⁴⁰. He will be important in the analysis of the *Ixion* Room. Mars was an indigenous Roman god originally associated with agriculture and later war²⁴¹. Completing the triad, Jupiter, with a history stretching back to the time of the Etruscan kings and equivalent to the Greek god Zeus, was god of the sky and dominated the Roman celestial pantheon²⁴². The roles are clear: Tellus Mater-Janus represents the body, the earth-mother, linked here to the numen-god Janus in order to underline the importance to be attached to the home; Mars represents the agency required to fertilize and defend this body, while Jupiter represents the celestial sphere – everything outside the material world.

Another characteristic of Roman religion is fundamentally significant. Unlike Christianity, Roman religion willingly assimilated into the many gods, cults and rituals of its own history those that it encountered through Rome's ever-expanding imperial conquests, giving them Roman interpretations in a ritual called *interpretatio Romano*²⁴³. The general consensus that the gods were indifferent to Man's plight required a constant *hailing* on behalf of the believer. Because every possible circumstance of life's processes and associated material enterprises, as well as the many aspects of unmediated natural phenomena, were ultimately believed to be in the hands of one power or another, religion was a matter of securing the *pax decorum*, or favour of the gods, as Geoffrey Parrinder has noted²⁴⁴. Whether it was a numen anthropomorphized or a bonafide god, considerable time was spent within and outside the home in religious observances and ceremonies that had to be performed with the utmost precision. The complexity of this can be imagined when one bears in mind that Roman terrestrial reality, converted to religious observances, was paralleled not only in the

celestial realm, but as well in both the underworld, where Dis, equivalent to the Greek god Hades, reigned, and in the realm of the sea, where Neptune, the Greek Poseidon, ruled.

A rarely mentioned but important aspect to the character of the nature of the Roman god or goddess is their association with one kind of space or another. It is understood that they were omnipresent in the temples dedicated to them, and it was also understood that they were present in the many shrines where offerings and appeals were made to them. There is, however, an aspect to their presence that is unique to the Roman pantheon, namely the presence of the multitude of gods associated with every celestial and terrestrial space. Joyce Salisbury writes: "*The Romans assigned particular gods to particular spheres and to almost every single moment [...] we get a picture of a people who saw divine power profoundly linked to the spaces they inhabited*"²⁴⁵. Celsus, the second century Roman, wrote:

[From] the beginning of the world different parts of the earth were allotted to different guardians, and in its having been apportioned in this manner, things are done in such a way as pleases the guardians. For this reason it is impious to abandon the customs which have existed in each locality from the beginning²⁴⁶.

And later Saint Augustine²⁴⁷, as a critique, wrote in *Concerning the City of God*, Book IV, Chapter 9:

But this very brief account is intended to make it clear that the pagans have not the impudence to allege that the Roman Empire was established, increased, and preserved by those divinities who were so clearly confined to their own particular departments, that no general responsibility was entrusted to any of them. When could Segetia have looked after the Empire, seeing she was not allowed the simultaneous charge of crops and trees? How could Cumina have even given a thought to arms, when her authority was not permitted to range beyond the cradles? How could Nodutus help in war, when his interest was confined to the node of the stalk and did not even extend the follicle? Each man appoints one doorkeeper...But the Romans appointed three gods; Forculus to guard the doors (forces); Cardea the hinges (cardo); Limentinus the threshold (limen) So Forculus could not guard both hinges and threshold at the same time.

This sense of Gods inhabiting and having power over very particular domains occupying their very spaces, no matter how great or small, both within and outside the home, is reflected in the Etruscan circle of divination that the Romans inherited as a religious ritual²⁴⁸. Each separated space confronts the pious person with a constant reminder at every

moment and at every occasion that they are entering or leaving, often trespassing, into one god's domain or another. Without hailing, paying tribute and offering libations, one's safe conduct was not assured. The concept of space for a Roman is definable through the frames offered by each unique space, but also through spaces defined by the relationships between the gods themselves, as in the form of the Roman triad – a geometry formed by the gods²⁴⁹.

All these spheres intersected on a daily basis within the cultural and ideological climate of the Roman world, in which the recognition of an individual's self-determination offered by religious choices confronted an otherwise hierarchical and near-inflexible social system. Every decision was embedded in the obligations to the larger order of the individual and their status in relationship to the collectivity or state. In all this proliferation and its attendant excesses it becomes easier to understand why certain religious forms were fixed as a way to at least present the appearance, no matter how tenuous, of continuity and stability when in fact their content constantly and dramatically shifted over time.

As a prime example, the principal early triad mentioned previously became more diverse and complex with Rome's ever-expanding frontiers, giving different – and often newly acquired – gods additional responsibilities²⁵⁰. The most important triad particular to Pompeii was that of Hercules, Dionysus and Venus, worshiped not only in the temple but also on a daily basis in the home²⁵¹. Hercules was regarded as the legendary founder of Pompeii. Venus Pompeiana was the city's official goddess, while Dionysus, the god of wine and theatre, was also the main protagonist in the Dionysian mystery cult²⁵² practiced in Pompeii. The cult, centred on a re-enactment of the apotheosis of Semele and Dionysus²⁵³, could be seen as Pompeii's civic symbol of generosity, prosperity and continuity. While this triad was particular to Pompeii, the triad of Jupiter, Juno and Minerva, represented in the prominently situated temple of the Capitoline in Pompeii's Forum, stood as a symbolic reminder of Pompeii's support for Roman sovereignty that followed on Rome's conquest of southern Italy.

Religious iconography

While these triads (fig. 1.122, 1.123, 1.124) held general currency, a much more particular triad holds primacy in the House of the Vettii. In the Upper Register of the *Ixion* Room, the

aediculae with their pedimented roofs see to signal temple settings²⁵⁴, and this assumption is given further weight by the presence of a triad of gods which includes Apollo, Fortuna-Augusta and Dionysus²⁵⁵. Apollo is seated on a throne at the centre of the south wall with Dionysus seated on a throne opposite on the north wall, while at the centre of the east wall facing the entrance is seated Fortuna-Augusta, who also incorporates Juno Minerva-Athena and Isis²⁵⁶. Fortuna's identity is confirmed by a coin from the Vespian period picturing Fortuna Redux²⁵⁷ that shows a seated Fortuna with a cornucopia in her left arm and a rudder in her right hand. In the *Ixion* Room the seated figure has both. The centrality of Fortuna-Augusta in the room betrays the particular significance of this triad for the interests of the Vettii, and reflects in its crafting the general significance religion held in the public and private life of a Pompeiian citizen. Not only did the goddess²⁵⁸ represent the personalized aspirations of each venerator, she also ensured future prosperity as one aspect of the four virtues – Discipline, Victory, Virtue and Fortune – which together personified the idealized Roman spirit and, more immediately, the ideals of the emperor Augustus. Indeed, in Pompeii the Temple of Fortuna-Augusta²⁵⁹ was dedicated to the good fortune of the Emperor Augustus, identified with the Fates and therefore with Fortuna. Fortune, and the Emperor, had smiled on the Vettii. Vettius Conviva was a freedman thanks to Augustus, and moreover held an *augustalis*, a high office normally conferred only upon highborn nobility as a consequence of generous donations to the state. Hence the central location of Fortuna-Augusta was likely meant to emphasize an understandably strong allegiance on the part of the Vettii to Augustus or to the empire²⁶⁰. The significance within the triad of Apollo's presence can also be attributed to the link with Augustus, who had adopted Apollo as his protector owing to the god's oracular powers, which were understood to lend wisdom and guidance in conjoining sexual passion and patriarchal love; hence Apollo's position over the mythological scene of Daedalus and Pasiphae²⁶¹.

For the Vettii, this would serve to reinforce the bond with an emperor-protector who had conferred on them the exceptional honour of the *augustalis*. Dionysus, the third member of the triad, is described as having among his many other attributes that of redemption and resurrection²⁶², of proving one's worthiness through generosity, good deeds or charity, and

learning²⁶³. His presence here can be interpreted as a reference to the generous donations on the part of Vettius Conviva which earned him his *augustalis* and the aristocratic genealogy conferred upon him. On the most immediate reading, then, this triad could be said to represent a sort of heraldic device, a very personal constellation for the Vettii in which fortune, wisdom and good deeds constitute and authorize social position.

The triclinium: – Dining with the Gods

“Jupiter” she prayed , “You make the laws for host and guest, they say.
Grant that this day be one of joy for Tyrians
And men of Troy; grant that it be remembered
By our descendants. Now be with us,
Bachus, Giver of happiness, and kindly Juno,
And all you Tyrians attend in friendliness this meeting that unites us” – Virgil²⁶⁴.

Having outlined the significance of triads in Roman religion and the particular triad of Fortuna-Augusta, Apollo and Dionysius for the Vettii, it is now important to draw attention to the purpose of the *Ixion* Room as an oecus, the place in which the diners break bread in the presence of the gods. It is important, as well, to recall that the diners are also guests of the ancestors through whose presence they passed as they moved across the atrium towards the oecus. This in effect constitutes the core of Roman tradition: to break bread and make offerings in the presence of the gods and the ancestors.

The oecus was entered on its west side, and from this vantage point guests would have the opportunity to take in the entire room at a glance. The complexity of this glance will be treated later, as will also the difference between viewing the room’s wall paintings from a standing versus a reclining position. Moving on into the room, the dinner guests would proceed to recline on three low inclined couches or *kliai* arranged against the side and end walls of the triclinium. All would be facing into the centre of the room, where their meals would be served from a low table. Other trays of food would be placed on tables against the north and south walls in the entrance area of the dining room waiting their turn to be served. The most privileged guest would be given the place with the longest possible vista. In the summer this would include a view through to the peristyle and *hortus*. Eating, as the principal activity in this dining room, complements visual beliefs with the perceptual beliefs

of taste, smell, and touch, since much of the food was eaten by hand. As well, the religious and mythological beliefs in the presence of the *hortus* would ensure the total multi-sensorial – perceptual and conceptual – experience of the dinner.

The *lares familiares*²⁶⁵ that protected the household have been suggested both by Adkins and by Parrinder²⁶⁶ to be dead ancestors that had entered the realm of the gods and became guardian spirits of the home. This correlates to their worship around the household hearth, the *larium* or shrine that was dedicated to them in the presence of the masks of the deceased ancestors in the corner of the atrium. In the House of the Vettii, the shrine in the minor atrium takes the form of a classical temple facade with a pedimented roof supported by two columns. The central image of the shrine includes the *penates* who along with the *lares* were worshipped as spirits of the household, but who were specifically charged with protecting the pantry or storehouse. A portion of every meal was set aside for them and thrown onto the fire in the hearth. On the table where food was served, a saltcellar and small offerings of fruit were set aside for their veneration. The origin of the tradition of still-life painting has been attributed to these ritual offerings of food left in shrines and tombs. Due to their perishable nature, these offerings of fruit or sacrificial animals came to be replaced by objects made of clay, wax or wood – votive offerings²⁶⁷, or simply two-dimensional painted representations: what in French is still called *nature morte*²⁶⁸.

The two still-life representations on the east wall facing the viewer as they would have approached the reclining couches both conform in content to ritual food offerings. In Virgil's *Aeneid*, during a godly feast Juno pours out a libation before she puts the drink to her lips²⁶⁹. It is clear that they are not simply framed domestic scenarios. Depicted are cakes, liquids, and even animals either sacrificed or about to be sacrificed as described in a number of literary accounts²⁷⁰. The most prominent of these accounts are the epigrams collected by Martial and published by him under the collective title of *Xenia* or gifts to the guests²⁷¹ shortly after the destruction of Pompeii²⁷². The 127 epigrams include allusions to such items as corn, asparagus, quinces, Luna cheese, eggs, chickens, peaches, sea urchins, kid – as well as wines for libations and many other foods that he includes as present in Pompeiian still-life paintings. Here is one of Martial's epigrams about the sacrifice of a young goat: "Let the

*wonton animal, mischievous to the green vine, pay his penalty; young though he be, he has already harmed the god*²⁷³. Martial likes to play with the perceptual slippage between the real and that which is represented in words or in pictures. In the introduction to these epigrams he suggests that because their publication only cost four sesterces the host could offer them to their guests as gifts like a *xenia*²⁷⁴ instead of a meal should they not have the money²⁷⁵. It is worth mentioning that the representation of one of the brown cups in the still-life left of centre on the east wall has its content spilling out onto the shelf. This would have the effect of enabling these representations to engage the viewer in the present of an action and its intentions²⁷⁶. This coincides with the animated quartet of war-ships waging battle (fig. 1.100, 1.101, 1.102, 1.103) on the north and south walls which very possibly refers to Augustus' victory over Anthony and Cleopatra and for which the Emperor credited his guardian Apollo who, it will be recalled, forms part of the triad of gods in the *Ixion* Room²⁷⁷. These scenes assume the viewpoint of an observer standing on the shore, but are also framed in an identical manner to the still-life on the east wall, and occupy a similar position in the overall pictorial organization of the north and south walls. The equivalence this establishes between representations of sacrificial offerings and victorious battle implies that the dining room was pictorially conceptualized as a place of active engagement between what was represented and what was actual: the still-life paintings and victory *snap-shots* are integrated into the act of eating and its associated ritual of celebration and appeasement. It suggests that in the dining room, *re-presentation* and *presentation* moved closer together in the here and now, a form of trans-substantiation. This kind of mirroring – presentation to re-presentation – is consistent with the transition of the body from the real to the imagined through the *dimension of the body itself*. A good example of this can be found in the houses of the dead along the Via Appia, in which elaborate dining rooms and kitchens are incorporated in order to make it possible for descendents to share the birthday of the deceased with the deceased in their own house²⁷⁸.

Inviting the gods to share in the celebrations of a sacrificial feast was first introduced in the early Roman Republic at the time when the Sibylline Books of oracles were imported from Greece and placed under the auspices of a special body of priests whose position

constituted political influence, since the oracles formed the basis for decisions in times of crisis. The priests gradually introduced a number of different cults that appealed to Roman sensibility and need. One such cult was introduced during the long famine of 469 B.C.E.: the cult of Liber Libera and Ceres required that the right relation to the gods could only be restored if six statues of gods reclining on couches at meals were displayed (*lectisternia*) and invited to partake in the sacrificial feast²⁷⁹. Incorporating in this manner not only the ancestors, but also the presence of the gods in the sharing of a meal, became a well-entrenched tradition invoked as one more attempt at securing certainty. Pliny confirms this pervasive anxiety when he writes:

[...] They wait upon gods with foreign rituals, they wear them on their fingers; they pass sentence on the monsters they worship and invent food for them; they inflict dire tyrannies on themselves, resting fitfully even when asleep; they do not make decisions about marriage about having children, or any other matter, unless instructed by sacrifices²⁸⁰.

The point that is perhaps most forcefully obvious from the perspectives of cultural history and personal experience is that anxiety – or uncertainty – imposes an existential dimension on our awareness. It therefore requires a leap of historical connectedness for the tourist or the researcher to think beyond the concept of the decorated room to realize that for the Pompeian citizens who came to dine in the triclinium, the paintings, and most especially the divine triad, were to be read as an animation of their own personal obligations and assurances; to be read, that is, not as two-dimensional points of reflection, but as dimensionally active points of reminder, like urgent spirits whose embodiment lay a feather's touch from their own.

1.5.3.2 Analysis of pictorial space in the Second (Middle) and Third (Upper) Registers

It is important to begin with the Third (Upper) Register, since this is the defining register for reference to Roman religion.

Third (Upper) Register

There is a spatial narrative served by the entrance on the west wall, since it is only at this point of entry that the room's entire complex of tableaux comes into focus. The Upper

Register from here can be seen as a totality. The entering guest would register and recognize the triad of gods (fig. 1.125), each positioned at the centre of the three walls in this upper zone, and in their viewing could not fail to construct across space a connecting triangulation. This recognition of course would almost immediately extend to include the arc of reflective mirroring that links the opposing symmetries that make up the central elements on each wall. This symmetry is held in the triangulation between the three gods, whose distance from one another forms an equilateral triangle due to the fact that the room's design as prescribed by Vitruvius is a rectangle constructed by two identical squares. With this in mind, it can be seen that the entrance side of this divine triad-triangle divides the *Ixion* Room exactly in half into two squares. While the square-triangle to the east end of the room is therefore animated by the eastwardly oriented triad, the square-triangle at the west end into which the guest enters acts as its mirror image, with the guest at the threshold completing a triad in which they echo the figure of Augusta-Fortuna. The point of entry, in other words, initiates a line through the apex of two opposing equilateral triangles (fig. 1.125), and places the guest in a rehearsal of the architectural hierarchy established by the primary axis of the Roman house, as previously described in the introduction, in which the *dominus*, though now Fortuna-Augusta, occupies the descending view while the guest occupies the ascending relationship.

Second (Middle) Register

Corresponding to the triangulations performed by the Upper Register, a second triangulation occurs directly below in the Middle Register and in line with each of the deities in the upper triangle. On red panels and at the centre of both the north and south walls three seahorses – *hyppocampi* – connect with a bare-torsoed Triton on a similar red panel at the centre of the east wall. The Triton holds a trident, itself shaped to represent a triangle, and is flanked on either side by three sea-bulls on blue panels. The trident is the symbol of the triple phallus, a masculine counterpart of the female triangle²⁸¹, which was displayed by any god whose function it was to mate with the triple goddess, here represented by Fortuna-Augusta at the centre of the Upper Register. The Middle Register is the lower of the two registers bearing pictorial depictions, and it seems clear that the triangulation here, with its reference to the nether regions represented by the creatures of the sea, mirrors the triangulation in the upper

register to suggest a tension, redolent with sexuality and power, between idealistic aspiration and base desire, between the promise of life and the threat of death.

This tension is enhanced through the use of colour, with six blue panels, each approximately the height of a person, representing the ocean depths, and alternating with the central red panels whose signature of passion gives the Middle Register its basic character. It is worth noting that the blue panels appear to continue on and connect behind the red, suggesting the contingency of human passion played against the vastness of nature's abyss.

A further tension is supplied by the reminder of a contest. Floating on four of these 'ocean' blue panels, and located just below the small naval scenes on both the north and south walls, a Nereid is portrayed as Athena in her role as ship-builder²⁸². On the east wall, Triton, son of Athena's rival Poseidon, is flanked by two blue panels. On each of these blue panels, the head of a seahorse faces away from the centre in opposite directions²⁸³ and towards respectively the north and south walls, where the blue panels each butt against a large white panel on the adjoining wall. This disposition of the seahorse heads could be in reference to Janus, the god of beginnings whose two faces look in opposite directions, but it may in addition serve to emphasize the competitive relationship between Athena and Poseidon, between – that is – life and death. Moreover, numbers seem significant here as well. Together with other spirits flanking the gods, whether ancestors or numina, the total number including the two male gods comes to twelve, leaving the centrally positioned Fortuna as the presiding agent of fortune or Fate. This choreography of 12 could well relate to the 12 gods and goddesses called in to choose the ruler of Attica, a competition between Poseidon and Athena in which Athena won and gained sovereignty over Attica²⁸⁴, a story that itself may well index the fearful intersection of land and sea in the ancient imagination. This possibility seems justified by the fact that while the lower part of the Middle Register appears to float in the indefinable depth of an overall aquatic presence, in the Upper Register the gods and spirits are positioned within a highly articulated complex reminiscent of temple architecture, or a mixture of temple and theatre architecture, in a manner that suggests that the gods are sitting in judgment²⁸⁵. Through all of this, it is worth being reminded of the proximity these stories held for the people of Pompeii, with the city itself lodged between the

sea and the mount of Vesuvius. That proximity is reflected in the height of these panels, which places them in clear view of the guests dining against the north and south walls, while just above those dining against the east wall would be the two small still-lives representing ritual food offerings, a reminder of the constant need to appease the gods.

Summation of Second and Third Registers

When we consider the degree to which, within a strange assemblage of hybrid texts, the profusion of gods and their particular histories are folded into a genealogical tradition of respect for the ancestors, whether personal or literary, we can see how very different from later western Christianity was the relationship Romans had to the notion of theological belief. Feeney writes that a polytheistic system makes it difficult to identify the parameters of what we mean by Roman religious beliefs, and he points to the example of Augustus who was both a participant in and an object of belief. As he notes, matters get further complicated:

[...] Our earliest texts show a delight in juxtaposing religious ideas from different registers combining Homeric and cult epithets for Jupiter, or turning the epic hero Anchises into a proto-decimuir who consults sacred books. Plautus puts on a bravura display with Mercury's prologue to the *Amphitryo*, enjoying the feat of throwing together 'Mercury' and 'Hermes', supposedly the 'same' at some level of comparison, yet scarcely recognizable as a figure of cult. In the first line Mercury puns on the etymology of his Roman title [twenty lines before he actually speaks his name] showing his status as a god of mercantile activity [mercimonii] [...] to announce that he also has the messenger function of the messenger-god Hermes-Mercury²⁸⁶.

Where these references lead is to the repositioning of the order in which religious belief was possible. As Feeney writes, what was previously understood was that any core of real belief must have been located in domestic rites, not public ones²⁸⁷. To understand Roman religious belief, we can contrast it with Christian belief structure, which rests on the assumption that while God's 'love' is unconditional, our own salvation is conditional on our belief in Him. For a Roman, however, the gods' indifference to man's general plight rendered their interest in the individual conditional on the individual hailing the god through offerings, celebrations and sacrifice. It was therefore not so much a question of the individual's belief in any god, to which the gods remained indifferent, but rather a question of the individual promoting the god's – or goddess's – interest in the individual's existence

and fortunes. This constructs a very different relationship between the individual and their god.

How this impacts on pictorial space is a matter of the terrestrial being mirrored in the various spheres of the gods. Instead of a Christian Heaven on earth, we have a Roman earth in the celestial sphere. While the gods might occupy all space, each space was particularly defined – one might even say framed – each an independent domain within which action and potency was possible; and that space became meaningless to a Roman if it were not charged separately with some terrestrial presence through the agency of spirits – numina. The hierarchy lies not in the fact that the gods imposed themselves, but rather in that Romans imposed *themselves* on the consciousness of a god – and any god would do, new or old, native or foreign. Any play, any gesture was therefore an acknowledgement, and belief was not uni-dimensional but multivalent, a constant tracing and overlaying of one identity over another, of different histories and different moments or cultures over each other. For Pompeiian culture, and this is evident in the decorations of the *Ixion* Room, pictorial space follows suit, depicting a celestial complexity and establishing a network of intersecting connections between the guests and the gods and spirits in which those who came to dine came as well to seek favour.

The guests, once reclining, lie at the edge between the subterranean world *Di inferi* where Dis Pater resided and the sacred world of water where Neptune ruled with the nymphs – young, beautiful and fond of music. The eternal God of the water keeps company with the nymphs who shared mortality with human beings²⁸⁸. In this atmosphere, perhaps comparable to Aeneas' descent into the underworld, the guests took on the role of the future heroes – a role involving rebirth and redemption following the cleansing of their souls.

In after years and from Italian blood
What famous children in your line will come
Souls of the future, living in our name,
I shall tell clearly now and in the telling
Teach you your destiny. – *The Aeneid* Book VI²⁸⁹.

It is also here in the underworld that Aeneas – Virgil's protagonist in the *Aeneid* through whom he pays homage to Augustus as the savior, future and founder of Rome – goes to the island where Apollo dwells. Nearby resided Daedlian, the god of prophesy, living in a

place apart – a dark enormous cave – as Virgil emphasizes. In the *Ixion* Room, the paintings speak of the relationship between Apollo, Daedalus and Pasiphae²⁹⁰. It is her *unholy lust*, resulting in the birth of the Minotaur, that Daedalus facilitated, and later out of remorse gave Ariadne, daughter of King Minos, the thread that helped her lover Theseus escape the labyrinth. In so doing, Daedalus undoes his labyrinth and his deed. The narrative content, echoed in the layered architectural depictions of the wall decorations, connects these two mythological panels to the resolution of moral conflict in the mythological panel of Ariadne and Dionysus

The maze none could untangled, until, touched
By a great love shown by a royal girl,
He Daedalus himself, unraveled all²⁹¹.

In the third element or mythological theme that completes the moral triangulation, Virgil employs Ixion as his model of transgression against the saviour – the patron and the pater, Jupiter. Ixion, though having been forgiven by Jupiter/Jupiter for murdering his father-in-law, in an act of ingratitude attempts to seduce Hera, also known as Juno, the wife of Zeus. In Virgil's epic poem, Ixion is banished to the underworld for eternity by Zeus and becomes the anti-hero Turnus, fighting the cloud phantom of the prophetically appointed future leader of Rome, Aeneas.

And Life was still ahead, assured for Turnus!
Now heavy dooms ahead for him...
In likeness of Aeneas, weird and strange,
Adorned the image with Daedanian arms
And matched the godlike hero's shield and plume,
Gave unreal words, a voice without a mind,
Away of walking after hid²⁹².

As Virgil stresses, each realm, each place, narrative or space was charged with importance and its own internal logic. In Roman life, even the future is a place apart. Here the underworld had its own rules, the terrestrial world other rules still, and the celestial world its own order or wisdom. Each separate sphere or register in the *Ixion* Room submits to these requirements. The Upper Register is ordered by the architecture of the temple structures, and given meaning by those that inhabited it. The Second Register is an aggregate of myth and

illusion (the Phantom Figure attempting to extend itself beyond its own sphere), while the First Register is an aggregate indeed, a depiction of the density that lies beneath the earth, the gravity of stone meeting the fluidity of water.

These divisions offer a fundamental hierarchy in which religion could separate virtue from vice. In the Middle Register that separation is given representations where the real and the illusory join in battle, somewhat as in the vital spirits of the heart with its labyrinth of emotion. As Feeny points out, the hierarchy of religious values – so closely integrated into Roman politics – demanded an ordering device, and here it is supplied by the division of the wall's surface into registers and sections and subsections, each pictorial space clearly framed, together insisting on the viewer's focused attention across a series of different episodes. This episodic focus is reinforced in the Upper Register, where – despite the fact that the architectural structures and their spaces appear to be interconnected – no deity steps outside their proper frame, while below, the guests and hosts, reclining on their couches, have clearly also been given theirs.

1.5.4 Scientific Beliefs (concerning the optical system)

1.5.4.1 General context

There are three approaches underlying both Greek and Roman optical thought: there is firstly the medical tradition that dealt with the anatomy and physiology of the eye; there is the larger philosophical question of epistemology, which can include psychology or perception; and there is finally the question of physical causation, what we may call physics, attendant on the application from within the mathematical tradition of geometry to the perception of space. It is this last that forms most specifically the study of optics as discussed below.

To begin with I would like to outline the seven primary geometric theorems that underpin all fifty-seven of Euclid's propositions relating to optics. As summarized by David Lindberg, these primary theorems had important influences on the understanding of perspective and spatial pictorial construction of the *Ixion* Room:

1) "*Rectilinear rays moving out from the eye diverging indefinitely.*" (to move, lie, or extend in different directions from a common point, the opposite view of renaissance perspective

which converge indefinitely) 2) "*The figure contained by a set of rays is a cone of which the vertex is in the eye and the base at the surface of the object seen*"; 3) "*Those things are seen upon which visual rays fall and those things are not seen upon which visual rays do not fall*"; (thinking here of the Second Register of the *Ixion Room*) 4) "*That things seen under a larger angle seem to be larger those under a smaller angle appear smaller, and those under equal angles appear equal*" (this plays an important role in the choice of multiple positions of the viewer in the perspectival construction of the *Ixion Room*; 5) "*That things seen by higher visual rays appear higher and things seen by lower visual rays appear lower*" (Again, this is important to the pictorial construction of the *Ixion Room*; 6) "*That, similarly, seen by rays further to the right appear further to the right, and things seen further to the left appear further to the left*"; 7) "*That things seen under more angles are seen more clearly*"²⁹³.

They also influenced my approach to a methodology by which to construct the *pictorial* spatial propositions that are fundamental to the *Ixion Room's* decorations. Consequently, rather than working from a two-dimensional representation of the *Ixion Room*, I made a three-dimensional model (fig. 1.126) on whose internal sides are inscribed with the linear outlines of all the pictorial architectural elements represented on the east, north, and south walls. In this I was inspired by my discovery of three items that can serve in different ways as examples for my central proposition – which is that the *Ixion Room* decorations must be experienced as a *volumetric* whole organized as a projection from the viewer's positioning at the entrance to the space; in its entirety a *hybrid*, one might say, involving the viewer in an extended engagement with the actual physical space of the room by means of its pictorial continuity.

The first example was a small painting on the back wall in a completely enclosed niche in the Domus Aurea, *Quadretto di paesaggio lacustre animato da figure appena abbozzate*²⁹⁴ (fig. 1.127). The painting, in the Second Style, is of a landscape gesturally painted with a few strokes of the brush to simulate a window with a view. At the centre of the back edge of the niche's ceiling are two painted lines, clearly visual rays that diverge out from a central apex towards the front corners of the niche to form a triangle. Contained in the apex of this triangle is a simple childlike representation of an eye complete with pupil and

eyelashes. The eye is looking at a bird flying in front of the sun. What is crucial to note is that the apparent triangle enclosing the sun and bird *is missing the side opposite the eye* that would otherwise enclose the space within. Substituting for the absent side is the sill of the alcove. Crucial, because this makes it an implicit triangle, not an actual or diagrammatically completed one, and this suggests the concept of an open cone of vision with the eye-apex a minor sun in its own right, launching its diverging rays out into the void of space beyond the edge of the sill to encompass all that can be made visible to it. Importantly, this little vignette demonstrates not simply pictorially but also spatially – in employing the actual *volume* of the alcove by choosing to present the scene on the upper surface *verging out into the room* – how vision was then understood.

The second discovery concerns G.J. Kern's article, *Glyptothek und die Skenographie bei Vitruv*²⁹⁵ (fig. 1.128, 1.129). In his lecture, he proposes that the conception of the perspectival impulse in Greek and Roman art did not arise from a flat schematic representation based on the concept of a vanishing point. Rather, it originates in the apprehension of space as depth, a space in which any surface can be seen not as the rectangle that it most usually is, but as a triangular wedge that moves the viewer into space when viewed from above or below. He chooses as his example the *Jahreszeitenmosaik* from around the 2nd century A.C.E. in the collection of the Münchener Glyptothek. This square mosaic, like many such mosaics using illusionistic geometric patterns, is constructed in such a way that one appears to be looking down – or up – into deep space. In positioning the viewer here as paradoxically peering both down into and up at a coffered ceiling, the effect reveals the importance that the extended *sensation* of physical three-dimensionality held in the construction of Roman pictorial space. In the central depth of the apparent ceiling, and inside a circle that is itself rotated to form a vertical oval, stands the sun god *Sol* with, in the foreground, four *tellus menaeids* personifying the four seasons. The central vertical diameter of the foreshortened circle within which *Sol* is pictured coincides with the mosaic's central vertical axis in a perspective constructed by diverging rays emanating out from within the sun-circle. This representation conforms to the circle described by Vitruvius that is to be inscribed around the figure on the basis of simple ratios²⁹⁶.

The third example was John Clarke's reference to the linear constructions of the First and Second Style pictorial representations²⁹⁷. In his schema, Clarke points to the First-Style²⁹⁸ system of framing doorways with matched columns as a device by which to unify all spaces in the Roman house. He first reminds us of the construction technique that involved coating the stone block core with cement and following this with plaster, thus producing a continuous surface that was frequently then divided into three horizontal divisions that ran along all the walls from room to room, lending further unity to the otherwise independent spaces of the house. In addition to this, in an innovation that required a suspension of disbelief, the real columns of the First Style were substituted by their representations, often in the form of a depicted colonnade running along all three walls of a room's interior. The significance of this lies in the fact that their perspective coherence functioned solely from the position of a viewer at the entrance; illusion was thus conceived as divergent rays inscribed as perspective lines emanating out from the eye of the viewer *at that point of entry* – or from an exactly opposing viewpoint, in an interesting variation that constituted a mirror reflection of the viewer's eye on the opposite wall. Needless to say, once the viewer entered the room, the illusion of the colonnade disappeared as it disintegrated into incongruity.

These three examples offer the core constituents of the Roman concept of spatial vision and representation. Firstly, and fundamentally, there is the concept of diverging rays of light forming a *cone of vision emanating from the apex of the eye*. Secondly, and specifically related to perspective rendering, *the eye can be reproduced on an opposing planar surface as one or more circles of emanation* sending out diverging rays through space and illuminating objects in their path, which are then seen inversely by the viewer as *converging* towards that centre – *or those centres* – of emanation. Thirdly, there is the construction of perspective – for instance in the development of rendered as opposed to actual colonnades – whose effect, one might actually say *existence*, depends upon this conception of the eye's diverging rays, *inscribed as lines of sight projecting out from the position of the viewer* at their point of entry into the space to produce what is in effect a suspended moment of recognition, one to be held in the mind as the viewer's passage takes them past the point of coherent illusion. With this

in place, it is possible to turn now to a consideration of how these constituents work together in practice.

In the example that Clarke refers to, the horizontal bands, it is easy to imagine that the original horizontal bands along the walls created in the viewer a sensation of perspectival recession, especially when seen from the point of entry, and given the daily experience of this same recession in the architectural colonnade of the peristyle home. The receding lines within a colonnade were a familiar experience in Roman life, and in 55 B.C.E. around the beginning of the second Style there is an interesting passage in Lucretius, *On the Nature of the Universe*, Book Four line 426, that makes a comment on this visual phenomenon:

[...] When we gaze from one end down the whole length of a colonnade, though its structure is perfectly symmetrical and it is propped throughout on pillars of equal height, yet it contracts by slow degrees in a narrowing cone that draws roof to floor and left to right till it unites them in the imperceptible apex of the cone²⁹⁹.

The observation is significant for how he understands his perception of the visual effect of recession. It should also be noted that his view of the convergence he describes is apparently perceived not from the centre but from the point of entry near the wall, and the colonnade he describes is one-sided, as in the garden of the peristyle. The depicted or illusionistic colonnades of the Second Style seek to encompass and incorporate the larger unity of the entire house, and the practice of painting a colonnade on all three walls of the room was intended as a cohesive pictorial illusion, although of course only from the position at the point of entrance to the room³⁰⁰.

If we assume this same position at the entrance to the *Ixion* Room on its west side (fig. 1.130), and if we accept both Alcmaeon's premise of visual rays or fire emanating from the eye and Euclid's first proposition based on this concept, we are then in a position to view the *apparently erratic* converging perspectival lines on the central vertical axis of the east wall as they would have been perceived at the time – as *diverging*, not *converging*. While we, with our vanishing point expectations wish to conceive of these lines as potentially converging towards infinity³⁰¹, it *could not* have been understood this way to a Roman mind³⁰². As I have pointed out in the section on philosophical beliefs, and will point out in the section on mathematical beliefs, the concept of two or more lines converging towards

infinity was both aesthetically and philosophically unacceptable, and therefore such coincidence was not mathematically, aesthetically or philosophically meaningful. There is a very important consequence to be derived from this – that the precision of singularity we assume was not for the classical mind a function of reality, and certainly not of perceived reality. For them, it was rather the plurality of things, their constantly shifting relationship to our perception, which characterized their thought. A corollary of this is that just as there would be no requirement or expectation that lines would recede towards a single point on the horizon, similarly there be no reverse expectation that with the eye as the point of diverging rays that these rays would emanate from a mathematically pure centre (but a mobile centre in the eye); in other words, whether the point of apparent convergence or apparent divergence was precise or not was simply not in question³⁰³.

Here the question arises as to what is meant by the centre of the circle of which Vitruvius speaks when he quotes Agatharcus:

[...] In the first place Agatharcus, in Athens, when Aeschylus was bringing out a tragedy, painted a scene, and left a commentary about it. This led Democritus and Anaxagoras to write on the same subject, showing how, given a centre in a definitive place, the lines should naturally correspond with due regard to the point of sight and the diverge of the of visual rays, so that by this deception a faithful representation of the appearance of buildings might be given in painted scenery, and so that, though all is drawn on a vertical flat facade, some parts may seem to be withdrawing into the background, and others to be standing out in front³⁰⁴.

John White in his *The Birth and Rebirth of Pictorial Space*³⁰⁵ translates Vitruvius's first mention of perspective in Book One, Chapter Two as follows: "*Perspective is the method of sketching a front with the sides withdrawing into the background, the lines all meeting in the centre of a circle*"³⁰⁶. "The centre of a circle" in the original Latin reads: "*Item scaenographia est frontis et laterum abscedentium adumbratio ad circinique centrum omnium linearum responsus*". In a literal translation this passage might better be read as: In like manner, scenography is the sketch of the front and of the retreating sides and the correspondence of all lines to the point of the pair of compasses, where 'circin -us -i' *m* means (geometer's) compass, pair of compasses, the compass making a circle to describe the divergent end of the cone of vision on a flat surface. It is necessary here to then imagine the

point of the compass (or pair of compasses) as positioned at the viewer's eye, with its infinite gradations of arc drawn as an *interrupted* projection of one gradation onto the opposite wall. The effect is similar to, though conceptually dissimilar from our own perspective construction, and it is the dissimilarity that is important. Without the belief in a point *out there* – a vanishing point lent credence by a belief in singular infinity, the centre of the circle referred to by Vitruvius refers back to the body – the body always in motion, not fixed but instead constantly aware of its own 'plural' occupation of space. A useful reference here is the plan of a Roman theatre as described in Vitruvius Book VI, where the audience is seated in a semi-circle facing the skena or scene, and in the drawing shown it is clear that the basic design is that of circle with points of correspondence around its circumference³⁰⁷.

To reiterate, there is an ambiguity in the concept of *centre*, with its meaning suspended between our tendency to conceive it as an exact point in space and the evident tendency of the classical world to understand it as describing a location or *place*, an *arrival point* more associated with the body in three dimensional space. In some respects we also adhere to this sense when we say we are standing in the centre of the room, whether or not we are at its dead centre. Moreover, many words in any language are subject to contextual interpretation, and an example is the Latin word for line: *linearum* can mean line, string, thread, plumb line, outline, boundary-line and limit. A particular point to be made on the basis of these two considerations is that words used in an abstract sense frequently betray their material origins, and in the physical world – including painting – exactitude is not often required. The significance I attach to this point is that in attempting to re-enact the construction of perspective in the *Ixion* Room, I decided to employ actual lines in space as a means of establishing the receding spatial dimension. Among the equipment found in a painter's workshop was a plumb bob for making vertical lines, and no doubt chalk lines for sketching out straight lines were employed as they are today³⁰⁸. The material base of Euclid's observations can be detected in passages such as: [These lines] should naturally correspond with due regard to the point of sight and the divergence of the visual rays. Note here in this respect also Lindberg's second summarizing point on Euclid's optical propositions: "*The*

figure set by a set of rays is a cone of which the vertex is in the eye and the base at the surface of the object seen".

In Lindberg's sixth summarizing point, Euclid is quoted as stating that *"things seen further to the left appear further to the left and things seen further to the right appear further to the right"*. There are two things to note. Firstly, Euclid's descriptive manner here is physical, with rays *leaving the eye* and then appearing to diverge, a physicality that Vitruvius implies as well by stating that *"Perspective is the method of sketching a front with its sides withdrawing into the background"*, although he is concerned with the flat surface³⁰⁹. Secondly, in fact Euclid's proposition is more clearly translated differently than stated by Lindberg. Euclid's ambiguously obvious proposition – incidentally, number twelve in Eecke's translation but number thirteen in Elaheh Kheirandish's translation³¹⁰ – when examined in reference to various translations from the Greek text should really read: *"things seen further to the left appear to move further to the right and things seen further to the right appear to move further to the left"*. In this case, another dimension becomes evident: the dimension of movement in space, a dynamic three-dimensionality so obviously assumed – hence the ambiguous language – by anyone who is conceptualizing in material spatial terms, anyone for whom the eye with its light-emitting rays is an active participant in the possibility of spatial vision.

For the Stoic architect Vitruvius, in pursuit of authoritative, one might say theoretical justification for the prescriptions he addresses, quoting Euclid and the theory of divergence to support pictorial illusion is inevitably more useful than reliance on mere sensation³¹¹.

[...] Showing how given a centre in a definitive place, the lines should naturally correspond with due regard to the point of sight and the divergence of the visual rays, so that by this deception a faithful representation of the appearance of buildings might be given in painted scenery. And so that, though all is drawn in a vertical flat facade, some parts may seem to be withdrawing into the background, and others to be standing out in front³¹².

Up to this point the discussion has been focused on the general issue of perception – the theory of diverging rays emanating from the centre of the eye, including the relation of this theory with an Epicurean tendency to favour *convergence* as a sense-perception – and as well

the issue of what is meant by the concept of centre and the related matter of circles of emanation. The substance of this has been to suggest the importance of understanding Roman attitudes towards space in order to realize why what might seem to have been awkward and un-informed by pictorial spatial constructions must, *in fact*, be seen as *logical consequences of their attitude*.

I would like now to treat a matter of significance for the issue of continuity in illusion, something quite pressing to the artist required to provide that moment of recognition mentioned earlier. In his précis of Euclid's propositions, Lindberg's third point paraphrases a number of different propositions as "*those things are seen upon which visual rays fall and those things are not seen upon which visual rays do not fall*". While Euclid's point may seem obvious, implied within it are both a warning and a solution for the decorative artist, which might be stated as an axiom: where an illusion is in danger of falling apart, obscure that point with an obstruction. This clearly becomes a very important element to be taken advantage of in the construction of an illusion that must negotiate the interruptions represented by, most obviously, the corners of a room. In the *Ixion* Room, the discrete openings in the Second Register (fig. 1.131) are designed to contain architectural details that give the impression of belonging not only to a space greater than the room, but also as a consequence to part of all the other architectural details in similar alcove openings in positions mirrored across the room³¹³. The pictorial problem for the painter arises when two different physical planes – two walls – meet in real space despite the fact that pictorial continuity must be maintained. A pragmatic solution to this problem of pictorial incongruity was effected in the *Ixion* Room by the device of finishing off the north and south walls with flat white tapestry panels, while the interior architectural details in each of the illusionistic windows at the corners of the east wall are painted in a perspective rendering that suggests pictorial congruity with the details painted in the similar windows of the south and north walls. The point of these manipulations of course is to replicate, despite each wall's individual central axis, the sense of continuous structural and cohesive space that marked the original rooms with their architectural columns, which as we have seen from Clarke were the inspiration for these painted substitutes. In the *Ixion* Room, both the central axis and the perspectival lines that define its

pictorial space – sometimes intersecting on the central axis and at other times not – are hidden from view by the central recessed entablature in which is suspended the mythological scene³¹⁴. On the Upper Register, axis and perspective lines are hidden by the central positions of Fortuna on the east wall, Apollo on the north, and Dionysus on the south.

The pictorial extension of the north and south wall into the east wall as just described cannot be successfully constructed from the internal pictorial logic of the east, north or south walls. For it to be successful, we must return to the point of entry from which it can be seen to operate like an anamorphic illusion across the three surfaces. This indicates that the artists/authors who painted this section of the pictorial illusion were aware and capable of conceiving a method of executing such an illusion with sight lines, imitating in a practical manner the visual rays³¹⁵ that Alcmaeon and Euclid describe as forming the cone of vision. Indeed, the anamorphic extensions of the north and south walls of the *Ixion* Room work well from the point of entry, while as soon as one moves into the room itself the convincing illusion falls apart, as Clarke confirms happens with the example of the colonnaded room in the Casa dei Grifi in Rome³¹⁶, or as can be seen in a yet more similar example presented in Pompeii itself by the second alcove of the cubiculum in the Villa dei Misteri of about 60 B.C.E.³¹⁷. However, as will be demonstrated in the analysis, these window illusions work from two distinct positions that the guest would occupy in the room – and surprisingly not only from the point of entry.

Having established the core of Roman spatial vision as emanations describing a body-centred circle diverging as a cone of vision from the eye, and also having established the significance of entry-point positioning in marking a point of recognition, like a snapshot to be carried into the room, it is important to turn our attention to the fact that, in the case of the Second and Third Registers, each of the walls in the *Ixion* Room has more than one spatial relationship with respect to the positioning of the viewer. To study this it is important to examine the relationship between the viewer stationed at the point of entry and the east wall directly opposite them. How to understand this problem of multiple viewpoints requires further examination of just how spatial relationship to terrestrial reality itself was imagined at

the time. For this it is necessary first to quickly note an important revolution in the acceptance of astronomical observation, and then to turn our attention to geography.

The existence of a comprehensive astronomical model based on optical principles permitted the study of objects, their shape and their relationship to each other in space, and changed the manner in which the Roman world could picture its relationship not only to the heavens, but also to the earth itself. This, of course, is the province of geography, and it was geography that played an essential role in the more immediate realm of perceptual relations. There are two aspects to Roman geography that bear on the *Ixion* Room decorations, and these have significant implications for the attempt to reconstruct their concepts of perspective. A crucially important figure here is the Greek geographer Strabo, born 63 B.C.E. around eight years before the death of Lucretius in 55 B.C.E. Strabo's great contribution to the study of geography lay in his recognition that the earth was spherical and existed in a spherical universe³¹⁸.

With this observation concerning the consequences arising from the curvature of the earth as a sphere, Strabo lays the groundwork for the Roman acceptance of a *serial perspective* in the representation of reality. In the *Ixion* Room the three registers thus combine contemporary knowledge of the relative positioning of the viewer with respect to the physical world and the metaphysical intent to suggest ethical content. It is within this context that the attempt to understand the multiple centres of perspective apparent on the east wall of the room must proceed.

The second important aspect of Roman geography for this study involves the relationship between pictorial convergence to a centre and Strabo's application, attendant on astronomical observations. Strabo worked out the complexity inherent in our progressive visual encounter with a spherical world by empirical means Strabo's observation of progressively larger objects, suggesting that we know the true proportions of things at a distance because we *mentally* move towards them.

[...] For it is not by the mind's reaching out towards them, as some say a visual ray from the eye does (in seeing), that one thinks of large things at a distance in space; but one does so by proportional mental movement. For there are in the mind the like figures and movements. Therefore, when one thinks the greater objects, in what will his thinking those differ from his thinking the smaller? (in nothing) because all the internal though smaller are as it were proportional to the external³¹⁹.

Strabo's practical focus, directed towards map-making and navigation, would naturally have great appeal to Roman commonsensical engineering incorporating the dimension of movement and could also have appeal to the painters of the *Ixion* Room.

1.5.4.2 Analysis of pictorial space in the First (Lower), Second (Middle) and Third (Upper) Registers

It is best to begin by summarizing some main points before applying ourselves to the room. There is the concept of diverging rays forming a cone of vision emanating from the observer's eye that produces the *effect* of a convergence when reproduced as a centre of emanation on an opposing surface; there is as well the recognition of the ephemeral nature of such rendered experience, their authority relying on a suspended moment of commensurability before their collapse, or rather, their *elision* into another reference point. It is in order to escort us through these elisions that viewing points require obstructing devices intercepting the passage of the rays of vision so as to mask off incommensurabilities and maintain an orderly transition between succeeding moments. Moreover, since our visual experience in the world is dependent upon our position relative to the curved surface of the earth, elevations in position reflect on our ability to stretch our spatial perception – to stretch the horizon of our comprehension.

