

4 The LOGIC of AESTHETICS

Form is both deeply material and highly spiritual. It cannot exist without material support; it cannot be properly expressed without invoking some supra-material principle. Form poses a problem which appeals to the utmost resources of our intelligence, and it affords the means which charm our sensibility and even entice us to verge on frenzy. Form is never trivial or indifferent; it is the magic of the world.

—Albert M Daleq¹

DISCURSIVE REASON

Reason along with other cultural systems is at root a form-making process. There are of course differences between the expression of logical argument and the arts, and indeed between the expression of the various arts themselves, but as we will see not such as to separate them from the formal roots of rationality. Traditional logic builds its arguments in a lineal sequence; indeed all language has a lineal form that strings out its ideas one behind the other, even though the objects being described may form part of a whole. Language cannot describe in any other way; it cannot present wholeness, as we perceive it, the nature of the discipline means that it must be presented sequentially. Consequently language builds time into its formulations, in order to understand language we need to be able to remember the words at the start of the sentence and ideally some of the content from the beginning of the conversation. Choosing what to say first, second and third influences how clearly we will communicate; clarifying the sequence establishes what can be said. Indeed it is only thoughts that can be arranged in this particularly lineal form that can be said. The structural form of language is known as discursiveness, ideas that cannot be expressed discursively in words cannot be held by language, they are incommunicable. As an extension of language the laws of reason, the logical rules by which words can be assembled into coherent sequential form, are sometimes referred to as '*the laws of discursive thought*.'²

Discursive reason seeks the clearest way of exact expression, and the philosophy of language as developed by Frege, Russell, Carnap and others wanted to establish the ground rules for such precise language. Linguistic philosophy sought to establish how things could be said with certainty and clarity; language from

1 Daleq, A.M., *Form and Modern Embryology*, pub in *Aspects of Form*, ed. Lancelot Law Whyte, Lund Humphries, London, p. 91.

2 Langer, S., *Philosophy in a New Key*, Harvard University Press, Cambridge, 1942, p. 82.

this perspective thus became a limiting function of knowledge. From this viewpoint we could only know what language would allow us to ask. How a question was framed determined how it could be answered; if a question could not be framed, if a proposal could not be verified or refuted, then it was unreal. It could not belong to the framework of knowledge that they call logical, in terms of the linguistic philosophers, it was neither true nor false, it was simply unthinkable.³ If we were to apply the filter of such rigorous conditions to everyday language, little would remain. Everyday language and conversation does not function with such precision. The material that was rejected by the filter of logical philosophy was considered an expression of emotion, feelings or desires.⁴ Such emotional content of the mind was considered to be unintelligent and unsuitable for thought. The philosopher Susanne Langer was critical of the limitations that the linguistic philosophers placed on intelligence; that their approach excluded not only other branches of philosophy but also other cultural disciplines.⁵ She felt that their methodology that made language the only means of articulating thought and reduced all other inner content to mere feeling was a limited perspective on reality. Her work argued for an inclusive understanding of rationality and intelligence and introduced the notion of '*presentational thought*' to complement and stand alongside '*discursive thought*' as a form of rationality that could accommodate a much broader spectrum of cultural disciplines.

PRESENTATIONAL THOUGHT

Discursive reason is not the primary form of thought. As we have just seen, to be able to reason in a discursive fashion we had to start by breaking down the original wholeness into a lineal sequence, then reassemble it in the most coherent sequence we could find to describe the wholeness we had initially perceived. Wholeness is the primary form of thought; '*presentational thought*' speaks more closely of such wholenesses, such gestalt. Works of art, sculpture and architecture are expressions of presentational thought. As we saw in the last chapter, perception presents us with wholenesses. When we perceive the world we see it as a whole and we read it in an instant. Generally speaking we read art in the same way, we do not need to break a work of art down into a lengthy discursive tract to be able to understand it; the work of art simply presents itself to us as wholeness. In this sense presentational thought precedes discursive thought. Matisse used to say to his students, "If you want to paint you must first cut off your tongue because you have lost the right to express

3 "Most of the propositions and questions to be found in philosophical works are not false but nonsensical. Consequently we cannot give any answers to questions of this kind, but can only point out that they are nonsensical. Most of the propositions and questions of philosophers arise from our failure to understand the logic of our language." Wittgenstein, L., *Tractatus Logico-Philosophicus*, Routledge and Kegan Paul, London, 1961, p. 19 (4.003).

4 Langer, *Philosophy in a New Key*, op. cit., p. 83.

5 Langer is critical of the limited range of the logical philosophers, pp. 81–87, "And here is the point of my radical divergence from them. Where Carnap speaks of '*Cries like 'Oh, Oh,' or, on a higher level, lyrical verses,*' I can see only a complete failure to apprehend a fundamental distinction. . . . Clearly poetry means more than a cry; it has reason for being articulate; metaphysics is more than the croon with which we might cuddle up to the world in a comfortable attitude. We are dealing with symbols here, and what they express is often highly intellectual." Ibid., pp. 86–87.

yourself with anything but your brush,"⁶ the wholeness speaks for itself, no need to extrude it into a discursive structure.

When I first made a detailed formal analysis of Erskine's work at Byker in Newcastle,⁷ I found it challenging, because the discursive explanation of the work in words was necessarily very lengthy and to some extent incomplete. The description even with the support of copious diagrams left holes in a full explanation of the work. When we visit Byker we do not see the layout of the routes before we see the housing layout, or the Byker wall or the link blocks as separate events, we see all those elements together, they wrap themselves around us and even a scheme as complex as the Byker development, we read as whole.⁸ We can use language to describe its qualities sequentially for inclusion in a book, but the description, as exhaustive as it was, could not possibly have included all the ingenious detail of the design, nor all the thinking that went into the scheme, the description though useful is necessarily fragmented and ultimately partial. Similarly with my description of Van Gogh's painting of the yellow chair, the description is clumsy compared to