The construction of a model

Taking these points into account, we can position ourselves at the entrance of the *Ixion* Room and at that moment of suspension before we move on in. This encounter will be consistent with the final point just made: the progressively elevated centres of emanation on the east wall ahead of us cause us to assume a series of increasingly elevated perspectives as we rise upwards as though towards a higher ground of experience. I am going to concentrate on this phenomenon for now, and before treating this as a formal issue of design, I want first to note

some practical matters of production. While the method of painting these frescoes is generally discussed from the point of view of technique itself, an extension of this is the process by which the Pompeian artists would have proceeded to set up their workstations. A wall painting from the tomb of *Trebius Justus* at Rome³²⁰ shows a building under construction. Not unlike in the Renaissance or even now, a wooden scaffolding was erected of several levels fastened to the wall with putlog holes. This construction would give the painter an opportunity to work comfortably while painting the frescoes. A fine layer of plaster *intonaco* was laid over a rougher section to become the actual painting ground. Each day only a certain amount was covered with *intonaco*, only the amount that could be painted that same day since the plaster had to remain damp during the painting process itself. The design was inscribed onto this layer, first as an outline with a brush and then filled in with undercoating and over painting, before being finished with linear hatching to secure the final definition of a form³²¹. This process of fresco painting applied when the decorations were systematically started at the top and worked down towards the bottom of the wall³²². The exception to this occurs with still life and mythological or subject paintings, where a seam indicates that they were most likely painted in later. These would be painted into freshly laid grounds that filled the cavity left for this purpose³²³. The scaffolding that was set up for the mason was presumably also used by the plasterer and eventually by the painter. Having considered the overall height of the room and its pictorial division into three registers, one can conclude that for practical reasons there were probably three different levels to the scaffolding in the *Ixion* Room.

It is in the formal design principles, however, that it is possible to best grasp the relationship between the three registers, the application of perspective and the concept of elevation. To clarify this I want to come back to the model I constructed. This included a basic replication of the room at scale, and a series of elasticized threads to indicate the diverging rays of vision emanating from the positions that represented the *apexes* or *centres* of divergence. Let me note before explaining the number and location of these centres that the threads fanning out from them were attached to the surfaces of the room's opposite walls – in the case of the entrance this would be the east wall – at the points in the *trompe l'oeil*

from which the perspective lines begin their suggestion of spatial depth. To examine the east wall, one could draw the strings together to a point at the apex of the eye (fig. 1.132, 1.133) located at specific points along the central vertical axis at the point of entrance to the room and discover that the threads aligned themselves with the perspective lines painted on the wall, and consequently with the rays of vision assumed by Roman optical theory. However, as suggested, it became evident that there is not simply one centre of divergence but in fact *several* along the vertical axis of the east wall. The fact that there are several, and that they occur at specific points, requires explanation since it is crucial to correcting a general misunderstanding that Roman perspective represents a failure to find a solution to the problem of accurately rendering perspective.

As we have seen in discussing Strabo, it was at the time a known and accepted fact of experience that our relationship to the horizon, and to objects at a distance, is mobile. Just how this mobility might be registered in the *Ixion* Room decorations was the issue. I therefore investigated how the points of divergence, clearly occurring along the vertical axes, could be understood in light of the overwhelming evidence in Roman philosophy for the desire of some kind of commensurability. My assumption was that this must refer back to the body, based on the well-known classical ideal of the human body's proportions as an organizing principle. Vitruvius is, of course, a prime source for this, and using his definition of a man's height as six Roman feet I calculated the approximate *average* height of a man at the time as 145 cm, or 4'9" in modern feet³²⁴. However, it is important to remember that Vitruvius' definition is of the *ideal* height of a man as represented by the diameter of a circle drawn around the figure with outstretched arms and legs, the so-called Vitruvian man made familiar to us by Leonardo da Vinci. In this ideal proportion with the navel at the centre, of the total diameter of 177 cm, one sixth (or one Roman foot) is the distance from the circle's perimeter to the top of the figure's head – approximately 29 cm. Moreover this makes the distance between the navel and the perimeter to be approximately 87cm, *and this corresponds closely to the height of the First Register in the Ixion Room*, which in fact is 87 cm. It is with this measure that I determined that the proportional calculations of the *Ixion* room form a correspondence, and thus provide the essential divisions on the central vertical

axes of the walls. The model here is the body, and it is important to acknowledge that it is more than the mathematical proportions of the body, it is the body that has physiological and perceptual dimensions.

These calculations also revealed that the total height of the three registers is very close to the height of three times the Vitruvian ideal (fig. 1.134). Vitruvius several times mentions the necessity to work within a system related to a concept of the body that is also within itself commensurate. Roman measurements in general were based on parts of the human body such as feet, fingers and paces³²⁵, and it is to the sculptor Polykleitos that we attribute the first theoretical treatise on bodily proportions based on the mean within each genus³²⁶. In applying Vitruvian calculations to the *Ixion* Room, and starting with the height of the First Register as 87 cm, or half the height of a person, we can add the Second Register of 245 cm and the Third Register of 132 cm to arrive at a height of 464 cm. We can then further add the vault, which from its remaining fragments could be calculated to be approximately 42–44 cm in height or approximately half the height of the First Register, making the room 506 to 528 cm in total height. If we multiply the averaged height of the ceiling vault – 43 cm – times twelve we arrive at the figure 516 cm. This makes the lowest register approximately twice the height of the vaulted ceiling, *a multiple of two equaling 86 cm*; the Middle Register six times the height of the vault, *a multiple of six equaling 258 cm* (a discrepancy of 13 cm), and the Upper Register three times the height, *a multiple of three equaling 129 cm* (a discrepancy of 3 cm), with the vault – representing the heavenly sphere or universe – as the unitary figure or dimension of *the multiple one at 4 cm*, fittingly therefore the *divine measure*. It is interesting to note on a practical level that the height of the *Ixion* Room up to the heavenly vault is exactly three times the height of an average Roman, significant for the process of construction and painting since the painters were working on scaffoldings and the fresco process involves starting at the top and working down. At all times the artist works on the scaffolding keeping his body automatically in an equilibrium and it is the artist and also the receptor of the work performed that must keep an equilibrium – the producer artist who works near the frescoes while the receptor will always see the fresco high up on the wall from afar. The artist is engaged with the representations of the frescoes not only visually but

also through touch, the tactility of his material encountering the wall surface. On the other hand the receptor from afar can only ever visually touch the representations and cannot decode the thickness of the representation. Interestingly, the gods – the materially intangible one might even say untouchable entities are perfectly placed up at the third register – beyond touch to maintain this immaterial integrity. It is exactly this relationship to the body that gives meaning through the body to this hierarchy.

Returning to the model I constructed (fig. 1.135, 1.36, 1.37), let us focus on the east wall. I placed small circular marks at 84 cm intervals – or materially close to twice the height of the vault – along the vertical axis of the wall. For the west wall, which would be the point of entrance, I substituted a piece of transparent Plexiglas. The question arose just where would I situate myself as a viewer. With the room as a mirror image, each side mirroring the other, and each side mirroring itself from end to end, a central position seemed logical. Therefore I also drew on the Plexiglas the same vertical central axis as on the east wall opposite, and at the same intervals proceeded to drill small circular holes so as to have points on the west wall, or Plexiglas, that corresponded exactly to those on the east wall.

As described earlier, I drew threads through each hole in the Plexiglas to correspond to, or line up with the drawn perspectival angles on the east wall. We can name these holes as angles of correspondence. How these angles correspond to the east wall are as follows: 1) the lowest angle of correspondence is at the approximate level of the navel of the proportionate ideal human standing at the entrance on the west wall and facing the east wall, with the navel marking the division between the Lower and Middle Registers; 2) the second point of correspondence puts us at the vertical extension of the ideal proportion representing a person facing towards the Middle Register and at the point marking the lower edge of the mythological scene of Ixion tied to the wheel of fire, in line with the still life paintings of offerings or libations situated below the window sills on which the mask of a tragic actor is positioned. These lines correspond to the angles constructed by the architectural detail in the upper left and right side of the window or alcove opening; 3) the third angle of correspondence is at the next navel centre moving upwards and intersects at the eye level of the painted figure of Zeus just above the hand he raises in a demonstrative gesture that refers

us to the justice dispensed on Ixion, and corresponds to the perspectival lines that mark the recession of the coffered soffit; 4) the fourth angle of correspondence puts us at the second vertical extension of the ideal proportion as we move up the wall, and marks the bottom edge of the upper register, which corresponds to the outer architectural perspectival angles of the aediculae containing the actors holding masks; 5) the fifth and final angle of correspondence occurs naturally once more at the navel centre of the third movement upward of the ideal proportion, and matches the eye level of Fortuna Augusta at the centre of the peristyle, accommodating the perspectival angles of the central field, a complex exedra or semicircular room fully open at the front.

It may be useful here to comment on the process by which the room's decorations were produced. In my opinion, the most probable method for constructing the pictorial compositions would have been for the painter – undoubtedly a master running an atelier or workshop and working under contract – to have set up a form of surveyor's sight lines in order to transfer a studio-designed drawing to the room's walls. To do so, a scaffolding such as I have mentioned before (fig. 1.138, 1.39) would have been erected, and a string would have been stretched from an apex corresponding to the formal structures I have just elaborated in the preceding paragraphs. From this apex (fig. 1.140), the string would be drawn taut to the salient points on the outline of the leading elements – the frontal forms – of the design. At each point, a painter stationed on the wall would be able to trace with a ruler onto the surface the perspective equivalent of the sight line as directed by the painter – we could call him a surveyor – standing at the apex and viewing the apparent angles of convergence resulting from the divergence of the string to its several points on the design. It would be a simple matter for the one painter to move the ruler until it lined up with the string from the viewpoint of the surveyor.

The method is probable, as I say, because I have used it in my own work for large and complex three-dimensional and two-dimensional constructions on glass. I have also applied this technique to creating anamorphic two- and three-dimensional constructions that functioned from the point of entry into the room³²⁷. I have found it to be a very efficient way of very closely simulating perspective (fig. 1.141). This is not to deny that experimentations

of other kinds were not underway, though we are left with little direction as to any of the methods employed at the time. Remarkably, Vitruvius relates no information as to the techniques of artists³²⁸; it is as though he himself had never observed them at work. This is all the more frustrating and strange, since he is able to speak about the process of building walls and can go into detail on the layering of the ground for fresco, the process of applying paint and the nature of the pigment used. Uncharacteristically, he betrays no hint of interest in the manner of applying perspective to images, instead merely referring back to the ancients with a very vague theoretical model. This vagueness suggests a lack of precision in Vitruvius' comprehension of Euclid's two books on optics and catoptrics. Paul Ver Eecke, in his translation of Euclid's Greek text into French, remarks on this inadequate refinement in Vitruvius' translation into Latin: "*Il est manifeste que les deux ouvrages sur les phénomènes optiques, qui nous ont été transmis sous le nom d'Euclide, sont d'un verbalisme moins châtié et d'une géométrie moins rigoureuse que les Éléments*"³²⁹.

A final observation may be made concerning the effects resulting from the angles of correspondence I referred to in my model on the perspective lines in the room. It appears that the receding angles directly in front conform to a shallower angle and those to the right and left to a steeper. The shallower angles correspond to a higher point on the vertical axis, the steeper angles to a lower point, much as one might experience in an elevator as it moves up or down. In fact, the best way to imagine one's perspectival relationship to the room is precisely as though one were being elevated up towards the heavenly sphere, bearing in mind that the proportions – and therefore the reference – is not to the actual or real visitors to the room, but to the divine proportions of the ideal human. This principle of elevation is implied as a property of sight in Euclid's Proposition 12: "*Of planes higher than the eye, the most distant one is seen as lowest*", a corollary of which would be that planes furthest left or furthest right of centre are at their most oblique angle, flattening towards a right angle as they move towards the centre. This feeds into his Proposition 13: "*Of those magnitudes distant from the eye and facing it, those to the right are seen [to move] to the left and those to the left are seen [to move] to the right*". It is also significant that in Greek theatre the 'gods' were mechanically elevated up or down as a part of the theatrical production³³⁰. In Roman

theatre, this same principle is accompanied by a similar elevation of the audience itself by virtue of the strategic elevation of the seating arrangement in three stages, each corresponding with one of the three floors, or stages of the theatre's *scaena frons*³³¹.

Having established a likely method for the conception and construction of the perspective positionings in the *Ixion* Room, I want now to turn to a discussion of the spatial configurations suggested by the paintings themselves.

Morphological coincidence

I want to clarify the reasons of why I am including the morphological coincidence in this section rather than under the heading of visual beliefs. The direction of the representation of the head directing the eyes of the mythological figures form in me the visual belief that they are directed towards each other. Acknowledging that I am also aware that their gazes construct for this viewer an implied spatial geometrical configuration within the actual space of the room connecting it to the pictorial space in which the figures are located. It is the understanding of the geometry underlying optics that this possibility is contextualized here. C.L. Raggiante in *Pittori Di Pompei*³³² speaks of the "morphological coincidence" between the directions of the gaze depicted by the figures and the geometric construction within the pictorial composition (fig. 1.142). A good example of this is represented by the gaze of the two actors on either side of Fortuna, their gaze being clearly directed towards her, and their positions significant for the maintenance of the mirror formation of the composition. It would seem, therefore, that there are two intersecting pictorial spatial constructions at play in the *Ixion* Room, both directly related to the active concept that the visual ray emanating from the eye apprehends the objects towards which it is directed. The one we have just described may be termed the mobile gaze of the ideal proportionate being who, like a sailor seeing afar the curvature of the earth, or like a god capable of traversing the boundaries of heaven and earth, exists simultaneously at different elevations of perception: an ideal being capable of conceiving and projecting the multivalent architecture of the pictorial projections³³³.

But additionally there is also the morphological co-incidence of the figures. Gods, actors, menads or other mythological characters construct a sub-plot through literal sight lines that connect them to each other within the otherwise independent compositions of the

painting's architectural framework. Emphasizing these connections of sight is the fact that the figures engage the space in which they are situated by being positioned obliquely, with the effect of cutting into the depth of the pictorial space to establish a *living* presence. But it is the directed gaze that is the clearest indicator of the *subtexts* in the storylines that are illuminated, one might say, by the perspectival framings pursued in the design of the room. And it is the subtexts – not the storylines themselves – that concern us here; as a consequence it is not the figures that are important but rather it is the network of connections they construct through the lines of their sight that animates the entire volume of the space and turns it into a minefield of intersecting rays of vision that arc across the room to finally implicate the viewers themselves within the skein of engagement. It is here that I find significant G.J. Kern's observation that Roman wall paintings were conceived as reflexive of the deep space *of the room itself*, its rectangular configuration³³⁴. For instance, in the upper register one can see – though the figures of Apollo and Dionysus are no longer legible – that Fortuna's gaze is directed towards Dionysus, and one can imagine that Dionysus in turn looks towards Apollo, and that Apollo closes the triangulation by returning the gaze to Fortuna. Triangulation, it will be remembered, is basic to the structure of Vitruvian proportions on which the rectangle of the room is based. While the paintings are degraded, the likelihood of this triangulated gaze can be extrapolated from the fact that the few remaining figures on either side of the gods, the menaeds or actors whose gaze is directed towards them, indicate just such a form of interconnection.

Moreover, the paintings in the middle register are relatively well-preserved, and here it seems fairly certain that from the east wall Hermes' gaze crosses to Dionysus and Ariadne on the south wall, while Hera's crosses to Pasaphae and Daedalus on the north wall; finally it seems arguable that Pasaphae's gaze directs us to Dionysus on the south wall to form a similar triangulation³³⁵. It is notable that no gaze in the south wall painting is directed away from itself, and this may be because, unlike the other paintings with their admonitions of crime and punishment, this panel represents a story of beauty and love redeemed: *a thing of beauty*, and a truth in itself. These narrative elements and the complexity of the interrelationships will be discussed more fully in the section on mythology.

Euclid's optics applied to the wall decorations

Euclid's theories of optics is an abstraction of the physics of light as it intersect with the physiology of the eye –visual apparatus and is expressed through geometric propositions. However as can be seen with Lucretius these geometric propositions are reinterpreted through Lucretius's visual beliefs, demonstrating how a concept as the abstraction and perception as visual belief play of each other. The artist likewise might refer to Euclid's principles of optics while at the same time referencing their visual perceptions-beliefs of what they are seeing. During the Roman period under examination here, there was no coherent pictorial spatial model of representation, one can assume that the artist depended on both.

So far the discussion has centred on the interlinked questions of elevation and perspective, both in positioning and production. Without necessarily leaving those matters behind, it is important to consider now several other aspects of the room, and again the model that I constructed opened up further possible glimpses into the methodologies available to the Pompeian artist. But it was a re-reading of Euclid through Elaheh Kheirandish's excellent translation of the optics that clarified for me key differences in the ten propositions that are glossed over in the versions usually offered as a summary of Euclid's work in this area. Kheirandish's³³⁶ version includes the Arabic and Greek as well, and offers annotations regarding possible additions and semiotic variations. An important consequence of this reading was that it enabled me to realize that Lucretius, in his phenomenological observations, was attempting to remove Euclid's propositions from their mathematical context and rephrase them as contributions to understanding physical and visual phenomena. For instance, in Euclid's Propositions Ten and Thirteen³³⁷. Proposition Ten – which states that "*right angle figures when seen from a far distance are seen as circular*" – in Lucretius' version becomes '*square towers at a distance appear round*', while proposition thirteen is restated as '*two parallel lines like the perpendicular sides of the colonnade*' from Euclid's "*For let there be two visible magnitudes [...] those to the right are seen to the left and those to the left are seen to the right*". In Lucretius' reference to the colonnade he states:

[...] When we gaze down a colonnade though the structure is perfectly symmetrical and propped throughout on pillars of equal height, yet it contracts by slow degrees in a narrowing cone that draws roof to floor and left to right in the imperceptible apex of the cone³³⁸.

But perhaps what struck me as most surprising in reading through the translations was the realization that Euclid's references to binocular phenomena, evident in the texts, has received to the best of my knowledge no comment in the literature on pictorial space. Yet this is an especially important aspect of the room's depiction of spatial dimension. In the references to this, both Kheirandish and Eecke agree in their translations of Proposition Twenty-Six and Twenty-Eight: Proposition Twenty-Six: *"When a sphere is seen by both eyes, and the distance between the eyes is equal to the sphere's diameter then that which is seen by the sphere is half its entirety"*; Proposition Twenty-Eight: *"When the distance between the eyes is smaller than a sphere's diameter, then that which is seen of the sphere is less than half"*.

Alcmaeon had already discovered that the eyes' individual optic nerves come together as one behind the eyes and continue on into the brain. In Proposition Twenty-Seven, Euclid states; *"When the distance between the eyes is smaller than the sphere's diameter then that which is seen is greater than a sphere's diameter"*. In this case the visual rays from both eyes, projecting on either side of the sphere move past the sphere and intersect in front of the sphere to form a point of convergence:

[...] Then I say that more than half of the sphere is seen. So let two rays BE, GD fall, and we draw them rectilinearly; then it is clear that their two ends meet in the same point because the sphere's diameter is smaller than BG or [distance between the eyes] so let the two ends meet at point Z³³⁹.

In each proposition he moves from a sphere with a centre A to a circle with a centre A as he describes the diagrammatic instructions (fig. 1.143). The model I constructed assisted me in understanding the basic principles that might have been applied in the formation of pictorial perspective. The complexities that became evident in working with the model became less confusing once I made the connection to Euclid's references to what we would call binocular vision. I will address this through the tradition of mirroring as well – itself generally evident in the symmetry of the room's layout, and most strongly emphasized by the

window-like alcoves – but here I will pursue it through a system of plotting circles on the general design of the east wall that could explain the slightly lateral dislocation of the perspective lines.

Vitruvius speaks of the circle and its centre as a basis for pictorial construction. It is clear under close examination of the design that there are two kinds of curves – an indication of the circles Vitruvius cites – within the composition of the east wall. There are in the lowest register two small painted circles of faux marble, while in the middle register there are two arching curves at the top of the alcove window opening. Finally, in the upper register exedra behind Fortuna on her throne there are several consecutive curves. To apply Vitruvius' statement, I began with the lowest register and proceeded first to draw in a circle of the same diameter as the two already there at the centre in line with and equidistant from them. The centre of this circle therefore coincided with the central vertical axis of the wall itself. I then repeated this circle as a series one above the other along the vertical axis until it reached the top of the Upper Register. This made the total height of the east wall 10 circles high, and I also established that the wall is exactly eight such circles wide. I discovered as a result that at a number of points there were exact coincidences or matches. Without going into an exhaustive analysis of these here, such matches included one between the seventh circle and the curve of the garland suspended from the centre of the entablature at the top of the middle register, as well as one between the ninth circle and the curve created by Fortuna holding a cornucopia and a dish for pouring libations: the width to the framing of Fortuna nicely accommodates this circle.

There is in addition a second, larger set of circles that can be extrapolated from the arc of the slightly arched windows represented to each side of the central mythological panel of the east wall. Locating the centre for this arc, I discovered that the diameter of the circle so formed was commensurate with Vitruvius' height of the ideal man. Taking this diameter, and with the floor as base for the circumference of the lowest circle, I proceeded to draw three of these circles up along the vertical axis and confirmed that they corresponded to the height of the room. Moreover, the curved top of the exedra behind Fortuna also matches the arc described by this same circle, evident when the compass point rests on the third circle's

upper circumference. Incidentally, Vittorio Spinazzola³⁴⁰, writing in a catalogue on the decorative arts of Pompeii, speaks of a curved space, similar to that seen here in the exedra of the east wall, that is to be found in the Casa dell'Ara Massima. Proceeding further, and employing the principle of morphological co-incidence, I used the eyes of the two figures flanking Fortuna Augusta as a centre for the compass and inscribed the same circle from these two points to find that these circles then approximated the height of the upper register, with each circle touching exactly the outside of the frame around Fortuna. Returning to the Middle Register and the two arched windows, I then inscribed as a circle for each the arc I had initially used to arrive at the circle's diameter and found that they both touched exactly the side edges of the mythological scene. I also found that the circle's diameter matches the width of the entablature to the inside line of the supporting *colonnettes*.

In all, it becomes clear the extent to which the design of the wall is governed by principles of commensurability established through the properties of circle and centre mentioned by Vitruvius. But the question that is begged is just how commensurability relates to vision, and whether the circles reflect anything more fundamental than merely playing on paper. Of course, the relation of the larger circles to the ideal proportions of the figure engages one such fundamental logic. Another, one somewhat difficult to apply, is suggested in Euclid's *objective* approach to optics, his view that there is a rational system to the external world that leaves our body's centrality with no fixed position in space. While the eyes permit rectilinear rays to project out towards objects in that external world, the position of the rays is dependant on the relative position of the viewer at any one time. But there is yet another, one that can be traced to both Euclid's propositions and Lucretius' observation, and that is the logic arising from stereoscopic vision.

On the Upper Register, the two larger circles with their centres established by the eyes of the two actors on each side of Fortuna – a tantalizing link to sight – form a narrow space between them reminiscent of parallax. Parallax is an innate function of the body's own symmetry, our *projection forward into the world as two lines of sight*. One could say that, in contradiction to modern photography or renaissance rules of perspective, our capacity for stereoscopic vision means that we experience two different visual fields simultaneously; we

exist, that is, in two disparate perspectives at any one time, and to anyone not coerced by our modern suspension of that fact, this would be obvious. In the *Ixion* Room, the two circles – in effect two eyes – that occur in each of the middle and upper registers represent the body itself, its visual symmetry. As well, in the upper register the positioning of the two actors on either side of Fortuna's curved space in such a way that their eyes are the centres of the two circles of vision producing the parallax invites us to recall both Alcmaeon's observation that the two optic nerves conjoin at the centre and Euclid's Propositions Twenty-Six to Twenty-Eight regarding the intersection of visual rays in front of the sphere.

In the Second Register, these circles as formed by the two arched windows allow a more generous space, but one that holds or suspends the mythological painting between them, a sort of third or mind's eye image as though *trompe l'oeil* vision were stretched to reveal a metaphoric vision, arguably one of even greater truth than that which is available to sight. The final aspect of the room's optical characteristics that I wish to consider is the mirror phenomena. The concept of pictorial mirroring is a crucial element in the *Ixion* Room's spatial dimension.

Generally, interpretation of the mirroring in spaces such as the *Ixion* Room has been based on the development of theatrical sets traceable to Dionysian rituals. Michael Walton's *The Greek Sense of Theatre*³⁴¹ makes a couple of interesting points that are relevant here. The early Greek stage was portable and had two side wings or *paraskenia*. While Thespis introduced a more permanent stone structure, Lycurgus developed stage settings suitable for mobility and versatility. The Roman world adopted both these aspects, investing them in a central columned stone facade of two or three stories, the actors entering through a central door but with the performance being acted out nevertheless in the *paraskenia*, constructed as columned porches with pedimented tops. The point is that the twin *paraskenia* produced the effect of a mirror or doubled view, the relation to parallax again evident. The relationship is important, and I would simply want to clarify that while the colonnaded structures of the Upper Register bear some distinct similarity to the stage, the window openings of the Middle Register offer themselves to this reference indirectly or by allusion, as for instance with the

presence of the actors' masks perched on the sills. Otherwise they lack any direct architectural elements, such as a pedimented roof, to suggest specific context³⁴².

The second interesting point Walton makes with regard to theatrical mirroring is that the actor is not isolated in space but defined by a relationship set up with the chorus³⁴³. All of this tradition is epigrammatically contained in the representation of the actors' masks sitting on the sills of the east wall in the *Ixion* Room.

Besides the matter of doubling, another significant effect of the mirror is its image reversal, and this can also be seen in the *Ixion* Room. Image reversal is explained by Plato as a consequence of internal and external fires causing at their point of coalescence a reversal of the visual stream, the effect of which is to reflect images so that the right side is left and left is right, or as Plato also suggests *like in a concave mirror* in his *Timaeus*³⁴⁴. In the latter, particularly the chapter on *memory and reminiscence*³⁴⁵. Plato speaks of the necessary relationship between vision and daylight that can explain the general importance of depicting windows as in the *Ixion* Room³⁴⁶.

Lucretius too was curious about mirror images, and the similarity they have with actual objects:

[...] There exists therefore flimsy but accurate replicas of objects, individually invisible but such that, when flung back in a rapid succession of recoils from the flat surface of mirrors they produce a visible image. That is the only conceivable way these films can reproduce such a perfect likeness of each other³⁴⁷.

What Lucretius describes is an idea of vision as forming physical images independent of perceptual mechanisms, an understandable position given Epicurean atomic theories³⁴⁸. If Euclid pictured vision as an active physical projection of the viewer navigating the space *towards the object*³⁴⁹, Lucretius saw vision as a passive experience of images flying *towards the viewer*. In either case there was a shared assumption that the earth rotates in a spheroid universe in motion, one in which the horizon line is mobile and proportionate to the position of the viewer – a view very much at odds with the static and planar assumptions of Renaissance in Europe.

If these early theories of picturing vision seem closer to subjective speculations, they nevertheless play an important role in the construction of pictorial imaging. In the course of over a hundred years of Pompeian mural painting from the decorations of the first style through to the fourth, it is obvious that painters re-thought the nature of representation. These decorations are not simply individual styles that accumulated to develop the fourth style; rather, they incorporated, adapted and extended their understanding of picturing and representation. *Euclid's theories of optics* – adopted even if only sketchily by Vitruvius – would have been a major influence and without doubt known and adapted by Lucretius in developing his own theory of vision. All of these would have contributed to the manner in which painters, and their clients, would have conceived their designs for, among others, the *Ixion Room*.

Catoptrics – Mirroring

It is clear from the writings of Heron of Alexandria, also known as Hero, a Greek geometer living around the same time as the destruction of Pompeii, that the matter of mirror reversal excited wonder as much as it might reflect a history of theatre staging. Hero studied optics at Rome and wrote on mechanical and physical subjects using examples similar to those in Euclid's treatises *On Divisions of figures* and *On the Dioptra* – a treatise on land surveying. Hero's treatise *Metrica* contains a geometrical proof for the expression of the area of a triangle in terms of its sides. Most relevant here, however, is that he divided the science of vision into three parts: optics, dioptrics and catoptrics³⁵⁰. Hero's belief in the visual ray as having a material nature, in line with Epicurean physical sensibilities, is well illustrated when he discusses the nature of mirrors. If for example a visual ray strikes any object, it becomes absorbed by the material porosity of the said object's surface. However, a ray cast by a mirror will, like a stone thrown against a solid wall, spring back. Like Euclid, he understood that the angle of incidence–reflection occurs at equal angles, and this is how he determined that rays proceeding from our eyes are reflected by mirrors³⁵¹. But for Hero the observation of mirrors also included his awareness and wonder at the right – left reversal.

[...] Clearly a science worthy of study and at the same time it produces spectacles which excite wonder in the observer. For with the aid of this science mirrors are constructed which show the right side as the right side, and similarly, the left side as the left side, whereas ordinary mirrors by their nature have the contrary property and show opposite sides³⁵².

If we look at the north and south wall of the *Ixion* Room, each wall is the mirror reversal of the other wall. This doubling or symmetry is in its most primary form related to that of the body, and while this may be a fact, the effect gives rise to fascinations bordering on the magical:

[...] we can see our own backs, see ourselves inverted, see ourselves standing on our heads, with three eyes, two noses, features distorted as in intense grief [...] Again who will not be astonished when he sees, in a mirror, neither himself nor another, but what we desire to see³⁵³?

Magic and wonder are properly the project of the sensual and the paraphysical. For the Stoic, magic is merely a distraction from truth. For the Epicurean, magic is the stuff of life, and it is perhaps appropriate to give the Epicurean position a final say in this section. The degree to which mirroring predominates in the decorations of the *Ixion* Room perhaps illustrates the Epicurean idea that objects – or the images within a painting – emanate simulacra, thin films of themselves that when projected forward to be deposited on the opposite wall become mirror images.

[...] No matter how suddenly or at what time you set any object in front of a mirror, an image appears. From this you may infer that the surface of objects emit a ceaseless stream of flimsy tissue and filmy shapes. Therefore a great many films are generated in a brief space of time, so that their origin can rightly be described as instantaneous. Just as a great many particles of light must be emitted in a brief space of time by the sun to keep the world continually filled with it, so objects in general must correspondingly off a great many images in a great many ways from every surface and in all directions instantaneously. Turn the mirror which way we will, all objects are reproduced in it with corresponding shape and colour³⁵⁴.

The wonder implicit in Lucretius' words reflects the magic of the simulacrum's mobility – an awe that inevitably has its dark side for those who prefer their truth straight up. The *Ixion* Room, a series of simulacra with its complex representations of surface and recess, indefinite spaces and mirror reversals across the north and south wall provides us with an

optical complexity that propels its pictorial dimensions into the relativities of time and space itself, folding the viewer into its elaborate web of intersecting narratives and stereoscopic moves. And that, to borrow from Euclid, is what I wished to demonstrate.

1.5.5 Mathematical beliefs

1.5.5.1 General context

[...] Then again, in the human body the central point is naturally the navel. For if a man be placed flat on his back, with his hands and feet extended, and a pair of compasses centred at his navel, the fingers and toes of his two hands and feet will touch the circumference of a circle described therefrom. And just as the human body yields a circular outline, so too a square figure may be found from it. For if we measure the distance from the soles of the feet to the top of the head, and then apply that measure to the outstretched arms, the breath will be found to be the same as the height, as in the case of plane surfaces which are perfectly square³⁵⁵.

This comment by Vitruvius on symmetry as an ordering function stemming from the human body, an internally referenced commensurability describing all its members, finds expression in Roman architectural space as an external geometry constructed by the body. The *Ixion* Room decorations are determined by the proportions of the body, principles of geometry of which symmetry is of particular importance.

In order to understand the methodology employed by Roman perspective in the *Ixion* Room, I shall first turn to Euclid's mathematics and optics, and then to the impact of his analysis on both astronomy and geography. It is in these latter experientially based applications of geometry that we can discover the mathematics of the *Ixion* Room's method of pictorial construction.

While mathematics is often closely affiliated with and incorporated into the field of science, I need here to separate out two subcategories of belief. Science is generally believed to research or investigate the physical world through inductive empirical reasoning. Mathematics, with its roots in Egypt and Mesopotamia, was based on both inductive reasoning and analogy. In Greece, from the time of Thales of Miletus around 580 B.C.E., mathematics became increasingly associated through analogy with the idea of pure reason. This method privileged deductive logic in an effort to stretch analogies obtained from

comparing particulars to generalized abstractions that could be seen as truths and universals. This development in mathematics was concerned with formulating definitions and explicitly stating assumptions that could become the basis of a rigorous logic by which to contemplate Truth, the Ideal and the Beautiful. The guiding purpose was to rise above the particular narrow view associated with the span of a single lifetime and the limits of each person's particular space. It was, in effect, an attempt to synthesize a Theory of Everything, and it took as its cue Form: if the form was logical, then it was beautiful, and therefore true; if it was not beautiful, it was neither logical nor true³⁵⁶.

It was with this kind of reasoning that around 295 B.C.E. the Greek mathematician Euclid, writing some fifty years after Aristotle, published *Elements*, setting out his founding axioms. *Elements* codified classical geometry and for the Hellenistic period represented one of the most important advances in the field of mathematics generally, including along with geometry, algebra and the mathematical aspect of vision.

It is clear that the mathematical beliefs that impinged on Roman understanding of themselves and their world were not of Roman origin. Rather, they must be understood as interpretations of Euclidean speculations. According to Morris Klein in his overview of *Mathematics in Western Culture*³⁵⁷, the prominent Roman Senator and Orator, Cicero, noted that "it was preferable that his country men were not dreamers as were the Greeks, but applied their study of mathematics to the useful". In fact, already during the Etruscan period and well before Euclid, the practical application of geometry is in evidence. The Romans learned a technique known as *limitatio* from the Etruscans, one that applied geometric principles for the purpose of establishing the boundaries of colonies. This technique divided the land into neat rectilinear grids irrespective of topological obstacles and created fixed regular and uninterrupted geometrical figures. Since there is no record indicating knowledge of the theodolite or dioptra, a portable water level for use in surveying³⁵⁸, it is possible that *limitatio* was purely a mathematical invention. The *Ixion* Room decorations divided the wall surface into discreet underlying enclosed geometrical forms.

Two other geometric figures played an important part in Etruscan culture. The Etruscan Circle of Divination was drawn on the floor of the elevated platform, the temple or *templum*

of the Sacred Space. This circle was divided into four sections and subdivided into sixteen sub-sections, with the four primary regions representing, in one section, the gods of fate and of the infernal regions, and in a second, the great celestial deities making up the northern hemisphere or *Pars Postica*. The other two quarters, the southern hemisphere *Pars Antica*, represented terrestrial gods and gods of nature. Each subsection represented the appropriate deities belonging to them. Within this circle the *haruspices*, or Roman soothsayers, would take up a position at the cardinal points in space, as John R. Clarke notes: [...] Clear definition of the axis in front of the platform and of the cardinal points to the right, left, and behind it formed the basis of reading the omen at the heart of Etruscan religion³⁵⁹. This early ordering principal finds its echo in the *Ixion* Room decorations with Fortuna or goddess of fate located in the most prominent position of the central wall on the Upper Register constructing the central axis of the room.

The second important and related instance of the application of geometry was therefore the practice of *extispicium*, the examination and interpretation of animal organs during sacrifice. The circumference of the liver was divided into a sectioned band, with the names of Etruscan deities engraved in each section. It is thought that the 42 divisions related to the regions of the sky³⁶⁰. The *Ixion* Room in itself is a complex of geometrical organization – horizontal bands, registers proportionally related, repetition of rectangles, squares, the use of circles and triangles – all of which are applied to making a relationship between the representations that became a mirror of the celestial and terrestrial subject matter.

While little is known concerning this, it seems that the Etruscans, and therefore early Romans, were quite familiar with a concept of lateral mirroring, one in which the events of the heavens were mirrored in terrestrial reality. In the *Ixion* Room, the mirroring of the right side of the wall decorations with the left side of the wall decorations echoes this mirroring, which reflects a determinism that privileged imposed geometric order above all else, quite evident when comparing Greek with Etruscan temple architecture. The Greek temple was freestanding, and the venerator was unrestricted in movement. As Klein adds, the Greek temple was small and completely visible to the observer, suggesting accessibility, finality and definiteness³⁶¹. The Etruscan temple, on the other hand, was placed on a high platform at

the rear of a sacred space that was enclosed and elaborated with an even higher platform and decorations, the tablinum, which drew immediate attention upon entering. Entering the *Ixion* Room there is in the presence of the gods high up on the Third Register a real presence of ritual and worship. The effect was to subordinate the individual to an order and a *symmetry* not only of the building but also, as Brendan Nagle writes:

[...] 'to the gods of the states who inhabited them' [...] the Romans early came to place the person in an orderly arrangement, symbolizing their belief that all people had preordained places in the scheme of life, places fixed by the gods and interpreted by the state³⁶².

In contrast, the Greek temples had neither this prescription nor a dominating visual hierarchy. The application of mathematics in the Roman period in question is to be found in the work of the architectural theoretician Vitruvius whose writings I suggest must have been available to the artists decorating the *Ixion* Room. He refers not only to the architecture, but he was also prescriptive about wall decorations and the material – the pigments – they employed. Vitruvius lists mathematics, history, philosophy, geometry, music and an acquaintance with medicine, astronomy and the theory of the heavens³⁶³ as areas of knowledge important to the study and practice of architecture.

It is due to Vitruvius that we know that the fundamental theories of Euclid's geometry dominated Pompeiian thought during the time in question. In his *Ten Books on Architecture*, he lists five principles the architect must engage. First comes *Order*, whose purpose is to give due measure to the parts of a work considered separately, and symmetrical agreement to the proportions of the whole. *Symmetry*, the second principle, involves the proper agreement between parts of the work itself and relations between the different parts and the whole scheme. This symmetry is present in the *Ixion* Room decorations, as I will demonstrate in the analysis. For this, Vitruvius gives the human body as an example – finding symmetrical harmony between forearm and foot, palm and finger and so on with other members. The horizontal divisions of the *Ixion* Room, for example, are related to the proportions of the human body. *Eurythmy* is the third principle, understood as beauty and fitness or adjustment of the various members, for which he suggests it is acceptable and even desirable to make small changes visually and not only mathematically, taking into account illusions and

distortions – although here he does not go into any detail. The geometrical proportions are approximate and appear to have been adjusted in the context of the *Ixion* Room. *Propriety* is the fourth principle, and stands for the perfection of a style, which itself must be authoritatively constructed according to approved principles of nature or in relationship to the presence and inclusions of gods. For example, a *hypeathral* edifice dedicated to Jupiter needs to have a space open to the sky or, as in the *Ixion* Room, a curved ceiling insinuating an open space and heaven in honour of Jupiter's command of thunder and lightning³⁶⁴. And finally, *Economy*, the proper management of the material site as well as the appropriateness of plans, taking into account whether the client is of modest means or wealthy.

Behind these principles are the mathematical, and specifically geometrical, assumptions of Vitruvius' rhetoric, and it is this that needs to be examined here:

[...] Geometry... teaches us the use of the rule and compass, and facilitates the planning of buildings on their sites and the truing of them by square, the level, and the plummet. By means of optics, again, light in buildings can be properly drawn from definitive quarters in the sky. It is true that it is by arithmetic the total cost of a building is calculated and measurements are computed, but difficult questions involving symmetry are solved by geometrical theories and methods³⁶⁵.

In the *Ixion* room there is a pictorial spatial dialectic between the projected pictorial space of the representation that is fixed, and the spatial apprehension of the actual space by the mobile viewer. Euclid concentrated exclusively on deductive reasoning. A brief outline of Euclid's main themes book by book can be found in the endnotes³⁶⁶. What these themes reveal is the *insistence* on symmetry, or Aristotle's propositions of commensurability, as a value that is good, beautiful, harmonious and universal, a position that is basic to Vitruvius as well. As I point out in the conclusion, commensurability – its importance to representations cannot be overstated – exists in the pictorial realization of the *Ixion* Room decorations between perceptual beliefs, visual being the dominant here, and conceptual beliefs. Even though Euclid's axioms were intended to be undeniable truths, the deep desire to privilege parallel or equal relationships is always present and, as Morris Klein points out, Euclid chose to work with static geometry rather than investigate the properties of changing figures³⁶⁷. Yet the artists adapted static representations to the changing positions of the original viewer or dinner guest in the representations of the *Ixion* Room.

Discussing the idea of discrete and continuous boundaries in his *Categories*, Aristotle states that everything is part of relationships with one another³⁶⁸. By *discrete*, he refers to those boundaries that can be contextualized, while *continuous* includes those that have no particular association. For example, a point is a discrete part of a line, whereas a continuous line is not a discrete part of anything but, being continuous, it just lies *somewhere*. What becomes clear is that for Aristotle what cannot be thought, argued, demonstrated or corroborated cannot be held in the mind and therefore cannot be defined: "*being infinite is a privation, not a perfection but the absence of a limit*"³⁶⁹. In the *Ixion* Room decorations, each discrete part – for example, a still life or myth – is limited by a frame. The set parameters dominating Euclid's mathematics have therefore to be understood in the context of Aristotle's universe, which is spherical and finite and with respect to which it is only *potentially possible* to imagine an infinity of divisions by which to measure the distance from the centre of the earth to the edge of the spherical universe. Since such a measurement cannot be held in the mind, however, in the Aristotelian conception of the universe there is no verifiability of the infinite, and it must remain potential only. The closest he will therefore get to the infinite, or *apeiron*³⁷⁰, is his suggestion of the *potentially possible* or *potentially infinite* as opposed to the actually infinite, writes Rudy Rucker³⁷¹. The concept of infinity can only exist when it is accepted that the movement or motion along a straight line that is not perceptible in its entirety is never complete. Vitruvius, a practical man, strives for conformity and control, puts his faith in the traditional Greek ideals of abstract principles underlying nature, and maintains propriety in the presence of the gods and associated myths³⁷². Morris Klein points out that the Greek tragic poet Sophocles (495-406 B.C.E.) felt that infiniteness and vastness were a curse upon mankind and that "*the concept of limitless processes frightened them and they shrank before 'the silence of the infinite spaces'*"³⁷³. In the *Ixion* Room decoration even the gods are framed by the architectural elements.

In conclusion, the infinite is imperfect, unfinished, and confused – the opposite to the concept of what is beautiful to the Greek mind: namely order, consistency, completeness and definitiveness as echoed by Vitruvius. In Aristotle this is also connected to his rejection of the concept of a *last generation* in which all generations would exist simultaneously in a

confusion of past and present. This rejection can be correlated to the atrium of the Roman house³⁷⁴, in which the coexistence of past with present generations was consequently always conceived as part of an emerging finite whole. There was no room here for a sense of infinity, just as from the entrance the vista of establishing points ending in the *hortus* offered not an infinity, but a discrete continuity.

1.5.5.2 Analysis of pictorial space in the First (Lower), Second (Middle) and Third (Upper) Registers

Euclid's mathematical speculations include three main themes that find their rehearsals in the *Ixion* Room. The first of these is the preoccupation with an *equilateral triangulation* evident in the arrangement in plan of the principle gods on the three walls – north, east and south – as points of an equilateral triangle formed by an imaginary semi-circle drawn on the floor and whose apex is centred on the east wall. This semi-circle is echoed or quoted in the arched ceiling that originally enclosed the room, which – rising above the gods seated in their temples – would have suggested the appearance of the open but limited Aristotelian universe assumed by Euclid. Seeing it through the eyes of Vitruvius who prescribed it, we can with a good measure of certainty say that this curved ceiling was intended to represent the spherical finite universe that is constantly in the process of completing itself. For the Epicurean Lucretius, a curved ceiling would never have been chosen to express his understanding of *infinite* space, a space in which Man's fate was infinitesimally inconsequential, and in the face of which sensual awareness was the only solution. Trimalchio, an exaggerated character of grand Epicurean proportions from Petronius' *The Satyricon* voices that emphasis in this little spontaneous poem while entertaining his guest to a grand dinner.

O woe, woe, man is only a dot:
Hell drags us off and that is the lot;
So let us live a little space,
At least while we can feed our face³⁷⁵.

Second, there is a Euclidean commitment to commensurability evident in the symmetrical mirroring resulting from the construction of the room's rectangle as two identical squares. Other commensurate relationships exist in the mirroring of the main

pictorial elements of the wall decorations on all three walls. Each pictorial space is represented so as to permit an imagined depth while simultaneously the trompe l'oeil lintels and crossbeams depict a visual interconnectedness. In the upper zone, the white background against which the temple structures are set represents a metaphor for the finite but undifferentiated space that is defined by Jupiter's Aristotelian heaven.

Thirdly, the perspectival construction along the vertical central axis of each wall with its different vanishing points can be related to Euclid's concept that along any line "of discrete moments", a *moment* or singular point is both in a relative position to other singular points while remaining in itself complete and finite. This is not unlike Zeno's Paradox³⁷⁶ in which all distances along a line are divisible with the result that there can never be an absolute point of arrival. In this process of deferral there is neither an absolute beginning nor an end, yet symmetrically all points are interconnected. Analogously, the Euclidean algorithm for magnitudes is arrived at by continually taking, of two magnitudes, the lesser from the greater. Should they prove to be commensurable, they will inevitably therefore also describe a finite or self-defining relationship that would be independent of any other relationship. On the other hand, should they after a number of steps prove not to be commensurable, they will be potentially infinitely incommensurable, therefore immeasurable, and also therefore inconsequent. Consequently, along the central vertical axis of each wall of the *Ixion* Room points related to the constructed illusion of advancing or receding objects – such as details of buildings – can, because each exists in a *discrete moment*, be set out according to the needs of the pictorial representation without regard for any absolute or *finite-less* picture of reality, the latter being inconsequent. Significantly for Roman perspective, and in contrast to post-renaissance conceptions of space, this concept of unity and symmetry as episodic visual perceptions establishes a shifting or *relational* rather than an – unimaginable – abstract condition or completion in the eye of the viewer. Classical thought in general sought perfection, and perfection can only be related to a closed or finite entity. Vitruvius articulates this nicely when he writes:

[...] Therefore, if it is agreed that [perfect] number was found out from the human fingers, and that there is a symmetrical correspondence between the members separately and the entire form of the body, in accordance with a certain part selected as standard, we can have nothing but respect for those who, in constructing temples of the immortal gods, have so arranged the members of the works that both the separate parts and the whole design may harmonize in their proportions and symmetry³⁷⁷.

This commensurability can be examined further. The *Ixion* Room's three walls strike a register of three, with the north and south walls divisible by two into the east wall, and with each wall divided into three different registers. The mirroring within each wall divides the whole into equal parts, which again produces commensurability. Moreover, since each architectural detail is echoed, there are no unique or incommensurable singular spaces; there is in fact a repetition and reflection of fantastical architectural interconnected illusions around the walls that are also connected visually across the space between the north and south walls, dividing and subdividing not only the pictorial space of each wall, but also punctuating the relationship between the viewer and the representations on the walls. This constant mirroring subdivides and organizes the physical space, positioning the viewer so that they not only glide across the repetitions on the visual surfaces but also find themselves caught in a kind of cat's cradle formed by the invisible grid crossing the space of the room.

Finally it is worth referring back to the three principle applications of geometry attributable to the Etruscans and early Romans: the equilateral triangle or pyramid, the laterally sectioned cone and the semicircle or hemisphere. How these traces of Etruscan culture fold into what we have seen as the Greek influence of Euclidean geometry can only be intuited. However, the Circle of divination with its equal divisions and equal representation given to the gods implies a set of two equal mirroring realities, heaven and earth, both within and without the circle. One can speculate that the laterally sectioned cone with its apparent hierarchy of divisions from base to apex, reflecting the four quarters of the heavens as a hierarchy of divinities, could bear a distant relationship to the different registers of the *Ixion* room with its subterranean or oceanic region below, its terrestrial region at the centre and the celestial sphere above capped by the original arched ceiling. What can clearly be seen from the third century B.C.E. Etruscan bronze model of a sheep's liver found in

Piacenza, Italy,³⁷⁸ used by the *hauruspices* for *extispicium*, or interpretation of signs, are the shapes of a pyramid – formed by an equilateral triangle – a cone, and a hemisphere, which together recall in the *Ixion* Room the triangulation of the gods, the spherical suggestion of the ceiling and the implied cone of vision supplied by the design of the room as having only three walls, as though the entire room is a *projection* from the west wall. These three elements, if indeed echoes of Etruscan divination, suggest a mystical element now lost to history.

1.5.6 Medical Beliefs (concerning the body)

1.5.6.1 General context

Since the premise of this thesis concerns the relationship that the body has to pictorial space through its cognitive faculties, it is centrally important to consider beliefs that informed Roman thought on the nature of the body, its anatomy and physiology. Much of this thought was inherited from Greek sources. Roman medical practice and research was only formally established in the period between 60 B.C.E. to 50 A.C.E. Charles Singer, in his *History of Anatomy*³⁷⁹ notes that a medical school was founded in Rome by Asclepiades of Bythnia around 60 B.C.E., and it was he who introduced the atomic views of Democritus (425-350 B.C.E.) into Roman medicine. This view contributed to a dramatic change in how the body, and its structure of matter, was integrated into rational explanation designed to link natural processes with divine creation as *a deliberate constructive activity of a craftsman*³⁸⁰. By 14 A.C.E., towards the end of the Augustan period, the personal followings of individual physicians were forming medical colleges, and these became further organized under Vespasian between 70-79 A.C.E. There are only two Roman works, both from outside these professional organizations, that give information on both the anatomical and medical knowledge of Roman pre-Christian society: Cicero's *De Natura Deorum* from 77 B.C.E., and Lucretius' *De Rerum Natura* of 60 B.C.E. There are additionally fragments of texts by others, such as the historian Celsus from 30 B.C.E. and the Greek medical doctor and researcher Rufus, 60 A.C.E., who studied in Rome. But before giving a more detailed analysis of their understanding of the body it is important to introduce the central themes prevalent in previous medical research and knowledge that influenced their writings and help

explain certain contradictions in Roman medical beliefs. What is also important is that they provide as well an important context by which to approach Euclid's analysis of optics in relationship to the application of geometrical axioms.

Roman medical knowledge about the body was largely based on earlier Greek accounts, especially as formalized by the anatomical teachers Herophilus and Erasistratus (fl. in the first half of the third century B.C.E.) Their research was disseminated through the medical and anatomical research located at the Museum Library Research Centre of Alexandria³⁸¹. These accounts naturally included the work of Hippocrates, founder of the formal study of medicine (ca.460-370 B.C.E.), who first separated medicine from philosophy by observations and inferences intended to free his judgment from the biases of preconceived ideas. This led him to the view that sensations of pleasure, pain and emotions were generated by the brain. Hippocrates, however, did not practice dissection, instead relying as a practitioner on theoretical speculation, a mode of inquiry that tended to limit his analysis to common-sense interpretations of natural cause. This lack of a research element in Greek knowledge of the body became characteristic of Roman theory and practice as well.

However, dissection *was* fundamental to the physician Alcmaeon's (ca. 450 B.C.E.) investigations into both the optic nerve and the primacy of the brain. Alcmaeon, according to Charles G. Gross in his book *Brain, Vision, Memory*³⁸², described the optic nerves as coming together behind the forehead in what is known to us as the optic chiasm³⁸³, a fact that suggested to him why the eyes move in unison. More significantly, Alcmaeon also concluded that the optic nerve was a light-bearing path from the eye as light-emitter to the brain as light-receptor, and he found confirmation for this through the familiar experience in which a blow to the eye makes us 'see stars', giving the impression that the eye itself contains light or fire. These observations became the basis for his theory of vision in which a ray of fire, or light, streams out from the eye to apprehend objects of the world visually before passing that light through to the brain. It's worth noting that this theory proved persuasive enough to persist into and beyond the Roman period and through the Renaissance³⁸⁴.

A third significant influence on Roman concepts of the body lay in the work of the philosopher Democritus, a contemporary of Plato, who introduced his theory of atoms as the

basis by which to understand not only the workings of the universe but also more specifically the workings of the body. His theory of atoms stated that everything is made up of atoms of different sizes and shapes. These atoms, he speculated, come in a variety of weights: the lightest, fastest and most spherical atoms made up the psyche – the soul, mind and vital principles – and while dispersed throughout the whole body, they are most numerous in the brain. The coarser atoms, on the other hand, are concentrated in the heart – the centre of emotions – while the coarsest atoms concentrate in the liver, the seat of lust and appetite³⁸⁵. Democritus also formed a theory that reduced vision to the sensation of touch, basing this on the observation of reflections or images mirrored in the cornea³⁸⁶. The question he posed was: How can the simulacra of one thing pass through another? This conundrum was eventually resolved by the Roman Epicurean Lucretius, whose speculation of very thin successive veils or films lacked any empirical observation³⁸⁷.

Democritus' theory of atoms influenced Plato (427-347 B.C.E.), whose hierarchical division of the soul into parts later became part of the Roman physician Galen's (129-199 A.C.E.) theory of medicine which posited three parts to the human constitution or pneumas of humoral physiology: natural spirit, vital spirits, and animal spirits³⁸⁸. While Plato's work generally falls into the category of transcendental philosophical beliefs, he nevertheless contributed to the growing anxiety surrounding the interpretation of the body. As Singer points out, Plato was responding to a search to justify the form and structure of all organs in reference to the function for which they were believed to be destined³⁸⁹. In *Timaeus*, Plato addresses the human body not as a material empirical enquiry but rather as a problem of creation:

[...] Living Creatures. (b) The human soul and body. Address to the gods, who are to have the task of framing a mortal body for the human soul, which is to be immortal and created by the Demiurge himself [...] In order that there may be mortal creatures and that the whole may be mortal creatures and the whole may be truly whole, turn your hands, as is natural to you, to the making of living things, taking as your model my own activity in creating you³⁹⁰.

Plato set out to understand the human body as part of a microcosm paralleling a macrocosm or Greater World, developing his anatomical reflections in relationship to these parameters.

[...] The human body: head and limbs. They copied the shape of the universe and fastened the two divine orbits of the soul into a spherical body, which we now call the head, the tiniest part of us which controls all the rest; they then put the body together as a whole to serve the head, knowing that it would be endowed with all the varieties of motion there to be³⁹¹.

By subordinating the function of the eye or sight in astronomical observations to the authority of the Divine and divine principles, Plato affected how the body as a whole began to be understood as an integration of the immaterial into the material status of the body's physiology³⁹². This is well illustrated from a passage in Plato's *Republic* on the dual status of sight.

[...] These ornaments of heavens...should be thought to be the most beautiful and to have the most perfect nature amongst visible things [...] are moved in relationship to each other, wherein they also move that which is within them, which matters to be apprehended by reason and understanding, but not by sight³⁹³.

Plato insists on vision in an idealized state, not in what he considers a degraded second-hand reality likened to the shadows in the cave, but rather in terms of *real vision* beyond the pragmatic as in the ascent from the cave to the sunlight:

[...] and that stage in the world above when they are still unable to look at animals and plants and the light of the sun, but can look at the divine reflections in water and the shadows of real things, instead of the shadows of images thrown by light...It leads what is best in the soul up to the vision of what is best in things that are, just as in our simile the clearest organ (soul) of the body was led up to the vision of the brightest object in the bodily and visible world³⁹⁴.

The body thus becomes transformed into an instrument of seeing permeated by the soul, a singular connection to the apprehension of the *best*, or uncorrupted and divine reality, and becomes a model of universal knowledge, fusing the conceptualization of the body as a material substance involving medical or anatomical knowledge to its conceptualization as a site of theological and ideological speculation. Plato's legacy to Roman culture is to render the material body immaterial, a poor cousin to its idealized Other. In this sense Plato constructed an opposition to the empirical aspects of natural science, an opposition which dominated European thought until the twelfth century when Aristotelian scientific investigations first made their appearance.

Despite Plato's enormous influence, an empirical approach to the body was for a while still maintained by Empedocles (490-430 B.C.E.) of Sicily, credited by Galen as the founder of the Italian school of medicine. Empedocles reversed the primacy of the brain. In his publication *On the Heart*³⁹⁵ he wrote on the pneuma or the Humoral physiology and taught that blood is the medium of thought, and that degrees of intelligence depended on the composition of the blood. He also believed that the sense organs are adapted to receive the effluxes from bodies around them and that perception is its consequence³⁹⁶. For Empedocles the heart, not the brain, was the organ of consciousness.

Plato's influence on Roman culture was equaled by Aristotle (384-322 B.C.E.). Like Empedocles, Aristotle maintained that the heart was the seat of intelligence – since it was the hottest and richest organ in the body – while he considered the brain's primary function to be to cool the heart. Nevertheless, he commented that although generally agreeing with Empedocles, he made no distinction between perception and thought.

Charles Gross lists a summary of Aristotle's arguments³⁹⁷ for the primacy of the heart, and for these Aristotle drew primarily on his observations of embryonic development.³⁹⁸ Aristotle's conclusions take the form of oppositions, as in hot versus cold³⁹⁹. His assessment of the heart follows a premise that it is an organ

[...] that is affected by emotion and that all animals have a similar organ. [...] The Brain on the other hand is not affected by emotions⁴⁰⁰ [...] And of course, the brain is not responsible for any of the sensations at all. The correct view (is) that the seat and source of sensation is the region of the heart. [Aristotle: (PA 656a)] [The heart] is specially the organ which enables us to think, see, and hear, and to distinguish the ugly and the beautiful, the bad and the good, pleasant and unpleasant⁴⁰¹.

The importance of the heart and the blood that flowed through it causing emotions can be identified with the intense red coloured field that frame the emotively charged myths of love passion and betrayal at the centre of the Second Register of the *Ixion* Room decorations.

Aristotle's assumption was a contestable one, however, and at Alexandria around the year 300 B.C.E. Herophilus of Chalcedon, a founder of the Alexandrian school of anatomy, was also one of its first to perform post-mortem public dissections. He isolated the brain as

the centre of the nervous system, and researched the sinuses, especially the eye, on which he wrote a treatise *Of the Eyes* and one *On Anatomy*⁴⁰².

At around the same time, Euclid also opened a school at Alexandria, where amongst other works he wrote his treaty on Optics. It is worth noting, therefore, that while Euclid did not consider optics from the position of making paintings, he must have been highly aware of contemporary research on the eye and on theories of vision.

A generation later (about 260 B.C.E.)⁴⁰³ Erasistratus of Chio began also at Alexandria to carry out a systematic study of the structure of the human body with open dissection facilities.

Unaccountably there is little known of any development of medical practice and research between this time and 30 B.C.E. Closer still to the Pompeiian period under investigation are the medical records of the Greek anatomical writer Rufus of Ephesus⁴⁰⁴ practicing in Rome. Rufus also studied at Alexandria in about 50 A.C.E., where he had naturally gained from its history of anatomical research. His principle contributions include completing the nomenclature of body parts and the skeletal framework begun by Celsus. Again there is a strong preoccupation with the anatomy of the eye and its structures. He was also remarkable for attempting to base the whole of pathology on anatomy and physiology.

Finally, as a footnote to the debate between those who saw the body in terms of an ideological attachment to grand design and those who took an empirical approach to the body's functions, it is worth noting that Rufus' work on anatomy and physiology was adapted by Galen in such a way as to render it subservient to a doctrine sympathetic with early Christian thought, a teleological doctrine which sought to justify the design of the organs as perfect for their functions as a means of establishing a relationship of the body to *a kind of theses of final causes*⁴⁰⁵.

1.5.6.2 Analysis of pictorial space in the First (Lower), Second (Middle) and Third (Upper) Registers

In examining the *Ixion* Room in terms of Roman concepts of the body, it is useful to begin with just this intent – not only to examine, but also to equate the nature of the body with a

teleologically constructed belief in purpose. In Pompeii at the time of the *Ixion* Room, this desire camouflaged the fusion of empirical medical observations of the body with Epicurean ideals, a fusion of science and religion that informed Pompeian folk beliefs.

Plato's concept of a greater order of creation was mirrored in the greater order of the Roman state. With respect to medical beliefs, this ordering contributed through anatomical nomenclature to establishing a hierarchy within the body. This hierarchy was expressed as an order of value that not only gave primacy to the heart over the brain, but also involved the concept of spirits: natural spirit, animal spirit and especially the vital spirit, this latter elaborated into a higher type of *pneuma* frequently associated with the soul. Along with this idealist conception, it is important to recognize the degree of anatomical investigation conducted on the body. Particularly interesting for a pictorial evaluation of the *Ixion* Room is the importance placed on understanding the organ of sight, as in Celsus' selection of the optic nerve as primary. It seems safe to assume that while much folk belief played a role in the way the body was understood, as it frequently does today, a more scientifically-based knowledge of the body and of vision would have been available to the artists of Pompeii. This assumption is supported by a study of the visual complexity of the *Ixion* Room and the implementation of pictorially original solutions to what were at the time difficult pictorial problems. The layered pictorial spaces of the *Ixion* Room (fig. 1.112) with all their internal contradictions are witness to the impulse that struggled to synthesize physiology with ideology, the microcosm with the macrocosm and the particular with the greater order. The artists here appropriated every part of the wall's surfaces of the triclinium, pushing its pictorial possibilities to the limit. In this we can distinguish that impulse to name and collect that we have seen in Roman religion and in the Hellenistic schools of anatomy, along with the competing impulse to determine a role that each played in the meaning of the whole.

As with the history of anatomy in this period, various pictorial traditions coexist in the room as the traditions of previous styles are extended and given collectively greater emphasis and renewed meaning. From an architectural perspective, the structure of the room's paintings amounts to a play of exterior and interior spaces. From an anatomical point of view, however, there is notably an inversion of internal to external, as though the body were

laid open, with the interior structures rendered as a series of glimpses suggesting an uninterrupted continuity through the alcoves on the middle register of the east wall to link with the north and south walls. This anatomical integrity is extended by the representation of a symmetrically arranged open roofed colonnade that extends the illusion behind the entablature supporting the red central panel on the east wall.

But this essential integrity can only be glimpsed. There is a constant pictorial challenge in the interlocking of flat and deeply illusionist space, as in the interplay between the large barely recessed red central panels enclosed by an entablature, or again in the totally flat white panels situated on the slightly larger red field that constructs its borders, with the deeper and less defined space of the alcove windows on both north south and east wall. As well, the windows on the north and south wall, whose colonnade of lintels and columns continue behind both the central red panels and the large white panels, seem to connect with the colonnaded structures on the east wall. It is as though, like the anatomist – or the priest-astrologer, since the roles of naming and predicting were not yet disassociated – the relationship between the facts of the body, its namable elements, and the organization of the body as a larger order remained obscure, a matter of contesting visions in which the urge to derive a form of truth inevitably transcended the resistance of conjecture. One is reminded of something Vitruvius notes in the introduction to Book III:

[...] Apollo at Delphi, through the oracular utterance of his priestess, pronounced Socrates the wisest of men: Of him it is related that he said with sagacity and great learning that the human breast should have been furnished with open windows, so that men might not keep their feelings concealed, but have them open to the view⁴⁰⁶.

Significantly, it is in the architectural elements of the Middle and Upper Registers that these glimpsed fragments of roofs and arches present a sense of a totality of the room-as-body that contains the trace of a commitment to an ideologically inspired motivation. The illusionist space of the mythological paintings, however, represents a very differently located pictorial space. Their appearance on the red panels at the centre of each wall is no longer a direct engagement with the anatomical space of the room. On the flat red plane they assert an internalized narrative set apart from the complex set of architectural elements – beams,

lintels, capitals and columns – visible in the six alcoves or window-like openings of the Middle Register.

These openings, like organs exposing their mechanical functions, are very different from the Upper Register with its protruding pavilion-like structures or aediculae modeled on temple façades and similar to *scaenae* and *frons* – the stage-building of the Roman theatre. What characterizes the upper register's realm of the gods in the transparent continuity of architectural devices, open to the sky, is a reminder to the viewer of the anatomical concept that lighter finer atoms contained the soul and the brain, while in the Lower Register the heavy and coarser representation of earthly material – in this case marble slabs with minimal illusionary space – can be said to represent the coarsest atoms and lack of spatial definition. Space, air, lightness and heat have superior qualities to dense, heavy and cold, as the underworld differs from the world of the living.

The Second or Middle Register in which the mythological panels are situated is dominated by a red oxide colour that reflects the centrality of emotions at the “heart” of human tragedy where animal spirits mix with vital spirits – where Pasiphae's lust drives her to mate with the Sacred Bull to beget the Minotaur; where Ixion mated with the phantom Hera who bore him the son Centaurus, father of the Centaurs. There is here a clear understanding of the incompatibility of species (fig. 1.144).

CHAPTER TWO

The Cycle of Saint Francis, the Bardi Chapel, Basilica di Santa Croce, Florence

Giotto (Ambrogio Bondone, detto), Frescoes, 1337

2.1 Santa Croce – The Bardi Chapel: general context

The Bardi Chapel is situated within the Basilica of Santa Croce, a late thirteenth century church in Florence at the corner of via Magliabechi and via di S. Guiseppeon that forms the north western corner of the piazza of Santa Croce. The church is impressive for its size and for the rawness of its exterior stonework, a rawness relieved only by the decorated white marble facade it finally received only in the 19th century¹ (fig. 2.1, 2.2).

The church was built between the thirteenth and fourteenth centuries. From the historical notes it seems that the original building was the adjoining monastery, whose main Cloister was built around 1220 by the Franciscans in what was then the poor area of the City of Florence (fig. 2.3). The monastery soon became the centre of social interaction and local activity, promoting the stability and growth of the community around it. In 1262 an adjoining piece of land was bought, as noted in Villani's chronicles², towards the future construction of a Basilica. This Basilica³, now known as Santa Croce, was officially established in 1294 and became the new church of the Friars Minor of Florence. The original design has been attributed by Vasari (1511 – 1574) to the most likely candidate, namely Arnolfo di Cambio (1245 – 1310) who is known to have designed the Palazzo Vecchio. By 1320 the new church was almost completely functional and finished except for the facade⁴. The architectural style of this church deviates from the gothic ideal despite such gothic attributes as stone-brick vaulting of the ceilings and tall stained glass windows. Ideally, its structural form was intended to give the building its decorative richness, but this has been subverted by the large and pervasive frescoes that decorate almost every surface of its walls and consequently obscure its structural integrity.

As one enters the Basilica (fig. 2.4) through the main doors on the via Magliabechi, one's gaze is directed down the longitudinal narthex or nave (fig. 2.5). This central isle terminates at the transept and is approximately 115 meters long, 38 meters wide and 73 meters wide at the transept. The 'T' shape of the church was probably inspired by St Francis' absorption with the Greek letter Tau, symbolic of the cross on which Christ was crucified⁵.

In traversing the nave you are following a path that leads not only to the high altar and the sacramental conjoining with the body of Christ, but one that is intended also as a passage to the enlightenment and knowledge of God⁶. It is in this spirit of communion that on either side of this path's journey through the centre of the church there are located five intimate chapels, three of which are decorated with narratives that speak to this path of enlightenment. These chapels were sponsored by prominent and wealthy patrons of the church, who paid for their decorations. This included choosing the artists and their workshops as well as the subject matter to be represented. Several examples are present in the Basilica. Apart from the Bardi itself, there is the Velluti Chapel to the extreme right of the right hand wing of the transept. In our imaginary walk towards the high altar, imagine that you have turned right at the transept, the 'cross' on the Tau, and found yourself at its end. Here you will find the Velluti Chapel to be decorated with frescoes illustrating on its right hand wall, the *Victory of the Archangel Michael* and on the left hand wall the *Apparition of the Bull of the Gargano* executed by a pupil of Cimabue known as "Master of the Velluti Chapel". To its left, on the walls of the Calderini Chapel the Riccardi family commissioned a seventeenth century painter, Giovanni di San Giovanni, and his workshop to execute a large painting of the *Ecstasy of St. Francis* for the right wall; in addition, they commissioned a Venetian artist, Domenico Passignano, to make a painting representing *St. Lawrence Giving Alms*. Further still to the left is the Giugni Chapel containing the tomb of Julie Clary Bonaparte and a monument to Charlotte Bonaparte. The two adjoining chapels that complete the right side of the transept and bring us close to the high altar are first the Peruzzi Chapel and secondly the subsequent Bardi Chapel next to it and holding the most prestigious location immediately to the right of the altar. Both these chapels are decorated with frescoes by Giotto di Bondone, and it is Giotto's work that is our subject here.

In approaching the Bardi Chapel, it should be remembered that Saint Francis was the co-titular saint of the church, Giotto an respected artist, and the Bardi family represented a distinguished patronage⁷. While Giotto frescoed three chapels in the Basilica of Santa Croce, the decorations of the third chapel – the Tosinighi-Spinelli Chapel, now called the Sloan Chapel – have since completely disappeared. In fact, the frescoes in both the Peruzzi and

Bardi Chapels where whitewashed⁸ in the eighteenth century and only rediscovered in 1852. At that point it was discovered that parts of the frescoes were missing due to two tombs having been installed on either side at a later date. As a result, the frescoes were 'completed' by a painter called in at the time. It was only in 1960 that restoration work in both chapels removed the nineteenth century paintings, leaving Giotto's original work unmarred by later additions. While there have been questions as to the authenticity of some frescoes' attributed to Giotto, the authenticity of these two chapels is undisputed and apparently remains the legacy of Giotto's mature work, in which both innovations of form and content confront the viewer with a mature gothic humanist sensibility⁹.

This chapter's investigation into the history of pictorial space will examine Giotto's Bardi Chapel for its spatial conception of the frescoes within the Bardi Chapel itself and their relationship to the fresco of *St Francis Receiving Stigmata* pivoted just above its entrance.

2.1.1 The Bardi Chapel and the Franciscan Order

The very existence of Giotto's frescoes attest to a struggle that divided members of the Franciscan Order, one that involved diametrically opposed points of view on the matter of material life. This struggle found a focus in Santa Croce, considered the most important Franciscan Church in Florence in the thirteenth century¹⁰. The decision to build and visually elaborate the Basilica as an addition to the original main cloister is witness to this internal politics splitting the order itself. Rona Goffen, discussing the life of Saint Francis and the Franciscan Order in the middle of the thirteenth century, writes of this confrontation as two opposing factions, the Spirituals – who were opposed to any material elaborations, whether clothing, domiciles or churches – and the Conventuals, who sought to celebrate Saint Francis' mission. Goffen notes that *tragically, the source of their disagreements lay in the character of Saint Francis himself*¹¹. whose ambivalence with respect to modest imitation of Christ's simplicity on the one side and emulation of his own exemplary persona on the other side split the Order into these two factions. Since the Spirituals remained deeply opposed to the building and elaborate decoration of the Basilica, responsibility for building the church consequently lay with the Friars Minor, who represented the Conventuals.

Giotto's task, given the controversial nature of the entire enterprise, was therefore fraught with visual complexity. Moreover, there is a deeper history to this interlocked theme of imitation and emulation, one to be found in the very nature of the painting of the medieval Icon. The art historian Hans Belting, in *Likeness and Presence*, writes that "*The making of many replicas of icons in the Middle Ages reflects the belief that duplicating an original image would extend its power*"¹².

The Icons of Saints and venerated holy individuals were treated and approached with the same reverence as would be shown them were they still living. Thus it was only natural when Saint Francis died in 1226 at the age of forty-five that the Franciscan Order – and particularly the Friars Minor – would practice a veneration that could be likened to a personality cult. All the more so since Saint Francis himself – by receiving the wounds of Christ's Crucifixion – participated in the ultimately ambivalent act of veneration and physical imitation inherent in emulating to an astoundingly literal degree the narrative and symbology of Christ and his Apostles. We know from the history of iconoclasm that the lines between imitation and emulation are very fine indeed, and this will be examined later on. The literal quality of this imitation, which may seem peculiar to a modern consciousness, reflects a fascination with mirroring that was perhaps a logical response to the overwhelming significance of a relationship between Man and God defined as one between an inevitably fallible likeness and its model.

O truly the most Christian of men,
 who strove by perfect imitation to be conformed
 while living to Christ living,
 dying to Christ dying
 and dead to Christ dead and deserved to be adorned
 with an expressed likeness¹³.

This constant mirroring, whose purpose was to articulate and extend the sense of authority invested in the model – be it a myth, a personality or indeed any act and its meaning – resonates as though with a long deep echo in the extension of pictorial space to be found in the Giotto frescoes, the subject of this chapter, and resonates as well in the defining literary work of the period, Dante's *Divine Comedy*. It is therefore illuminating to consider the Chapel in the context of Dante's work.

2.1.2 The Bardi Chapel and Dante

O Light Etern, who dost thyself include,
 who lovest, smiling at thine own intends,
 self-understanding and self understood!¹⁴

Particularly relevant instances in Dante's *Divine Comedy* written in 1310 – when the Basilica was half completed – focus on the potential increments of an ever-increasing presence of an exemplary life that extends its own power not only through the significance of that life's work, but everlastingly through an accumulating presence conferred on it, but also derived from it, by those who follow in its path¹⁵. Dante writes about the fame of the painter Cimabue, Giotto's teacher, whose fame Giotto extends but also appropriates. Inherent here is therefore also in development a theme of Progress that goes hand in hand with emulation.

O glory of the human powers, how vain,
 How little green may at the top endure,
 Unless rude after-ages supervene!
 In painting Cimabue held secure
 The field and now is Giotto in request,
 So that the other's fame is grown obscure.
 So did one Guido from the other wrest
 The palm in language; there may be, who knows!¹⁶

As we will see, the theme of progress – progression in its sense of ascension – extends to questions embracing the body, philosophy, mathematics and geometry, and becomes important to this investigation of the period's belief structures. It is significantly that Dante, in what are nearly the last lines of his *Divine Comedy* – in the *Paradisio* – is pre-occupied in his thoughts with the question regarding the extension of the power of a circle, multiplying or squaring by multiplying–squaring it. Benno Artmann writes of Dante's sense of urgency at this time that a method be found for squaring the circle in order to open a way to the secret of the natural divine order¹⁷. In fact, the circle in the *Divine Comedy* as a symbolic form moves in ascending order from the *Inferno* (the fourth to the thirty fourth Canto are titled as Circle one to Circle nine) – ascending, that is, from Lucifer to light¹⁸. The ultimately point of progress is *Paradise*, Love's circle circumscribing two worlds in the meeting of Dante and Beatrice¹⁹.

That circling which in thee seemed
 effluence of light reverberated, by my view
 Surveyed awhile in its circumference,
 Within itself of its own proper hue,
 Seemed painted with the effigy of man,
 whereat my sight was wholly set thereto.
 As the geometer, intent to scan
 The measure of the circle, fails to trace,
 think as he may, some feature of the plan,
 Such I at the strange vision of the face:
 how the image fits the circle, fain aright
 Would I perceive, and how it there finds place²⁰.

The existential importance attached to squaring the circle (fig. 2.6) can be clearly seen in the geometric nature of the gothic arch of the chapel, articulated as the intersection of two overlapping circles. Robert Lawlor's *Sacred Geometry*²¹ draws attention to the division of a circle into two parts, which in their overlapping form contain the square root of a divided surface or the image of the *vesica*, the major thematic source for the architecture of the Gothic cathedral. This is reflected also in a medieval zodiacal sign of the *Vesica Piscis*, which in one instance in a bas relief contains at its centre the seated figure of Christ with the marks of the stigmata visible on both feet: Christ as fish and the universal symbol that joins heaven and earth. All this clarifies the cultural landscape for Saint Francis' emphasis on *the study of the natural world as leading the soul to God, its creator and ruler*²².

As with Saint Francis and Dante, Giotto too employed the circle in search of Divine Form. From Vasari's *The Lives of the Artists* we even have this anecdote concerning Giotto's demonstration of competence requested by the Pope. "Giotto [...] took a sheet of paper and a brush dipped in red, closed his arm at his side, so as to make a sort of compass of it, and then with the twist of his hand drew such a perfect circle that it was a marvel to see"²³.

Giotto's act can in this light be seen to be more complex than the simple perfection of the circle. It was far more importantly a symbolic act, an intellectual proposition one might say, that takes up the theme of extending man as the centre of duplication, imitation, multiplication or division. This theme plays an important role in the pictorial spatial relations not only of the fresco of *Saint Francis Receiving Stigmata* outside and over the Bardi Chapel

in its relationship to the frescoes within it, but also in its extension to the position of the viewer²⁴, a matter hinted at by John White in speaking of the relationship between the viewer and the chapel²⁵.

An important event under consideration in Giotto's life is the claimed friendship of Giotto and Dante. Although there is only a single statement of their friendship by Benvenuto Rambaldi to Imola, friend of Dante's son Pietro, other references place them in the city of Padua around the same time. Giotto carried out commissions in Padua in the Basilica del Santo and the Palazzo della Ragione, but principally in the Arena Chapel constructed in 1303 and consecrated in 1305, by which time the frescoes are presumed to have been done²⁶. Dante was exiled in 1302 from Florence and a document places Dante in Padua in and around 1306²⁷. Dante not only speaks of Giotto in *The Divine Comedy*, Purgatory volume II but also in *Paradiso* volume III he dedicates Canto XI to Saint Francis under the title of Saint Thomas Aquinas²⁸ in praise of Saint Francis²⁹. Dante was born in 1265 and died at Ravenna in 1321, but the earliest known manuscript of the poem dates from 1336.

2.2 General layout and iconographic description of the frescoes in the architectural context

The size of the Basilica permitted the gathering of a large group of individuals and was ideal for processions inside the church during the course of the mass and its liturgies³⁰. This public ritual engaged the space of the central church, separate from and in contrast with activities in the side chapels of the transept, in which took place only very personal and private moments of individuals' quests for contact and veneration of the saints, communion with Christ and revelation of God. Even the architectural proportions of these chapels, which in their height and narrowness are ideal for focusing on and receiving divine communion, are completely unsuited for viewing from within them the totality of the frescoes. It is as though the chapel and their frescoes – communion with God and celebration of that communion – are intended to be defined as two separated realms. Having spent some time myself trying to view the frescoes while standing or kneeling, it is clear to me that it is physically possible only for very short moments, like hard-won illuminations, and that ultimately on the level of

admiration or celebration the frescoes can only be seen from a position outside the chapel walls.

The Bardi Chapel's width corresponds with the full width of the fresco of *Saint Francis receiving Stigmata*, or 3,90 meters³¹. Using the width of the frescoes that literally extend to the whole depth of the chapel, the frescoes measure 4,50³² meters plus 60cm for the borders, bringing the total depth to 5,10 meters. The total approximate height of the chapel is calculated as follows: the lowest part, a bare wall without any visible fresco, measures 160cm; that would have included the original border visible in the Peruzzi Chapel on its right. Each of the three frescoes (six in all) on the left and right hand wall measure 2,80 meter in height and are surrounded by a border (three borders of 40cm) bringing the total height of the chapel to a close approximation of 11,20 meters. *Saint Francis Receiving Stigmata*, above the chapel, measures 3,70 meters in height. If one divides the total height of the chapel at 11,20 meters by the height of this painting, the painting comes to very close to measuring one third the height of the Chapel – 3,027. Or one could say, the painting divides into the Chapel three times. This would mean that the height, *including* the painting of *Saint Francis Receiving Stigmata* divides the chapel with its over-arching fresco neatly into four equal sections.

The dating of the Bardi Chapel decorations and the stage of life Giotto had attained can be considered together, and evidence suggests that the frescoes constitute a reflective position of maturity rather than the advancing position of youth. While little is known about Giotto's own life, Peter Murray in his article on the date of Giotto's birth³³, convincingly argues that Giotto was born closer to the dates of 1266-1267. He died in 1337. The frescoes of the Bardi Chapel under examination are estimated to have been carried out sometime after 1317³⁴, when the basilica was nearing final completion, and as late as the first half of the 1330's. A number of interesting arguments are advanced by Murray and others that put forward a good case for a later date³⁵. Amongst these can be included a political argument to the effect that the influential and rich Bardis, the Florentine banking family³⁶ that commissioned the frescoes, would have been aware of the internal problems within the Franciscan Order. It would have been wise for them to incorporate the commission of the

Bardi Chapel, given to Giotto with the stipulation of the Saint Francis theme, closer to the date of the centenary celebration of the saint's death in 1327 and the date of his canonization. Accordingly one can calculate Giotto's age at the time when he was carrying out work on the chapel to be somewhere in his sixties. Both the age of the artist and the gradual resolution of the conflict within the Franciscan Order can be seen to contribute to the calm and measured execution of the frescoes on the Saint's life. They mark more than an uninterested involvement in the tenor of the times, and hint at the watchful calm that follows the storm.

A description of the Chapel should start with the fact that it is lit from the flat rear wall by a narrow stained glass window representing scenes in the life of Christ (fig. 2.7), amongst which is *The Annunciation*, (fig. 2.8) by Jacopo del Casentino³⁷. The embrasure of this window is decorated with a rounded and voluptuous border of foliage that is punctuated by cherubic images. A round window or oculus is situated at the top between the window's two sides (fig. 2.7). Below the window a stone altar (fig. 2.9) is positioned at centre. Above the vaulted ceiling, a quadripartite vault³⁸ divides into four curved sections (fig. 2.10). The three-sided ribs that support the ceiling at centre are geometrically decorated, while the sides frame four medallions containing the Franciscan virtues³⁹ (fig. 2.11) incorporated in a ceiling painted to resemble the sky with a border of leafy vines. The four ribs that arch across the ceiling from its centre descend to join a relatively small pier buttress at the corners of the chapel just below the beginning of the top fresco. At this point the three-dimensional shape becomes a painted trompe l'oeil illusion (fig. 2.12) that continues down all four corners to the point at which the first fresco begins. Opposite the entrance on the left of the rear wall at the height where the bottom fresco and the second fresco above it meet are two personages painted life size⁴⁰. They are framed in the shape of a Gothic niche⁴¹ and represent Saint Claire (fig. 2.13) who is standing against a blue background on a pedestal holding a lily⁴² and Saint Louis of Toulouse (fig. 2.14) (canonized in 1317) standing on a pedestal against a striped ground holding a staff. On the lower right side also of the rear wall is an image of Saint Elizabeth of Hungary (fig. 2.15), now quite degraded⁴³. Originally there is reported to have been a fourth figure of a saint above on the right hand side, now missing, making the decoration of the rear wall symmetrical⁴⁴. Nothing is known about this personage. The

intrados under the arch of the entrance to the chapel are decorated with busts of saints at the centre of quatrefoils.

Our specific interest here though is with the frescoes. On both the left and right wall (fig. 2.16, 217) as one enters the chapel are six scenes, three on each wall, taken as highlights from the life of Saint Francis. Richard Offner writes⁴⁵ that

[...]The story in the Bardi chapel does not, as in Padua, unfold in a narrative moving progressively in a freeze-like continuity across the surface. The vertical form of the chapel in St Croce better suited a system of superimposed scenes. This allows a greater width to the compartment, the story thereby becoming less fluid. This altered factors accord with Giotto's advancing interests, which give greater compass to the scene. For he comes to be concerned not so much as formerly with a concise, progressive disclosure of the fortunes of the protagonist, but rather with a symbolic presentation of the typical moment in his life⁴⁶.

Most of what is known about Saint Francis's life we think of as part of the tradition of legend⁴⁷ in the writings and readings that survive from the period. The readings of the rules and testaments attributed to him gave structure to the Franciscan Order. Two of the principal biographers of Saint Francis are referenced here. Brother Thomas of Celano was first commanded by the General Minister to write on the remembrances of the saint and was later commissioned by Pope Gregory, former bishop of Assisi, to write *The remembrance of the Desire of a Soul* (1245-1247) which was not so much about Saint Francis himself but rather about the way of life that he founded⁴⁸. Over the twelve-year period 1255-1267 the Franciscan Order in its restructuring phase commissioned Brother Bonaventure of Bagnoragio to write the officially adopted Biography of the saint which is in itself a fusion of many texts, poetic, factual and simply common beliefs. It is primarily Bonaventure's account, the official version, that provides for Giotto the main iconographic material that he incorporates, sometimes quite literally, into the representations within the frescoes⁴⁹.

Any summary of Saint Francis's personal history and its intersection with the social and political conditions of Italy and medieval Europe in general must focus first on the undoubted effect of those conditions on framing what would become the saint's main theme of *peace and good will*. Most obviously, this theme can be seen as a reaction to the bloody encounter in 1202 between Assisi and the city of Perugia that caused his imprisonment for a

year until his father negotiated the price of ransom for his release. This year of isolation and contemplation, as well as serious ideological differences with his father, contributed to his leaving home by 1205 to adopt an intensely religious and disciplined life of absolute poverty, servitude and obedience. The meaning of Saint Francis's poverty is interpreted by Lawrence Cunningham⁵⁰ as the challenge to live by absolute faith at the mercy of God. His inspiration can be traced to Matthew VI:24-33 (the faith of love in the absence of evidence).

[...]No man can serve two masters for he will hate the one and love the other; Or else he will hold to one and despise the other... Therefore I say to you, take no thought for your life, what ye shall eat, or what ye shall drink; nor yet for your body, what ye shall put on. Is not the life more than meat and the body raiment? [...]Whereof if God so cloths the grass of the field, which today is and tomorrow is cast into the oven, shall he not much more clothe you, o ye of little faith?... for your heavenly father knoweth that ye have need of all these things. But seek ye first the kingdom of God, and his righteousness; and all these things shall be added to you. Take therefore no thought of the morrow, for the morrow shall take thought for the things of itself. Sufficient unto the day is the evil thereof⁵¹.

This passage acknowledges that life is an unpredictable and insecure state and it is this state that causes fear. Saint Francis understood that the conventional remedy is a desire for material security. But as he pointed out, this causes envy and strife leading to wars and even greater fear⁵². He therefore attempted to achieve an antidote by adopting *a radical insecurity that the poor struggle against*⁵³. By eliminating any state of desire, Saint Francis reasoned that both the emotion of fear and desire would be gone. Taking a rather more nuanced view of this reasoning, Dante In the *Paradisio*, Canto XI 64 –75, aligns Saint Francis' reasoning with the erotic, a desire to be wedded to and identified with *Lady Poverty*⁵⁴.

Reft of first husband [Christ] she in Widowhood
Till the eleventh hundredth year,
contemned, obscure, awaited him unwooed; [the time of St Frances] ...
Nor aught avail her faith and courage tried,
so that, let Mary at the foot remain,
she mounted up where Crist was crucified.
But lest too enigmatic be my strain,
from long parable shalt though infer
That poverty and Francis are these twain

2.2.1 Six Frescoes on the life and legend of Saint Francis within the Chapel, and the seventh above the Chapel's entrance

Each fresco takes up the entire width of the wall. Giotto deals with the chronological order of the events of Saint Francis' life by leading the viewer's gaze from left to right, right to left and left to right again. He places the first narrative of the cycle directly under the lunette high up on the left wall of the Chapel, thereby initiating for the viewer an upwards-towards heaven's gaze.

2.2.1.1 Fresco #1, top left, depicting *Saint Francis Renouncing his Worldly Goods*

The legend:

In 1208 Saint Francis received God's command to rebuild his houses in the church of Saint Damiano. Saint Francis set out to rebuild not only this but two other dilapidated churches using his father's money. Consequently his father, in a fury of disapproval over his son's use of the money and his new vocation, took legal action against him – demanding that he give up his inheritance in front of the Bishop of Assisi. Saint Francis renounced not only his inheritance but also his father and all his worldly possessions in the presence of the Bishop⁵⁵.

Iconographic description:

The action being represented is set outside and in front of a high wall, possibly the palace of the Bishop of Assisi (fig. 2.18), against an enveloping blue background, possibly signifying the arc of the sky. On the left side of the fresco, a group of six noblemen are restraining Saint Francis' father who in anger lurches forward towards his son. At the extreme left, a mother is indulging a willful child. Thomas Celano, in his First Book, notes of Saint Francis that *the child of wrath is turned into the child of grace*⁵⁶, and duly on the extreme right of the fresco we have the image of a *child of wrath* screaming in pain as his mother pulls his hair to control him. Saint Francis himself appears covered only by the Bishop's cloak, and is lined up with the intersection of the left and right side of the architecture, marking the point of convergence. The architectural perspective is foreshortened, for both the wall and the palace above before which the grouping of figures on both left and right side are framed. This

foreshortening, achieved by the greater presence given to the base of the palace and its surrounding wall, automatically guides upwards the eye of the viewer, positioned below the fresco. It is extremely important to an understanding of Giotto's pictorial strategy to consider this effect, which I will be discussing later. In addition, a strong set of opposing diagonals – formed by the three-quarter perspective of the palace walls and by the sloping placement of the figures – forces the viewer's sight towards the centre of the arc, automatically guiding the viewer's gaze upward in response to the converging diagonals represented by the two groups. At this point, at the very centre of the fresco – a centre marked by the space between Saint Francis and his father – the viewer's gaze is caught by Saint Francis' hands, folded in prayer and directing us towards the apex of the arc. Crucial here is to note that this centre, this space, is presented to the viewer as a powerful action in which Saint Francis's hands deflect his father's violent diagonal thrust (fig. 2.19). It is interesting as well to note that the palace itself has a three-columned wall, signifying the Holy Trinity. Saint Francis is accompanied by Franciscan Friars and Saint Clair. Contrary to the concept of vanishing diminution, the figures are however a mix of sizes, placing emphasis on the architectural structure. From this scene the viewer is encouraged to turn towards the right wall. This is because there are repetitions at play here, for example the arcs that structure both Fresco #1 (*Saint Francis Renouncing his Worldly Goods*) and Fresco #2 (*The Confirmation Of The Rule*) and the opposing diagonals described by the downward thrust of the right side of the palace in Fresco #1 linking to the upward thrusting diagonal of the left side of the Chapel's roof in Fresco #2. We can note that both the arced frame and the rooflines of these two narratives construct a rhythmic formation – arc versus line, diagonal versus diagonal, which I will discuss later.

2.2.1.2 Fresco #2, top right, depicting *The Confirmation Of The Rule*

The legend:

It is in 1209 that Saint Francis and his first eleven brothers in simple words *lay down a form of life and a rule* as a code for their conduct. These he took to Rome to present to Pope Innocent III. In Rome he also had the support of the Bishop of Assisi, Guido, and the Lord

Bishop of Sabina, John of Saint Paul. This convinced Pope Innocent III to grant provisional approval of the *first rule*⁵⁷.

Iconographic description:

The presentation of the Rule to Pope Innocent in Rome is set *inside* a small enclosed space (fig. 2.20). Above in the oculus central to the pedimented roof is an image of Saint Peter looking up to Heaven (fig. 2.21), symbolizing the location as Rome. The centralized lines of this roof and its wings converge to lead the eye of the viewer upwards (fig. 2.22). The Pope sits on a Papal throne on the left side of the fresco, flanked by two bishops possibly intended to be the Bishop of Assisi and the Bishop of Sabina who were supporters of Saint Francis. This ensemble of three signifies the Holy Trinity. Saint Francis, kneeling in profile at the foot of the Pope, presents the first rules on a scroll. Twelve friars are kneeling behind him. The perspective or vanishing point of the coffered ceiling, only two deep, points to the twelve friars (while according to both Bonaventure and Celano there were only eleven, Giotto appears to be making an allusion to the apostles). On both sides of the intimate chapel on the left are two figures located under a portico roof, unrecognizable, and on the right are two tall male figures possibly intended to be Saint John the Baptist, Saint Francis' original namesake, and Saint Mathew, from whom he drew his first inspirations. They are standing in the wings behind Saint Francis and the friars. The rear wall of the chapel is designed as a very simple rectangle two high and six wide. Both this fresco and the first fresco are decentred, constructing a diagonal relationship from the centre of attention, which is closer to the rear of the Chapel, to the centre of the kneeling apostles, who are closer to the entrance of the Chapel.

Rather than returning to the next fresco down on the left wall, the viewer's eye is invited to read vertically down⁵⁸. The agency for this action is the juxtaposition of a strong *horizontal* axis described by the figures kneeling before the bishop in Fresco #2 and the equally strong *vertical* axis of the Sultan's throne in Fresco #3. (*Trial by Fire*) that together can be construed to form a cross, notably of course the Christian Cross.

2.2.1.3 Fresco #3, middle right, depicting *Trial By Fire*

The legend:

Saint Francis set out for Egypt to convert the Muslims. The encounter with the Sultan, religious head of the Muslims, is illustrated here and is mentioned by his first biographer Celano. There is, however, a dramatized version by Bonaventure in his chapter nine⁵⁹, and it is this version that was officially adopted by the Franciscan Order, which Giotto illustrates here⁶⁰. To demonstrate the power of his own faith in the Christian God, Saint Francis challenges the Sultan's priests to walk through the fire with him, proving his God's righteousness. The Sultan's priests, upon hearing this, flee.

Iconographic description:

This event is depicted in a curtained outdoor space resembling a relatively shallow theatrical setting (fig. 2.23). It is delimited by two walls on either side, each with an open doorway that is seen in sharp perspective projecting outwards towards the viewer. The Sultan occupies a central position of authority, seated on a high throne with two steps and a pedimented roof (fig. 2.24). From this height the Sultan looks sternly towards his priests on the left side of the fresco as they flee the scene. He points with his right arm towards Saint Francis⁶¹ on the right hand side of the fresco, who is shielding his face from the heat of the fire as his gaze challenges the Sultan's divine authority. Saint Francis is in the company of brother Illuminato to his right, *a virtuous and enlightened man*, who accompanied him on the journey to Egypt. The Sultan, in the dead centre of the painting, becomes the focus of the converging lines (fig. 2.25) of architectural perspective, but this symmetry is intersected, one might say *crossed*, by the doubled diagonal gesture of the Sultan's gaze towards the priests on his right – the fresco's left – and his arm pointing towards Saint Francis on his left but the painting's right. Again in this fresco the viewer's gaze is directed upwards by a combination of both the architectural symmetry and the strong diagonal linking Saint Francis' eyes and the Sultan's arm, a diagonal that is then forced upward by the throne's height. One has to note the subtlety here, with the Sultan, himself representing a challenge to Christian faith, acting as a vehicle for representing Saint Francis' link to the cross.

The viewer is then invited to return to the centre of the left hand wall of the Chapel and to Fresco #4 (*The Apparition of Saint Francis at Arles*). This reading is curious since it follows the direction taken in reading an Arabic text! In any case, the formal agency for this direction is Giotto's repetition of the marked horizontal line described by the top of the wall passing behind the throne in Fresco #3, on the one hand, and the strong horizontal roof line over the triple arches in Fresco #4 on the other.

2.2.1.4 Fresco #4, middle left, depicting *The Apparition of Saint Francis at Arles*

The legend:

Little detail is given by Bonaventure and others on this event. Bonaventure makes an allusion to a number of appearances that Saint Francis makes *through divine power*⁶². It is in the form of a cross that Saint Francis appeared to the brothers at Arles during a sermon by Saint Anthony of Padua.

Iconographic description:

In a cloistered interior somewhat similar in its flat symmetrically balanced theatrical conception to the last scene with the Sultan – itself an interesting supplemental commentary – seventeen brothers are seated in contemplation on benches placed on either side of a wall that divides the depicted interior into two rooms, one in the foreground, the other in the background, with a central arched aisle connecting them. There is an open doorway – another quotation from the previous painting – to the left of the nearer of the two rooms. The dividing wall is pierced by two arched windows on either side of the aisle, and together the three identical semi-circular arches signal the presence of the Holy Trinity. Additionally, however, the central arched aisle also becomes the space in which the apparition of Saint Francis hovers, Christ-like. The friars are seated in both rooms to the right and left of the central aisle, and to the left in the second or furthest room from us a holy man is seen standing. Or is he entering? This figure is hard to determine. The most obvious assumption is that he is Saint Anthony of Padua delivering, or about to deliver, his sermon to the friars. Yet there is a sense of anticipation set up by the open door in the left foreground, and the figure's halo – no other figure in the frescoes than Saint Francis himself is depicted with a halo –

suggests that this may be an animation of Saint Francis himself appearing in sequence: entering silently and unobserved to then hover in the central space⁶³. Certainly the friars appear to be taken unawares by the appearance, since some are looking up while others have their heads bowed in contemplation. In any case, the hovering apparition of Saint Francis in the central arch both forms a cross in its vertical totality (fig. 2.27) and completes the semicircular arch above him to describe a circle comprised of his lifted arms and the belt of his garment. All the architectural perspective projections are centred on his upper body near his heart, and at the bottom near his feet. The distant background wall behind him changes from a horizontal band to an open rectangular container at centre, within whose frame the saint appears almost like a painting. In the immediate foreground of the fresco, the nearer of the two rooms is seen as itself constructed of four thin white columns that support the front edge of a golden tiled roof that covers the cloister. The perspectival projections of the cloister's side walls diverge outward at the fresco's edges to embrace us while the pattern of the roof's tiles converge inwards towards a distant centre above the roofline. With this, our view is led upwards as the roofline simulates rays from heaven spreading out over the scene. Once again, then, there is an encounter between two distinct apparent vanishing points, one inside and the other outside.

Chronologically we next follow the cycle to the fresco below, where reading from left to right resumes.

2.2.1.5 Fresco #5, bottom left, depicting *The Death of Saint Francis and the Verification of the Stigmata*

In this fresco Giotto condenses two separately recorded events: the death of Saint Francis and the verification of the wounds of the stigmata.

The legend:

Near his death Saint Francis asked to be returned to Portiuncula to be laid naked on the ground keeping his faith with *Lady Poverty*.

[...]In all things he wished without hesitation to be conformed to Christ crucified, who hung on the cross poor suffering and naked. Naked he lingered before the bishop at the beginning of his conversion [...] he wanted to leave this world naked [...] [and when] that most holy soul was released from the flesh and absorbed into the abyss of the divine light, the blessed man fell asleep in the lord, One of his brothers and followers saw that blessed soul under the appearance of a radiant star carried up on a shining cloud to be born aloft to heaven over many waters [...] where he rests with Christ the Lord. [...] and the amazed brothers asked to whom he was speaking so boldly [...] and he replied Don't you see our father Francis going to Heaven⁶⁴?

From Bonaventure's account, we are informed that on many occasions brothers that were intimate with Saint Francis saw his wounds, and that the supreme Lord Pontiff Alexander affirmed the sacred stigmata while he was still alive. More than fifty of his brothers, along with the Virgin Clair and innumerable laymen, saw his stigmata wounds after his death. One,

Brother Jerome, who was taking care of St Francis *saw* the stigmata, *measured* it with three fingers and also accidentally – here we have the forbidden touch – *touched the sacred wound*⁶⁵.

Iconographic description:

Giotto deviates from the description of the death of Saint Francis in portraying him laid out in his monk's habit on a simple bed (fig. 2.28). He is surrounded by his friars and Saint Clair, in a white gown and smaller than the monks on the right, as well as possibly Saint Elizabeth on the left, also in a white habit; finally in attendance there are the official dignitaries. Of the friars, there are six kneeling around the bed – clearly intended to be the original six brothers, kissing his hands, feet and lovingly glancing in sorrow at Saint. Francis. The official figure kneeling next to him and touching his wounds probably represents the Lord Pontiff Alexander who affirmed the sacred stigmata while Saint Francis was still alive⁶⁶. A brother near the head of Saint Francis looks up because he *sees Saint Francis going to Heaven*. At the centre and above the body lying in state is a disc carried by four angels, two on each side, containing the figure of Saint Francis surrounded by rays of divine illumination and rising on a cloud. This is a literal representation of the description given by Bonaventure. The two front angels are painted in a light alizarin red, while the two angels at

the rear are in Naples' yellow and green. All this takes place against a blue background. Exactly below, a group of three monks are bent over in despairing gestures. The damage from the insertion of a tomb sometime after the fresco's completion makes the reading of the exact placing of the architectural structure difficult. The architectural details that are still visible – given the damage – have their projective lines centred on the inspection of the wounds to the left of the image, whereas the arrangement of the figures constructs a progressive upward and centralized projection in their placement. The imploding (fig. 2.29) or divergent architectural perspective emanates out from the body of Saint Francis, while the lines that converge at centre emanate upwards to Heaven. This scene takes place in front of an interior but outside under a brilliant blue cloudless sky. The apparent contradiction of this description requires noting that the viewer is placed outside the representation of the scene by virtue of the low wall with columned windows behind which the action takes place. Furthermore, the height of this fresco is just above the eye level of the viewer when standing in the chapel. Giotto therefore forces the viewer to look up at the fresco, although in much closer proximity than with the upper and middle frescoes. If the viewer stands back, the kneeling monks, with their feet now at eye level, guide the viewer's eye to the horizontal element of the body, the effect of which is to correlate Saint Francis himself with the horizon. The scene is dynamic, constructing both a centering symmetry – the inward-facing, solemn standing figures on each side – and a central asymmetry – the very active emotional figures first pushing our sense of balance towards the left and down to the horizon line of Saint Francis' prone body, and there at that point pushing us up through the figure directly above the head of Saint Francis whose gaze upward to the angels carrying the saint to Heaven transports us along with him. The effect is a powerful rhythm that we feel rather than see.

2.2.1.6 Fresco #6, bottom right, the final fresco inside the Chapel, depicting the *Visions of Brother Agostino and Bishop Guido of Assisi*

Again this is a conflation of two events that occurred at the same time as Saint Francis's death, but in different locations.

The legend:

In chapter fourteen, Bonaventure gives a brief account of Brother Augustine who just before his own death, having already lost speech, suddenly raised himself and exclaimed [...]wait for me, father, wait!... Don't you see our father Francis going to heaven?[...] To the astonishment of the brothers who had gathered about him he passed away at the same moment as Saint Francis. The second narrative concerns the Bishop of Assisi who was making a pilgrimage to Monte Gargano. In a dream Saint Francis appeared to him the night and even the same hour as the saint's death. According to Bonaventure's legend, Saint Francis spoke to him these words: "*Behold, I am leaving this world and am going to heaven*"⁶⁷.

Iconographic description:

This fresco (fig. 2.30) divides the two separate events by placing the story of brother Augustine on the left and the dream of the Bishop of Assisi on the right. Two figures appear to keep vigilance over the sleeping Bishop, whose bed is on an elevated platform. Symbolically the bishop still wears his signifying attire – gown and hat. One of the guardians appears to be in a deep slumber, while the other is looking upward. It is difficult to reconstitute the whole scene because here also the installation of a tomb destroyed much of this fresco. On the left half of the fresco, a group of seven monks is gathered at the end of the bed and towards the centre of the fresco. Saint Alexander is sitting up in his bed while another monk on the other side of the bed standing behind him is lifting the drawn curtain that surrounds his bed. The perspectival projections that can be drawn from the upper corners of the walls on either side of these enclosed spaces intersect on a figure now lost except for the bottom of his habit visible at the rear and apparently standing in a doorway (fig. 2.31) – now just barely evident in the fresco – and apart from the closely grouped monks at the foot of Saint Alexander's bed. This mysterious presence in this otherwise vacant space may, I suggest, be the figure of Saint Francis. In every other case in the frescoes the intersection of architectural projections has pointed to an important part of the narrative. And such a reading would give the attendant on the extreme right at the bottom of the Bishop's bed a focus for what appears to be his gaze. It seems that this figure is attentively looking in that direction,

and it certainly forces our eyes towards the doorway. This also would make the seated figure of Saint Alexander and the lone figure of the monk positioned behind him part of a visual ascending projective axis that has been part of every other composition in this cycle of Saint Francis's life. The pictorial space of this fresco appears like the others, clearly defined but relatively shallow. As John White has observed, the shadows within all the frescoes inside the Chapel appear as though they were lit from the windows of its back wall, giving them a unified look⁶⁸.

On the transept wall immediately above the Chapel's entrance and running its full width, is the fresco of *Saint Francis Receiving Stigmata*. The privileged position of this fresco signals its status as most dramatic and significant event of the entire Cycle.

2.2.1.7 Fresco #7, outside the Chapel, depicting *Saint Francis Receiving Stigmata*

The legend:

Related here is the legend of Saint Francis going on retreat to Mount La Verna to fast for forty days in honour of the Archangel Saint Michael. As he was deep in prayer

[...] Through a divine sign [...] the Lord's passion always met his eyes [...] just as he had imitated Christ in the actions of his life, so he should conform to him in the afflictions of the world after true love of Christ transformed the lover into his image...A Seraph⁶⁹ with six wings appeared, suddenly between the wings the likeness of a man crucified his hands and feet extended in the shape of a cross fastened to a cross [...] Two wings raised above his head two extended for flight and two covered his whole body [... Francis] rejoiced at the gracious way Christ looked upon him [...] as the vision was disappearing it left imprinted in his flesh a likeness of signs no less marvelous [...] After true love of Christ transformed the lover into his image⁷⁰.

Iconographic description:

All the interior frescoes (fig. 2.32) are surrounded by geometrically patterned borders. In the border of this fresco, however, and very prominently are details of circular marks painted in relief⁷¹ that appear to symbolically represent the head of nails protruding from the flesh of Saint Francis – in effect an echo nailing this fresco to the wall. Celano writes:

[...] His hands and feet seemed to be pierced through the middle by nails, with the heads of the nails appearing on the inner part of his hands and on the upper part of his feet, and their points protruding on opposite sides. Those marks on the inside of his hands were round, but rather oblong on the outside; and small pieces of flesh were visible like the points of nails, bent over and flattened, extending beyond the flesh around them. On his feet, the marks of the nails were stamped in the same way and raised above the surrounding flesh⁷².

Fourteen circular openings around the four sides interrupt a line of six-sided stars, a pattern that runs like a frame along the edge to the corners where it meets a square. Surrounding this patterned band is a singular coffered border whose linear false perspective constructs the illusion of the fresco as a recessed surface. It is evident from the shading on this coffered border that the light is intended to be coming from top right. The representation of a mountain intended to signify Mount La Verna occupies most of the left side. Near its top perches a falcon-like bird – the falcon, as one of the funerary birds, being a symbol of the soul released at burial⁷³. Below the falcon is an isolated tree, and some Christian authorities insist that Christ's cross should be associated with the tree of life. Left of the tree is the image of a cave. This cave is identified both with Jesus' birth and the first re-enactment of that birth in a cave by Saint Francis at Christmas. The complex shape of the cave also represents entry into mother earth, with its overlapping rock formation recalling the vaginal birth opening. Just to the right, and taking up the bottom half of the fresco's left side, Saint Francis is kneeling with his hands raised. While he is kneeling forward his upper body is turned sideways as his eyes meet the eyes of Christ. His head is raised and turned diagonally towards the figure of Christ on the Cross. As described in Bonaventure, Christ is encircled by two of the Seraph's wings above him, two wings to the side of him, and two wings folded down – one of which provides the figure's modesty. Lines (fig. 2.33) mark the connection between the wounds of Christ and the stigmata received by Saint Francis. Below the floating figure on the cross is a disproportionately small chapel⁷⁴.

This building has a number of symbolic associations in the context of Saint Francis: certainly it may represent the church or churches that Saint Francis restored as his first fulfillment of God's command to him. Additionally, its frontal exposure with the Rossetta window evokes the feminine, and most Gothic cathedrals were known as *Palaces of the*

Queen of Heaven dedicated to the Virgin Mary, or *Ecclesia*, referring of course also to the Church itself. The feminine link also includes *Lady Poverty*, the purity and perfection embodied in the straightforward simplicity of this humble church. On the side of the mountain and vertically in line with the saint's raised right hand is an olive tree recalling Saint Francis' association with nature, typifying the tree under which Saint Francis is generally portrayed talking to the birds⁷⁵. Unlike all the frescoes in the Chapel's interior, the representation of *Saint Francis Receiving Stigmata* is less literal and more symbolic in its representation, and unlike the others this fresco is stripped of any embracing architectural framework. This fresco is constituted by the figure in the landscape, the figure of Saint Francis doubled – married – to Christ. The simple church is apart from the figure, but part of a triangle whose base, or horizon, is established by the church on the right and Saint Francis on the left – or, given the fascinating play with mirroring versus rotation in the painting, it could be articulated equally as the church on the left side of Christ as the triangle's fulcrum with Saint Francis on the right – and whose apogee is the Seraph bearing Christ.

Brother Julian Speyer, a contemporary of Saint Francis, wrote some liturgical texts in which he sums up the saint's ambitions.

The singular virtue had already reached his goal when he believed he had scarcely begun. His greatest desire had always been to extend himself to the things which lay before him, and to count the past as nothing. [progress] Therefore he desired still to endure anew all the sufferings of the body and all the agonies of mind so that every wish of the divine purpose might be more perfectly fulfilled in him⁷⁶.

These words speak of the infinite extension towards a singular infinite design and purpose – to which William of Ockham (1285-1349) contributed the argument that God's infinite presence and freedom of creation cannot be limited⁷⁷. However, while the very nature of the relationship between what was knowable and what had to be taken on faith required empirical methods in order to construct proof that could be integrated with faith.

The unassailable certainty of this stunning miracle [reception of stigmata] is supported not only by the witnesses –which in every way are worthy of our trust-of those who saw these wounds, and touched them, but also by the wondrous apparitions of the miracles which have shone forth after his death to drive away every cloud of doubt from our minds⁷⁸.

Taking this into context, from Giotto's perspective Saint Francis' reception of the stigmata is ultimately an act of such empirical demonstration, and the pictorial spatial experiments Giotto applies to this fresco attest to his understanding of the necessary intersection of faith and proof.

2.3 Belief categories: Perceptual beliefs, Philosophical beliefs, Religious Beliefs, Scientific Beliefs (concerning the optical system), Mathematical Beliefs, Medical Beliefs (concerning the body)

2.3.1 Perceptual Beliefs

By necessity it is to the pre-dominance of Saint Augustine's influence over the earlier centuries that we must turn in order to grasp the emerging character of the visual in the Middle Ages. While for the period under review, the late thirteenth and early fourteenth centuries, Saint Augustine's influence remained strong, his rejection of the visible world had long been under review. Simply put, for Saint Augustine the visible world and any beliefs in regard to it had to be understood as subservient to Faith. And what, for Saint Augustine, was Faith? Just as Man is subservient to God, the Visible is subservient to the Invisible, and Sight is subservient to Hearing. Faith, most succinctly comprehended as Awe and Subservience to the Supreme Invisible Being – God, cannot *by definition* be acquired by sight. Faith may be acquired through hearing, particularly of course the inner voice – or through abstractions such as language; but to the extent that cognition is a function of sight, for Saint Augustine one could say that the concept of visual cognition would be an impossibility. The visible had to be understood as merely a function of the invisibility of faith.

[...] The rich man asks the good Master what is he to do to win eternal life. Let him listen to the Good Master, of whom he thinks as a man and no more, although it is because God that he is good. Let him listen to the good Master who tells him that if he wants to win eternal life, he must keep the commandments⁷⁹.

By the time Giotto was charged with painting the Bardi Chapel frescoes, Saint Augustine's position was in many respects displaced by a keen interest in the visible world. This development must be considered against the renewed connection to classical texts, and to the philosophical traditions to which Western Europe increasingly turned as the world continued to exist beyond its long expected shelf life of the year 1000.

The western philosophical tradition had from its inception taken pains to distinguish belief from knowledge as separate entities. Plato's concept of knowledge, for instance, posited the *episteme* as representing the *intelligibles* – immutable and eternal Forms or Ideas apprehended only by the mind. This he differentiated from opinion, or *doxa*⁸⁰, as the *sensibles*, the transitory experience of particulars. If Plato made *sensibles* subservient to *intelligibles*, Christian philosophers gave belief a very special status and identified it with faith. These beliefs were, for them, derived from God – in his *Word* – and represented a vital aspect of the possibility of salvation. In other words, instead of separating knowledge from belief, the Christian tradition made belief – or Faith – the means of transmitting a *superior* knowledge to Man.

But before entering into these debates, I want to clarify two points. The first is that in order to avoid unnecessarily repeating explanations concerning perceptual belief structures, I will rely on the first chapter's introduction to visual beliefs to provide this information. The second point is that in this chapter religious belief is so central to all other forms of belief that I feel compelled to explore our contemporary cognitive investigations of belief associated with religion. It should be kept in mind that Saint Francis was no doubt a spiritual person looking for answers to unanswerable questions. Yet it is only in the object of religion in this case Christian religion that beliefs about its theological dogma can be challenged or practiced. Christian beliefs are the primary thematic of Giotto's subject presented through the life of Saint Francis. For us as secondary viewers, religion is therefore central to the subject matter of the narrative that Giotto – as the artist and *initiating* viewer – wishes to communicate. The fact that the architectural site in which the frescoes are represented also happens to be a church, or more specifically a basilica, makes the presence of a religious aura inevitable and significant. The relationship of religion to emotion and empathy is also important to the core of Christian beliefs, and in the case of Saint Francis crucial. And in his contribution to western pictorial representation, to our visual cognition, Giotto's transmission of this relationship is in effect the subject of our investigation.

For the majority of his commissions, Giotto was engaged by the Franciscan Order. This engagement began about sixty years after Saint Francis' death. While much is known about

the life of the saint, almost nothing is known about the life of the artist – with two exceptions. The first is his inclusion in Dante's *Purgatorio*. The second and most important is Vasari's reference to him that describes his meeting Cimabue as well as two or more occasions regarding his personal life. Interestingly, however, Paul Barolsky, in his book *Giotto's Father and the Family of Vasari's Lives*⁸¹, demonstrates that the veracity of Vasari's reference is suspect, that his purpose was to construct a particular fiction for the ascent of a poor peasant boy – Giotto – to the status of a respected and elevated member of the Florentine elite.

I think it important to note that biographical facts on the artist are not essential to a discussion of Giotto's frescoes, any more than they are for a discussion of the Pompeian frescoes. Biographical and autobiographical information can provide insight, but they can also provide miscues and outright fabrications, and their claims must be tested against other data. Indeed, for the purposes of this chapter, Saint Francis himself provides just such an example, and since his life – his biography in effect – is the central issue of the Giotto frescoes, biographical witnessing as an aspect of cognition inevitably enters into our discussion.

2.3.1.1 Ten sensations in perception: religion in mind, framing, outlines, horizon line, colour, texture, element of time, perspective, scaling, element of emotion as applied to pictorial space

Religion in mind

Please note that spiritual/religious experience/belief is taken up in this section through cognitive perspectives. Inevitably there are philosophical consequences. These, however, help to contextualize the section.

Two types of belief⁸² are possible. *Intuitive beliefs* are the product of spontaneous and unconscious perceptual processes, or *perceptual* beliefs. From these processes one can infer descriptions of emotive states, of which it should be remembered one isn't necessarily aware. *Reflective beliefs*, on the other hand, are second order beliefs that I call *conceptual* beliefs,

and are interpretations of representations that ultimately are *embedded* in the context of an *intuitive belief*⁸³.

Religious belief, according to Pascal Boyer, is counterintuitive⁸⁴. In Macann, there is a quote from Heidegger – "*that which is not provable yet needs to construct some evidence of control in the face of fear of the unknown*"⁸⁵. It is a question of convincing oneself that one has successfully manipulated the counterintuitive *agents* and *forces* so as to achieve relief, an emotive state that is expressed as joy – euphoria, ecstasy and so on – in the face of this fear. Pyysiäinen writes that the connection between the roles of religious experience and emotion is an important instance of counterintuitive thinking, and the reportage of a counterintuitive experience, as for example a religious experience, when related either in text or image, is always highly formalized as *schematized accounts*. These formal accounts should therefore not be seen as *literal* accounts of what somebody actually felt and experienced. To paraphrase from Pyysiäinen: counterintuitive beliefs, religious or otherwise, must transfer these counterintuitive *intentions* to something inanimate – possibly an object – denying it the physical and biological properties that make human beings vulnerable. The manipulation of these forces can take the form of offerings, or as in Christianity, the form of Faith. Boyer in his book *The Naturalness of Religious Ideas*⁸⁶, argues:

[...]In the competition among ideas for a place, so to speak, in the human mind, those ideas that strike an optimal cognitive balance between the intuitive and the counterintuitive are most likely to be given attention to be remembered, and to be passed on to succeeding generations. Gods, spirits, and ghosts for instance are often depicted as anthropomorphic in various ways, and their conformance to our expectations respecting human capacities, purpose, and behavior renders them plausible [...] their invisibility, their ability to pass through material barriers and so forth -that renders them memorable⁸⁷.

It is easy to dismiss religious experiences as simply unexamined emotional reactions to religious representations, but it would be a mistake to belittle the significance of this connection between religious assumptions and their representation. As Boyer notes, religious assumptions are not reducible to abstract intellectual entities. Framing these assumptions with symbolic systems that carry complex layers of meaning is wrong-headed. It is also an error to posit cultural theories that supposedly underpin the connections. Theology, in

various ways and quite systematically, mistakenly constructs religious representations that are believed to be part of a shared, consistent and integrated set of assumptions. And this, Boyer writes, is made in the context of less than perfect empirical confirmation⁸⁸.

Joseph LeDoux, in *The Emotional Brain*⁸⁹, writes that cognitive evaluations, by virtue of their particular processes, can lead to ideas that are *considered*, whose implications are to one extent or another realized. Epistemic evaluations, however, remain simply descriptions of how the world is understood. An important differentiation lies between those spiritual or religious responses that are expressed as emotions – said to be grounded in the neuro-physiological reflex complex understood as *background*⁹⁰ – and those that are socially constructed, or in other words sensitive to culture. In the Middle Ages, particularly evident from the thirteenth century through the example of Saint Francis, feeling and empathy for the suffering of Christ was of paramount importance to the successful act of redemption⁹¹, and consequently falls into the arena of religious experience grounded in *background*.

The position taken on intellectual cognition by Duns Scotus, and extended by Ockham in the early part of the fourteenth century, struggled with the opposition between intellectual and sensory experiences. For them, cognition reaches its maximum potential when it apprehends an existent object as existent. From this perspective, cognition cannot proceed through the agency of *species*, and must be limited to an immediate relation between existent soul and equally existent object. Ockham, by extending this idea to the sensory cognition or *doxa*, suggested that the concept of 'species' be abandoned, lending to emotive states more authority⁹².

In contemporary analysis, cognitivism has a number of theories. Benson Saler calls them part of an expanding universe of theories that have moved beyond the medieval arguments. It is John Searle's approach that for me most convincingly sums up the contemporary cognitive realist's position when he writes:

[...] On my view, mental phenomena are biologically based: they are both caused by the operations of the brain and realized in the structure of the brain [...] On this view, consciousness and Intentionality are as much part of human biology as digestion or the circulation of the blood. It is an objective fact about the world that it contains certain systems, viz., brains, with subjective mental states, and it is a physical fact about such systems that they have mental features. The correct solution to the "mind-body-problem" lies not in denying the reality of mental phenomena, but in properly appreciating their biological nature⁹³.

Antonio Damasio also proposes a biological origin to feelings⁹⁴, and considers feelings to be a higher form of emotions as aspects of higher cognition. Feelings, he writes, correspond to body states prevailing between emotions⁹⁵, defined by bodily changes and feelings that can be either consciously experienced or operate as background⁹⁶ – "*feelings are a way of matching an organism to its environment*"⁹⁷. Feelings, therefore, can be categorized as either conscious or background feelings. Again, Searle writes:

[...] Intentionality occurs in a coordinated flow of action and perception and the background is the condition of the possibility of the forms taken by the flow. An unconscious belief is an occurrent physiological event that causes conscious thoughts and behaviors, and unconscious actions⁹⁸.

The cognitive is helpful in understanding the transmission and recurrence of religious representation. It is an *emic*⁹⁹ model of analysis for religious states – in other words an insider's model that can also shed some light on why different cultural environments have similar religious objectives and representations. For example, Boyer points to the universal preference for essentialism, the widespread use of *abductive* thinking that entices a person away – transporting someone mentally through the elaboration of images that may be viewed in the context of a psychology of desire. This is certainly the case with respect to Giotto's intention when he constructs his representations in the Bardi frescoes.

For the philosopher, Baruch Spinoza (1632-1677), God is just an idea¹⁰⁰ – to offer a contrasting and, for a modern secular viewer, possibly a relevant alternative model. But Damasio, in his book, *Looking for Spinoza: joy, sorrow, and the feeling brain*¹⁰¹, writes that the pragmatic view held by Spinoza – that suffering and death are, after all, only natural biological phenomena – can never offer a true resolution. The stark reality we face, even in death, is the sense of absolute aloneness. Christ's cry on the Cross, "*Why hast thou forsaken*

me", offers the best summation of this, and in fact it is always the presence of the Wound, a wound of not-knowing and of aloneness, that must forever remain¹⁰². For the medieval Christian believer, God in Christ is made flesh and blood, able to share this part of the wound that accompanies the living at every step of the way – despite and because of that death on the cross.

For Saint Francis, joy in God and sorrow over His sacrifice through the Crucifixion offers the emotional telescoping through which his salvation may be accomplished. Joy and sorrow – emotions at the opposite ends of the emotional spectrum – are part of a complex process by which the body maintains its emotive and chemical balance. Let me paraphrase Damasio in the following paragraph.

Emotionally competent stimulus, it's processing in a specific context, leads to the selection of preexisting programs of emotions. Emotions¹⁰³ lead to the construction of a particular set of neural maps of the organism – to which signals from the body proper prominently contribute. The configuration of certain maps represents joy in all of its variations – feelings of pleasure signify states of equilibrium to the biological body. Aristotle's notion of happiness offers a precedent to this concept. Another configuration would be sorrow, a negative state in the form of anguish, fear, guilt and despair, signifying a state of disequilibrium. We naturally gravitate to the fluidity of positive feelings and stay away from the strained states of negative feeling. The contents of feelings are the configuration of body states represented in *somato* – sensing maps. But the transient patterns of body states¹⁰⁴ change rapidly under the mutual reverberative influences of brain and body during the unfolding of an occurrence of feeling. Both the positive and negative valence of feelings, and their intensity, are aligned with the overall ease or difficulty with which life events are proceeding.

Emotional responses are an integral part of all aspects of religious cognition, from effective prayer to participation in solemn ritual. Devotion to religious ideas can be so extreme as to claim the life of the believer. In fact, martyrdom for faith is held to be a virtue – particularly in Christian and Islamic religion, as Patrick McNamara elaborates in *Religion and the Frontal Lobes*¹⁰⁵. There is a strong link between religious cognition and the frontal

lobe and evidence that people with strong religious feelings, and faith in prayer, enjoy better health in old age. Religion, like all forms of spirituality, would therefore seem to be a definable survival strategy, and the evolutionary origin of religion can be surmised by studying the evolution of the frontal lobes, as well as through such associated disciplines as the theory of mind. The origin of the notion of sin, as an instance, lies in the awareness of the self as the intending perpetrator of the offending action, and in recognition of the unpleasant implication of the action for others – together adding up to its *moral* repulsiveness. To this relatively secular equation there must be attached the concept of the Mind of God. For the Christian God, the Mind of God is Goodness. All of this is dependent upon the healthy body. The initiation, execution and self-monitoring of moral action is all part of the central executive of the brain, which can do nothing without the frontal lobes performing correctly¹⁰⁶. Theories of religious cognition – and their physiological and psychological implications – remain theories in progress; but what has been shown empirically is that religious cognition is an integral part of the evolution of the brain, and has a function necessary to the body's survival, whatever significance its role as an aspect of socialization may be. In effect, religious belief cannot be dismissed as mere 'opiate for the masses', in Lenin's famous phrase.

Framing: the approach to the Bardi Chapel frescoes

The Bardi Chapel's location next to the high altar is heralded long before we arrive at its entrance. The light streaming from the principle oculus high above the altar, and directly facing the viewer upon entering the Basilica, acts like a guiding compass for the viewer as they approach. By the time one reaches the Bardi Chapel one has traversed the entire Basilica and, as I have demonstrated, this progress induces some fundamental spatial experiences that are then inevitably brought into one's engagement with the frescos. Positioned next to the immense height of the chancel, the Chapel's scale seems intimate in contrast – an effect arising from the natural inclination to look up, which then brings our gaze into alignment with the fresco of Saint Francis receiving the stigmata above the Chapel's entrance. As a consequence, the approach to the Chapel is dominated by this fresco, whose pictorial composition is in turn dominated by an upwardly thrusting diagonal of light-dark contrast

that leads the eye up and towards the oculus. This diagonal is all the more effective as an index pointing to the light for the fact that the subdued colouring of the fresco, and the economy of its composition, at first blends into the complex texture of saints that decorate, in *trompe l'oeil* manner, the vertical column that separates chapel from chancel.

Framing

If in the case of Assisi the borders (fig. 2.34) for the Saint Francis Cycle converge uniformly downwards to construct the illusion of a three dimensional frieze – and in that sense present a double spatial entrance to the representations of the frescoes¹⁰⁷ – the Bardi Chapel has no such illusion in its borders (fig. 2.35). Here, the border has become simply a geometric pattern. Apparently. But on closer inspection it becomes clear that the lozenge-shaped elements that occur regularly to interrupt – or pierce – this pattern are in fact the heads of nails that pierced the flesh and mark the crucified wounds of Christ. This device substitutes for the standard construction of a spatial illusion intended to break the real surface of the architecture a far more pressing necessity – the reminder of God's sacrifice and our empathy with it – the subject, in fact, of Giotto's fresco. Panofsky, writes Samuel Edgerton, considered the illusory border as marking a psychological space¹⁰⁸. The image of the nails piercing Christ's flesh is now – in Giotto's border – no longer associated with illusion, but with the pierced material reality of the body (fig. 2.36) – the wound as the psychological space of the body's very physical sensory empathy. Damasio confirms that the speed with which the hallucinating body can invoke not only emotive states in accordance with the body's maps, but also induces changes in the body proper – in seconds from the moment of response, hormones are released into the bloodstream to create a temporal relationship between image and subject that can be immensely transporting¹⁰⁹.

Turning to the pictorial space of the painting within the borders of the frescoes – and all the frescoes are surrounded with a border – there is a greater penetration of the surface than is the case with either the detail of the borders or of the saints that occupy the shallow *trompe l'œil* niches between the Chapel and the chancel. Notably, these saints and niches (fig. 2.13, 2.14, 2.15) are painted to appear as though they are sculpted and part of the architecture (fig. 2.37), with the effect of a folding of the plastic dimension into the supporting structure of the

cathedral. Whether through niche or through border, the representation is that of a closed inner space¹¹⁰. These framings isolate the image and give it its own unique reference as I discussed in chapter one. There is the separation of one narrative from the one next to it. Then there is the frame of reference in relationship to the viewer. Giotto does not establish an *egocentric* frame, in which the visual features of the environment and within it the position of the idealized viewer, is included. His representations to a large extent are established through an *allocentric* frame, in which objects are located independently of the producer or perceiver¹¹¹ (fig. 2.38). Giotto compensates intuitively – one might say – for this absence of the viewer's positioning by making his figures near life-size in an effort to establish a relationship based on equivalence, or mirroring, between the representation and the viewer. It is possible to reverse this interpretation, with Giotto starting with figures that have a size relationship to the viewer and then fitting around them the architectural structures. It is said that the preliminary sketches of the composition in carboncio, or charcoal, calibrated the scene and the figures within the pictorial space by means of careful measurement, compass construction helped him situate the points from which he could snap centering lines, plumb-lines, and ground-lines with thin ropes or cords dipped in pigment, whose ends were tied around the heads of nails. The artist reinforced the figural sketch in carboncio by laying in within a fine brush a pale hue of un-tempered ocher, greatly diluted with water. With a bunch of feathers, he usually brushed the ocher under-drawing clean of any traces of preliminary charcoal under-sketch. Probably the final design would be clearly legible on the ensuing layers of intonaco. *"Giotto and his immediate followers, muralists, constructed the finest painted architectural ornament painstakingly unit by unit, directly on the intonaco, by the measured, geometric means of cord snapping, compass sectioning, stylus ruling and/or ruling with reddish or brownish under-paint"*¹¹².

On this point, I would like to suggest that after reading the description of the methodology employed by Giotto, I came to the conclusion that he drew his figure compositions first in order to accommodate their near to life size scale into the rather small spaces, after which he constructed around them the architectural detail. I would propose that this manipulation of space was for Giotto a strategic privileging of the figures over the

architectural surround. As evidence of this, I would point to the manner in which his architectural structures always index his figures, often through their lines of perspective.

Outlines

At the time, outlining the drawing clearly and the application of colour were considered the principle support for arriving at a convincing representation, and the fresco's of the Bardi Chapel would seem to conform to this principle¹¹³. With the exception that Giotto reserves this principle primarily for his figures, their hands and faces. While some outlines do exist in the architectural representations, little can be discerned in the landscape of the important fresco of Saint Francis' reception of the stigmata. In body language, the most expressive features are the face and the hands, and the outlining of the figures can be read as an attempt to mark out a space within which experience, the human experience caught in body language, could be delineated. I suggest that Giotto's drawing served this purpose – to render simultaneously vital and reassuringly authoritative the facial characteristics and hand gestures for which the figures are so remarkable¹¹⁴. The outlining thus serves two functions: it constructs a singular pictorial space that exists within its own right, and it does so with an economy that most simply and directly communicates the emotions of the figures in the frescoes. The fact that Giotto does not outline the figures in their entirety permits them to merge into the architectural space – as Panofsky noted concerning the merging of the plastic figures with the architecture.

Horizon line

For Giotto, the horizon is established not by the viewer, but by the figures in each scene. But he is not unaware of the necessity to establish contact with the viewer, to hook the viewer into the cycle. He chooses to locate the most provocative – indeed, as I believe, the key introduction to the cycle – *The Death of Saint Francis and the Verification of the Stigmata* – at the lowest register so that its relationship coincides closely with the average eye level of a person kneeling on a bench, that is between 130-160 cm up (fig. 2.39). This decision inevitably brings the immediacy of the narrative home to the viewer, who is consequently also invited to observe and inspect the stigmatic wound in a shared act between the represented and the living. For the rest, the horizon of each fresco would be in line if the

viewer were to occupy the position of the figures. For example, if we took the position of Saint Francis in the *Apparition* fresco (fig. 2.40), we would then be looking down on the floor and the benches. That these frescos would have been conceived and executed from scaffolding would have placed Giotto and his workers as though indeed they were occupying the same space as their figures, and their horizon line accordingly. In any case, each fresco is spatially composed as though at ground level with the viewer. There are, however some significant compensations of which I will speak later.

Colour

Colour in the Middle Ages, according to Herman Pleij¹¹⁵, took on an importance that can only be explained by the belief that everything was part of divine revelation, seen as divine rays illuminating the earth. Stained-glass windows, with their light spilling into the churches, mediated this divine flooding of earthly reality. In the Middle Ages, the presence of nature freely displayed its profusion of colour, and since nature was God's creation, to emulate it to wrap yourself in God's glorious creation, gave colours a special status, and took on social values linking colour to status. In fact, particular colours became the sign of particular social classes and, through the colour of one's clothing, became a code announcing who one was¹¹⁶. Colour was also a weapon of war; the bolder, purer and brighter the colours, the more confident and bold a foe was seen to be, which is why in the Middle Ages, the soldiers' tunics, tents, and armour were brightly coloured and boldly patterned.

Countless texts¹¹⁷ described Christ's sacrifice for man by describing the bright and colourful robes he wore. Christ's sacrifice was lavishly described in terms of colour, blood-red colour for his wounds as life ebbed away. Religious texts were illuminated with brightly coloured illustrations dominated by blue, red and gold. It should be remembered that medieval churches, with their highly coloured interiors and stained-glass windows, were extraordinarily colourful, and this was a way of wrapping themselves in God's creation – *a temple of colour brought to life by light*¹¹⁸. The simplicity of blacks, whites or browns adopted by monks – black for the Benedictines or white for the Cistercians, immaculate white, offering cleansing and deliverance¹¹⁹, variously expressing humility and joy – found its complement in the lilacs, scarlet and purples of the bishops and cardinals¹²⁰. For wealthy

women, the brighter and the more striking and costly the dye used to colour their clothing, the higher their status. In time, this profusion, even extravagance, became a conundrum. Ironically, because the voluptuous and expensive colours alienated the poor, who could not afford them, this colour obsession – which had extended to dying hair, the feathers and furs of animals – became for the Church a debate as to whether colour was the work of the Devil or the glorification of God. Suffice it to say that it was during this time that particular associations were made to colour that are still omnipresent today in the West.

If for the Middle Ages colour was a substance both created and made visible by light, with the source of *natural* light being *divine* light, Giotto's sensitivity to light and his desire to have the works flooded by natural light is understandable, especially given his subject – the connection with the Divine that Saint Francis represented. The Bardi Chapel's window provided the fulcrum by which the introduction of natural – that is, divine – light could find its corresponding pictorial representation by the emulation of the actual architectural play of light and shadow within the frescoes¹²¹. This is consistent with Giotto's attempt to create a transitional experience linking real and pictorial space – the figures in the frescoes are near life-size¹²² – and, one imagines, an echo of the transitional nature of the story being told – the life of Saint Francis and the linkage between Saint Francis's physical body and the divine body of Christ.

Giotto's application of colour is also consistent with the connection between light and the divine. It was considered a perversion to mix colours, since pure colour was held to most properly resemble God's pure creation¹²³, and the frescoes exhibit a sense of clean, bright light accordingly. The understanding of the physical characteristic of colour in the Middle Ages held that it was refracted from objects, but that light could change to matter. Colour was an inherent property of the object in as much as the duality of colour was at one and the same time part of the thing itself and also part of the light that illuminated it¹²⁴. Stained glass windows were intended to simulate the beauty described in the Book of Revelations concerning the Eternal City's construction of gold, silver, and precious stones. That the nature of glass was to refract light was therefore important: if colour was refracted light, it

was considered to originate from the divine; if, on the other hand, it was a substance in its own right, it was considered an earthly ornament and the work of the devil¹²⁵.

This duality would have to be a matter for careful consideration by any painter working in the Middle Ages. Playing with colour, and developing or giving it meaning, was an important part of medieval artistic practice. Giotto, in the setting and representation of his subject matter, could invent architectural settings as well signify a person's importance and characteristics through complex colour codes; placed in the right setting, colours took on particular meanings¹²⁶. The preference for blue, for example, was cued to Heaven, while yellow was avoided except to suggest the golden colour of the sun – heavenly sunlight¹²⁷; blond hair was only beautiful when in combination with brown eyes, suggesting humility. The aversion to yellow followed on its connotation of sorrow, covetousness, hunger and death, and was often worn by muslims and Jews or heathens¹²⁸. Yellow was also, therefore, the colour code of disapproval. Red-headed individuals were considered devious, and the devil – Satan – was portrayed with red hair. Green, associated with the third day of God's creation of the world, was the colour of the earth and nature, and by extension of the fickleness of fortune and fate, since nature is unpredictable and capricious. Hildegard von Bingen found green restful on the eyes as it was also considered to lie midway between black and white¹²⁹. Blue was associated with timelessness and the midpoint between heaven and earth, yet it had as well many negative connotations – for instance, the blue, unreal make-believe world of the blue devils who could so easily disguise themselves through the camouflage of colour¹³⁰.

Giotto's frescoes bear out many of these medieval meanings and associations with colour. It is hard to say with Giotto's use of colour how much the pigments have faded over the years. But what is noticeable is that the intensity of the chroma appears to be quite subtle – one can almost speak of pastel or a *less material* colour. There may be a reason. For example, stained-glass itself is extremely rich in chroma intensity, whereas the refracted colours from the glass that flood and tint the surfaces of walls, floors, and ceilings is much less saturated than the coloured glass itself. I would suggest that it is the *refracted* colour –

the colour of the immaterial light, rather than of the glass – that inspired Giotto in his use of colour in the Bardi Chapel.

In *Saint Francis Renouncing his Worldly Goods* (fig. 2.18), the ground on which the bishop's palace sits is a light blue, the colour that was believed to connect heaven and earth, which is also similar to the blue robe the bishop is wearing and which he wraps around the naked Saint Francis. On the left side of centre, the lurching and threatening father wears a yellow robe, signifying – as noted – covetousness, sorrow, hunger, and death and the colour associated with heathens. The light palace walls and the light red robe of the monk, or brother, behind the bishop on the right can be seen as acknowledging Christ's suffering, while two women behind him are dressed in glowing, pure white robes signifying cleansing, deliverance, humility and joy. Behind the father, his supporters and attendants are dressed in darker, greyer, more muddled colours, unlike the purer and clearer colours on the right, giving them an ambiguous and morally questionable status. The fresco below *Apparition of Saint Francis at Arles* (fig. 2.26) is rendered in tones of browns and grays, the absence of colour in their adornment signifying their humility and their focus on the glorification of God rather than themselves. The only pure colour is the heavenly blue seen at the roofline and both sides of the cloistered room, as well as the light red of the tiles and stucco on the side of the building. This again is more than just local colour, and signifies the acknowledgement of Christ's suffering. This same colour palette is repeated in the blue sky surrounding the open room of *The Death of Saint Francis and the Verification of the Stigmata* (fig. 2.28) as well as the light red interior walls of the room itself, while the attending monks are dressed in brown or pure white robes, their humility and purity emphasized. The body of Saint Francis lies in state on a yellow cloth, yellow here representing the colour of death. Only the central monk on the left hand side has a robe of the same colour with, however, a blue undergarment showing. The yellow applied to the halos of the ascending angels as they carry the saint to heaven should be read as gold rather than yellow. The bishop kneeling to examine the stigmatic wound of the Saint is appropriately dressed in a deep red gown.

Again, in *The Confirmation of the Rule* (fig. 2.21), the basic colour is that of the blue sky surrounding the chapel, now badly faded, while the chapel's interior has a glow of light

as the monks, dressed in browns – the colour of humility, kneel in front of the papal figure, who is dressed in the deep red robe of Christ's suffering. Flanking him is a bishop on a lower tier, dressed in a white robe with a golden border – a sign of enlightenment. Of the figures in attendance outside the chapel, those on the right are dressed in a light purple, and on the left the bishop is dressed in light scarlet.

The *Trial by Fire* (fig. 2.23) employs a green background, green being the colour of God's creation that here signals an embrace of the Sultan as part of God's creation. Here also, a blue sky surrounds this open-air garden setting. The Sultan is dressed in a red robe with a pure white tunic underneath, acknowledging his conversion to the presence of Christ. Saint Francis and his companion friar are, as always dressed, in the brown colour of humility. By contrast, the Sultan's vizier at the centre of the left is dressed in a light orange-yellow robe as he scurries out of the scene, a heathen figure of scorn, now also taking on the disapproval of the Sultan.

In the bottom panel on the right side, *Visions of Brother Agostino and Bishop Guido of Assisi* (fig. 2.30), both figures are lying on a yellow ground – a lighter yellow than the deathbed of the Saint, while the room is transfused with a light greenish glow – signaling that their visions are a part of God's creation. This room, with its visions, is also surrounded by blue, the colour that connects heaven and earth, while a deep red is visible on the side of the bed the bishop is sleeping on, connecting him through Christ's blood with the ascending Saint.

But perhaps more than any other, *Saint Francis Receiving Stigmata* (fig. 2.33) leaves no doubt as to the intended signification of colour codes in Giotto's conception of the frescoes. The small chapel, more a sign than a scaled referent, is represented as blue in colour. God's House is the ultimate connection for Man between heaven and earth. The halo-like blue sky surrounding the crucified figure of Christ is suspended in an otherwise worldly darkness. The wings that support Christ are coloured a deep red, associated with his sacrificial blood. The mountain – Mount Vernon, the place of revelation – is light, almost white, illuminated by Christ's presence from the right; the Saint himself is clothed in the brown garb of the Franciscan Order, the colour of humility. Christ's halo is gold with red

marks, reiterating the form of the cross, while the halo of the saint is only gold – the immaterial colour of light, as are both the lines that connect the stigmatic marks of Saint Francis with Christ's wounds of the Crucifixion and the door to the chapel and its adjoining arched entrance – a signal that the humble church is not a church, but the Church, the embodiment of God, whose entrance is open to those who are blessed.

Since no records exist of Giotto's intentions with respect to his use of colour in the frescoes, it is not possible to verify those intentions. However, all the evidence from the records that pertain to medieval conceptions of colour, its implications and attendant strategies, would seem to correlate with decisions inscribed into Giotto's own approach. For this reason, which I've elaborated above through an analysis of individual panels, I feel confident that – however speculative – the frescoes can be read productively against what we know about colour in the medieval period.

Texture:

It is difficult to determine precisely the textural qualities of the Bardi Chapel frescoes since they were over-painted and only later revealed. Specifically, judgments on the relationship between the relative texture of one area with another have likely been destroyed due to restoration's uncertain history of processes. Any subtleties of coarsely textured areas signifying proximity and finely textured areas surfaces signifying distance – gradient texture, in the terminology of perception – if they existed, are now likely lost. An example of uncertainty can be found in the fresco of *Saint Francis Receiving Stigmata* on the outside of the chapel, the near-black sky, which appears to be coarse in texture, and which surrounds the blue that frames the figure of Christ nailed to the Tau, would seem to contradict a sensation of infinity, something one would think would have been logical for the experience.

But it is possible to make assumptions on the basis of other less degraded work by Giotto. In Assisi, where certain areas of the frescoes can still be seen to be intact, it would appear that he painted his surfaces with relatively flat monochrome colours, applied consistently smooth. Having lightly touched the surface of the Bardi Chapel frescoes myself, I can confirm their smoothness. While he increased the perception of depth in the pictorial representations through light and shadow, there is no evidence of gradient texture. Moreover,

the process of fresco painting, in which the pigments soak into the surface, would normally minimize any notable textural shifts. In fact, from the point of view of Giotto's objectives, one might argue that to represent pictorial space through texture gradient would announce a materiality that would be counterproductive to the narrative, which promotes the immateriality of the Divine over the corruptible vulnerability of the material world. From my experience in standing before the frescoes, I can certainly say that despite the circumstances of the frescoes' history, there still emanates from the coloured pigments a lightness that invites a sense of touch, a reaching out to feel the surface of the frescoes as though they were the immaterial body of Saint Francis himself.

Element of Time

The pictorial space in the Bardi Chapel itself is defined by the fresco above its entrance – *Saint Francis Receiving the Stigmata*. There is a significant difference in the Bardi fresco when compared to the Assisi panel. Here in the Bardi Chapel, the fresco shows Saint Francis alone at Mount La Verna silhouetted against a cliff that rises behind him to his left. The legend that sprang up around the event of the fissure or chasm in this mountain is related by an anonymous source of the period in *Considerations on the Sacred Stigmata*. According to the legend, Saint Francis was praying at La Verna when it was revealed to him by God that the chasm had been made in a miraculous way at the very hour of Christ's passion – Christ's crucifixion¹³¹. To enter the Bardi Chapel itself is, then, to enter this chasm, *and by extension to enter into Christ's wounds*, the final cause of his death. A space that celebrates a beautiful death is a strange place. A beautiful death is ultimately an expression of a non-sensory beauty. Giotto represents the life of Saint Francis as one of passion, trials, and doubt – a sensory dependence culminating in a peaceful death wherein loved ones accompany him in his dying, and death purifies the body of sensory vulnerability¹³².

It is also Giotto's choice to represent the life of Saint Francis in horizontal frescos that, in themselves, refer back to nature – the landscape, but also the pure horizontality of death. What is aesthetically important in architecture, writes Zangwill, is pure spatial form¹³³, which consists of describable physical spatial arrangements of walls, roofs, ceilings, doors and windows. For Giotto, architecture simply held up the envelope of the emotive and vulnerable

human frame, for which death initiates the moment at which its life is celebrated. In the frescoes, this life is given back to the viewer with the exactitude of moments: each fresco *records* a significant moment in the life of the saint, a moment in which time appears at first to be frozen, only to be re-engaged by the viewer through their own body's empathy with the action. In the Bardi frescoes we are not being engaged to become part of an *eternal* moment, but of a *specific* moment – the painting's paradox of now and forever. Despite the notion we have of time as a continuum with a past, a future, and a present, the instantaneous moment or ego¹³⁴ in which consciousness takes hold of the rate of passage is enormously slowed down. Giotto's world is not motionless, it is only still in a trance – in which the full meaning of each scene can be not only observed and contemplated, but also absorbed in empathy. It is not any longer universal time, but the human time of absorption and response.

Perspective: a hybrid of affine and projective

Margaret Hagen¹³⁵ defines Giotto's *The Epiphany* as the ideal *affine* perspective. It has no scale change from the original. But in the Bardi frescoes, this is true only as far as the figures are concerned. In an *affine* projection, lines are parallel. In the Bardi frescoes, Giotto has moved to a *projective* projection mode in which the projective lines converge, replacing *affine's* parallelism with convergence, although not all lines converge to the same point. Frequently there is a relationship of an individual or group onto which the projective lines converge – as can be seen in *The Apparition of Saint Francis at Arles* (fig. 2.41), or in the groups of Franciscan brothers kneeling in *The Confirmation of the Rule* (fig. 2.42). *Affine* projection deals with large surfaces – which these are, but light on the planes in *affine* projection is parallel to the viewer. In the Bardi frescoes, light and shadow on these planes are simulated as though cast by the real window in the chapel, making them more in tune with directed *projective* projection. This light is not indirectly reflected from a large source – ambient light, for instance the sun – as in *affine* projections. In the Bardi Chapel light is coming through the window on the rear wall. Planes in *affine* perspective are not parallel to the picture plane. In the Bardi Chapel frescoes, they are in fact parallel – frontally completely parallel to the picture plane – and recede into the distance. Moreover, the cut-away front of

the *Apparition at Arles* is larger than the receding back wall, contrary to the *affine* in which there is no diminishing scale with distance.

According to Anne Mueller¹³⁶, the pictorial construction that initiates this spatial frontality by employing perspectival vanishing points represents Giotto's attempt to define different spaces within the whole, where the figures are integrated as a cohesive spatial whole. But Giotto was not looking to construct an idealized cohesive space in which everything was proportionally commensurable, or in which things receded to the same point into the distance. Rather, I believe, Giotto was looking to find a pictorial architectural space that reflected the unity within the individual's struggle of body and soul. Giotto's pictorial architectural solutions propose a cohesive space of a different order than the Gothic cathedral's totality. The fundamental architectural fragmentation in the Bardi Chapel becomes a singular space, the part of the whole. But here the part is a horizontal, not a vertical part; it has the feeling of extending sideways – in relationship to the body's interior – the interior landscape of the individual's state of being. A kind of *dasein* in which the horizontal, or horizon, is a point of reference. Giotto, in this context, is acknowledging the horizon's *horizontal* relationship to the figures and the viewer.

But there is another kind of spatial consideration that Giotto proposes, one that becomes evident when we look at the interior of the six frescos inside the chapel. The upper fresco on the left has a pictorial *convexity* as the wall of the Bishop's palace protrudes forward in *Saint Francis Renouncing his Worldly Goods* (fig. 2.41), and a pictorial *concavity* in the *Confirmation of the Rule* as it recedes. Panofsky, in his notes, refers to the vision of space in the thirteenth century as having a linear manifestation that was first defined by Villard de Honnencourt (fig. 2.44). In his architectural drawings, de Honnencourt represented concavity by a downward bending or breaking of lines, and convexity in contrast by an upward bending of lines¹³⁷. In the upper left fresco (fresco #1) Giotto achieves *convexity*¹³⁸ with the downward motion of the two sides of the stonewall around the palace, and in the upper right fresco (fresco #2) *concavity* with the upward curve constructed by the kneeling friars and of course the interior receding roof. Because the occidental narrative shifts us from left to right, there appears to be an alternative in/out pictorial construction.

Petrarch, in his *Painting as the Model of Art*¹³⁹, writes about the fact that the statues appear to be breathing. It is this in/out convex/concave alternation produces here this effect of breathing. Also, the top frescoes are the only ones in which the projective perspective converges or diverges off centre. This is the only instance in which the viewer on the ground benefits from this kind of foreshortening. On the left wall (fresco #1) the confrontation between Saint Francis and his father is thrust forward towards the viewer by virtue of the projective nature of the two planes meeting at the corner of the palace, and the result is that this event is most prominently positioned on the picture plane. This prominence – while equally true in the case of the kneeling Saint Francis on the other side (fresco #2) – is achieved through an inverse manoeuvre involving a *concavity* produced by converging *receding* perspective lines towards the back of the chapel. Note that the figure of Saint Francis in this fresco retains its predominance through a concavity that is achieved as well through an inversion of the upside down “V” line of the church roof, now turned into a deep “V” cutting into the space St. Francis occupies between the bishop on the one side and his followers on the other. This describes a form of repetition. Important to bear in mind in all of this is that while in fresco #1 the figure of Saint Francis – due to the outward thrust of the perspective – seems situated before us in the space of the viewer, in fresco #2, due to the inward thrust of the receding perspective lines, Giotto removes Saint Francis from the space of the viewer, who must move toward the saint and beyond the picture plane into the interior of the representation – breaking the surface as though entering a wound. This represents another instance of Giotto adopting a strategy of empathy linking viewer and saint. Because the angle of view is so acute, the viewer standing at the entrance must look up obliquely, and the space closest to the viewer becomes foreshortened. Sheena Rogers speaks about compensation in visual perception on the basis of a simultaneous perception of the picture surface as oblique, while distortions or irregularities in virtual space – transformation of layout – will have little effect on perception if the observer assumes that regularity in fact exists in the environment. This has implications for the concept of perceptual belief. The displaced centre is also re-centred because the nearer frescos below are absolutely centred¹⁴⁰. If the position of the eye is too near a picture – the viewing angle reduces in size all visual angles, and both magnification and reduction in size have consequences for depth. The slant

of receding surfaces becomes more frontal in virtual space under magnification, and less frontal in size reduction. For instance, a cube will either be stretched or squashed depending on angle of vision¹⁴¹. The viewer in the Bardi Chapel, being unable to see either wall in their totality due to the height and the narrow space of the chapel, needs to move back and forth in order to perceive all the frescoes.

Scaling

In the Bardi frescos there are some elements that diminish in distance – the angle of the perspectival projections as well as the diminishing planes that they form. Planes receding parallel to the picture plane become progressively smaller as the distance from the picture plane increases – for example, the architectural side wings in *The Confirmation of the Rule* (fig. 2.45) – while the figures, on the other hand, appear not to diminish and seem therefore relatively larger. The scale of the wall around the bishop's palace in *Saint Francis Renouncing his Worldly Goods* (fig. 2.46) becomes larger at the front edge, where the two sides meet near the pictorial surface, and recedes into the distance. As an aside, it should be noted that in this painting – and in this painting alone – while the figures near the outside edge are smaller, here they are women. This would account for the smaller size, and this therefore does not mean that Giotto has become inconsistent; they are smaller due to natural gender difference, not through depiction of pictorial depth. Again, returning to the question of diminishing architectural perspective scale, the throne in *Trial by Fire* (fig. 2.47), like any object in a projective scene, sits on the ground plane or parallel surface and also diminishes with distance¹⁴².

There are exceptions in extreme scale differences, for example the much too small chapel compared to the size of Saint Francis in the fresco outside the Chapel, *Saint Francis Receiving the Stigmata*. The chapel is here merely a symbol, and not intended to articulate a cohesive pictorial scale or signal a particular depth cue; it is symbolical by choice, not smaller by perception¹⁴³. There is in this fresco some evidence of gradient size. The ground on which Saint Francis is kneeling appears coarser and more in focus than the receding ground on the hill behind the chapel. It must also be remembered that this is difficult to assess because of the degradation and restoration of the fresco. The tree on Mount La Verna

appears to be in the distance because it is much smaller than the one below it and to the right of the saint. In this fresco Giotto has taken the liberty of mixing the symbolic with the real. The hovering figure of Christ, so much smaller than Saint Francis, appears to be some distance off rather than simply a small figure of Christ. In each instance in all seven frescoes, it is the size of the figures by which scale parity or difference can be assessed.

Element of Emotion as applied to pictorial space

Emotions are causal and are contingent on cause and effect relations. Object relations are causal if each one can be described separately. Emotions and their objects in the world are bound or contingent on each other¹⁴⁴. In the Bardi Chapel, signs of emotions construct the dialogue between figure and frame, an exchange between sculpture and architecture negotiating the delicate transition between building and sky – a *diaphanous intermediary*¹⁴⁵. Therefore the pictorial spatial relations resonate with the architecture and the figures in their beliefs and states of being – their physical and psychological states. I wish to repeat Hagen's comment on the different expressions of pictorial space: "*All representational paintings succeed as representations because they carry perceptual information about subjects they picture, but not all paintings carry the same feeling of the spectator 'being there'*"¹⁴⁶.

Emotions have no specific organs, but we localize them in different parts of our body. This provides a model, a precedent as it were, by which we then identify emotions that seem spatially portable – locatable – with respect to different spatial configurations outside our body. In some way, bodily sensations can be understood to stand halfway between perception and emotions – emotions are then also closely tied to time, which is the measure of local motion. One can feel, Kenny writes, a very brief pain, or an intense cry of deep grief for the space of a second, no matter what preceded or follows it¹⁴⁷. There is considerable emotion embedded in the concept of sin and transgression, and written into it is already a sense of movement, which typically has a moral component, involving thought, action and judgment¹⁴⁸. Giotto's pictorial resolution is at a point of transgression, a halfway point caught in the moment of deep empathy, moving between image and its meaning – the feeling it generates – and the belief that judges it. I was struck by the soft dark brown eyes with which Giotto represents the empathetic witnesses that hold vigil to the left and right of the saint in

The Death of Saint Francis (fig. 2.48), whose lifeless body undergoes examination of the wound as the viewer verifies the reality of the emotively charged pictorial space. These eyes are large and solidly dark, emanating love, while the facial expressions emanate sorrow¹⁴⁹. Yet light bathes the scene, and nothing is hidden, all is visible. The eye of God illuminates the world with light – whose geometry determines what we understand today as visual perception. Vision depends on the eternal light of God.

2.3.1.2 Analysis of pictorial space in *The Cycle of Saint Francis in the Bardi Chapel*

The Basilica of Santa Croce might be described as a typical Italian Gothic cathedral. But such reductive descriptions ignore the facts. As one passes out of the hard bright light of day and enters the lofty mystery of the church, that light now suddenly appears to speak – through a seemingly infinite choir of heavenly voices high up on the Basilica's walls – to the eternal Grace of Divine Light. The Basilica is not the Romanesque fortress of the early Church. It does not guard the Faith. It *is* the Faith.

Phillip W. Rosemann comments on Panofsky's controlling principles in Gothic architecture in the following terms: the neo-platonic metaphysics of light penetrating the large windows and thinner walls – and the organization of these into a structured systems of distinct parts in which smaller detail are mirrored in larger versions – exponentially become an expression of the whole. God made the world, and made Man in the image of himself. The paleographer Robert Marchial makes this same relationship when he compares on a more complex level gothic architecture and Gothic script *with its characteristic combination of rational clarity and opaque abbreviations*¹⁵⁰. This openness, he suggests, makes the whole infinitely fractionalized, *open to the eye*, in which the whole is made accessible through the parts.

Open to the eye, or is it eyes open? Gothic architecture operates as a metaphor whose aim is to reveal an empathy with the body – and foremost of course the body and blood of Christ – and the potentially emotive body states associated with seeing and feeling. I am here integrating Damasio's idea of empathy and its relationship to *mirror neurons* which are capable of mimicking others emotive states, or capable of simply identifying emotive

states¹⁵¹. Is Gothic architecture not an expression of this? To speak of emotions is also to open up a discussion of Richard Gregory's black box analogy¹⁵². It can be argued, however, that here the interior processes of emotive states do not work in the same way as in his concept of illusions. Gregory's illusions help to identify perceptual mechanisms because they are mis-readings of contradictory visual stimulus, or – according to a theory of conceptual beliefs – top down misinterpretations. According to Damasio, emotions that are identified with feelings include the fluidly changing motions of emotive states as they respond and adapt to the environment. This occurs in the emotive response of one person to another, or of one person to – as in this case – the architecture of the Basilica. Another case would be, as well, the emotive relationship a viewer can have with an image. Giotto's images in the Bardi Chapel are strongly intended to carry such content. It is possible to see this as part of the traditional role associated with the idea of empathy – that is, to be carried along with something, or to be transported, as in a theory of aesthetics¹⁵³.

To enter Santa Croce is, in effect, to enter a complex body whose architecture – with its many ordered columns and colonnettes – permits the viewer to gaze in awe at its immense skeletal frame, the columns of the arcade that line the main vessel of the church reminiscent of a gigantic vertebrae. From the Basilica's entrance, the equal spacing of the columns in the central isle recede in an ordered symmetrical progression of perspective towards the high altar, which is placed at the juncture of the transept, while along the way the side aisles are punctuated with small equally spaced rows of cells, now offices and other uses, but originally for the Brothers. Off these columns and the many smaller colonnettes is hung the building's skin – the roof and walls that are the Basilica's envelope. At the transept, the walls on either side of the central nave fold open to reveal ten chapels, whose penetration of the transept walls provide an exquisite spatial climax, a warm mysteriously feminine embrace, to the visitor's passage from entrance to altar. The building itself seems to expand here, to enfold the Faithful in its acceptance of their passion¹⁵⁴. This enfolding is all the more compelling for the fact that as one enters the Basilica the possibility of an extended and overall view of the church diminishes with every step taken, and one becomes conscious only of one's own body moving in space. Approaching the chancel and its high altar at the centre (fig. 2.49), one's

retinal imaging of the surrounding surfaces naturally expands exponentially with the rate of movement, producing an illusion of impending collision with the transept wall ahead, a collision that the chapels transform into an embrace¹⁵⁵.

Central to this embrace is light. The chancel and the chapels are penetrated with windows, each with a long thin vertical opening and a smaller circular oculus. A number of *oculi* also crown the central chancel above the altar, and high above the chancel itself there is placed a large clear oculus, through which as though through the lens of an eye streams a brilliant shaft of light, a divine lantern to light the way forward for the Faithful. No other openings are so boldly transparent. Instead, they cast their light, emanating from God, as narratives of the Christian myth, with the visual thoroughness and chronological telling of the Bible elaborated with bookish Scholastic zeal¹⁵⁶. The curious effect of these stained glass leaded windows, with their abstractly patterned representations mingling clear and coloured glass illuminated through God's daily Grace, is to shift recognizable image into simple pattern. In a kind of tracing over, a sense of undecidability, one's eye focuses to catch the image on the glass only to have the light that makes it intelligible convert content to form, to patterns of light itself. This experience is, incidentally, somewhat similar to the auto-stereogram¹⁵⁷, a visual puzzle that requires considerable committed physical attention. But the Basilica is all about attention. For these windows there is of course the pleasure of the light, and its capacity to illuminate the biblical stories. More than this, however, there is the act of seeing. Looking hard against the light to decipher the images and their stories, distance becomes ambiguous as one's perceptions move rhythmically between the proximity of the colored surfaces of glass, framed and spatially flattened by leaded lines, and the clear glass surfaces that lace through them an indeterminate space.

While the external flying buttresses are not visible from inside, one senses nevertheless their presence lending support to the extremities of the Basilica's vertically extended frame. Despite the vastness of its interior, so long as one remains standing, in visual contact with one's body set firmly on the ground, the sense of transparency provided by the light – and made possible by the buttresses – ensures a sensation of solid familiarity and dependable intimacy. In gazing at this complex interior, described as a fractionalized structure¹⁵⁸, careful

observation becomes essential in order to read the detail. The eyes must move from one point of intimacy to another, each point reflecting an illuminated logical transparency¹⁵⁹. In a paradoxical reflex from this detailed looking, one's gaze is lifted up by the sheer verticality of the space with its rational sense of commensurable geometry. There is, in other words, a telescoping from the particular to the general, from the intimacy of the part to the immeasurability of the whole.

A thought occurs to me as I myself stand in this space looking up, subject to this paradoxical gaze. I am suddenly, even ecstatically aware of what this encounter would mean for one to whom God is present in this church, in the light that draws me to Him. I imagine myself, a believer – perhaps a Franciscan Brother – aware of the infinite, the immaterial nature of this very material structure. I lie prostrate on the ground, my body assuming the form of the Cross, taking on Christ's pain, his fear and humiliation, taking on in imitation the Basilica's plan, the shape of the TAU. And now, just as I sense my body falling, sinking into the cold stone floor as though into ignominious death, I feel myself transported, lifted up as, in my mind's eye, the tensions written into the building's complex skeletal frame produces a linear force that pulls me towards the light that penetrates me all around, a light whose culminating effect is to suspend me far above the ground, my only contact the feel of my feet on the floor beneath me. My body describes an arc from earth to heaven, and space has become both vast and insignificant.

Needless to say, spatial orientation has an element of disequilibrium. What is spatial orientation, but the process of establishing a correspondence between perception of the environment and a spatial knowledge of that environment that is either already in the mind as a cognitive representation, or a graphic map, by which to orient oneself¹⁶⁰. Since, in my example above, the Basilica is seen from a completely different order than that of its plan, it becomes unfamiliar and there is an inevitable sensation of disorientation and misalignment, a temporal and spatial discontinuity. I would even go so far as to say that in looking up as I did, the lack of ground references¹⁶¹ becomes an exocentric – or as Campbell defines it – an *allocentric* experience to spatial location. We measure our position from the outside in, and when we no longer have ground reference we lose our sense of scale and relative

proportions. As we enter the church, we are looking straight ahead and our spatial relationship is egocentric – measuring the spatial relationship we have to our own location on the ground. The idea of spatial disorientation can be further understood in relationship to our view of space. As Campbell¹⁶² notes, if we occupy space in a fully engaged manner, with responsibilities to perform, we are in a very different space than if we remain detached from it in a disengaged or theoretical manner. This distinction, in other words, is between imagining space from a particular point of view – as a subject at the centre of one's world, or on the other hand thinking about it independently of any particular viewpoint in an impersonal or absolute way. I believe that a person in the medieval period, looking up towards the central oculus in the Basilica of Santa Croce, would respond in a way typical of this latter occupation of space – a mode in which space takes on the character of the absolute. I would even say that in this circumstance, it would not be possible to have an objective conception of self, and in this way a sense of vertigo is created that needs to be compensated by “a stabilizing and powerful presence” – in effect the idea of God.

2.3.2 Philosophical beliefs

2.3.2.1 General context

The philosophical struggle of the Middle Ages cannot be separated from the ideological specificity of the Christian theological doctrine and its relationship to physical “nature”, the nature of the individual and the definition of God. It is important here to realize that the concept of nature¹⁶³, as we understand it today, did not then exist as a separate category. The core of medieval philosophy is invested in metaphysical issues – questions of being and existence¹⁶⁴. Since metaphysics involves ideas regarding existence, causality and truth, and through these a concern with the origin of the natural world and human nature, this examination of medieval philosophy will therefore concentrate on the nature of nature, nature as read through metaphysics, and the application of empiricism and logic to the problems posed by nature.

The central problems of medieval metaphysics were in large part received and transformed from Greek and Roman thought – Plato, Aristotle and neo-platonism. In

classical discussions on nature a differentiation was made between *physics*, or that which grows of and by itself, and that which has come through art or *techne*. All growth had a unifying cause and represented the essence of a living thing that makes it what it is. Growth was also considered in relationship to the doctrine of creation-from-nothing that raised questions about nature versus grace. This initiated the inquiry into the essence of both that which is created and the creator itself. This aspect of classical philosophy was taken up and extended by Thomas Aquinas, as I will discuss later. It is this debate concerning the essence of the created and its creator that moved classical philosophers from their enquiry into the pure physical nature or *physics* to the enquiry of essence or that which stimulates and guides growth. The result of this discussion formed two categories, namely *physis* as a biomorphic paradigm or the theory of nature as a whole, to be distinguished from *techne* or the technomorphic paradigm of living individuals¹⁶⁵. While this line of reasoning seems distant from Giotto's frescoes of the *Bardi* Chapel it is the beginning of an individual will, emotively expressive that begins to redefine the individuals relationship to God as demonstrated by Giotto's subject, Saint Francis and contributes to the changing beliefs that underlie the *Bardi* frescoes pictorial spatial formation.

In the Middle Ages, coming to terms with this complexity occurred in three different stages. In the twelfth century the cosmological problem was expressed by the question of *nature as nature* in the context of Creation, adapting it to the Christian model of creation. This task was taken up by the Bishop of Toledo, and the translators of Arabic texts that were affiliated with him, amongst whom were Gerard of Cremona and Daniel of Moreley.

The thirteenth century had different concerns, dominated by Aristotelian and Arabic models that interpreted nature through metaphysics within the concept of *Grace* – the ultimate state of Being as essence and perfection¹⁶⁶. Thomas Aquinas 1224-1274 took up the challenge of metaphysical speculations to rationalize an accord between natural philosophy and Christian theology while keeping the Aristotelian system of natural philosophy intact. This latter lead his contemporary, Saint Bonaventure, 1221-1274, to believe that Aquinas' system required more cohesion. Consequently, while privileging the Platonic elements of non-materiality as the highest form, he nonetheless applied much of the Aristotelian

system¹⁶⁷ of logic, philosophy of science, ethics and metaphysics. Moreover, he also incorporated aspects of neoplatonism¹⁶⁸, whose central theme is *super-existence* as the source of all beings. With this eclectic mix Bonaventure hoped to achieve a unified integration of creation and nature, of natural philosophy and metaphysics. This, it must be remembered, was specifically tailored to the theological direction taken by the Franciscan Order, of which Bonaventure was an important disciple¹⁶⁹.

The third stage in the development of medieval metaphysics, and the point on which this discussion of philosophy will end, is represented by the most influential philosopher of the fourteenth century – William of Ockham (1285-1347). Ockham rejected the metaphysical and epistemological assumptions of *medieval realism*, and proceeded to reconstruct philosophy on the basis of a radical empirical principle based on *parsimony*, popularly known as *Ockham's razor*. This principle proposes that all knowledge is best secured by taking the shortest possible route through direct experience of individual things and particular events. He defended this position of simplicity by suggesting that divine reason itself takes the most direct route. I would argue that this idea of parsimony derives from observations, already familiar at the time, on the nature of light as always taking the most direct route and traveling in straight lines. And to complete this epistemological empiricism, Ockham complemented it with a logic that had developed at its foundation its own form of empiricism based on the basic premise that "*the human mind can directly apprehend existent individuals and their sensible qualities, and that it can also apprehend its own act*"¹⁷⁰. Giotto leaves no doubt that the individuals he represents become the focus of their own acts as individuals – as for instance with Saint Francis and the Friars as a collective shared experience in *The Death of Saint Francis and the Verification of the Stigmata*.

Nature as nature

As I have mentioned, nature in the Middle Ages was not a clear and separate category which could be investigated in isolation. In the Scriptures, nature was really only a part of a *transitional* place that held very little interest for understanding it – or the world it represented. In other words, nature was not seen as an organizing principle between God and

his creation. By the medieval period, however, the Friars of the twelfth and thirteenth centuries considered nature as both a part of and also a link to Creation and God.

This shift can be attributed to the emergence of classical thought through Arab translations of the primary texts, but also – and as fundamentally – through Arabic interpretations and comments on those texts. These texts became the key to developing the particular medieval relationship to nature¹⁷¹. If the task, in some sense, was to understand the nature of the divine, then the philosophical tradition, and through it what eventually became the natural philosophy of the Middle Ages, became an important bridge and fulcrum at the service of theological ambitions to reflect or at least harmonize classical thought with Christian ideology, an ambition that, as noted previously, underwrote Bonaventure's project to unify Aquinas. This objective was further complicated by the Arabic commentaries and their interpretation of the nature of the Divine. For theologians, it was therefore necessary at one and the same time to reframe classical thought in order to conform with Christian ideology, and to reframe Christian thought in order to distinguish it from Islamic interpretations of those same texts, primarily Plato and Aristotle¹⁷² on the question of nature. It is in this light that one can understand why the Archbishop of Toledo was eager to sponsor translations of ancient texts from the Arabic¹⁷³. The most fundamental issue that divided the Arabic interpretive texts from Christian doctrine lay in Islam's antithetical hierarchy of intelligence¹⁷⁴. In the Arabic view, God gave to the first superior being in this hierarchy the power of creating all that was inferior and below. What this kind of hierarchy accomplished was to distance God from His own creation, of which man was considered one of its superior beings. Inscribed in this view was a greater autonomy for the concept of nature, including human nature, and it was therefore in this spirit that the Arabs interpreted and commented on Greek texts. In Christian theology, in contrast, nature¹⁷⁵ and its physical material reality was designed by the Christian God himself. Physics and its laws of nature became in this way understood as the first principle of divine creation. The physical properties of light (divine in origin) as propagated in straight lines, and the workings of the celestial spheres or bodies, were frequently interpreted simply as agents of God's will for the lower world, and become two conflicting realities that define Giotto's pictorial space. Their motion in the upper

sphere of the world was considered to be the direct cause of change in the lower world or earthly realm. In the Middle Ages, this produced a systematized astrology and rules for predictions. This could be complicated by a certain dialectical relationship, and Gerard of Cremona suggested that the cause of planetary effects could be undermined by the material nature of the lower world¹⁷⁶. In this overwhelming emphasis on the primacy of divinely inspired purpose, mathematics and the laws or axioms of geometry came under a kind of determinism which, while giving the appearance of autonomous and objective systems, became enrolled as the keys to understanding the nature of the Divine.

The struggle the church encountered with different interpretations led to rules of confirmation and condemnations that attempted to limit the acceptance of undesirable propositions. However, over time many ideas were integrated, while other became important points of speculation. For example, the Arab philosophers developed a rational proposition by which man could perfect his own nature, something that appealed to the Christian Mind. Alfarabi's approach to this problem was taken up in the *Attainment of Happiness*. In it he divided natural science into *metaphysics*, whose aim is to know the ultimate causes of being, and *political science*, which does not depend on knowing about beings beyond and above nature. In his contemplation of political science, Alfarabi compared the structure and nature of cities to the *sensible bodies* that constitute the world – exclusive of their relationship to divine beings. Political science for him also involved a theory of ethics, understood as an attempt to rationalize the nature of virtues and vices organized into theoretical virtues, deliberate virtues, moral virtues and the practical arts for citizens of nations and cities. These virtues are what distinguish man from natural and divine beings and it is through these that man could exercising will and choice¹⁷⁷. Alfarabi's definitions were to find their way through complex sets of arguments into medieval metaphysical speculations. On the ceiling of the *Bardi Chapel*, Giotto painted Franciscan virtues, as a moral code of conduct.

One of the main problems inherited from the classical period was how man can achieve theoretical perfection when perfection constitutes theoretical knowledge that cannot be demonstrated with certainty and that is not self-evident. This perfection, Alfarabi insisted, is *demonstrative* knowledge of man himself and of all the parts of the world: until knowledge

of this is achieved, everything is really opinion. Rather than starting with the idea of will and choice, Alfarabi began with the investigation of nature, the very subject matter within which political science is grounded. He reasoned that nature precedes will and choice, and that therefore will and choice cannot be understood until man first understands his own nature. Consequently one should first seek knowledge that can be attained with certainty and can be demonstrated. Alfarabi argued that this is as true for natural as for human investigations, because this is the only kind of knowledge man is able to act on. Giotto, by using a combination of divine emanations formed by the individual and the architectural elements, secured it to concrete reality.

For the Christian Church at the end of the twelfth century, however, this line of argument was too deterministic in the sense that Alfarabi's insistence on an independent examination of man's nature separated that nature from God's direct authority. To ensure subordination of man to God, the church was compelled to divide the world into upper and lower world orders, in which the lower world became cause to the upper world's effect. It was Gerard of Cremona and Daniel of Morely that applied this kind of rationale to harmonizing Christian beliefs with both classical texts and Arab interpretations. They were also largely responsible for disseminating this conception in continental Europe and England. Daniel of Morely gave to the Christian philosopher four basic causes, borrowing heavily – according to some – from Aristotle. These were defined as: *efficient*, *formal*, *material*, and *final*. Together, these defined this new relationship between upper and lower world¹⁷⁸. God was the efficient cause; wisdom the formal cause, the four elements the material cause, and goodness the final cause¹⁷⁹. In addition to the concept of upper and lower orders, it was urgently important to integrate the Christian idea of Creation – conceived as all but instantaneous – with the Islamic concept of a world and eternal universe having no beginning. To bridge this discrepancy, Morely named two ultimate causes, of which the first constitute the *principles* or *original causes*, and the second those dealing with creation, which have two further principles – *unity* and *diversity*¹⁸⁰.

The problem concerning the discrepancy between Christian and Islamic beliefs was pursued by Archdeacon Dominic Gundisalvi in the middle of the twelfth century. Gundisalvi

worked under the patronage of the Archbishop of Toledo, who claimed for himself not only the mere transmission of knowledge but also the role of a missionary bent on forwarding this knowledge as a tool by which man could perfect himself¹⁸¹. Gundisalvi adopted philosophy's methodology of deconstructing the text by the idea of *distinctio*, or *distinctions* dividing and subdividing the content until this process became overwhelmingly open to rich explanations on the nature of Christian beliefs. In this way Gundisalvi's approach aimed to dissolve questionable discrepancies between classical and Islamic beliefs as a means of both rationalizing and expanding Christian doctrine.

For Gundisalvi, knowledge was *for* something and *about* something. Knowledge of *scientiae* was intended to help man look after his own material needs. *Scientiae* was subdivided into the seven liberal arts. Man was provided with the *trivium* – grammar, dialectic, and rhetoric – for the purpose of good communication, which took on special importance in theological dialectic for using tools of philosophy to define and defend Christianity. Henceforth dialectic became central to the theological enterprise¹⁸². Gundisalvi defined the other four liberal arts, or *quadrivium* – arithmetic, geometry, astronomy, and music – all given to man from the divine as part of the *Sacred Page* – as serving the purpose of assisting man in attaining truth. These theoretical subjects were, through philosophical discourse, meant to assist in *assimilato* (making them similar) to the truth, the Good and all the work of God¹⁸³. Almost a hundred years later Roger Bacon quotes Cassidorous on mathematics:

[...] These four sciences, geometry, arithmetic, astronomy, music, we ponder over with an attentive mind, they sharpen our perception, they wipe away the mire of ignorance, and produce that speculative contemplation by the gifts of the Lord. Rightly do the holy fathers persuade us to read these four, since in a great measure through them our appetite is drawn away from carnal things, and we are caused to desire those things which we can view in spirit only with the help of the understanding¹⁸⁴.

Philosophy in this way became synonymous with the demonstration not only of Christian truth, but of truth itself. Gundisalvi, elaborating on the initial concept of the quadrivial arts, made *Scientia Naturalis* the knowledge of concrete things on earth and in heaven in conjunction with their motion. In other words, Gundisalvi was interested in the knowledge of things – knowledge itself – more than in the knowledge of nature, and in the

nature of philosophy more than in its practice. This made it possible for Jean Buridan (1300-1358) to study the laws of motion, regarding with some objectivity both the *primum-mobile* and the particular characteristics of bodies in motion. From this he developed quite a sophisticated concept of quantity of matter and velocity, studying the qualitative and differential sense or momentum and concluding that the impetus was an enduring condition, constant and only corrupted by gravity. These concepts of physics are presented in the form of abstract argumentation rather than experimental facts, and Buridan is interesting for revealing the extent to which philosophy had by the fourteenth century absorbed empirical impulses and moved towards an objectification of knowledge. Buridan writes: "*The mover in setting the projectile in motion gives to it certain impetus or certain energy by which the projectile keeps moving in the direction in which the setter puts it into motion*"¹⁸⁵. Giotto's incomplete dynamic projections that form part of his pictorial spatial resolutions of the frescoes, I propose, were simply meant to set his projective pictorial elements into motion, without feeling the necessity to terminate them into a point of infinity as was demonstrated by the camera obscura projection.

Nature through metaphysics

Despite its gradual movement towards empirical observation, if not experimentation as such, medieval philosophy remained a tool for speculation on nature and the Divine. An important figure in this regard is the Franciscan Alexandre Neckman¹⁸⁶ who studied in Paris and Oxford between 1197-1204. His *De Naturis Rerum* might appear at first glance to be strictly about the observations of creatures; but reading the text more closely, a possible understanding is that Neckman's research into the physics and philosophy of nature is intended to lead the mind from their specific nature to their origin. In other words, God is advanced as *summa natura*, based on the belief that the love one can experience of the physical world leads one directly to God. For the twelfth century friar, nature was tantamount to God's relationship with creation, not a separate intellectual enterprise. The Franciscan form of philosophy was in character a theocentric natural philosophy¹⁸⁷. Contemporaries of Neckman who investigated the classical writings, Neckman called "Acute investigators of subtle things", or

"observers through windows" "*when they inquire into the nature of things through subtle and fine reasoning*"¹⁸⁸.

Looking through the window of "subtle and fine reasoning" was intended to reveal through nature's processes a model by which man could understand how to achieve his own perfection. If the twelfth century largely investigated the problem of nature in the cosmological sense, the thirteenth century looked at it in a metaphysical sense. To situate Giotto's Bardi Chapel frescoes within this era, it is important to have a grasp of those debates, and these can be briefly summarized through the figures of Aquinas and Bonaventure. Thomas Aquinas believed that all objects of our experience were created from nothing by God, and that not only the objects but also their own nature must be created, and this nature must be observable and found to be relevant to its entire being¹⁸⁹. This nature then permits the object to have an *esse* or essence [act of being]¹⁹⁰ and a sense of belonging and participation through reference back to its creator and by virtue of its definition as the particular effect [of God]¹⁹¹. Thomas Aquinas believed that it was living nature and its *substantial form* that should be interpreted. He understood that nature demonstrates to man the purpose of change. As he understood it, "*change is the means of finding perfection [in life]. Nature becomes in that sense subjective, and its "accidental" properties aid in producing change for the sake of perfection*"¹⁹². He also established with this chain a kind of hierarchy that preserves the difference between the causality of nature and the causality of God. *Faith* was at the top of this chain because it presupposes natural knowledge, and the *state of grace or divine intervention* – that element of accident – presupposes both nature and perfection, giving Grace or the essence of being the status not of residing in nature but of completing nature¹⁹³. The fresco of *Saint Francis Receiving Stigmata* is set in a landscape, yet all of its pictorial construction is interdependent on the relationship formed between Christ on the cross and Saint Francis. In other words, their presence not only completes nature but also constructs it.

On the other hand – as we have seen – Bonaventure, as a Franciscan – was dissatisfied with Aquinas. Bonaventure sought to limit the difference between philosophy and religion. He argued against Aristotle's rejection of archetypes, and supported the idea of Christian

exemplarism, the Christianized version of Plato's notion. However, he did support Aristotelian ideas based on knowledge of the external world through the senses, and the mind coming into existence as a *tabula rasa*¹⁹⁴. He also takes the middle ground between the position, on the one hand, that eternal light is the sole reason for human knowledge, and the belief, on the other, that eternal light merely influences and guides it¹⁹⁵. Like Aquinas, he defends the doctrine that all creatures are patterned after exemplar causes or ideas and that the essences of their being is in the mind of God. But he is less subtle in his differentiation of divinity and nature, and refers always back to the revelation from the scriptures that demonstrate that the divine hand of God lies hidden behind knowledge and nature, both of which simply mirror it¹⁹⁶.

With this debate in mind, it is possible to now see the significance to be attached to the quality of naturalness that Giotto invests in the figures depicted in his frescoes. In effect, his figures reflect the new positions these debates engendered in the relationship between the natural world and God. Moreover, and very importantly, Giotto's heightened sense of realism is extended beyond depiction of individual figures to include the relationships he suggests *between* the figures.

Empiricism and logic

Against these three examples, the late thirteenth century Franciscan theologian and philosopher William Ockham, developed a radical idea of the relationship that God, Creation, and man have with one another. While I say it is radical as a unified and rationalized position, it strikes me that it is the very position that Saint Francis proclaimed himself¹⁹⁷. Ockham felt that the less assumptions that are made, the more clearly there would be established a direct relationship between thought as a universal entity and everything else that exists as a singular and individual entity¹⁹⁸. He considered the doctrine of a common nature of individual things to be a contradiction, and argued that individual things can no more have common properties than universals can be defined by individual things. It therefore comes down to the way language is used, and he posited that both universals and communities are properties of signs¹⁹⁹. As an epistemological problem²⁰⁰, it is important to explain how the experience of individual existing things can give rise to the concept of

universal character. He resolved this conundrum by developing a doctrine of intuitive and abstract cognition. Intuitive knowledge acts on immediate awareness that is capable of making judgments on contingent facts²⁰¹. Abstract cognition, on the other hand, is not based on concrete knowledge or contingent fact, its judgment instead dependent upon propositions²⁰² and demonstrations²⁰³. The main thrust for this argument, then, concerns the question as to whether a mental universal concept; a concept is a mental image or species because it resembles the external object and causes the intellect to become aware of those objects²⁰⁴, and is also merely an act of understanding the individual thing of which it is said to be a concept. This theory is given preference because it is economic²⁰⁵. Ockham, through the process of his logic, also concludes that there is no necessary reciprocity between man and God, and he underlines God's freedom – and therefore spontaneity – "*on the givenness of the world that God creates*"²⁰⁶. For Ockham, this opens up a greater autonomy for the self-determination of the individual, and a connection to the consideration of free will.

It is well to remember that Saint Augustine had initiated the discussion *On Free Will*²⁰⁷, which for him nevertheless must necessarily be always subordinated to the grace of God. Thomas Aquinas also made a relationship between free will and the intellect²⁰⁸, but it is John Duns Scotus, 1265-1308, who laid the ground for Ockham's argument. Scotus stated that will causes the act of willing in the will. This is an echo of Saint Augustine's *City of God*, Book XII chapter six, in which Augustine writes that it is will alone that makes the difference between one man succumbing to temptation and the other not. Scotus argues against the idea that evil can instigate negative volition, since evil has no material presence, and concludes that the appetite for choice is determined by the perfect rational power, "the will", that can determine for itself whether to be positive or negative²⁰⁹.

2.3.2.2 Analysis of pictorial space in *The Cycle of Saint Francis in the Bardi Chapel*

Aesthetics in the last half of the thirteenth century was for the Scholastics a function of theological, ontological and logical questions, rather than a separate problem in its own right²¹⁰. Scholasticism, devoted through the work of such figures as Grosseteste and Bonaventure to the integration of the classical texts with Christian doctrine, was the principal

philosophical movement during most of this period. In the course of their philosophical speculations, Grosseteste, Bonaventure and to a lesser extent Aquinas attempted to define the nature and essence of beauty and what could be said to be its meaning. The Franciscans represented another position, one intent on direct experience rather than on scholarly integration of texts, and one concerned with stressing the limits of human knowledge. For them, aesthetics was similarly a property of a larger experience – that of God’s immeasurable bounty, whose definition exceeded human ingenuity – and this insistence can be seen to persist even in the work of Ockham, himself a Franciscan, who as a nominalist philosopher emphasized the limits imposed by language itself. This similarity should not, however, cloud the fact that for the Order, beauty was an *integral* aspect of religious experience, not merely an associated intellectual problem. This was primarily due to Saint Francis’s relationship to the world around him, which he embraced as at one and the same time moral and aesthetic, and in which it was possible to discern traces of divine beauty in everything one saw²¹¹. The analysis that follows, while acknowledging the general philosophical framework within which aesthetics of the period was discussed, will pay special attention to that discussion for purposes of delineating how concepts of aesthetics influenced the Giotto’s Bardi Chapel frescoes.

The Cycle of the Life of Saint Francis in the Bardi Chapel (fig. 2.50, 2.51, 2.52) – from the very first fresco in which the saint renounces his worldly goods through the remainder which document the integrity and consequent action with which he led his life – speaks most eloquently to the concept of Will. Aquinas, in his appraisal of beauty, writes; *beauty demands first integrity*²¹², and integrity demands will. One could say that the subject matter Giotto represents through the cycle of Saint Francis, that of the Saint’s own life following in the footsteps of Christ, is already beautiful and infused with will. Every scene that Giotto represents of the Saint’s life cycle is calculated to demonstrate a moment in which the integrity of Saint Francis can be revealed to the viewer (fig. 2.53).

If the motions of the celestial sphere are considered agents of God’s will, so too are emotion the agents of human will and choice. Arafabi argued that will and choice can only be understood by man when he comes to understand his own nature. Giotto, true to his time,

struggles with the concepts of will and choice that are central to Saint Francis. The spatial organization within each of the six frescoes inside the chapel is guided not simply by factually interpreting Bonaventure's narrative text, but by carefully orchestrating through a formal configuration each separate narrative to reflect the emotive state and tension of each scene. This configuration involves the disposition of the figures and their gestures as well as their organization into relatively tight groupings. Each group gives a density to a particular emotive state. In *The Death of Saint Francis and the Verification of the Stigmata* (fig. 2.54), the adoring monks at the saint's side are grouped at the centre of the composition, while the monks on their left and right gaze silently, witnessing the examination of his wound. Each of these groupings contributes to the totality of the scene's emotional experience and consequently charges the pictorial space with emotive qualities, or in medieval terms, *complexion*. In another fresco, *Trial by Fire* (fig. 2.55), the Sultan's priests slink out of the picture frame in the motion and gesture of guilt, fear and evasion, thereby placing emphasis on the emotively conflicted Sultan at centre. In another example, *The Confirmation of the Rule* (fig. 2.56), Giotto carefully depicts a concentrated intensity through the cluster of monks led by Saint Francis as they look expectantly towards the pope. Despite, or perhaps even due to the shallow pictorial depth of the frescoes, these emotively organized groupings create a pictorial space that is highly charged, and the fact that different groupings are given varying control over their emotions provides not just contrast but also a more complex tension. The two principles of creation are unity and diversity. While throughout the frescoes there is a collective sense of emotional charge, each figure is also represented as independent, marked by an individual gesture or slightly personal pose reflecting the essential nature of their own being²¹³. For Giotto, and for his public in the medieval period, this play between collective purpose and individual responsibility summarizes the relationship that God has to his own purposeful creation, a relationship in which his purpose becomes visible or is revealed through the essential nature, the human nature, of each and every person²¹⁴.

This dialectical relationship Giotto confronts through the depiction of two different states of being: that state occupied by the monks and company *in search of* perfection, and

that state – occupied solely by Saint Francis – in which perfection as a state of *Grace* has been achieved. The Saint Francis cycle must therefore be recognized as dealing with the metaphysics of being as a progression that passes from being and essence to an ultimate state of grace. But, most tellingly, this progression that Giotto now ascribes to Saint Francis was one that hitherto was represented as the culmination of a spiritual force reserved for Jesus Christ alone. The interesting question is how this extension of perfection from God to man could be accommodated in the medieval mind, and this involves examining the structural factors that connect the paintings with their public.

A most evident connection lies in their scale and graphic immediacy. Giotto gives to the viewer through the near life size figures a sense of identification with the actors in the scenes. Moreover, the scenes or pictorial space they occupy are not enclosed and have about them a semi-permeability that moves the viewer simultaneously to feel the presence of both inside and outside. Each scene is presented as though it were an anatomical section in which both the inside and outside are held together by the lines, angles, and figures which, Grosseteste writes, act on the sense of sight. The significance of sight was echoed by Aquinas, who placed the importance of seeing on its *certainty*, which extends and contributes to the experiences of the other senses and which for him included the mind's cognition²¹⁵. In the frescoes, the viewer becomes, as Neckman put it, the observer looking through a window, or in this case looking into a cut-away scene observing human nature or *summa natura humanus*. The intention is to lead the mind through beauty and love of the physical world to the specific nature of the observer's own origin, in other words back to God. The metaphor of the window is for Giotto not to be confused with the renaissance window's objective framing. The importance of the window here is its *permeability to eternal and divine light*, believed in both the twelfth and thirteenth century to have unique properties. Grosseteste explains that light is beautiful because its nature is simple – uniform, equal and capable of rendering things beautiful to the highest degree. Amongst physical properties, the nature of light is also unique because it is not based on numbers, nor is it a measure or anything other than sight itself²¹⁶. Bonaventure reveals this in saying that light is the most beautiful and best

amongst physical things²¹⁷. It was eternal light that was considered by most to be the sole reason for human knowledge, while others understood it to merely guide human knowledge.

If the purpose of the cut-away scene is to construct a window for the observer, its correlative purpose is therefore to enable the entry of light, and not only light, but ultimately *divine* light. Giotto's rendering of light in the chapel's frescos is such that it appears to be cast on the figures, architecture and objects through the *actual* window positioned on the real wall of the chapel. This cunning depiction, this appropriation of the penetration of actual light into the frescos, achieves a similar goal as the life-like scaling of the figures. The real world penetrates the represented world. The depiction is, however, also charged with the conviction that eternal light is the celestial effect to the physical or material and emotive cause that, reflected, reveals the effect of God. It is important to conceive of Divine or eternal light as having no material value and thus it cannot be thought to be part of a material substance: all it can do is complete it and thereby reveal it. If for Bonaventure it is through perception that the whole world penetrates the human soul, for Giotto this divinely charged space is both completed and revealed by light arcing from the real window to the painted image²¹⁸. In the frescoes the light that the viewer perceives gives the frescoes metaphysical meaning and dimension²¹⁹. I want to emphasize that while a commitment to the imitation of nature, or naturalness, is often discussed as Giotto's central contribution to pictorial space, it is my conviction that Giotto can be seen to have been aware of these larger metaphysical issues. He constructs for the viewer a pictorial space that actualizes, in fact demonstrates, in a concrete way the metaphysical relationship the viewer has to their origin and the divine perfection, the state of Grace, they may choose if they so will it. To this end, the representation of the window's light must be seen as posing a crucially significant pictorial 'proposition'.

By reflecting the light of both the physical and metaphysical worlds, it seems more than likely that Giotto is intentionally directing us towards two kinds of knowledge – intuitive, or direct; abstract, or propositional. The reference is to Ockham, who put it this way: "*Things that belong to nature are in contrast to art...and thus everything which does not act freely is called art [...] the image is therefore not made by nature, but by the maker's intentions*"²²⁰.

It must be noted that Ockham's distinction differs from Grosseteste's much earlier idea that knowledge examines *causes* of truth, while art on the other hand acts *according* to truth. Given that Ockham is Giotto's near contemporary, it is logical to assume that it is Ockham's approach that would have been present in Giotto's conception of the frescoes. Ockham's division of knowledge into direct and propositional modes is akin to Giotto's simple depiction of individual experience on the one hand, and his metaphysical play with light as a form of demonstration on the other hand²²¹.

This dual concept of knowledge is important for its implications with respect to perfection. Both Alfarabi and Ockham struggled with how to demonstrate that the concept of perfection instigates metaphysical knowledge. Alfarabi's position, noted earlier, that man must have knowledge of himself and all parts of the world would make perfection attainable only through the sum of intuitive and abstract knowledge. For his part, Giotto's project in the Bardi frescoes was clearly to demonstrate, through his treatment of the figure and story of Saint Francis, that with Saint Francis as a model for perfection, the Franciscan Order was itself dedicated to that path of metaphysical enlightenment made available through both direct observation and a consequent freedom from conventional constraints – in a word, open to new ideas about the world and man's relationship to God. It might be said, incidentally, that this concept initiated the urgency of progress, and indeed for Aquinas change was the means to finding perfection. It can be no surprise, therefore, that over the span of his life Giotto breaks with the pictorial conventions of the past. Rather than being content with perfecting the likeness of objects, Giotto invented new pictorial representations to accommodate the changing beliefs of his time, a context of examination and experimentation captured by Filippo Villani's praise of Florentine artists as not merely craftsmen but *ingenium* or inventors²²².

An important implication arising from Giotto's frescoes, one embedded in this concept of knowledge – with its ultimate goal of Grace – as direct and inventive is that Nature becomes for the individual a subjective experience, one not defined, or at least not defined solely, by reinterpretation of received texts. But more accurately for the period it can be stated another way. The medieval concept of both the body and the mind was based on

certain natural processes that have been discussed earlier. It is with this intensely physiological view of man's nature that Thomas Aquinas argued for a *hierarchy* of Faith, in which to have Faith is to know the distinction between the physical and the metaphysical. To have faith presupposes 'natural' knowledge, and knowledge of *human* nature must also presuppose it. Human nature is thus elevated to a post-natural knowledge. Consequently, subjectivity requires a continuum, or hierarchy, of knowledge necessary to stimulate the individual's growth towards a state of Grace.

Subjectivity therefore has itself important implications, and in Giotto's case this involves his development of a pictorial grammar whose hierarchy of attachments is closely related to the physicality of the body at one end of the scale, and the metaphysical perfection of Grace at the other. In terms drawn from medieval rhetoric, one can relate this to the *trivium* and its material concerns with language and communication on the one hand, and to the *quadrivium* and its concern with numbers, geometry, and astronomy – all divinely inspired elements of proportion whose beauty alone gave dignity to the psychological and spiritual world. Arguably the sense of divine inspiration attached to proportion in the medieval period may reflect its deep history, a history that stretches back to Vitruvius himself²²³. Certainly proportion marks the metaphysics of the Bardi frescoes. Whether it is the proportion of the figures in themselves, or the proportion and, I would stress, the apparent symmetry of its architecture, the centrality of the compositions in the Bardi Chapel always refer back to that desire for uniformity and equality that was considered the epitome of the beautiful in the highest degree.

As I have noted, however, subjectivity is marked by invention as well, and the pictorial innovation of these frescoes is their foreshortening, which accommodated the point in space or position of the viewer. By having the furthest sections of the frescoes wider than that closest to the viewer, Giotto creates not an actual centrality in the upper and lowest frescoes but the *appearance* of a centrality *for the experience of the viewer*. Each of the frescoes gives the appearance in this way of a symmetrical arranged and perfectly ordered world. Bonaventure writes:

[...] The world is perfectly ordered like the most beautiful poem, multiplicity, diversity, simplicity, order, rectitude, and beauty and divine judgment you must embrace the whole world to grasp the beauty. And more beauty pleases more, therefore enjoy what gives the greatest, delight in God²²⁴.

Giotto made these accommodations for centrality in both the top and bottom frescos while leaving the central frescoes perfectly centred. The apparent contradiction is easily explained if one considers that Grosseteste had suggested one can witness the beauty of the world by its circular shape²²⁵. Bacon had emphasized that the universe must be concave because it is equidistant everywhere. Giotto was familiar with reflections in mirrors, and concave or convex mirrors would have been known to him. It seems appropriate that the complex narrative he was visually portraying near the end of his own life was also the complex reflection of the convex, or intuitive world as a body with its *physics* and *techne* and the concave or abstract universe from whose mind emanated the *effect* of symmetry and *eternity*. Foreshortening in concave and convex mirrors exists primarily at the top or bottom, giving the structural spatial division inside the Bardi Chapel formal unity to the cycle as a whole. As a matter of further interest, if one imagines projecting a hemisphere from the surface of each side of the chapel in such a way that they overlap in space, between them they would form the shape of the Bardi Chapel opening as it is actually constructed.

The final work of Giotto's Saint Francis cycle in the Bardi Chapel – outside and over the Chapel, and situated so as to assert an independence that then may be freely donated – is a demonstration not only of the epiphany of Saint Francis and his willfulness, but also of its paradox – the giving over of that Will entirely to the abstract and the immaterial – the conceptual ephemeral Will of God. My understanding of Giotto suggests that it is this aspect of the myth surrounding Saint Francis that he emphasized: that the Saint's whole life is a demonstration of this paradox, as it is of the corollary – that it is possible for one to be unencumbered *by all but one's own will* in direct communion with God. Saint Francis seems to have been on the one side very pragmatic about individual emotional states, and on the other side unwilling to speculate on the nature of his own being, refusing to participate in metaphysical speculations. His intention seems to have been to use his body and mind by responding directly and openly to nature, including his own nature, in order to achieve

perfection and reach the ultimate state of being and essence, Grace. Nature was always the place to which Saint Francis retreated. In this fresco, in every sense the cycle's summation, Giotto grasps this emphasis and its paradox, and places the saint in his moment of reception almost exclusively within the setting of the natural world's unencumbered state. *Almost* exclusively, though not quite, and Giotto in fact establishes a subtle polarity, an ambiguous *interpenetration*, of nature to culture when he employs scale to designate Saint Francis' relationship to both Nature and the Church. Nature is bigger and encompassing, the church smaller and off to the side, like a necessary footnote. Saint Francis' body is turned in such a way that with his upraised hand and knees he is in direct contact with the whole picture plane, affirming its invisible presence. The figure of Christ on the cross cuts into the space in a relatively shallow angle, and this flattening out draws out the lines of force – which are direct and straight between them – to form a diagram. It is only in the viewer's mind that these diagrammatic lines spring into a three dimensional configuration, like a cat's cradle – suddenly sprung. Moreover, both Christ suspended on the Cross at the top and Saint Francis keeling at the bottom construct an otherwise identical exchange of markings on their body. One receives and the other transmits, left to left, right to right, and so forth. What Giotto realizes here in the representation of the bodily and material relationship between the figure of Saint Francis and the body of Christ is a relationship of *equality* that marks out a historically significant trajectory in the course of the Middle Ages. This trajectory can be viewed, I believe, as re-emergence of Christianity's struggle with the fatalistic determinism that spelled the ruin of the Classical world, and the forces that throughout the Middle Ages continued to threaten the transparency that the Christian revolution offered.

Giotto's *Saint Francis Receiving Stigmata* (fig. 2.57) is therefore a reflection of Ockham's razor in its insistence on the power of direct transmission. But it is as well a radical re-conceptualization of the previous pictorial conventions that represented this moment in the saint's life²²⁶. In the Louvre panel painting (fig. 2.58), Saint Francis and Christ are locked not in an exchange but in a true mirror reflection, right to left, left to right, and so forth. In this relationship, which is highly interdependent, self-determination and the exercise of the will is not possible. In the Bardi Chapel, Giotto shifts the relationship (fig. 2.59, 2.60)

to one of equality, both social and metaphysical, in which there is a coming together, equally joining or intersecting on a neutral ground between them. Within the ambivalences inscribed into a millennium of doctrinal regulation, this shift marks a moment as nearly revolutionary as the Gospel itself.

Thomas Aquinas believed that all objects of our experience were created from nothing by God. This meant that the object and its nature must be created, that it must be observable and be relevant to its entire being²²⁷. The traditional representation of Saint Francis is a literal transcription of a flat mirror image. In this image, one Being, God reflects his own essence in man in the closed structure of a cube between them. This kept the real or intuited persona and the abstract or reflected persona locked in their respective spaces, one outside and the other inside. God is on one side and man on the other. Giotto changes this convention by giving equality to each in the crossing over from left to left and right to right, giving each a separate space to express their own essence and meeting not in, or not in front, but on the *surface* of the mirror. The frontality of Saint Francis and the lines of force between Christ and himself²²⁸ appear very much on the surface, locating and articulating the new essence of man's relationship to God and creation, both metaphysical and pictorial, in which man is given a greater autonomy and self-determination, while from the perspective of God a clear distinction is made between physical and spiritual nature. Two forms of knowledge, not one, not separate, but joined at a common centre.

The world, although it has shifted, is for *and through* Giotto still beautiful. Each gesture, each action is meaningful to the essence of the whole, and with a sense of renewed respect we are returned to Neckman's "observers through windows", inquiring into "the nature of things through subtle and fine reasoning".

2.3.3 Religious Beliefs

2.3.3.1 General context

Giotto's interpretation of the Saint Francis myth inherited a rich tradition of complex discourse. In the three centuries that preceded the period under review, Christian religious beliefs underwent major revisions and clarifications that were influenced by a number of

important events and circumstances. It is impossible to get a clear understanding of the form and impulses that drove these changes forward and included the entire society, laity, clerics and the formal institution of the Church, without understanding these circumstances in greater detail. They are responsible for the formation of shifts in Christian theological concepts, and the meaning these took on within the social and political arenas of the fourteenth century.

The Muslim world, classical texts, and the power of God

In *Trial by Fire* (fig. 2.61), the middle fresco on the right hand wall in the Bardi Chapel, it is clear that Giotto was fully aware of the political and cultural circumstances of his time that had brought the Christian and Muslim worlds into contact. As a consequence of Islam's political and cultural expansionism, Europe by the eleventh century was in a position to benefit from the arrival of Arabic translations of classical texts. Embedded within these, however, were the beliefs and religious convictions of Muslim translators. From the seventh to the twelfth century, Islamic theologians contributed to Christian theology their rigorous application of classical philosophic concepts and logical arguments. Some argued for interpretations of the Koran that permitted their contemporary aspirations to be defended, thereby enlarging on its literal meaning. Others took a more fundamental approach, using classical texts and logic to defend a literal interpretation of the Koran's text. These two positions influenced Arabic interpretations of classical texts, and confronted with the intellectual force of these convictions, Christian theologians found themselves having to clarify and differentiate clearly the nature of the Christian God. At the crux of this differentiation lay a fundamental tenet of Islam, one that had evolved a definition of the nature of God as a singular unity without sensible characteristics, such that he could not be seen and could only be known through his many attributes. Muslim theologians understood their God to be *unconstrained* in his omnipotence, free to do evil as well as good, beyond the scope of human explanation or judgment²²⁹.

In Christian thought, God's omnipotence was characterized by restraint. This distinction no doubt lay partly in a natural evolution of difference due to co-existence with Muslim populations in Italy and Spain. Another social factor might explain this as well: the

misuse of power within the feudal system by the aristocracy. But the distinction is primarily the work of the theological theoretician Anselm²³⁰, whose dates – 1033-1109 – span the eleventh century, and who eventually became Bishop of Canterbury between 1093-1109. Anselm was the foremost early medieval theologian to assume the challenge of defining in response to classical and Muslim thought what were God's limits and responsibilities for a Christian world. Struggling with the problem of free will, Anselm proposed two separate states for it. The first state is *of itself*, neither made nor received from another, which is of God alone. But there is also another – made by and received from God – that is found both in angels and man. For angels, this is borne with rectitude; for man – lacking rectitude – it is borne with Sin²³¹. In his pictorial spatial propositions, Giotto articulates both the space designated to God, outside the architectural frames that enclose the narratives of the cycle of Saint Francis's life, and the events specific to earthly events of his life occurring within the frame of the architecture.

On the matter of God's free will, Anselm borrowed from Aristotle in qualifying the Christian God as *benevolent*, the very *personification of Good*. In stating that God cannot be corrupted, or lie, make false what is true or change the past, Anselm argued that these apparent limitations on Divine omnipotence were in fact simply in respect to issues that might involve possible contradictions to God's definition. While these limits or impossibilities might suggest a certain impotence in God, Anselm argued that for God to have power to do or experience what is not for his good, or to do what he *ought not* to do, restraint should be understood in this context to be by its very nature a form of power. Since Anselm's argument was based on God as reasonable and good²³², as having ordained a *particular* order from among the infinite possibilities available to his free will. In effect, Anselm maintained that since God must always act wisely, God's ordained order was the best possible choice²³³. Giotto was careful not to suggest otherwise, and does not elaborate on the myth of Saint Francis, remaining economical in the dispersment of the figures and the architectural elements of the representations.

With this dialectical debate on God's necessity and freedom, two different routes by which to frame the freedom and will of God were opened up. The first route envisions God's

nature as revealed in extraordinary justice and truth, and refers primarily to the first part of the Scriptures, that concerning the existence and nature of God and centered both on the doctrine of the Trinity and the creation of the world. The second line of argumentation envisions God's freedom as limited by the boundaries of the laws and institutions – the Church – to which, as Courtenay writes, God voluntarily committed himself. This option privileged knowledge of the historical events of Christ's life – his birth, death and resurrection – and encouraged speculation derived from it. What Anselm was proposing was that this second route be conjoined by applying pure reason and classical philosophical arguments, without dependence on the authority of the Scriptures²³⁴.

This separation between knowledge tied to the holy text and those speculations associated with Christ's life reveals the freedom with which it becomes possible to discuss *nature*²³⁵ with more objectivity. On this basis, it is possible for Giotto to posit a relationship between God and man as a vehicle to represent nature, and in that both nature and human nature are redeemed. In another ground-breaking deduction consistent with the logic of Christ's life, Anselm proposed that the incarnation and crucifixion of Christ was the *only* way that man could have been redeemed. In *Why God Became Man*, he wrote that mankind under the influence of sin could not possibly comprehend the necessity to meet or recognize and return to his creator so long as man lived in a sinful state. God needed to become human in the form of Christ in order to *demonstrate* to humans that redemption was both necessary and possible. This interpretation in the scholastic tradition was a demonstration through logic. Anselm's deduction also clearly affirms Christ's human physical attributes, disputed since the ninth century. With these carefully invested theological speculations, Anselm defined the act of redemption as an unavoidable exchange – if salvation was to be attained – between the giver of life and the abuser of that gift. Within this definition lay the necessary quality of restraint that Anselm, again logically, assumed God must possess: a God that was unpredictable would be a God with whom there could be no exchange. Without reliability and the security of certainty that this evoked, the act of redemption would be meaningless²³⁶. Giotto's compassionate God was predictable and therefore an exchange was possible, as seen in the reception of stigmata by Saint Francis.

Anselm represented what has come to be called the Scholastic position, though that tradition evolved considerably over the course of time in its application of logic and reasoning as to the nature of God, the world and man. But there evolved as well another position formed by a group identified as the Nominalists²³⁷. This position culminated in the late thirteenth and early fourteenth century with the theological speculations of William of Ockham, whose ideas became its defining moment. Ockham took particular issue with the paradox of God's limited omnipotence, stating that by limiting his freedom we arrogantly presume to set limits on infinite power that by its very definition cannot be limited. Ockham's objective was to limit the presumed ability of natural human reason to grasp universal truths, proposing that the existence of universals, being a concept created by the human mind, cannot therefore be meaningful outside the limitations of the human mind and human language. Ockham therefore concluded that the problem of universals was a matter of epistemology, grammar and logic – and not a matter of metaphysics or ontology²³⁸. These conclusions were to forever separate natural philosophy from theology, and science from metaphysics.

The Eucharist and the material and immaterial nature and process of transubstantiation

The nature of transubstantiation was for the Church in the Middle Ages a concept of immense problematic significance, and one which was exceedingly difficult to clarify. The word is first found in the twelfth century, and is the name given to the process by which in the Holy Sacraments of the Eucharist the body and blood of Jesus Christ becomes *substantiated* by the conversion to bread and wine – the body of Christ converted from bread and Christ's blood from wine. Throughout the ninth to eleventh centuries controversy raged around questions dealing with *how* this might happen and *at what point* in the benediction would it happen. Indeed, The Eucharist as a Christian Sacrament was for the first time only fully adopted by the fourth Lateran Council in 1215 A.C.E. The most fundamental reason for the controversy lay in the shift of the *insubstantial* to the *substantial*. It was argued that for Aristotle, shifting from one state to another involved *the accident*. The term accident, understood in this way, are any circumstance and attribute not essential to the nature in which substance exist. For example, a table is *accident* to tableness. Bread and wine, in other

words, are the accident of – and not essential to – the flesh and blood of Christ. Yet, it was argued, did not change have to occur in something? The Church could have chosen Ockham's first of three propositions, which stated that transubstantiation was a production in which the body of Christ is produced out of the substance of bread and wine. The Church, however, insisted on keeping the concept of transubstantiation as an act of faith and not of reason. Ockham's second proposal was an inversion of the first, that the substance of bread and wine cease to be present, with only the accident remaining, and in the shift from essence to accident, the body and blood of Christ comes into being as an essence. It was this interpretation that became the commonly held position among late medieval theologians²³⁹. Transubstantiation implies that the material can become immaterial or vica versa. I propose that in Giotto's time it must have occurred to the artists that the materiality of artmaking – paint, stone – could *transubstantiate* the metaphysical into the divine, or belief into faith.

The Institution of the church confronts lay clerics and the desire for a more direct and simple contact with God

While within the Church the early part of the twelfth century was dominated by theological speculations, several powerful but diverse groups – clerical laymen, as they were known – were critical of the material wealth that was visible in churches and evident in the personal lives of the church fathers²⁴⁰. These groups increasingly organized themselves against the authority of the Roman Church, not only in Italy but in other parts of Europe as well. This movement of disillusioned Christians, or *heretics* as those whom the Church opposed came to be called, began to form around 1140 during the papacy of Innocent III²⁴¹. Today one might describe them as Christian fundamentalists. These groups took a literal approach to the Scriptures and particularly to the life of Christ and the Apostles in an effort to get back to the fundamental teachings of Christianity. They imitated and emulated the role given to the Apostles and pursued the missionary goal of spreading God's Word, going to great lengths to model themselves according to the words of Christ as reported by Luke: ²⁴² "*Take nothing for your journey, neither staves, nor script, neither bread, nor money, neither have two coats*" Luke, 9, 3²⁴³.

This heretical rejection of material reality²⁴⁴ extended to the material reality of the body, with a specific intent to reject the sexual body – a repudiation of the flesh, and the concepts of Goodness, spirituality and material transcendence as God-given were set in an opposition to Evil and material or physical pleasure as the work of the Devil. Material reality employed in the glorification of the divine, as in churches and not for self aggrandisement, could be tolerated and therefore took on even greater more powerful meaning in the way it was employed, for example in Giotto's use of his materials in the frescoes. Light was divine, and so was the material employed in painting or representing it, yet the materiality of the human body, it was nevertheless considered, needed to be redeemed.

This dualism was at the root of the ethical position assumed by the lay clerics, whether or not proclaimed as heretics, as they chose to live by the spirit and abstain from the material and carnal pleasures of the world. The danger of carnality for them was simple: they feared the consequences of being contaminated by the evils of lust and the impurity of women²⁴⁵.

This demonizing of lust would no doubt today be dismissed as repressed desire. But in the Middle Ages this conflicted desire for purity and the fear of pollution found its origin in the realm of the imagination. The imagination was a matter of considerable debate. Vincent de Beauvais, in his *Speculum naturale* written about 1250, quotes an anonymous book, *Concerning the Soul and the Spirit*, in which it is set out that the greater strength of female lust can be attributed to *natural will* overpowering rational will due to a woman's *weaker flesh*²⁴⁶. This argument established that the spiritual body was corruptible by the corporeal body of the senses, on which imagination was dependent. Imagination was believed to originate in the heart whose corporal flame and heat traveled to the brain, where it was purified and *cooled* by reason²⁴⁷. This cooling off also kept the dangers of unwanted impressions or desires under control. Vincent's view was that sensuality was kept in check by reason, while fantasy was kept in check by the intellect²⁴⁸. Imagination – *imaginativa* was at its source therefore physical. On the spiritual implication of this, Elliott writes:

[...] Richard St. Victor (d.1173) describes the imagination as the handmaiden of Rachel, who was the traditional symbol of contemplative life [...] attempting to harness the imagination, perhaps the female imagination, by structuring meditation around the events in the life of Christ. These imaginative exercises were believed [in the middle ages] to have a potentially profound impact on the holy person's body - the most famous example probably being Francis of Assisi (d.1226) whose meditation on Christ's Passion resulted in the reception of the Stigmata²⁴⁹.

Saint Francis and the Lay clerics: their social and ideological impact

For some lay clergy, the rejection of materiality was understood as a personal choice. For others more fanatical, this was the *only* choice open to a spiritual life. Because ideologically these groups threatened the authority and the very institution of the Church itself, a council of Inquisition was set up²⁵⁰ which by the early thirteenth century eliminated most of the extreme heretical factions.

Despite these policies of intimidation, the Church was unable to eliminate completely their spiritual opposition. What the church opposed most vehemently was that a layman who was not authorized by the bishop could preach the gospel. It was also, of course, disconcerting that these laymen of the faith gave so much of themselves while demanding – unlike the local priests – so little in return.

A leading example is the case of the Waldesian lay preachers. In 1173, a wealthy merchant of Lyon, Waldé, gave up his wealth and his family to follow in the footsteps of the Apostles and preach the Word of God. He committed himself to live a life of poverty, relying on alms as the Apostles had done, and emphasized the act of charity. For instance, despite his own lack of material possessions, he provided for the needy during the great famine of 1176. While Waldé and his followers did receive approval from Pope Alexander to preach, it was under the condition that their preaching had to be approved by the local priest. Frequently this approval was denied, and in fact the collective downfall for most of the Waldesian preachers came when a number of their extremist followers rejected the existence of purgatory. It was only in 1208 that their more moderate brethren were reconciled with Pope Innocent III.

The fate of the Waldesians is instructive. Logan writes that the similarity between Francis of Assisi and Waldé seems too close to be a total coincidence. He speculates that

Francis had traveled with his cloth merchant father to France on business – and where but to Lyon, the town of Waldé's origin, famous even then for its textile manufacturing. It would have been in Lyon that the young Francis must either heard of Waldé's conversion – a likely subject of discussion among his father's wealthy business colleagues, or perhaps he even attended a sermon²⁵¹. In any case, Saint Francis could be said to have re-enacted Waldé's rejection of wealth and family, and to have adopted as well the Waldesians' ideology of poverty, charity and Apostolic missionary zeal²⁵².

Saint Francis first presented his Rule to the Pope for confirmation in 1210, just two years after the Waldesians were reconciled with the Pope but the details of this document are now lost²⁵³. A Second Rule was presented by Saint Francis to the Pope in 1216. This was approved by the Pope, though he amended as too extreme – and perhaps politically uncomfortable – the harshness in the conditions that Saint Francis had stipulated for the conduct of the members of the Order. The final amended version stated that a Friar had to give up all property, serve in obedience and humility, not indulge in any form of poetry or aestheticism, be free of malice, not handle money or take on administrative positions. Furthermore, Friars should live an Apostolic life, feed themselves with simple foods, own only one simple garment and consider it a privilege to live with the sick, the weak, the lepers and the outcasts. The Friars must also accept alms without shame as Christ had done before them, and above all take *lady poverty* as their mistress. The underlying moral standard was to be poor in material things but rich in *virtues*²⁵⁴, understood to be the road to the Kingdom of Heaven²⁵⁵.

The phenomenal expansion of the Franciscan Order across Europe needs to be understood in a larger context. The Church had by the period under examination existed for twelve hundred years, during which time it had become a powerful institution with a hierarchy of power that was not without a strong political agenda. Any power structure, secular or religious, needs to be actively maintained. In the Middle Ages, Church and State struggled to each maintain their autonomous power and position. There were as well times when they needed to conspire together in order to maintain power and to avert civil strife. Much of this struggle for power started in the early medieval period, as Guy Halsdall reveals

– defining the entire medieval period as one of exceptionally sustained military and civil violence. The thirteenth century historian Agnellus²⁵⁶, lecturing to the clergy, gave a typical example of this violence. He describes a conflict in Ravenna in the late seventh century.

[...] The historical records show that it is a custom of long standing 'which lasted until today' for citizens of all ages and backgrounds to engage in open brawls on Sunday afternoons. During the Pontificate of the Archbishop Damian the tension between the factions of the porta Teguriensis and the Porta Posterulensis, both on the west side of the city, degenerated into a vendetta culminating in the wholesale slaughter of the former faction by the other. As a consequence 'there was great mourning, and lamentation everywhere [...] the baths were closed, public theatricals ceased merchants retraced their steps and went home, publicans kept their taverns closed. Tradesmen abandoned their shops [...] and all souls were drowned in their bitterness²⁵⁷.

Agnellus also writes about similar cases in the late thirteenth century in Florence, and suffice it to say that the author's main theme is the irrationality of the crowd. As Halsall points out, Agnellus' matter-of-factness in reporting these violent events suggests that they were a normal part of everyday life, a natural aspect of, as he put it, *confused and diverse warring factions*.

It was the Archbishop who frequently performed an elaborate series of liturgical ceremonies for the whole city. The aim was to bring this potential violence under control by attempting to reconcile the warring groups within the Christian message by securing God's favour. By their very nature these rites involved each social group, and emphasized the rightful hierarchy and essential unity of the entire Christian community of the city. But the power struggles happening outside in the communities were also happening inside the Church. The interests and investments in the Church by leading members of the aristocracy forced on the Church acceptance of members of their own rank as bishops and Popes. A consequence was a 'military-clerical complex' of noble-born clergy who controlled through family connection both the military elite and the clerical bureaucracy. The entire period is increasingly defined by feuding over territorial divisions, individual ambitions, family rivalries, rural-urban conflicts of interests, as well as rivalries between the clerics and the lay elite. In this climate of competing power and violence, all these groups collectively or individually manipulated the common folk, who came to fear for not only their life on earth but for an eternity in hell²⁵⁸.

In a period of such violence, no century was more destructive to human life than the fourteenth century, writes Logan²⁵⁹. The great famine in 1315-1317, years of severe cold winters and very wet summers, caused severe food shortages, was followed in 1347-1350 by the Black Death. Christianity in the Middle Ages represented a force working not only for those who died or those who mourned, but for all those afraid of eternal condemnation, in which an untimely death offered no possibility to sufficiently repent errors of one's life²⁶⁰. In other words, eternal life depended rather importantly on the fate of the physical body. It must be remembered that religion was not just a compulsory aspect of daily life, it was part and parcel of medieval law. The consequence was that Christianity's privileging of spiritual existence and the afterlife as superior to the material life of the here and now posed a social contradiction. The problem of spirituality – as is frequently the case with ideological propositions – lay in the fact that its effect on human existence was not incorporated in its parameters. The Church's renunciation of the life of the senses could not actually be renounced in practice, a fact as true for the clerics as it was for the private faithful Christian. As Barbara Tuchman points out in *A Distant Mirror* that "*economic man and sensual man are not suppressible*"²⁶¹.

Within the Franciscan Order itself, just such a serious paradox was also taking place. In the course of time, the Franciscan Order attracted wealthy patrons for the simple reason that they imagined they could buy their purity and salvation through donations of property, money and whatever else was a desirable currency for the Friars. The Order consequently acquired property, built churches and cloisters, and constructed within itself a hierarchy of power, all of which ran counter to the basic principles of Saint Francis' Rules. Friars even had 'pocket money' in some chapters of the Order, and many believed that if they were buried in their Franciscan robes or habit they would thereby escape any chance of going to Hell. Through songs and poems of this time it becomes clear that the monks were also great seducers of women, a flagrant abandonment of all pretense at living by the Rule. Of course, on the other side, there were always those that actually with integrity were committed to its original principles²⁶². But whether perverting the Rule or living by it, the Friars found themselves becoming an integrated part of the Establishment. They entered noble households

as chaplains, spiritual advisers, or teachers, and represented a major force within the University system, influencing both the social and political arena. The Franciscans' power lay in the faith they generated at large – at this time of high personal and collective anxiety concerning both the present and eternity – in their vision of achieving redemption. It seemed to many that redemption could be achieved most effectively, as shown by Saint Francis himself, through the abnegation of the sexual body and the imitation of the physical pain and humiliation suffered by Christ on the Cross. While the Church incorporated the act of redemption as part of the Eucharist and its attendant symbolic processions and rituals, a more extreme form that became popular was the activity of flagellation, which first made its appearance in the thirteenth century. Flagellation was intended to bring the lust of the flesh under control and to act as atonement for past sins. Long lines of flagellating men in hooded garments wandered through towns and country-side chanting *Sabbath Matter*:

Stood the mother sorrowful
Beneath the cross weeping,
Whilst her son was dying...
Make me wounded by his blows
Make me by his cross inebriated
And by your sons blood²⁶³.

Against this background of debate, Giotto himself could not have been immune to these sentiments. In the representation of the cycle of Saint Francis's life lay an opportunity for him near the end of his own life to consider his *own* form of redemption. The Cycle of Saint Francis represented a life as an act of redemption. The importance of its representation must have been for Giotto not only a chance to communicate the chronology of events in the saint's life, but to consider the representations as part of an imaginative exercise for the viewer: in a sense, a kind of visual imaginary/physical re-enactment transmitting the very act of redemption to the faithful.

If the Franciscan Order was indeed inspired by the example of lay preachers before it such as Waldé, the greater freedom Giotto enjoyed from the Order to reinvent pictorial conventions could only have been facilitated by the moderating influence on Church authority in general that was exerted by the continued presence of lay clerics. Their more democratic forms of internal government, their granting of greater individual autonomy, was

influential even more profoundly beyond the framework of their own institutions. And within the Church proper, the necessity for a greater openness to encompass them also promoted a greater openness to knowledge human reason and nature, all of which gave to people in general greater autonomy in God's universe. This autonomy was pivotal in giving man the free will or element of choice in returning to his source in God. In fact, without this freedom, it was increasingly believed it was not possible to freely love God.

2.3.3.2 Analysis of pictorial space in *The Cycle of Saint Francis in the Bardi Chapel*

Anselm, with his emphasis on questions of freedom and free will, set up a model that became – as he defined it – one of *contingency*, in which God's choice of the ordained world order is a voluntary act, not one borne out of some necessity²⁶⁴. The main theme within the narrative of Saint Francis of Assisi that Giotto was representing in the Bardi Chapel was a prime example of a voluntarily submission to this contingent relationship. But as Ockham, Thomas Aquinas and Bonaventure all agreed, there was a gap between the merits of a man's actions and the gift of eternal life. This gap or pivot of contingency can only be bridged by Grace, because the Holy Spirit holds Man's acts until God accepts them through his Goodness. Each scene of the cycle in the Bardi Chapel exemplifies this relationship of voluntary submission as an affirmation of God's Goodness and God's Grace, themselves exemplars of God's omnipotence and God's omnipresence. Giotto's task is to incorporate two disparate pictorial realities. One is the narrative of Saint Francis, who is the protagonist at its centre, and the other is God as the omni-centre who is both source and cause. It is a case of both Saint Francis' voluntary submission and God's voluntary acceptance, each one free to act²⁶⁵, yet each one bound to the ordained order of their relationship.

Pictorially, Giotto resolves this intersecting relationship of spheres of ordained order by constructing for each of five narratives a tightly structured interior, an architecturally finite space that appears to be quite isolated from the external space. The lack of reference points in these external spaces implies their potentially infinite character. Between the two spatial realities there is a telescoping typical of medieval cosmogony. The shift from the finite and the particular to the infinite and the whole was an important part of the period's religious theory on the origin and creation of the world²⁶⁶. This telescoping quality of late thirteenth

century argumentation can be seen to have its point of departure with Saint Augustine's declaration that the point at the centre of a circle is a point of perfection, is oneness as God. But it is from this point of emanation that everything becomes associated with the Material, since it cannot escape the dimensions of volume or magnitude, dimensions that must always be finite: after all, volume is shape and shape has boundary.

How to bring together the abstraction of oneness with the divisibility of material particulars was solved by Bacon, Duns Scotus and Ockham through the application of geometrical equations. It was their faith in the absolute certainty of geometry that led Ockham to state that indivisibles such as points, lines and surface are only pure negations, incidental propositions of physics that are in fact just aspects of volumes and magnitudes²⁶⁷. Geometry thus bridged the *one* with the dimensionless propositions of line, point and surface of the physically finite world of the Material. But one more problem remained, one that is brilliantly articulated by Ockham when he asks whether a perfectly spherical body realized by divine power – one presumes this might be the spherical infinite universe – be in contact with a perfect plane – an abstract dimensionless concept. As long as they are separate Ockham believed they each remain perfect, and presumably dimensionless. But as soon as they come in contact with each other are they then corrupted? By virtue of touching one another, the part comes in contact with the whole. The integrity of perfection, Ockham concludes, is about the whole and not the part²⁶⁸. In Giotto's Bardi Chapel, both frescoes in the upper lunettes of the chapel might be a clue to this dilemma. On the upper left, *Saint Francis Renouncing his Worldly Goods* (fig. 2.62) is set outside the Bishop's palace. Giotto went to great lengths not to have the building or the figures come into contact with the edge of the circle. On the left it is notable how the figure holding the child bends her body away from this edge. Nor do any of the architectural corners of the palace and its surrounding wall touch the semi-circle's circumference. When this circle is extended into the next fresco below, into *The Apparition of Saint Francis* (fig. 2.62), the circle's continuity is not overtly visible. However, both aspects of the architecture and the placement of the figures are clearly considered in the composition. *The Confirmation of the Rule* (fig. 2.63) at the top of the right wall shows none of the architectural structures or the figures touching the semicircle that

forms the lunette. Also, when this circle is extended into the fresco below, *Trial by Fire* (fig. 2.63), it becomes obvious here as well that the composition of the architecture and placement of the fire, the cloth, and the figures is in relationship to this extended circle.

In the upper frescoes, the Bishop's palace and the sacred building where Saint Francis presents his Rule to the Pope occupy a space that is clearly isolated from the encircling border. On the other hand, the scenes in the two frescoes below are framed very close to the rectangle of the fresco, touching – in the case of *The Apparition of Saint Francis* (fig. 2.64) – the limits of the frame. There is also a spatial reversal: the space occupied by *The Apparition of Saint Francis* (fig. 2.65) takes place inside a building, while that in *Trial by Fire* (fig. 2.65) on the other hand takes place outside. While the two frescoes below these are now incomplete, there is again a reversal – with *The Death of Saint Francis and the Verification of the Stigmata* (fig. 2.65) set outside an architectural structure, and *Visions of Brother Agostino and Bishop Guido of Assisi* (fig. 2.65) taking place on the inside. As subtle as it might seem, each scene either approaches the viewer or recedes away from the viewer, drawing them further into the scene. This in and out movement is also reinforced by the projection of the rose-coloured walls of the Bishop's palace, the Sultan's red mantle and the redness of the fire, as well as the rose background in *The Death of Saint Francis and the Verification of the Stigmata*. Giotto thus intentionally creates a persistent movement of telescoping, whether the reading of the frescoes is horizontal or vertical. This I believe was Giotto's solution to the spatial paradox arising from the incompatibility of the finite with the infinite and God's infinite Goodness – the divinely Ordained Order contingent on – but separate from – the material order of the physical world.

If the circle or sphere is one key to the paradox of infinite and finite, the plane is the other key. Giotto asserts the presence of the pictorial plane in each one of the Bardi's frescoes by virtue of the contact that the figures – whether kneeling, sitting, or standing – have with a pictorial surface that lies apparently within the viewer's touch. The convergence to points evident in the receding planes of the architectural structures, or evident as well in planes within the scenes, is located frequently in the finite volume of a single figure or a group of figures – for instance the friars in *The Confirmation of the Rule* (fig. 2.66), or the

wounds of Saint Francis in *The Death of Saint Francis and the Verification of the Stigmata* (fig. 2.67) or both the Sultan and Saint Francis in *The Apparition at Arles* (fig. 2.68). Yet there are also architectural features that, if extended, converge *outside* the pictorial frame. Those points of convergence are instances where the plane by extension almost touches the concave boundary of the sphere of the universe that is the subject of Bacon's speculation. However, the touching of the infinite is an abstraction, the conceptual conundrum that Ockham poses. The infinite universe – the perfect sphere touched by the perfect plane – could only ever occur from the inside and will always be in a state of deferral. The perfect sphere always keeps its perfection and integrity on the outside, and the plane is always an internal space within the sphere. John Buridan, affirming Ockham, writes:

[...] We allow that surfaces are to bodies what lines are to surfaces, and points are to lines; then if one does not admit indivisible points in a line, one should not admit lines indivisible in width in a surface, and surfaces indivisible in depth in a body²⁶⁹.

If the reasonings of geometry are a constant, they are invested by the anxiety of corruption of the Spritual by the Material. Giotto's points of convergence define planes whose relationship is always to the internal reality of the world as *body* within the universe or mind of God. Therefore for Giotto there is a contingency operating between the plane-surface, as a section of the body, and the infinite extension of a plane reaching for the mind of God. What becomes possible in this model is that this duality within the concept of wholeness also answers a pressing question of the time. Does the Holy Spirit proceed from God alone, or also from the Son? In Giotto's pictorial model, God and Son are presented as contingent – the material substantiation of God as the Son is the telescoping of the part as contingent to perfection of the whole. The fresco *Saint Francis Receiving Stigmata* depicts the encounter between Saint Francis and Christ as co-existent, and the transference of Christ to Saint Francis belongs to the last stage of emanation from the Spirit to Man. The Seraph is positioned next to God, holds his Son in the form of a man in the materiality of Christ – flesh and blood as the materiality of Saint Francis or Man. It is this materiality that is their point of convergence and correspondence.

The interpretation of Christ's life in the context of the institution – as opposed to the literal interpretation of Christ's life and death from the scriptures – can be seen in the

freedom that now becomes possible for Giotto and other artists in the period, notably Simone Martini of Sienna (1315-1344), Pietro Lorenzetti (1306-1347) and Ambrogio Lorenzetti (1319-1347) and Taddeo Gaddi of Florence (c. 1300-1366)²⁷⁰. With the clarification of Christ as man, it becomes permissible to insert Saint Francis as *imitatio* without ideological problems or anxieties of corruption. Giotto pursues this lead by taking the liberty of representing the apparition of Christ to Saint Francis quite differently from the original telling. As related by Bonaventure and Celano, the Seraph holding Christ does not include the Cross, or the Tau as Giotto depicted it, and from which the figure of Christ is suspended. The presence of the Tau-Cross refers back not only to the architectural plan of the Basilica but more importantly to Saint Francis' symbol for its institution. The cross as Tau also aids the pictorial representation of this event in becoming a geometric demonstration of salvation. The perpendicular of the Tau nearly touches the horizontal limit of the fresco, freely floating obliquely as it cuts into the body of space. The body of Christ becomes the vertical perpendicular and is suspended in a conscious gaze directed at Saint Francis rather than folding into death, as He is depicted for example in the *Cruxifix* of Cimabue, painted in 1280 (fig. 2.69), or in Giotto's *Cruxifix* of 1300 in Santa Maria Novella (fig. 2.70). Incorporating the Tau, in contradistinction from his earlier representation of *The Reception of Stigmata* (fig. 2.71) in the Louvre, renders the figure of Christ in this fresco more than an apparition or an annunciation. The substitution of the Tau Cross – with its confrontational structure of one axis meeting *rather than crossing* another – acts as a reminder that the crucifixion is the concrete event of Christ taking on himself the physical suffering of Man's sins. It is not just the symbolic death of Christ, but the brutal physical act itself that confronts the viewer as a reminder of what God through Christ has sacrificed. The representation of the of crucifixion is a powerful example of how the visual belief of this sign and its interpretation encourages a multisensorial response in the viewer as the viewer must however first feel the same pain in their own sentient body in order to empathize with Christ's pain. The viewers pain is physiological, the most primary (animal) response, a paradox when the primary physiological pain becomes the vehicle of transcendence of the very possibility of the senses.

This then becomes more than a representation of Christ's suffering. It becomes a reminder of that which is owed and a demonstration of that which is expected in return – sacrifice as an act of charity. Giotto in a sense moves the act of crucifixion, like transubstantiation, from the realm of the metaphysical or symbolic to the realm of the empirical. In pictorial terms, space is opened up to become the recipient body of suffering. Giotto's geometry is not about absolute or merely academic geometric figures. Suspended in Giotto's representations is the concept of demonstration within the potential of a transubstantiation of belief into pictorial space. The geometric demonstration in the act of making can be seen by the relative positions of Saint Francis and Christ in the moment, suspended and incomplete, of the reception of stigmata. The geometric figure that Giotto constructs between them is as yet only an apparent set of straight lines. The viewer completes the figures of intersecting lines for hand and feet with the single diagonal of the wound on the side; two intersections – one for the upper body one for the lower body. In an apprehension of transference, if one could rotate Saint Francis to become the viewer, and Christ to face the viewer, we find ourselves returned to the crossing on the surface of the mirror – that point of coincidence from which the viewer projects into the pictorial space, and the picture plane as a point of entry once again asserts its presence.

The necessity of viewing the totality of the frescoes from a distance

For Aquinas, God was not a remote truth, but one immediately relevant to human experience. He asserted that a *deeper* understanding of nature provided a deeper understanding of creation and its Creator, and he conceived of the relationship between nature and the spiritual world as intimately bound up with one another. Man in this schema becomes the pivotal centre of the two realms. As Aquinas wrote, [Man] "*is the horizon of the corporeal and spiritual*"²⁷¹.

This pivotal centering of Man between the realms of Nature and the Spirit is fundamental to Giotto's positioning of the viewing believer. In the six frescos *inside* the Bardi Chapel, the viewer's position or horizon line is taken into account, and while it is not formally incorporated within the projective pictorial *structure*, the presence of the viewer *is* acknowledged in relationship to the view and what is taking place within the pictorial frame.

It is clear that Giotto manipulated the viewer by engaging them in a very specific way. Subdividing the side walls of the chapel into three horizontal narratives that take up the entire space of the wall, Giotto forces the viewer to step far outside the chapel's boundaries in order to gain visual access to all three narratives as a totality. I found myself moving fifteen feet from centre to the left, and fifteen feet perpendicular backwards before the entire right wall was visible. This was equally true for the left wall. Again in this instance, two positions are necessary for the total experience, and these two positions cross diagonally, forming a point of intersection²⁷².

From these two positions outside the chapel, looking at the frescos seems akin to looking inside a space – not unlike experiencing the representation of the large fissure in the side of the mountain on the fresco above the chapel. It occurred to me that looking into the chapel from this distance is like looking into the wound of Christ, examining and verifying its reality with that projection of the imagination that at its source in the Middle Ages was understood to be, after all, physical. The medieval imagination was quite capable of entertaining the belief that it could have an impact on a person's body, as is clear from Saint Francis, and despite – or rather *because of* Giotto's strategy of cohering the frescoes from beyond the chapel itself, the viewer – even now – projects themselves into the narrative. The act of projection into the pictorial space traverses and includes the real space, and the real physical opening of the chapel entrance, whose geometric reference to the fissure of the mountain above and the wound of Saint Francis within, serves to profoundly increase their iconic proximity. Perhaps it is that this act of projective imagination is purified of its contamination by the body – though today we might say it *emphasizes* our experience of the body – by its conformity to the geometry that is constructed between the position of the viewer and that which is viewed.

Geometry, then, also raises these representations to a conceptual level, in other words to the level of *pure* reason. Geometry understood as *dimensionless abstraction* offers itself up, like the soul, as the counterpart, the inescapable alter ego of the Material, of the worldly body²⁷³. It is within this relationship that we must locate Christianity's concept of true materiality, and locate as well the significance of the very nature of fresco painting for the

Middle Ages. The fresco becomes the period's perfect means of representation: a process in which the material presence of paint becomes absorbed into the wall's surface, removing all material excess that could promote any sensation of material lust. Fresco posed the perfect material resolution for the Christian dilemma involving the body and transubstantiation²⁷⁴; it becomes the accident of which Ockham speaks. With fresco, colour and the traces of paint's texture now carried meaning only through their illumination by the divine order²⁷⁵. Giotto's six frescos inside the Bardi Chapel are illuminated by the light that enters the window of the rear wall, an illumination that he is careful to 'quote' and to which we are consequently directed as representing that quality of 'dimensionless abstraction' consistent with both geometry and the soul²⁷⁶.

The Fresco of *Saint Francis Receiving the Stigmata* situated on the exterior of the chapel is also illuminated from the tall narrow window directly above. The light from this window shines down on the scene and is its simulacrum, since that which literally, *or physically*, lights the scene is rendered within the representation of the fresco. Physicality is transformed into projective action, constructed, purified in an extreme contrast to the physicality and vulnerability of the body.

The body in the Middle Ages was exposed to the danger of disease, premature death and the unruly brawls of the unpredictable violent mob – not to mention terror concerning the consequences to be faced in the afterlife – the Last Judgment, Purgatory and Hell – from a Christian God who would right the injustices of this life with justice in the next²⁷⁷. It is not that Giotto's ordered, composed, measured and simply stated pictorial space reflects all aspects of the medieval human dilemma, but rather that it constructs *a map*. This map not only demonstrates the contingency²⁷⁸ of the finite to the infinite, the part to the whole, but also the relationship to progress – most especially the progress of the soul to God – inscribed into the act of redemption. Giotto's Saint Francis Cycle represents the idealized Christian world space of that private emotive space situated in the world and therefore ultimately in the mind of God.

It is in fact the mind of God that is the *ultimate* limit, Perfection illuminated with simple light, the perfect spherical body of which the world and its nature become – as

Ockham suggested – the perfect plane²⁷⁹, and through geometry simply an abstract aspect of volume and magnitude. This complex cosmography is articulated by Bernard Suilvester in *ad imaginemen speiemque*:

[...] It is necessary to know then in the first place that, with Nature showing the way, God the fabricator of man, created his form, his condition, and his entire material frame in the image of the cosmos... For he made the body of man just as the world from mixing together the four elements. – fire, water, air and earth in order that the harmonious union of all these might be the adornment of the living being in the form of divine imitation; [...] divine fabrication [...] co-ordination [...] so that [the body] or world might be prepared for that divine spirit which descends from the celestial mind for sustenance of the mortal frame [...] so that this living being which is made in the image of the world, might be ruled by a substance similar to divinity²⁸⁰.

It is in *Saint Francis Receiving Stigmata* that we can find both a culmination and a resolution of this new relationship between Man and God. In this fresco, Giotto sets out the condition for the descent of the celestial mind to the mortal frame. The landscape setting is typically represented by a shallow pictorial space, the human frame²⁸¹ located against it in an indeterminate larger space that extends behind the hills of the chapel into darkness. The Tau, the symbol of suffering, and the door of the small chapel, the symbol of the Church, obliquely opens up this shallow pictorial space to Saint Francis' mystical joy in the sacred fellowship to be enjoyed with nature and human nature as one, the ecstasy to be experienced in the wound and the suffering.

Together, the frescos of the Bardi Chapel demonstrate that the medieval church was turning away from the world-denying Christian philosophy forged by Augustine and underpinned by Plato. It was moving towards Aristotle in the Scholastics' own intellectual evolution²⁸². Giotto took full advantage of the more sympathetic view of the Creator that Aquinas had determined was reflected in the order and beauty to be found within the created world – in which giving value to Nature was no longer considered counter to, but an encounter with God's supreme Perfection²⁸³.

2.3.4 Scientific Beliefs (concerning the optical system)

2.3.4.1 General context

The thirteenth century saw a resurgence of scientific enquiry resulting from translations of classical texts from the Greek through Arabic into Latin²⁸⁴. As I have mentioned in the introduction, I am treating beliefs about the optical system separately from perceptual beliefs because optical systems are not only explained as geometrical propositions but also in relationship to the physical properties of light as understood at the time. Optics and the nature and study of light in the Middle Ages are closely affiliated with questions of origin, propagation, divinity, the soul and of course vision and visions. Medieval scholars considered optics as important a subject of scientific enquiry as mathematics, whose significance I have already discussed. What I intend to discuss here is how this question of optics – and the search for illumination it entailed – was conducted during the period relevant to Giotto, and who were some of its principal theorists. We will find that for the later half of the thirteenth century it is the figure of Roger Bacon that is preeminent²⁸⁵. Bacon (1220-1292), a Franciscan and teacher at both Oxford and Paris, was to be followed by Witelo and John Pecham, who extended his theories following on Alhazan's mathematically based optics or *perspectiva*²⁸⁶. Bacon himself built on the scholasticism of Robert Grosseteste (1170-1253), Chancellor of Oxford University and Bishop of Lincoln²⁸⁷ in the earlier part of the thirteenth century, while owing much to the availability of Aristotle through translations by Avicenna, and the important writings of Alhazan, the Arab scientist.

Behind Bacon and thirteenth century optics therefore lies the work of Plato and Aristotle as communicated through their Arab translators and interpreters. By 1255 the Church had lifted its restrictions on Aristotle's texts, and these quickly became central to the study of cosmology, meteorology, psychology, matter theory, motion, light, sensation and biological phenomena. Naturally these influenced Bacon's position on optics. This reconciliation between Aristotle and the Church reflected a process of accommodation – a process led by Grosseteste²⁸⁸, – between an Aristotelian concept of eternal reality as having neither beginning nor end and Christian ideology with its story of the Creation – one dependent on the very idea of "*In the beginning...*"²⁸⁹. The Aristotelian cosmos, in other

words, existed on the basis of natural causes, a basis entirely in conflict with the divine determinism of both Plato and Christianity.

The classical Greek inheritance was important. The first fully elaborated theories of matter connecting a chain of cause and effect were formulated in this period, and these theories of cause and effect were further elaborated by theories of atomism that speculated on the transmission or movement of material particles through a void or some other medium. Given the Christian investment in a First Cause, theories of cause and effect were especially attractive. Their reemergence in medieval Europe as readymade hypotheses about the material world, and their source – the Arab translations, however imperfect²⁹⁰, with their intimate links to ethics and theology – gave them a particular significance. For medieval scholars steeped in mathematical speculations, a major contribution offered by the Greeks was to insist on rationalizing with mathematical theorems, even or perhaps because they did not always differentiate qualitatively between arriving at a law through induction or deduction. In a sense it was a diviner's attempt at observing phenomena that permitted a broad range of speculation²⁹¹.

It is no surprise, then, that the principle theories of vision of the Middle Ages were based on Greek models – especially Plato's and Aristotle's theories of rays as extramission and intromission²⁹². Aristotle believed that the eye and the external media are linked as an external chain transmitting motions to the observer's intellect²⁹³. These weren't always compatible with Plato's position, but they both agreed in principle on the notion of a medium that permits the experience of vision to take place between the object and the observer in a kind of chain reaction linking the visible object with the soul of the observer²⁹⁴. Plato writes in Book Six of *The Republic*:

[...] Surely when there is sight in the eyes, and the man who has sight tries to use it, and there is colour in the visible objects, still you know that unless a quite different third thing which exists just for this end is also present, sight will see nothing, and colour will be invisible. To what do you refer? he asked. 'It is what you call light' [...] Then whom of the gods in heaven can you name as the author of this, whose light makes our sight see in the fairest manner, and makes what is seen be seen²⁹⁵?

Linking the visual ray with the medium of light as the necessary activator further gains strength in the medieval mind when Plato extends this analogy of the sun as *the cause of sight*, not sight itself, and further identifies it with the nature of the good, the soul, geometry and truth. *This, then, which imparts truth to the things that are known and the power of knowing to the knower, you may affirm to be the Form of the good. It is the cause of knowledge and truth*²⁹⁶.

As I have already mentioned, within medieval thought, the groundwork for the mathematical framing of optics had been laid by Grosseteste. Unlike Albertus Magnus and subsequently Bacon, Grosseteste²⁹⁷, who had relatively few translations from the classical period to work from²⁹⁸, contributed immensely to a precision of thought through his own careful translations from Greek to Latin of the classical texts, which had become increasingly contaminated by inept transcriptions. Moreover, in arguing effectively for the fundamental role of geometry in the study of causes, his work cleared the way for Roger Bacon. Grosseteste tended towards Plato's theory of optics in proposing that every *natural agent* acts in the same way as does *a source of illumination*, emanating from the realm of the divine, in which the agent sets out its "species" or its own copy along geometrical lines. It was this proposition that made the mathematical study of optics the foundation of all causation and creation²⁹⁹.

Mathematics, however, was not the only basis for medieval optics. The body came increasingly to be equally significant, and the relationship had a long and ambivalent status in the evolution of medieval thought. For the Roman anatomist Galen, following in the classical mold and immensely influential on the Christian, vision was an all pervasive active agent made up of a mixture of air and fire that flows from the seat of consciousness directly to the eye. For Galen and the Stoics, the simultaneous merging of the optical *pneuma* with the light of the sun on the air created a vehicle for the soul to merge with the human body, of which the act of seeing became its extension³⁰⁰. Saint Augustine himself, influenced by Plato and the Platonists, spoke at length about the divine nature of light and differentiated it from *the light of the flesh*³⁰¹. By the thirteenth century, medieval scholars and particularly Roger Bacon had come to discuss the nature of vision and optics through a consideration of the

body's physiology – the light of the flesh – as much as through geometric diagrams. Bacon's section on optics is central to the second volume of his *Majus Opus*, as mathematics was to the first, and it is his text that became the most important contribution to optics at the time. In it, Bacon privileges Aristotle's physiology while nevertheless echoing many of Plato's sentiments about light for its relationship to the soul and its analogy to truth.

I think it is important to emphasize here, as French and Cunningham³⁰² point out, that Bacon's enquiry in *Perspectiva*³⁰³, as with almost all translations and scholarly works from this period that are identified as optics, differs from the classical optics of Euclid or Ptolemy due to the fact that the medieval impulse for investigating it was differently motivated. That motivation was the need to understand the nature of divine light. The Franciscan relationship to Dionysian or Neo-platonic ideology is centred on this question, and all classical texts were interpreted through this screen³⁰⁴. Plato had thought of mathematical optics as a special branch of geometry – significant for the geometrical properties of divine light – a position echoed by Grosseteste. This point has important consequences for the meaning of optics during the medieval period, as I will elaborate later³⁰⁵. While Bacon supported Plato's privileging of the geometric properties of light, he shared Aristotle's attitude towards the physiology of optics, believing that the veins and nerves and all the faculty of the soul have their origin in the heart³⁰⁶. Nonetheless, these comparisons with classical thought should not obscure the fact that Bacon exhibits a sense of ecstatic longing or desire typical of the Middle Ages when it comes to the study of light and vision. He writes: "*For Aristotle vision alone reveals the difference in things and we take especial delight in vision and light and colour have an especial beauty beyond the other things that are brought to our senses*"³⁰⁷.

Bacon is, then, a touchstone for any comprehension of medieval attitudes towards vision or visualization. Consequently, rather than very briefly summarizing Bacon's optics in his *Majus Opus* I believe that a more thorough understanding of his thinking about the relationship linking the physiological to the geometrical and theological gives a deeper insight into the picturing of vision at the time in relationship to the frescoes of the Bardi chapel. In order for Giotto to represent *divine* light as I will show, he not only gives it visual presence but also movement from its origin-heaven-God, through converging geometrical

lines in the representations. This divine light streams through the actual chapel's windows bathing the viewer. Giotto, I suggest, must also believe in the presence of this divine light when he creates a continuity of the real light coming through the window and spilling over to illuminate the objects and surfaces of the representations he renders in the Bardi frescoes.

Bacon's account begins with a detailed investigation of the physical properties and interaction of the visual organ: the optic nerve, the eye and its location, and the form of the cranium. While he applies syllogistic and geometric proof to optics – always in relationship to the perceptual characteristics of the sensible soul – he also investigates the nature of the *species*, the *impression of the likeness* of the image, which is propagated by light with respect to the viewer.

Bacon's optics: Physiology

Bacon identifies the concave nerve or optic nerve with its origin in the brain as the cause of vision. The sense of sight is capable of forming its own judgment, for example on light and colour or touch, smell and taste. Senses independently judge their own experience. Bacon's observation, I propose, also resonates with Giotto's exploration of emotion in the representation of the individual figures, who seem self aware.

Bacon's optics: how vision occurs

Bacon successfully identified the two optic nerves that come from the eyes to a point at the optic *chiasma* where they join to become one before separating again as they enter the brain. His explanation concerning this configuration is fundamental to how sight was understood in the Middle Ages (fig. 2.72), and it is instructive to compare this with Giotto's deployment of the circle in the structure of the Bardi Chapel frescoes and the intersecting lines in his *Saint Francis Receiving Stigmata* outside the Chapel. Bacon determined that the nerve that comes from the *right* part of the anterior cell goes to the left eye and the nerve from the *left* anterior part goes to the right eye. Bacon rationalizes the apparent contradiction of this coming together and crossing by the fact that vision always selects straight lines. This crossing of the eyes, he suggests, permits vision to spread out like a funnel and it is at the point of the optic chiasma – the point of intersection of the two concave nerves – that Bacon speculates vision

is completed³⁰⁸. His equating of the term optic with the word concave makes sense when considering the geometric integrity of vision as he understands it³⁰⁹. While it would be difficult to ascribe this *in toto* to Giotto's representation of the Saint Francis cycle, the point I would like to make is that in his exploration of the *imitatio*, Giotto could be seen as seizing on a paradox. This paradox entails our *direct and linear visual comprehension* of the world – through which the *equivalence and transparency* of God's relationship to Man can be construed – *despite* the criss-crossing of the eye-brain relationship, and the point of this is that the paradox demonstrates the very complexity of our relationship to the divine with which Giotto, Bacon, Saint Francis and the Church itself were grappling.

Bacon's optics: vision and the object

The act of sight, then, is a single and undivided performance by the eyes and the common nerve. Bacon writes:

[...] I have said that vision takes place chiefly by a radiant pyramid; [that terminates at the object seen] for since this pyramid alone is perpendicular to the eye, and fall to the opening of the *uvea*, and is directly opposite to the centre of the eye, it produces for this reason good vision³¹⁰.

Bacon brackets vision to exist between, on the one side, material density that makes seeing impossible, and on the other side translucent or transparent materiality that becomes invisible to the eye³¹¹ (fig. 2.73). Significantly, he points out that there are realities that exist *beyond vision*, and that are subject to another order of materiality – though they are just as physically perceived by the other senses. This proposition raised an important question about that which is observable and provable and that which is not observable visually but experienced by the other senses. I would like to propose that the geometry set up by Giotto between all the elements, for example in the fresco *Saint Francis Receiving Stigmata*, could be construed as plotting the immaterial – revealing while simultaneously veiling a transparent materiality – that informs vision.

Bacon's investigation on the nature of light's propagation is initiated with the question: why is colour not visible without light? His answer comes from Avicenna's book on the soul

in which he states that colour does not have a *real* existence. This then permits light to act according to invisible realities, namely that of divine forces³¹².

Bacon's optics: vision – estimative or memory faculties

Turning to Giotto's *Apparition of Saint Francis at Arles* (the middle fresco on the left wall of the Bardi Chapel) and *Visions of Brother Agostino and Bishop Guido of Assisi* (the bottom fresco on the right hand wall), it now becomes possible to see how Giotto could have imagined both apparition and visions – invisible realities – to embody through his representations the divine forces that Bacon anticipates are the properties of light. Bacon merges philosophical methodology – syllogistic argument – with the faculty of judgment; in other words, the physics of sight is tied to reasoning, and reasoning is tied to the judgments that determine the soul's relationship to the divine³¹³. It is through the geometry of reflected and refracted vision – for which Bacon employs Euclid's Optics – that he begins to approach the deeper intention of his research, which is to derive through an understanding of the physical properties of light the realm and intention of the divine³¹⁴.

Bacon's optics: vision – perspective and theological knowledge

While I am going to go into the nature of the divine ray of the divine light more thoroughly in the section on religious beliefs, I nevertheless want to initiate here thoughts that pertain to the Franciscan friars' ideological position. Roger French and Andrew Cunningham in their publication, *Before Science: the invention of the friars' natural philosophy*, outline the Franciscans' pre-occupation with the nature of light as seen also by the importance it has in the works of Roger Bacon.

This divine emanation or divine truth, Bacon writes in his last chapter on optics – *Concerning the Relationship of Perspective to Theology*³¹⁵ – must somehow be understood or expounded upon because it is ordained and emanates in the direction of this world. Consequently, the science of perspective has as a particular function an understanding of the organ of vision itself in all of its layered complexity, since it resembles in every way the divine order: the earth mirroring heaven. And because vision, according to Bacon is three-

fold, sense alone is only a weak vision; the vision of memory is more perfect, while vision by reasoning – in this case syllogistic and geometrical – is the most perfect.

Knowledge of the perception of vision therefore mediates divine illumination. There is another dimension of three-foldedness: namely direct, refracted and reflected light. Direct light is the most potent and the most perfect, and belongs to God. Refracted is less certain and befits the nature of angels. Reflected vision belongs to man³¹⁶. His proof for the importance of this research he finds in the Bible, as he writes: "*For in God's Scriptures nothing is so much enlarged upon as those things that pertain to the eye and to vision [...] and therefore nothing is more necessary for the natural spiritual meaning than definite knowledge of this science*"³¹⁷.

2.3.4.2 Analysis of pictorial space in *The Cycle of Saint Francis* in the Bardi Chapel

There are a number of recurring themes that give form to the picturing of vision in the light of Bacon's theories. A prime example is Bacon's idea that perception is based on predictions and judgment on the part of the viewer. Giotto, for instance, being his own first viewer, becomes an integral part of his own compositional considerations. The visual narratives, so familiar to viewers at the time, anticipate not only the movement of the viewer's gaze within the scenes, but also take into consideration the proximity and position of the viewer in the space of the church as well as the relationship to the location of each fresco independently.

The distant location of the fresco *Francis Renouncing His Worldly Goods* at the top of the left wall within the lunette is given a dramatic physical presence by the foreshortening of the walls around the Bishop's Palace. It is against these walls that the action of the renunciation plays itself out. The foreshortening³¹⁸ exaggerates the size of the corner where the walls meet and compensates for the distant scene by pushed the action out towards the viewer. In this way the viewer is able to participate in the dramatic action of its story. The town folk that accompany the father are closest to the viewer, and together they are facing Saint Francis, who confronts them with his intention. The protruding wall³¹⁹ is most prominently at the edge where the walls join. The right hand wall separates the assertive figure of Saint Francis – standing in front of its edge – from his father who is lunging at him

from the left wall. The walls recede into the distance on either side, the lines of the stone or brick converging away from the protruding edge. This edge where the two walls meet is off centre to the right and relatively closer to the rear wall of the Chapel. This is calculated to compensate for the oblique angle from which the viewer is forced to observe the scene – high up and within the narrow confines of the Chapel.

Bacon also briefly discusses the problem of the angle of vision. The perpendicular direct viewing that Bacon suggests is strongest, while not possible in the Chapel, is somewhat recovered by Giotto's pictorial strategy mentioned above. Moreover, the curve of the lunette adds to the reading of this architectural projection as resembling, while not inverted, that of a reflection on a convex mirror jutting out towards the viewer. Bacon had analyzed and studied these, and Giotto likely made an association between the elements of the lunette and Saint Francis literally projecting his intention out to the world³²⁰.

Opposite, in the same corresponding position at the top right wall within the lunette, and chronologically sequential in the Saint Francis cycle is the fresco, *The Confirmation Of the Rule* (fig. 2.74). Compositionally and spatially it is, however, the other fresco's inversion. Here we have the representation of an interior space, whose coffered ceiling constructs a sense of concavity and pulls the viewer into it by its receding lines. There is also another kind of foreshortening. The coffered ceiling does not recede centrally, but points to the friars at right of centre. This compensation, as in the opposite fresco, constructs a false centrality for the viewer³²¹. The scene must be viewed from an oblique line of sight at the entrance to the Chapel, and produces the illusion that Saint Francis – who is actually kneeling left of centre – appears to be kneeling at the centre of the fresco. Interestingly, this technique has echoes in anamorphic drawings of the Renaissance. The viewer is also in line with the brothers and Saint Francis as they kneel facing the Pope. If the opposite fresco centres on the idea of intention and projection, this fresco centres on the idea of reception. In the scene, Saint Francis is waiting to receive approval for his brotherhood. All the figures are up close at the forefront of the pictorial space and picture plane. On both sides of this central interior are two side wings that contain on each two figures that observe the scene, each one seeing the event from the opposite position. Creighton Gilbert proposes that the figures not actively

participating in the narrative are there as a witnessing of the event³²². This idea of proximity and distance is repeated most especially *The Death of Saint Francis and the Verification of the Stigmata* (fig. 2.74) to be discussed later. And in the centre of the roof above the kneeling figure of Saint Francis is the head of Saint Peter, patron to Saint Francis, framed by an oculus. The roofline and the continuing rooflines of the side wings encompass the space below in a kind of protective emanation, but they also simultaneously guide the viewer's eyes to their apex, where even the direction of the marbling of the pedimented roof sweeps up to reinforce the heavenward gaze.

These two frescoes find the viewer's sense of sight engaged in the judgment of position, distance, magnitude and motion – producing a perceptual judgment on the general character of their pictorial spaces of reception or projection – concave or convex. One sends a message of intention, the other one of reception. Clearly one could imagine Giotto intentionally making these pictorial propositions as much a statement on his understanding of vision as an homage to the life of Saint Francis and its ideological implications.

Chronologically the next two frescoes are differently inverted. The Sultan (fig. 2.75), seated high up on the throne, is enclosed in its symbolically tall narrow housing. The projective lines of the throne's roof extend downwards, pointing to the narrow side doors. However, the internal oblique lines of the ceiling of the throne – when extended – point to the Sultan's head, possibly his eyes as he looks at the fleeing priests³²³. What his eyes are seeing constructs a conflict of reason, or in Bacon's term – complexion. His central and enclosed position of the throne, with his head turned in one direction and his pointing hand and arm in the opposite direction, speaks of what Bacon would identify as the experience of internal senses in a confliction of judgment. This state is hidden to the external senses. The lines that draw our attention to the Sultan's head and eyes – if we project them in the manner of the optic chiasma crossing and continue them as straight lines of sight – form a pyramid of vision that Bacon describes. The space that this pyramid encompasses in front of the throne is a space empty of any figures or object, leaving the Sultan powerless. But what it does encompass on the right-hand side is the burning fire, whose flames follow exactly the shape of this triangulation. This is also symbolically the fire and force of vision, perhaps even

divine, which is simultaneously the cause of fear but also of certitude. Behind and surrounding the throne is a layer of soft and pliant walls. This shallow curtained space is possibly a garden. The incline of the side-walls, when extended, converge on the centre of the middle riser of the second step to the throne. This riser is symbolically decorated with ten small circles whose specific meaning one can only guess at – perhaps the commandments. While the walls incline inward, the shallow scene forces these projections to continue across the pictorial surface to meet in front of the lightly coloured, almost white throne. This reinforces our attention to the centralized conflict of the Sultan and engages the viewer in reconstructing, however subtly, lines of sight that both converge and diverge from the Sultan. The result is to open up the pictorial space in front of the sultan, *giving access to the viewer*. Saint Francis on the right-hand side of the fresco and closest to the viewer rehearses this action as he gazes towards the Sultan in a movement from right to left. The position of this fresco on the wall is much lower than the frescoes above, and it does not appear that Giotto felt he needed to compensate the centrality or have the figure close to the surface, since the action plays itself out in the centre of the pictorial space represented.

The pictorial spatial resolution of *The Apparition At Arles* (fig. 2.76) in the centre of the left wall is also organized symmetrically. While the Sultan, positioned at centre, looks away from the viewer and at the fleeing priests, Saint Francis with his head turned to his left, looks straight at the viewer standing at the entrance of the Chapel. The stage-like setting of the side-walls and roof together with the columns at the front constitute the projective lines that can be constructed from the architecture. The spatial projection of the centre columns converge on the feet of Saint Francis, who appears to be standing – if not even hovering – at the centre on a reddish brown surface that appears to be on the same level with the seats on which the brothers sit. The roofline projects downwards, converging on the area close to the heart of Saint Francis. The space of the rectory is progressively recessive, and just as Bacon suggests about the nature of light and colour, becomes darker and the colour more dense. The low wall at the front supporting the columns for the roof are rendered in the lightest value, appearing to illuminate the middle value of a sienna and umber interior. Against this appears

the rear wall or the background, rendered as the darkest contrast. This space represents well what Panofsky implies when he states that:

[...] the enclosed interior space [that appear in Giotto for the first time] clearly felt as a hollow body, signifies more than a consolidation of objects. It signifies a revolution in the formal assessment of the representational surface. This surface is not a wall or the panel bearing the forms of individual things or figures but is once again the transparent plane through which we are meant to believe that we are looking into space, even if that space is still bounded on all sides [...] we may already define it as a 'picture plane'³²⁴.

On the left side of the fresco closest to the viewer, Saint Francis looks down on the friars sitting below him on the left, who are largely oblivious to his gaze and appear to be in a state of internalized contemplation, while those on the right side of the fresco and furthest from the viewer look up towards him. This visual pyramid therefore has as its apex the vision of Saint Francis and as its base the two groups of friars. Together, this structure of the gaze constructs a pyramid of rays of vision, creating a bond of vision between the apparition and the friars.

It is, however, the red tiled roof that dominates the sense of visual convergence (fig. 2.77). The structural lines of the tile pattern draw the eye to converge off in the distance beyond the fresco's frame, while at the same time appearing to fan out across the entire scene like a divine emanation. Saint Francis, at centre, constructs a circle formed by the curve of the arch (fig. 2.78) that frames him at the top and the curve of his raised arms that encompass the sign of the crucifixion. The halo that surrounds the saint's head is at the dead centre of this circle, recalling the iris at the centre of the eye: the head in the centre of the iris becomes the visual pupil – the spiritual pupil – for the entrance to the soul. The centering of all the optical circles completes itself in this supple sign of the eye, and connects it with the eye of God at the vertex of the emanation³²⁵. The equidistant rays that extend the pattern of the roof spread like the divine ray, *most ungrudgingly over those seeking it*. For Bacon, knowledge and wisdom are quite literally caused by illuminations, or as he calls it, the illuminationist's act of understanding³²⁶.

The complexity of interior and exterior spaces makes this scene unique among the frescoes in this cycle. I am reminded of the seven layers of the eye that Bacon describes. They are here re-enacted as seven spatial layers:

- 1) There is a space in front of the columns
- 2) There is the low wall.
- 3) There is the space where the friars are sitting.
- 4) There is the middle wall with three arches at whose centre Saint Francis hovers in the impossibly shallow space of the arch.
- 5) There is the space behind where the other friars are standing or sitting.
- 6) There is the rear wall; and finally
- 7) There is an ambiguous linear configuration, like an opening, in the rear wall, slightly to the left and more in line with the sight-lines of the viewers at the entrance to the chapel. This 'opening' leads the viewers' ray of vision into an undefined space beyond the rear wall³²⁷.

The scenes in all the frescoes have both an inside and an outside, and it is easy to move back and forth between them. But unlike *The Trial by Fire* (fig. 2.79), this architectural setting has only one doorway on the left side, closest to the viewer, offering the viewer an entrance into the scene. The pictorial space surrounding the Sultan in *The Trial By Fire* is constructed primarily in the more tangible aspects of vision, whereas in the *Apparition at Arles* (fig. 2.80), despite the four straight and upright and perpendicular columns supporting the roof, it is the roof that leads to the sensation of divine emanation that falls over the whole scene.

The Death of Saint Francis and The Verification of the Stigmata (fig. 2.81), although badly damaged, has a number of wall fragments and other symbolic elements that also speak to the understanding of vision. The low wall of the architectural structure on the left side of this fresco inclines, and if extended, it converges directly on the stigmatic wound. The wound's inspection for proof or verification is made with two senses, the senses of sight and touch— the immaterial and material. What remains in the painting that depicts the ceiling of the enclosed space on the left side appears to suggest a similar convergence at the point of proof. The young brother on the other side of the of the bed on which the saint's body lies in

state has his head turned to see Saint Francis rising up to heaven surrounded by angels, spiritually closest to man. The angels are taking Saint Francis to the next level in the celestial hierarchy, guided by a triad of light bearers in a state of (*geometrical*) *perfection*. Each holds a long vertical torch arranged at an inclined angle towards the centre of the fresco, where it converges in the shape of a pyramid with its apex at the top edge of the fresco pointing heavenwards. The figures in this emotionally moving scene both express and suppress sorrow. Sensations and their complexions are internalized or externalized. The figures to the right and left look on with quiet controlled sorrow, and are the register for two separate independent views. A third view is registered by a group situated at the middle of the painting, physically in contact with the body of the deceased saint, whose members touch adoringly or gesticulate in dismay as they converge towards the centre where the body lies in state.

This structure replicates the meeting point of the two separate optic nerves, the point at which the *ultimate image* is formed and which represents the *ultimate point* of perception. This resemblance to the action at the optic chiasma parallels the perception of vision as understood by Bacon, for whom in this centre there exists the convergence of *complex sensations* to be identified and memorized. The touching and looking all occur in sensible time and are more direct and stronger than when looking occurs from a distance. The senses of sorrow, loss, and joy impress themselves on the memory faculty of the brothers, here in the painting cast in the materiality of their own bodies, through which they can be shared and rehearsed by the viewer. Giotto emphasizes this sharing by placing the scene and the stigmatic wound – the proof of Saint Francis's proximity to God – just above the viewer's eye level. The viewer is consequently induced to feel as though they are kneeling behind or beside their representatives – the friars kneeling next to the body. The intimacy of this embracing viewing position is further enhanced by the near life-size scale of the figures. But that is as far as a reading of the work can be pursued, since unfortunately no traces have been left concerning the particularities of the pictorial space beyond this point.

The final scene of the *Visions of Brother Agostino and Bishop Guido Of Assisi* (fig. 2.82) also unfortunately has too many parts missing to be able to comment on it.

Nevertheless it is possible to observe generally that all the scenes discussed have been pictorially constructed with the understanding of direct or reflected and refracted light. The direction of the light in *Saint Francis Renouncing His Worldly Goods* (fig. 2.83) illuminates the right side of the wall and palace above it, leaving the wall on the left side to become progressively darker. The fresco below with its apparition of the saint is also illuminated from the right, and Saint Francis appears to be illuminated from the top. This also seems to be true for the verification of the stigmata fresco. The three panels on the right are illuminated from the left. Giotto acknowledges as well the presence of the window on the rear wall and renders the light within the frescoes as though illuminated by it. White noticed the same phenomenon in the illumination of the Arena Chapel³²⁸. However, the overall illumination is not dramatic and the shadows cast are very subtle. For example, the pillars that support the roof above the apparition, with their progressive shift from light to dark, adds another level of plasticity and a sense of reality or volume and gives a further dimension to the geometric rationalization of the spaces. Whether the sight-line of the figures in the scene or the symbolic object or gesture, all become part of an understanding of the nature of vision as understood by Bacon and others at the time.

The final fresco to be discussed in this cycle is *Saint Francis Receiving Stigmata*³²⁹ (fig. 2.84). All the visual constructs here are tied to the figures of Christ and the saint. The mountain becomes simply a backdrop whose mass emphasizes the twisting movement of Saint Francis' body. That movement provides the figure with a strong frontality despite the clearly depicted gaze between the saint and Christ. This complex move folds the viewer into the action as the eye tracks back and forth between saint and saviour following the lines of force, or rays of light, that hold the two figures in a an embrace of equivalence. This fresco carries a rather unique demonstration of Giotto's understanding of optics. A comparison with two other versions of the painting is instructive. There is a version now in the collection of the Louvre and executed by the Giotto's workshop around 1300 (fig. 2.85), almost three decades earlier; a second one, part of the Assisi cycle, *Legend of Saint Francis* (fig. 2.86), dates from about 1304. In each case the crucified figure of Christ is enfolded by the four-winged seraph that supports his outstretched arms and body, though *without* the presence of

the cross. What is then to be especially noted is that in these earlier versions, while the marks of the stigmata are visible on the body of Christ, the lines of force that transfer the stigmatic marks to Saint Francis are organized in a way that would indicate a simple understanding of mirroring (fig. 2.87). Saint Francis, facing the body of Christ, receives the stigmata from Christ's right hand to his own left hand, and from Christ's left hand to his own right hand. This perpendicular exchange is also true for the stigmatic marks on the feet: from the right foot of Christ to left foot of the saint, and from the left foot of Christ to the to the saint's right foot. This mirroring exchange constructs a rectangle between them.

In contrast to this mirroring, the later Bardi Chapel fresco depicting *Saint Francis Receiving Stigmata*³³⁰ (fig. 2.88) has a different order to the transfer and reception of stigmata. Here the lines of force or light that give visual presence to the transfer of the stigmata *are no longer parallel*, as in a simple mirror image, but *cross* so as to truly duplicate the marks from the figure of Christ to the figure of Saint Francis. In other words, the stigmatic marks are transferred from right hand to right hand, from left hand to left hand, and similarly from right foot to right foot and left foot to left foot. Between the figures of Christ and Saint Francis, this configuration forms a crossing of two lines that clearly parallels the structure of the optic nerves that extend from each eye, crossing from right to left but at the centre intersecting at the optic chiasma – which as we have seen was understood to be the ultimate point, the ultimate complete image – before continuing on in its straight linear propagation. A number of descriptive diagrams of this understanding exist from this period³³¹.

This indicates a new way of picturing vision that is not represented by the appearance of the mirrored image, whether in front or behind the mirror's surface, but as Bacon describes it *at its point of intersection*. This then represents a clear indication that Giotto was, by the time of the Bardi Chapel's painting at least, well aware of contemporary research into the physiology of the eye and brain and their relationship to vision. That research, appealing to geometry and syllogistic logic as it did, nonetheless was naturally argued in the context of the theological belief in light as a model and source radiating illumination. Giotto's painting does more than just demonstrate his knowledge of this research. By abandoning the

conventional mirror representation, in which only one person can claim identity to the mirrored image – Giotto abandons Saint Augustine’s model of vision and supplants it with a true *exchange* and a more complex understanding of the nature of vision. Francesca Flores D’Arcais suggests, without going into more detail, that the play of diagonals in this fresco creates an embryonic perspective system³³². It should also be noted that it is also Giotto who, for the first time, includes these shafts of light as part of the representation of the stigmata³³³. Massaccio’s *Trinity*³³⁴ (fig. 2.89), executed almost a century after Giotto’s Bardi fresco, attests to Giotto’s understanding and gives a visual model in support of Grosseteste, Bacon and others who believed that geometry³³⁵ was capable of depicting cause through the use of the natural effects produced by lines, angles, and figures together with light as pure intelligible form³³⁶ – light being the form that gives form to everything else³³⁷.

A final reference here, to Proclus, that *Space is nothing other than the finest light*³³⁸, is interesting for its aphoristic summation of the ideas taken up by Bacon that if light is ultimately geometric by nature, then light is space. It is possible to recognize in Giotto’s Bardi fresco of *Saint Francis Receiving Stigmata* a paradoxical approach to this matter of space and light. On the one hand, Giotto’s floating of the fresco images against an indeterminate spatial background transforms space into a homogeneous and so to speak, homogenizing fluid, one that is immeasurable and indeed dimensionless. On the other hand, with his complex imagery of light representing the reception of the wounds, Giotto transforms that feared immeasurable infinity into one having a finite dimension, *a dimension of activity*, an activity centred on two bodies – that of Christ and of Saint Francis – firmly anchoring the era’s desire for redemption through the body of Christ to the human body itself, and shifting the gaze from the transcendent to the terrestrial.

2.3.5 Mathematical beliefs

2.3.5.1 General context

The relationship between the transcendental and the terrestrial is implicit in the centrality of mathematics for the thirteenth and fourteenth centuries. In the early part of the thirteenth century Robert Grosseteste, Bishop of Lincoln and a multivalent mathematician, astronomer,

physicist, philosopher and translator of Greek to Latin insisted that natural philosophy – or science, as we now refer to it – should be based on both mathematics and experiment³³⁹: mathematics for its realization of the hidden dimension of reality, and experiment for reality's effects. John Bridges, writing on the life and work of Roger Bacon, discusses Grosseteste's immense influence on the need for scientific study at Oxford and on the development of an empirical approach to knowledge³⁴⁰. Interestingly, since Bacon was a Franciscan, in 1224 Grosseteste was made rector of the Franciscans, recently established there. According to Bridges, Bacon mentions attending lectures on optics at Oxford, most likely given by Grosseteste, for whom Straker mentions that "*the mathematical study of optics was the foundation of all creation, all created being, and all causation*"³⁴¹. There is inescapable evidence that Roger Bacon was a disciple³⁴², but in any case, Bacon, whose own influence on empirical thought is well known, and whose interest in geometry has been examined in the preceding section, states his position on mathematics in this passage from his *Opus Majus*, chapter one:

The gate and key is mathematics, which the saints discovered at the beginning of the world [...] the knowledge of this science prepares the mind and elevates it to a certain knowledge of all things, so that if one learns the roots of knowledge placed about it and rightly applies them to the knowledge of the other sciences and matters, he will then be able to know all that follows without error and doubt easily and effectually. For without these neither what precedes nor what follows can be known; [...] Comprehension of mathematical truths is innate, as it were³⁴³.

By the later part of the thirteenth century mathematics touched every aspect of society. Its application was pragmatic, whether for the theologian as a tool by which to rationalize religious belief, or for ordinary tradesmen and merchants as useful in manufacture and commerce. It was only in this period that mathematical skills were recognized as useful for broader applications. Mathematics was now taught privately in grammar schools, universities or guild schools or in special primary or Abacus schools, where the teaching of basic arithmetic and geometry was based on written instructions rather than diagrams. This dependence on text led to a tendency that reversed the order by stating not the original proposition of Euclid, for instance the question how can a triangle fit a circle, but rather what is the largest circle that fits around a triangle³⁴⁴. This would lead to a different approach to the

subject that shifted medieval thought beyond the classical mold. Advances in arithmetical calculations enabled international banking to invent loan systems for the purpose of fighting wars on credit. Indeed, Florence was the primary centre of international trade, developing letters of credit through banking families like the Bardis and Perruzis.

But as mentioned, and clearly entertained in Giotto's frescoes for the Bardis' Chapel, there was another dimension to mathematics beyond the simple numbers of arithmetic. In the Middle Ages mathematics came to be charged with sacred or magic meaning. Numerology as a *fabula* was not new, even as far back as the Pythagorians. They had been interested in what can be termed philosophical numerology, through which for Plato mathematics took on meaning³⁴⁵. The Christian Church adopted much of Platonic thought, and from the time of Saint Augustine number symbolism was part of inserting layers – at times secret layers – of meaning into a written or visual text, and arithmetical patterns were used even in the structuring of poetry³⁴⁶. In the theological application of mathematics the Trinity – 'The One', or Oneness, of Mind and Soul is identified with Divinity. Medieval thinkers felt authorized by Saint Augustine to develop complex mathematical relationships in the belief that numbers were of divine origin and it is in that sense one can see why it was thought, as Slocum notes "*they were the key to the pattern and form of the world*"³⁴⁷.

If Divinity was monadic it was assumed that Evil was a Duad, or diversity, which was of course characteristic of ordinary life. It was therefore the Soul's task to aspire towards this state of unity and leave behind chaos. Other numbers carried similarly loaded connotations, as for example the number *three* as perfection. The applications were universal. Symbolic numbers were an essential and fundamental aspect of medieval architecture. Jacques de Liege gave special importance to the number *four* as it related to the number of elements of the material world, and when added up, as in the numbers 1 2 3 4, 10 was the result. The number four also represented the four characteristic humours in the body – phlegmatic, sanguine, choleric and melancholic – and their conditions: hot, cold, moist, and dry. John Secor writes that Dante was so aware of this relationship that in the *Purgatorio* he makes a neat geometrical symmetrical relationship between the separate sections of the cantos. And in *Paradisio* Beatrice wears the same three colours as the colours of the three circles. Dante's

use of numerology can be seen again in the *Inferno*, in which five cantos the length of 7, 10, 10, 10, and 7 add up to 44, a doubling related to medieval symbolism' defined of four as the number for a human being³⁴⁸. As a final example of the widespread interest in numerology, Kate Frost writes that John Donne was enamoured with the number *twenty-three*, associated with Divine Justice, and with the vertical structure of the Universe. Not surprisingly, numerology was closely linked to astrology – as in the case of the famous medieval mathematician Cardano casting the horoscope of Jesus³⁴⁹.

Numerology's importance extended beyond its specific application into an entire mindset one might call a *Weltanschauung*³⁵⁰. Under its influence, Vincent of Beauvais developed from Vitruvian theory of proportions a set of proportions for the human figure in *Speculum Naturale*³⁵¹, and in the early part of the century Leonardo Fibonacci of Pisa published in 1202 his most well-known treatise, *Liber Abaci* or Book of the Abacus³⁵² in which he introduced the nine Arabic numerals³⁵³ plus the zero. Fibonacci writes "The nine Indian figures are 9 8 7 6 5 4 3 2 1. With these nine figures and an 0... any number may be written".

Dante – aware as ever of contemporary knowledge – appreciated the progressive and incremental possibilities of these numbers, always casting them as Divine. In *Paradisio* Chapter XII he writes: "*in nine subsistencies together brings itself eternally abiding One*"³⁵⁴. In my analysis of mathematical beliefs, I suggest that numbers – whether proportion or circles, squares or triangles – and the relationship between mathematical beliefs and Giotto's representations of the Bardi Chapel seem manifold, and that mathematical considerations touch not only on the principal aspect of the compositions, but dominate even the very smallest detail, as I will demonstrate.

It is not only proportion itself that became a subject for discussion. Implicit in it lay the question of progression and infinity itself. The controversy can be traced back to Saint Augustine's intuitive argumentation concerning the parallels between mathematical and religious concepts of the infinite³⁵⁵. As Saint Augustine argued, the infinite must exist in God since God must already know each and every natural number, and he not only knows infiniteness, but is himself that³⁵⁶. Saint Augustine went on to intuit the infinite vanishing

point by putting a hierarchical value on geometrical forms, suggesting that the equilateral triangle was superior to any other triangle, the square superior to it, while next in the hierarchy was the circle and finally above all these is the point-indivisible, centre and beginning and end of itself, the generating point of a circle, the most beautiful of all figures³⁵⁷. And Dante in line 49 *Two Modes of Creation* writes,

Open thine eyes now and behold how bound
is thy belief with what I shall reply
both in the truth like centre in the round.
That which can die, and that which cannot die,
are nothing save the splendor of that Word
In love begotten by our Father High³⁵⁸

This eventually becomes the vanishing point with no beginning and no end, identifiable in some degree with the apogee and perigee – the highest or most distant point.

Bishop Etienne Tempier, in arguing against philosophical speculations on the matter of eternity and *non-createdness* of the universe, nonetheless admitted the possibility of parallel or multiple worlds and advanced the idea that the heavenly spheres can have both circular and rectilinear motion. This marked not only the start of an acknowledgment that an infinite universe was possible, but also that there was space beyond the *Premum Mobile*, the Ultimate Sphere or extent of the Christian Universe up to this time³⁵⁹. By the beginning of the fourteenth century, Scholastic thought came to reject Aristotle's insistence on the nonexistence of the infinite, and accepted the existence of an actual infinite.

Geometry

Edgerton, in *The Heritage of Giotto's Geometry*³⁶⁰, writes that medieval scribes were frustrated in representing volumes because, lacking a shared graphic language, they lacked the ability to represent three-dimensional forms.

Means therefore had to be found by which the geometry of volumes as a visual language could become integrated into the common visual system of belief. The resources were slender. An Arabic version of the original Greek text of Euclid's treatise *Phaenomena* – demonstrating spherical geometry for astronomers – and translated into Latin had survived into the twelfth century. Additionally, while others of his texts were largely devoted to the

geometry of planar figures, he did speak occasionally about spheres. Thus, while Roger Bacon was interested in familiarizing Christians with the *Geometry of Mother Earth* and the physical character of the Universe, he and others had difficulty in geometrically representing a sphere or hemisphere. One can fully appreciate this dilemma when reading his explanation for the roundness of the Universe, which is accompanied by two diagrams, both in plan. Even though a bit lengthy, this whole passage illustrates clearly the anxieties that geometry, it was hoped, would be able to relieve: that is, that it would enable speculations of the physical world – by demonstrating with logical argumentations providing credible answers – that it conformed with expectations about the nature of the universal divine order.

Since of necessity the bodies of the universe are many and divisible and are quantities, they must have a form required for the existence of the universe [...] Therefore the universe must be a spherical form, in which solid alone are all diameters equal, so that it can revolve freely on every diameter, and thus no inconvenience results. Likewise within it must be spherical and concave; for it cannot be of a *plane* figure³⁶¹.

But the parts of the heavens must be equally distant from the earth on account of the equality of nature. Therefore of necessity it must be of spherical form³⁶² (fig. 2.90).

No more natural emblematic repository of truth can be imagined for this period than the architecture of the churches themselves. Eric Fernie in the introduction to Nancy Wu's anthology *Ad Quadratum*³⁶³, a book dedicated to recent research on the practical application of geometry in medieval architecture, discovered a numerological system explaining the typical proportional relationships of nave to aisle, arcade to wall, and the aisle arcade wall. He concludes that the ratios of the nave, the aisle and arcade wall, as well as the aisle and the arcade wall in themselves can be shown to have the same ratio of 26. While measurements of churches are generally approximate, varying to some extent from place to place, he remarks on the amazing recurrence of their similarity between the proportions of medieval church architecture. It is also possible to identify these proportions with interrelated forms of the circle, triangle, square and other polygons. The above proportions, based on the square root of 2, 3 and 5, not only relate to the Golden Section, but are reflected in two intersecting circles whose angles form 60 degrees, or three overlapping circles that form an isosceles triangle, while the square root and grid are generated from the square³⁶⁴. This is also very

evident in Giotto's pictorial representations. This means that medieval architecture was dependant on and integrated with geometric structures and their numerological associations. And as we have seen, it was hardly alone in this: poetry as well was, as with Dante, both numeric and geometric³⁶⁵. In turn, geometry's association with religion and sacred number systems and symbols during this period recasts it as quite hermetic, an emphasis that saw it interpreted as functioning on the notion that spiritual forces of the universe actually have the potential to engage or enter and influence the material forces with which Bacon was preoccupied³⁶⁶.

2.3.5.2 Analysis of pictorial space in *The Cycle of the Life of Saint Francis*

Having made these general points concerning the application of geometry to medieval church architecture, it is appropriate now to consider them in reference to the particular church under consideration in this chapter, the Church of Santa Croce.

The following analysis will emphasize first the numerological aspects of the Church, and then examine its geometry. Both need to be prefaced with a caveat. Starting with the measurements for the church of Santa Croce taken from the official plan, the stated length of the entire church is 115 meters long. Yet I found it to be closer to 110 meters. Similarly, the transept (note here its derivation from *sept* or 7) that traverses the nave or body of the church at right angle to the entrance of the choir, is given as 73 meters from one side of the church to the other, while my calculation brought it to within 70 meters. This is based on measurements made by myself from the Chapel and its adjacent pillar – and information from other published measurements including the plan of the church. The point is that whatever measurement is made, the issue of its relationship to intended proportions remains open, particularly since as the scale increases there is more variance at play. With detailed work, there is of course more control possible³⁶⁷. As another example, the aisle is given as 38 meters wide and I found it closer to 40 meters. Again, these variance might be a matter of including or excluding the wall measurements. Therefore I want to stress that the numbers here are only within a few meters of accuracy. It is, however, difficult to ignore the fact that the square in the chancel – considered the key to the grid on which the whole church is based

– is very close to 10 meters. I should state here that whether these measurements are taken in Roman feet, the measurement of the period, or using our contemporary metric system, the numerical relationship and relative proportions remain the same. For ease of comprehension I will therefore use metric.

Returning to the area of the church of most interest here, the transept's width is approximately 20 meters (fig. 2.91). Leading off it beside the high altar, the Bardi Chapel itself is approximately 6 meters in depth if the exterior wall is included, and 5 meters in width if half the width of the pillars separating it from the altar on the left and the next chapel on the right is included in the calculation.

Length of church	11000 cm	divided by 10 meter grid	= 11	11-7 = 4
Transept length	70000 cm		7	7-4 = 3
Aisle width	40000 cm		4	4-2 = 2
Transept width	20000 cm		2	2-1 = 1
Square in Chancel	10000 cm		1	

total ratio and proportions = 10

The sequence 1 2 3 4 can be related to Jacque de Liege's number four of the elements whose addition makes 10, the perfect number, which number also defines the dimensions of the key to the grid in the church's chancel, rendering it the monad – the primary unit from which all is generated. Four also represents the four humours, and in Christian symbolism the number for a human being. The square root of 2000 – the width of the transept – is very close to 44, which for Dante illustrates the union of two people, namely Beatrice and himself ascending into paradise.

11000 : 10 = 11000	sq root of 11000 = 10.4
70,000 : 10 = 7000	“ “ “ 7000 = 8.3
40,000 : 10 = 4000	“ “ “ 4000 = 6.3
20,000 : 10 = 2000	“ “ “ 2000 = 4.4 X
10,000 : 10 = 1000	“ “ “ 1000 = 3.1

	25000
subdivision for the 5 chapels on either side	500 wide
	500 deep

	26000 (each side of the chancel is 26 meters)

Note that the number 11 is the number of times the principle square – the dimensions of the chancel – divides into the length of the Basilica. Eleven is the combination of the One – unity and singularity – and of the Ten – the perfect path leading up the aisle to the altar. James Addiss gives another example of a medieval church, San Miniato in Florence, for which he demonstrates that the square forms the modular plan of a crypt interior³⁶⁸.

Number symbolism was also used in the octagonal columns of Santa Croce to divide the nave and aisles. The number 8 signifies birth and rebirth, making the baptisteries traditionally octagonal. The five apses and the five chapels that flank either side of the chancel would have been a reminder for the friars of the five wounds of Christ, and of Saint Francis' emulation of them³⁶⁹. The number 5 as a significant number representing both Christ's crucifixion and Saint Francis' stigmata was repeated in devotional literature. Without going into detail here, which I will be doing below when I turn to the church's geometry, it's important to make the point that Giotto would have been aware of the church's use of the grid, and that he follows suit. In his six frescoes in the Bardi Chapel he divides them horizontally into five equal parts, and vertically into four (fig. 2.92, 2.93).

Clearly one could go on with this analysis at greater length, but whether it is possible to reconstruct all the complex layers of numerical meaning that are integrated into the architecture of this Basilica, and in particular the frescoes, is not the aim. There is substantial evidence that for the medieval mind the accomplishments of a work, whether literary, musical or visual, was measured by its ability to integrate the divine order meaningfully³⁷⁰. This notion of the divine order was already mentioned by Plato in the *Timaeus*, and as Otto von Simpson reminds us in *The Gothic Cathedral*, medieval writers spent a great deal of time rationalizing their texts to conform with this divine order³⁷¹.

Shifting emphasis, then, from numerological considerations to geometry, we can note that the pointed gothic arch that forms the entrance to the Bardi Chapel is constructed out of two overlapping circles whose radius is the width of the fresco of *Saint Francis Receiving Stigmata* (fig. 2.94) just above it. The *Intradoes*, or round medallions (fig. 2.95), of two saints on either side of the arch are framed by circles that are proportionate, being one sixth of the width of the stigmata fresco. The radius of the large outside circle of each that frames the portraits divides in half to become the halo worn by the saint. This interior portrait is surrounded by six semicircles that are again half the radius of the halo. Therefore a consummate proportional relationship is established between all parts of the representation. It will come as no surprise that the frescoes themselves are also subject to an internal order that reflect the greater order expressed by the proportionate relationship established by a geometry linking the symbolic and narrative content of each work³⁷².

As already mentioned, I became aware of the sub-ordering of the six frescoes by a grid within the Bardi Chapel. Studying *The Apparition at Arles* (fig. 2.96), which is the central fresco on the left wall, I became aware of the spatial regularity between the four columns that support the roof in the foreground. And since the excellent photographic reproduction at my disposal included all four edges of the fresco, it was possible to measure with reasonable certainty the vertical relationship of the spaces depicted between the column and the rest of the fresco surface. It became clear that the fresco neatly divided the surface vertically into five equal sections. On the right hand side I observed in the fresco *Trial By Fire* (fig. 2.97) that the Sultan's throne has similar vertical proportions. Upon measuring the throne, it turned out to have an identical width to the space between the pillars. This then led me to divide the remaining four frescoes in this manner. In each case the vertical divisions coincided with some important elements of the composition. In *Saint Francis Renouncing His Worldly Goods* (fig. 2.98), the uppermost fresco on the left wall situated in the lunette, when divided vertically using the same measurements, coincides dramatically with the vertical edge of two diverging or converging walls against which the separation of Saint Francis' old life and his new life plays itself out. Villani, who wrote on the lives of Florentine personas and events in the later part of the fourteenth century, in describing the great buildings of Florence from the

left bank of the Arno writes: "*From here every crany of our city can be fully seen. Let us climb up, pray, and look down on the city walls jutting upward to the heavens, on the splendid towers, on the vast churches, and the splendid palaces*"³⁷³. And John White writes:

[...] with Giotto's ability to combine a jutting architectural mass that fully exploits the semicircular field with a centralized figure design that fills the forward plane. While the architectural knife-edge blunted by the figure of St Francis himself, emphasizes the all-important centre of attention, the receding side wall of the massive structure bridges the dramatic gap across which the straining father tries to rush³⁷⁴.

While badly damaged in parts, in *The Confirmation of The Rule* (fig. 2.99) – its counterpart on the right hand wall – it is still possible to see that the horizontal width of the roof conforms exactly to the dimensions of the vertical divisions. Due to severe damage suffered as a result of the erection of tombs in the eighteenth century, the two lowest frescoes *The Death of Saint Francis* and *The Verification of The Stigmata* (fig. 2.100) on the left wall and the *Visions of Brother Agostino and Bishop Guido of Assisi* (fig. 2.101), on the right wall, one must examine more subtle indications that the vertical divisions played a major role in their composition as well. Irene Hueck's article concerning Giotto's proportions looks at the relative proportions of the Saint Francis cycle in the Arena Chapel. She remarks that the proportions of each narrative field was somewhat wider than tall³⁷⁵. This led me to see if there might be a horizontal division that was consistent in the compositional arrangements of all six frescoes indicating the presence of a grid, one albeit rectilinear rather than square since the proportions of the frescoes are in fact close to 320 cm by 510 cm. I found that there are in fact enough horizontal co-incidences to suggest that indeed there are regular horizontal divisions. While the vertical surface is divided into five equal parts, the horizontal is divided into four equal parts. Joel Brink examines the geometrical ratios of three altarpieces by Duccio, Cimabue and Giotto, and discovers that they are all related to each other through the square root³⁷⁶. The proportions of the fresco's division of four by five can have associations with – as previously demonstrated – symbolic numerological meaning. For example, the five wounds of the crucifixion and the number four to indicate a human being. The Fresco on the outside of the Chapel, *Saint Francis Receiving Stigmata*, is divided into four squares, both vertical and horizontal. It also is one third the height of the Bardi Chapel, and if we include it in the height of the Chapel we have a height of four squares. But before I go into further

detail I want to add that both the horizontal and vertical division of the frescoes in the Bardi Chapel can be further subdivided into ten parts horizontally and eight parts vertically. Ten and eight: these divisions and their numbers can be seen to relate to the Basilica as representing the divine monad – 10 – and birth – the number 8. Further, the geometric designs on the framing system of the frescoes are a clear indication of the presence and application of geometry, literally framing the ideological beliefs³⁷⁷. While discussion has frequently centered around the proportional relationships of individual narrative panels, the subdivision of a grid adds another dimension to the geometric construction and disposition of the architectural elements in each of the frescoes. The size of the figures represented in these narratives is at the maximum for the dimensions of the frescoes, close to 1,40 m or nearly life size, a scale that Giotto favoured whenever possible³⁷⁸. The architecture, on the other hand, is reduced from its original scale, while maintaining a more or less plausible relationship. This proportional geometry between architecture and man favoured the importance of the figures to the setting. It would therefore seem reasonable that the geometry of the architectural settings, relatively shallow and set-like, was also determined in part by the figures and their narrative importance. I suggest that when examining the architectural constructions and their perspectival representation, it is possible to see that the angle of a wall converging or diverging was a hybrid of the impulse to apply principles of perspective that were known at the time with modifications related to the narrative text.

In each of the six panels within the Bardi Chapel, what might seem like an awkward visual choice can be explained by the extension of the angles as they converge on the principle personality and group and their actions in the scene. In *The Apparition at Arles* (fig. 2.102), the sides of the roof when extended intersect at the neck of the apparition of Saint Francis floating at the centre of the fresco. And again, the odd juxtaposition of the receding perspective of both the right and left side of the coffered ceiling in *The Confirmation of the Rule* (fig. 2.103), when extended, show that the projected lines point clearly to the friars behind Saint Francis³⁷⁹. Another instance involves the slightly differing converging angles of the base of the Sultan's throne that converge on the pointing arm, indicating the importance of Saint Francis' beliefs. Each fresco has numerous coincidences

of this sort that help explain what might otherwise indicate ignorance of architectural perspectival observations and rules that were known at the time. There is however a third element, and that is the integration of figure to architecture and its perspectival potential, as well as the symbolic division and construction of a grid indicating the presence of the larger Divine Order. For example, the angle of the Sultan's pointing arm in *Trial by Fire* (fig. 2.104) is in line with the diagonal division of the rectangle formed by the grid that surrounds it³⁸⁰. Or the receding perspectival sides of the foot stools of the Pope and the Bishop in *The Confirmation of the Rule* (fig. 2.105) intersect perfectly with the intersection of the grid as its projection meets at that point at which the coffered ceiling's projections point to the group of Friars.

In *The Apparition at Arles*, all the heads of the friars (fig. 2.106) in the foreground are lined up on the horizontal division of the grid almost right across the entire fresco, and the disposition of individual figures can be seen to be defined by the grid. In another example, in *The Trial by Fire* (fig. 2.107), the figures of Saint Francis and his companion are restricted to the first fifth of the grid on the right hand side, the fire by the second fifth, the Sultan occupies the third fifth, while the fourth has the priests turning to go and the fifth segment has the priests with lowered head escaping. In each of the other frescoes the grid is similarly quite clearly integrated into the narrative.

From these observations it seems possible to propose that Giotto was conscious of combining the Grid – as Divine Order – with the architecture that at times intercepts it, and further that he aligns it with narrative value, making accommodations to relate architectural proportions with figure and narrative, and by the same token permitting the figuration to be organized in conformity with the grid, architecture and narrative³⁸¹. John White also confirms the mathematical feel of order to Giotto's work when he writes:

[In the] *Massacre of the Innocents* comparing it to the organized Chaos of Giovanni Pisano's slightly earlier *Massacre at Pistoia* which Giotto almost certainly knew well... Giotto endows the same self narrative ingredients with the abstract clarity of a mathematical equation³⁸².

What is intriguing in these six frescoes is not only the shallow and measured pictorial space that Giotto constructs, but also its difference from, as an example, the Arena Frescoes

– where there are no views through the buildings themselves, an observation made by Max Imdahl³⁸³ (fig. 2.108). While the buildings in the Bardi Chapel frescoes are depicted as having both an exterior and an interior – as in the inclusion of sky and side entrances and exits around the margins of the paintings – there is an acknowledgement of the pictorial surface that is no more clearly emphasized than in the fresco of *Saint Francis Receiving Stigmata* (fig. 2.109).

In this Fresco the setting is primarily a landscape. Saint Francis is praying on the mountain when suddenly the apparition of Christ on the cross interrupts his prayer. Saint Francis is turned as though he had been facing the Basilica's high altar – an interesting position suggesting that Giotto might have been playing with the relations between Saint Francis and the Basilica itself – and is caught by the unannounced apparition. This sudden gesture, a gesture of awe³⁸⁴ and surprise, is very differently represented than in the panel of *Saint Francis Receiving Stigmata* (fig. 2.110) hanging in the Louvre and painted around c.1312 by Giotto and his workshop. While that painting has adopted a number of the conventional depictions of this event, in its case Saint Francis has his body turned face to face with the apparition. In the Louvre painting the Seraph is not accompanied by a cross and embraces Christ by supporting him with his wings. In the Bardi version Christ's figure on the cross cuts more dramatically at a diagonal into space than is the case with the one in Paris. Moreover, in the Bardi Chapel painting the diagonal of the cross is extremely close to the degree of the angle by which the symbolic chapel within the painting cuts also diagonally into space. Together, the cross at the top and the chapel at the bottom construct a diagonally receding picture plane that appears to be almost touched by the right hand, the right knee and right foot of Saint Francis. It is also the right side of Saint Francis that corresponds to the diminishing plane, while the left side of his body corresponds to the larger nearer edge of the plane. This is all part of forays into foreshortening, which according to Hueck, became of interest to artists in Rome near the end of the thirteenth century when geometric and optical information was just beginning to be applied to the idea. Giotto would naturally have had some knowledge of the basic elements of its application³⁸⁵.

Another very significant depiction in the painting involves the question of *force*. Christ's cross represented as a Tau – the Greek letter T and Saint Francis' preferred symbol – takes the form of a simple horizontal beam that butts up horizontally against a vertical post. Because they do not intersect, their two equally opposing forces are maintained rather than dispersed in the transfer of energy that Bacon talked about. The figure of Christ on the Tau cross is enfolded by a six winged Seraph which, as described earlier, has two wings positioned above the cross, three wings actively propelling in mid air to the side as though in mechanical action³⁸⁶, while the sixth wing discretely covers Christ's nudity³⁸⁷. The high positioning of the fresco lends force for the viewer to the relationship between Saint Francis and the figure of Christ on the cross. The equation between Saint Francis' emblematic stigmata³⁸⁸ and the Crucified Christ is clearly drawn.

Though the painting's balance of figure to landscape – the importance of Saint Francis to the viewer balanced against the importance of nature to Saint Francis – forms a significant dialectic within the painting's conception, these factors are further and most profoundly complicated by the relationship the painting establishes between the wounds of Christ and the stigmata of Saint Francis. Between, one might say, the bodies of the Saviour and his Servant. From the wounds of Christ on the cross project golden lines of light like thin straight beams that transfer and project those wounds to the body of Saint Francis. But what is most fascinating from the perspective of pictorial space is that the spatial geometry accorded the depiction of this transposition is different here from that in the Paris and all other versions that I have seen. Here, Saint Francis receives the mark from Christ's right hand on *his right* hand, from Christ's right foot on *his right* foot, from Christ's left foot to *his own left* foot (fig. 2.112). The older versions transfer the marks as though seen in a mirror from left to right and right to left. In another interesting instance of Giotto's mapping of the painting's internal order to in a sense quote from or extend the miraculous transference, the configuration of the rays that *write* the stigmatic marks on Saint Francis's feet can be found repeated in the invisible lines that diverge out from and construct the cave's entrance – already earlier related to the birth canal – and connecting the cave's left side with the raised right hand of Saint Francis – see the diagram.

Similarly the configuration of the ray of light that writes the stigmatic mark on the saint's right hand can be found repeated in an invisible line that aligns the right side of the mountain with the right hand of Saint Francis. As well, the height of the chapel is scaled to the length of the ray that writes the stigmata on Saint Francis's left hand. If there is a similar geometry of scale established with the landscape by the ray writing the wound on Saint Francis' side I have not been able to find it, though interestingly the length of that ray is exactly the distance between the saint's right foot at the painting's lower left corner and his raised right hand just above and to the left of the painting's centre, a distance that describes the greatest extent of the figure; and if that has significance, let it also be noted that the midpoint of that imaginary line – remember, a line the length of the celestial ray marking Saint Francis on the side – marks the exact location of that very same stigmatic wound.

Thus if the narratives of the six frescoes that lie within the Bardi Chapel construct their internal geometry through a relationship in which architectural forms and their spatial value – their lines of perspectival projection – are subject to the grid and the pictorial planes demarking the importance of the figures in the narration, the fresco of *Saint Francis Receiving Stigmata* presents a different order. Lying *outside the narrow confines of the chapel*, the fresco – while subjected to a grid – is spatially organized in accordance with an order whose geometry is based on a dynamic transference involving our acceptance and appreciation of a spatial rotation, literally speaking *a revolution*, in tracing the transference of the sacred wounds from the body of Christ to the figure of Saint Francis.

A final point: The depiction of this landscape is dominated by Mount La Verna, with only one building – a diminutive symbolic representation of a chapel, possibly dedicated to Saint Damien, whose architectural feature is linked both in its dimensions and disposition to the cross and the rays of transference emanating from the figure of Christ on the cross. And as we have seen, the landscape owes the depiction of its form at least in part to the architecture of the rays passing between Saint Francis and Christ (fig. 2.112). In all this I am reminded of Bacon's notion of a force field that is present everywhere but that moves always to a point of infinity. I am also reminded of the notion of parallel worlds and the acknowledgement of the infinite subdividing into potentially infinite parts, and the

consummate proportional and meaningful relationship between all parts, so complex to imagine yet presented with an economy matching the sharpness of William of Ockham's famous razor. If the medieval imagination is often associated with unleashed complications, it must equally be seen capable of a sense of order whose essential simplicity spoke to the Truth of an indivisible Unity encoded in a sacred geometry.

2.3.6 Medical Beliefs (concerning the body)

2.3.6.1 General context

Galen

It was without any great resistance that the authority of the Greek physician Galen (c.130-200 A.C.E.) was adopted by medieval wisdom. As discussed in chapter one, Galen himself practiced and set down in *Ars Medica* his understanding of the body. The first copy of this in Latin, from the Arabic version by Avicenna, was published in Salerno³⁸⁹ around 1200 A.C.E.³⁹⁰, and around 1300 A.C.E. the Venetian Senate issued a permit for an annual dissection. This enabled Mondino to publish a book on anatomy based on both dissection and Galen's text. The main thrust of Galen's approach was to divide medical knowledge into certain sections: the temperature of the body; fluids; and important organs such as the brain, heart and the female reproductive system³⁹¹. Galen had been trained in stoic thought, and his deterministic approach to medicine was formed in a climate quite contrary to his own thoughts. The popular belief was that external forces acted on the body arising from outside the framework of human affairs. It was assumed therefore that a cure lay in the movement of the heavens, in which the celestial spheres both predicted and controlled the life and fate of man³⁹².

It is easy to see why the idea that the heavens had an impact on the state of the body inserted itself so easily into a medieval culture dominated by the concept of a Divine Order³⁹³. It is not that Galen can be strictly equated with Christian theological imperatives (he rejected the concept of miracles), though it has been noted that his Stoicism was informed by Christian thought³⁹⁴. He lived in a Roman world in which physicians worked by the rule of the heavenly bodies, since astrology was enrolled into stoicism. Galen, however, had his own

version of the order set down by God. He believed that knowledge of the body and of the bodily organs and functions revealed both God's divinity and sacred mystery, a god who was benevolent and reflected his perfection and wisdom in the design and function of the body itself. He rejected the stoic faith in astrology, emphasizing instead the stoic version of natural law. Galen himself stated that in that respect he differed from Moses³⁹⁵, and indeed despite apparent similarities to Christianity, Galen's basic texts were for the Middle Ages theologically neutral. They were nonetheless compatible with Christian monotheistic theology, even if his more philosophical texts remained more ambiguous, and his medical writings during both the medieval and renaissance periods were de-paganized by making Galen acceptable in a kind of *conversion* to Christianity³⁹⁶.

Because there are many elements in Galen's understanding of the body that became important themes in medieval thought, it is worth summarizing the larger general concepts. Galen studied anatomy in Alexandria and described the skeleton in a work titled *Bones for Beginners*, in which he gives an accurate description of the skeleton. He recognized the spine as the most important of the body's bone structures – and *sacrum* was duly translated by the medieval scribe as sacred. He also defined and described the articulation of the joints, but ignored their movement. He wrote a book on the anatomy of the muscles, both form and function. What was problematic in his text was the lack of nomenclature. He described both the brain's spinal chord and the olfactory nerves as well as the facial and auditory nerves linking them to the cranial pair. He proposed that the principle nerve was the optic nerve and wrote in great detail about it, and went into some detail describing the ocular motor. He wrote another book on veins, originating in the liver, and arteries whose movement of the blood was understood by him to be comparable to that of a tree³⁹⁷, whose branches are in the lungs and other parts of the body.

The grand design of Galen's physiological system – which is difficult to describe briefly, but which it is important to understand for its implications with respect to Christian beliefs about the body – worked on the general understanding that spirit or *pneuma* was the basic principle of life. This spirit was manufactured in a process that involved the integration of three internal *pneuma* triggered by drawing in with our breath the all-present external

pneuma, the *world spirit*. On entering the body, this *world spirit* passed to the lungs. Galen believed it was the liver that was capable of elaborating *chyle* into a mixture of venous blood and the first of the internal *pneuma*, the so-called *natural spirit*, *pneuma* innate to all living matter. As Singer writes: "*This pneuma was spoken of as the natural spirit. Charged with this natural spirit derived from the liver and with nutritive material derived from the intestines, the blood, he believed, was distributed by the venous system ebbing and flowing in the veins*"³⁹⁸. The *spirit* suffuses the whole body. A third *pneuma*, called the *animal spirit*, was secreted by a mysterious organ at the base of the brain, the *rete mirabile*, from which it was distributed by means of the (hollow) nerves throughout the body³⁹⁹.

Concerning the various parts of the body, Galen concluded that the brain, blood vessels and nerves are formed from seed, and the heart is formed from blood. We can see that blood, then, was considered a primary material substance in generating the physical body, whereas the brain – along with its nerves – was less physically involved, did not generate other organs, and seemed rather to be the mechanism by which the soul was received. As a consequence of Galen's schema, the heart – more or less located at the centre of the body as the site of purification – assumes primary significance in medieval thought⁴⁰⁰. The idea of the purification of the body, opening and bleeding, is also part of the Saint Francis myth as I will show opening up pictorial space in a new way. Concerning the brain and nerves, in dissecting the cerebrum Galen identified the seven pairs of the cranial nerves, the optic nerve amongst them. Of special note is Galen's privileging of the optic nerve over all others. Galen's achievements here can generally be summed up by his having established the primacy of the brain as the source of bodily motion and sensation. He thought of the spinal cord as an inferior brain and made a distinction between motor and sensory nerves, believing that the latter were motivated by the centrifugal flow of the third level of *pneuma*, or animal spirits.

The Mind / The Brain

Research into the questions of the mind in the Middle Ages was based on three Greek concepts of the brain's function. Namely that it was the 1) seat of the soul, 2) location of motor and sensory activity, 3) *rete mirabile* – motivator of miraculous sensory nerves such

as the eyes – and their localization in the ventricles of the brains. Until the beginning of the fourteenth century this understanding motivated the three-cell doctrine, in which the primary cells of the brain were given a hierarchical order. The largest cell, or *first cell*, received sensations from the special senses and the rest of the body, together thought of as *sensus communis*. It was here that images were created. And this area was known as *imaginativa* or imagination. The *second cell*, or central cell, was the site of judgment, *cogitativa* or thought, and *ratio*, or reason and reflection. The *third cell* took care of what was left over, to which was attributed memory. The absolute determination of the position of these divisions underwent some rearrangements by the middle of the fourteenth century, likely due to the opportunity to perform anatomical dissections granted by the Venetian Senate⁴⁰¹. It was due to anatomical verification that the number of the brain's divisions was revised to five ventricles. This division of five becomes important to the compositional divisions that can be ascertained in the *Bardi* frescoes. In a rare diagram made between the middle and the end of the fourteenth century, roughly contemporary with Giotto, the brain is represented as a circle with the optic nerve and optic chiasma lying outside the circle ⁴⁰² (fig. 2.113).

In a crude diagrammatic representation illustrating a translated text of 1347 by Avicenna, while there is no legend, there is an indication of five senses connected to the first of five interconnected cells. The first two are the anterior ventricle, the second two are the middle ventricles, and the last the posterior. In a manuscript copy of *De Scientia Perspectiva* by Roger Bacon a very similar figure is found⁴⁰³.

Compare this to our contemporary description of the brain, which is also divided into five parts: 1) two cerebral hemispheres; 2) the inter brain; 3) the med brain; 4) the pons Varolii and cerebellum; 5) medula oblongata.

The divisions mentioned above correspond to the five secondary cerebral vesicles and, grouped together, become the cerebrum. The cerebrum has four ventricles, with the fifth representing the lower half of the fourth ventricle⁴⁰⁴. This is the case for Giotto, for whom the number was particularly associated with the body and mind.

The Body

The notion that celestial bodies influenced the state of the human body was formalized through astrological systems that were introduced by the Stoics into Greek and Roman thought, and elaborated by early Christians. Henceforth, astrological beliefs became ingrained into medieval beliefs concerning the body. It is important, however, to remember that belief both in divine visitations and in astrological influences precluded any simultaneous belief in natural causes. Jacques de Vitry, a physician from Salerno, in analyzing the dangers of astrology, suggested that if it were not mediated by theological authorities it could lead to a spiritually hazardous belief that the planets determine human physiology, humoral predilections, and vices, eliminating in that sense personal responsibility and social accountability⁴⁰⁵.

We know from the Condemnation of 1277⁴⁰⁶ that the Church – in arguing against Galen's proposal that physical causes reigned supreme over any divinely inspired interventions into the material world – moved to limit the authority of the physiologist or anatomist, especially concerning psychological matters, and subjected their findings to principles of medieval Christian beliefs and ethics. Galen's error was cited as his having imagined that God came *with* the earth rather than, as the Church held, that *he created* everything⁴⁰⁷. Condemned along with these was the belief that a man, by nutrition, could become another. In Saint Augustine's Confessions, Book VII, we have Saint Augustine quoting God as follows: "*I am the food of full-grown men. Grow and you shall feed on me. But you shall not change me into your own substance, as you do with the food of your body. Instead you shall be changed into me*"⁴⁰⁸.

This raised questions of the host that was served at mass representing the body of Christ: was it food or was it nutrition? The implications raised were numerous, and concerned the necessity to clarify whether Christ was a man as a result of the union of body and soul. Did Christ shed all his blood in his Passion on the Cross? Three days after his death could Christ's blood have been consecrated – and did he have blood left in his body to enable the physical capacity of his body to support resurrection? These were confusing enough. But the most troubling question was the nature of Christ's body in the consecrated host. *Can it be*

so divided or ground up that it ceases to be the body of Christ? The question was also whether a consecrated host, when eaten, can nourish? These questions, always spoken rather than written down, surfaced during the Advent of Lent and became known as *quodlibets*⁴⁰⁹. Other revealing questions – revealing for their curiosity and confusion concerning the body – are also mentioned by Peter Biller. Is the sense of touch an *independent* sense? Is there a special mechanism in males, lacking in women, that converts the food into strength? Can God make a person appear in more than one place at a time? Is death natural? *The Visions of Brother Agostino and Bishop Guido of Assisi* places Saint Francis in two different locations at the same time.

From these examples it can be seen that the practice of medicine in the Middle Ages can be defined as a combination of theology and science fraught as well with philosophical, moral and ethical questions in which the care of body and soul was inseparable. It is little wonder, then, that physicians also referred to the Bible to justify their role and reinforce their authority⁴¹⁰.

[...] My son in thy sickness neglect not thyself, but pray to the lord, he shall heal thee. Turn away from sin order thy hands aright, cleanse thy heart from all offence. Give a sweet savour, and a memorial of fine flour, and make a fat offering, and then give place to the physician. For the Lord created him and let him not depart from thee for his work is necessary. – Ecclesiasticus 38. 1-15

The condemnation of beliefs at the core of astrology undermined the natural determinism of both astrology and medicine. A word of caution must be inserted here. It is too easy to reduce the Middle Ages to the strictures of the Church. To appreciate the climate of debate that makes the era interesting, one should consider the case of Pietro d'Abano, a thirteenth century physician, who dared to take a similar position to Galen and wrote in 1295 – several years after the condemnations – a *famous* treatise on the *Compendium phisionomie* in which he employed astrology, physiognomy and theory of complexions to describe psychological dispositions of the patient. He was a strong defender of total secularization in the practice of medicine, and only referred to the Creation section of the Bible in order to praise and acknowledge God's achievement⁴¹¹.

Nonetheless, generally medication ranged from herbal medicines or simple astrological predictions to the contemplation of devotional pictures, or devotional music intended to facilitate healing – or at least to accompany the patient in the passage from life to death. Today, we believe in the power of advertising to sell a product, in the Middle Ages the power of an image to mediate a direct relationship to the divine was undisputable. Another remedy involved the patient's proximity to relics whose power was to be absorbed into the body through a process of osmosis, and linked to this was the deployment of appropriate symbolism to secure the return to a state of health. Hospitals were in effect religious institutions, where liturgies and confessions were calculated to keep the patient, the caregiver and the facility pure of heart and avoid spiritual contamination⁴¹².

From the foregoing, it is clear that the human body was a site of contest for the Middle Ages. Giotto realizes in his representation of the myth of Saint Francis the significance of this contest. In *Saint Francis Renouncing his Worldly Goods* (fresco #1), top left wall in the Chapel, Giotto implies that the saint presenting his naked body – stripped of clothing or adornment – as a *tabula rasa* on which his beliefs would be written. In *The Death of Saint Francis and the Verification of the Stigmata* (fresco #5), bottom left wall, it is now the friars verifying through their examination of the wound on his body their own belief. In *Saint Francis Receiving Stigmata* (fresco #7, outside the Chapel), Giotto here depicts an equation between the trials of Christ's body (through his crucifixion) and the reception of the wounds by Saint Francis. Whether it was the Church attempting to rationalize doctrine, or popular curiosity attempting to satisfy confusing contradictions, the nature of the body held immense significance for an understanding of one's place in the sight of God – or as we would say, in the Universe. Such questions as how the embryo is formed, and whether male or female embryos were more quickly formed; or whether skin colour is related to differing mixtures of the elements of earth and water or air and fire: all these and more absorbed countless debates and implied nuances of value that returned always to the core question: what is the nature of the self⁴¹³? This pre-occupation with the self goes back to Saint Augustine's invention of the concept of self, following on his rejection of the soul's immortality⁴¹⁴. The focus on one's

body and the concept of the self forms so much a part of Giotto's pictorial spatial construction.

Saint Francis

Galen, in his attempt to categorize different personality profiles, articulates a personality that resonates with that of Saint Francis. This personality possesses symptoms of extreme sympathy, exhibiting a melancholic state in which their empathy for others permits the black gall at elevated temperature to pass through the heart, the centre of purification. It is this very physiology or temperament that is capable of *imitatio*, the imitation of Christ that Saint Francis lived⁴¹⁵. In Chapter XIV of Celano's first biography the description of Saint Francis also resonates with Galen's personality profile⁴¹⁶. Celano's Saint Francis striking for his intense empathy clearly spoke to an era whose fascination with the self was in contest with divine will. A capacity for empathy would seem to resolve the dilemma, allowing for an authentic self – yet one within God's Grace.

Sexuality in the Middle Ages was replaced by the heart as both the centre of purification and of love and empathy – *the bleeding heart* formed from blood itself – can be traced to the writings of Anselm, Bishop of Canterbury 1033-1109 A.C.E. In questioning the nature of God and Jesus, Anselm de-emphasized Christ's gender by making love a neutral force. As Caroline Bynum writes, Anselm opened the doors to a strong presence of Mary as Mother, representative of an asexual love. There follows a form of idealized or spiritualized feminine representation, notably lacking any overt sexual character, with the female body dominated and replaced by the presence of the heart as a neutral principle⁴¹⁷ of unconditional and infinite love⁴¹⁸ – pure, or perhaps more aptly, *purified* empathy, the wounded, bleeding, suffering heart, the wound of birth or death. In a final bravado thrust, Anselm raised the question, "*Jesus [son of God] are you not also our Mother*"⁴¹⁹?

2.3.6.2 Analysis of pictorial space in *The Cycle of the Life of Saint Francis* in the Bardi Chapel

The Mother we all know, Mary, Mother of Jesus, of Christ – The Virgin Mary – is the mirror subject – as co-titular Saint of the Basilica – of Giotto's Saint Francis, occupying the left or distaff side of the Chancel just as Saint Francis occupies the right. To Giotto's *Saint Francis Receiving Stigmata* (fig. 2.114) is offered Gasparo Martellini's *Dogma of the Immaculate Conception* (fig. 2.115). In light of the equation of empathy and pure love that finds metaphoric and visual expression in the heart and in motherly love, the juxtaposition of these two – the Virgin Mary and Saint Francis – takes on a very specific and even strategic meaning. The fact that Mary has her hands folded at centre in the position of the heart simply follows as a signifier. Notable is the difference between the two paintings. On the one side we have Mary's Immaculate Conception symbolized by her seated at the centre of a receding oval, her hands over her (pure) heart. Constructed here is a singularly passive pictorial event, with the viewer entering the pictorial space symmetrically at centre – received directly into the Virgin, one might say. *Saint Francis Receiving Stigmata* (fig. 2.116), opposite and perhaps intentionally so, is far more dynamic and in a sense establishes at least his equality, if not his primacy, in this church⁴²⁰. We are given witness to the moment of *connection*, the consequence of the most extreme case of empathy – the Becoming the Other, the equivalent, the duplicate. The place no mother, certainly no virgin mother, can – or dare – occupy. The viewer is placed face to face with the very moment of imprint, the moment when duplication – of the wounds, but also of the spirit – occurs, an ultimate empathetic sharing of the pain in the viewer's heart. And while in the painting there are acute angles cutting into space they are all incisive, straight, thin and direct – with a symmetry recalling Celano's idealized description of Saint Francis. The imprinting of the wounds and the deterministic character of the pictorial space – its formal construction in reference to the grid – resonate as one.

Recalling Celano's portrait, his precisely drawn description of Saint Francis, or the description of Saint Francis as precise – the distinction is drawn only to note that from the viewpoint of the mythologized Saint Francis there need be no argument about the truth – reflects an almost skeletal structure, a version of Ockham's razor perhaps, or as Rona Goffen

writes; the shallow body in an autopsy. The audience, for its part, is set in a box-like structure, representing the Lateran, of which the front walls have been omitted as though it were a stage set⁴²¹.

Memento mori. From a certain perspective, this characteristic admonition of the era carries the mark of the body's empathy for – its ultimate *projection to* – the Other, and Giotto engages the viewer as an accomplice to this 'passion'. In pictorial terms it is the lines of extension across a space, linking one entity with another in. In medical terms it is the empathy of one part of the body with respect to another, holding the body itself in the balance of life. And the *rete mirabilis*, the mysterious organ or mechanism by which the soul was received, offers entrance to the body through hollow conduits of nerves and brain matter. So different from this is the the venous system, referred to as such by William of Auvergne, in that on the material substance of its blood depended physical life itself. In the tree of life, it is the blood that conserves life and endows a person with immunity from death⁴²². One – the hollow nerves originating in the brain – requires the emptiness of space to permit the soul to enter the body; the other – the venous system – the necessity of material to fill it.

I am convinced that the metaphoric principle of the grid was derived from the body – limiting the amount of Chaos, or organizational impurities, within the composition of the work, just as in the composition of a healthy body⁴²³ the venous system crosses the heart at centre in a perfect meeting of the material and the virtuous. The Basilica and the frescoes in the chapel thus seen become the body writ large. Consider the brain, conceived of as a schematic grid divided physiologically into five ventricles, and Giotto's division of the frescoes inside the chapel into five vertical sections. As we have seen, the function of the brain and nerves, including the *rete mirabile* was seen as providing a receptacle for the soul. Within Giotto's frescoes, one can see the analogous deployment of the brain – credited with bodily motion and sensations – in the conception of the architectural perspectival projections that set the compositions into a dynamic play. The projective character of the architectural perspective lines engages the viewer through what one might call a centrifugal absorption into the core of the narrative – and I am making here an analogy to Galen's centrifugal flow of the *pneuma* to the heart that gathers and then releases its content – the core being the key

character or event of its narrative, revitalizing the meaning of the narrative in the frescoes just as blood flows back into the body. In the same way that the vertical division of the brain's ventricles separates the different sensory functions of the body, Giotto makes divisions in the frescoes so that that each section takes up different aspects or parts of the narrative. The sequence of these ventricles was often associated with digestive processes, the images created by sensations – *sensus communis* – in the first cell were manipulated by reasoning in the second cell, and whatever was left over was stored in memory, the third cell⁴²⁴.

The all-pervasive *sensus communis* is the reservoir of the imagination where sensory experiences, both perceived and *not actually* perceived, co-existed: the fantastic and the actual – the vision of the sense of sight and the vision imagined with other senses. Saint Francis himself had many ecstatic visions and there are recorded many ecstatic visions by those who saw Saint Francis. These witness accounts and the legends make no differentiation between the two different modes of seeing – *fantasm* and *actual*. Arnold Davis writes that in the sermon of October 1255 Saint Francis's vision is described as corporeal, very much as though visions were about taking into the body a true reality. It is interesting in this regard to recall that long before Saint Francis, Saint Paul already had proclaimed *I bear on my body the marks of Christ*⁴²⁵. Certainly Giotto's representation of *The Apparition of Saint Frances at Arles* (fig. 2.117) makes no attempt to render his *imagined* presence as any less concrete than the other monks present, with the exception – as Goffen points out of *the swaying of his posture* expressing the visionary rather than the earthly. The representation and posture of Saint Francis is repeated below in the fresco *The Death of Saint Francis and the Verification of the Stigmata* (fig. 2.118) as he is taken away on a cloud to heaven – surrounded by a circle that possibly symbolizes Saint Francis held in the perfection of the Divine Mind. Here it is only scale that changes and establishes the movement into the distance⁴²⁶.

Representations as legends or as songs, spoken in liturgies or written, became even more real as they were metaphorically or symbolically structured. It is worth emphasizing that mind in the Middle Ages was more real than reality itself. Anselm's ontological

argument – that nothing is greater than God – may be fraught with contradictions in contemporary logic, but it worked well to the medieval mind. God is that something-than-which-nothing-greater-can-be-thought. For the contemporary mind that which exists in reality is greater. However for Anselm and the medieval mind, that which exists in the mind alone is greater⁴²⁷. Consequently, any associations between mind and God, visions or revelations, were believed to be more real. For Giotto, it is not only the desire to make the world more real; the world in the presence of God gained a greater sense of reality, and Giotto's impulse towards this greater reality was informed by the presence of God – as was Dante's or the physician's.

The later work of Giotto, when compared with more traditional forms of representation at the time, reveals an overall experience of what could be described as a kind of hyper reality that was hitherto unknown. Every contemporary commentary on Giotto's work remarked on it. The sense of an emotively charged expressiveness to the characters portrayed was part of the precision with which the body and its actions was observed. Bruce Cole writes that Giotto never flags in his total understanding of all the dramatic elements at play in the story, and we can include in this most especially his ability to realize the primacy of the mind *as more real than reality itself*, of the part sensation, or the sensory in human emotive states, plays in relations between the soul and the heart. "*And so he arose, if I may so speak, sorrowful and joyful, and joy and grief were in him alternately*"⁴²⁸.

Emotional states and character types in the Middle Ages are discussed as a dialogue between the nature of Man and the nature of God. This dialogue can be understood as one between the *Mind* of Man and the *Mind* of God, between the *tangible* and the *intangible*. The nature of Giotto's pictorial space seems as tangible and available to touch as the individual characters' bodies or emotions – whether or not those characters represent the living or the dead – and becomes inscribed and organized accordingly. The reach of the medieval imagination springs forth from this reservoir of reality as *Imaginativa* – the realm of both perceived and not perceived experiences – a reservoir always subject to argument and logic – the realm of *Estimativa*. As a result, their awareness was capable of oscillating between these two experiences. An example can be seen in the manner in which Giotto focuses our

attention on the apparition in *The Apparition of Saint Francis at Arles* (fig. 2.119). The lines of perspective drawn from the side-walls and their roofs converge at a central point that appears to be the apparition's heart. This is interesting in itself as a crossing of the rigour of the grid with the rigour of the saint's purity, of the *perceivable* with the *unperceivable*. But it is yet more interesting, its meaning is completed, let us say, when we consider closely the pictorial means Giotto has brought to bear on the relationship of the side-aisles with the main aisle that holds the central imagery of the fresco. These side-aisles are enclosed – but also strangely *not* enclosed – by a roof that disappears *as an illusion* into the central roof structure. What we experience as visible and what we experience as visualization – what we can actually see and what we can only visualize – are maintained in a tension that defines the medieval apprehension of Man's proximity to God: the ability to hold together contradictions as illuminations. We know this dialectic consciousness formally as the tradition of Scholasticism, whose roots go back to Dionysius Areopagiticus, one of whose central tenets is paraphrased as follows: "...life, which through love floods forth from God, has a counter-flow whereby it draws its own creation to itself"⁴²⁹.

While there are no vistas as such in Giotto's six frescoes, there is always this presence of an inside and outside that defy separation. This dialectic relationship, as one could call it, represents in itself the moment that occurs in the shifting, or oscillation, between the internalization of meditation, the transition to revelation, and the awakening of consciousness. This *moment* is *framed*, as one might imagine snapping a photograph, by always exposing to view not only the sacraments – as was the rule for patients in the hospitals – but as well the body of the wounded Christ whose wounds were the key of empathy that could open the door to redemption.

This active engagement of consciousness, then, constructs the frescoes' pictorial space. The reasoned argumentation of cognitive evaluations, separating the pictorial space into various precise units of emotion and revelation, renders their relationship comprehensible and the narrative's information capable of being organized and evaluated, its precision judged. Compare this with the five separations of the heart, where this act of conceptualization takes place in the fourth ventricle. Each fresco speaks about an act in

progress, and they are about showing, seeing and verification. Perhaps, as Bruce Cole writes, the reception of the stigmata was for Saint Francis no easy revelation arising between ecstasy and fear, but instead was an excruciatingly real mental crisis⁴³⁰. For Giotto, this crisis seems real too; in fact each scenario demands the viewer's personal implication in the events and tests their judgment through paradoxical conflicts of reason and emotion within the narrative. Consider the showing *for verification* of the stigmata, or the sudden *mysterious* appearance of Saint Francis at Arles, or the Sultan's evident *confliction* caught between the strength of Saint Francis' conviction and the flight of his own clerics. And again it is clear in the figure of Christ on the Cross held aloft *in a gesture of revelation* by the wings of the Seraph, with Saint Francis *in surprise and awe* turning his body to receive the evidence of his passion⁴³¹. Conscious knowledge of the body, its physical and psychological state, was generally devoted to helping construct a deeper empathy for the wounded figure of Christ. Saint Francis, on the other hand, chose to radically attack his body by wearing hair shirts, depriving himself of sleep, and taking himself to the edge of starvation; even finally wounding himself to attain a state of hyperconsciousness alert to the discomfort and pain that Christ suffered⁴³². If for Giotto the path of redemption lay in using his eyes to observe the physical world and celebrate the work of God, organizing his body and mind to mediate this understanding, it could be said that for Saint Francis his path to redemption lay in a contrary route: to abnegate the physical world, and ultimately to find in blindness God's Grace. In fact, Bonaventure recorded Saint Francis's reactions to the narrative of Christ's Passion *as another way of seeing*. The passion of Christ was so vividly impressed on Saint Francis's memory that it seemed to him he could see Christ on the cross:

[...] My dearly beloved, the angels are always reminding us of all God has done for us. Who created us [...] Whom have we offended [...] St Paul bathed his eyes, and St. Peter too went out and wept bitterly, Mary Magdalen wept bitterly and St Francis wept so bitterly he lost his sight⁴³³.

Appropriate, then, that of course Giotto would – as he did – draw a line through the stigmatic wounds on the side of Christ's body to pass invisibly through the eyes and hands of Saint Francis (fig. 2.120).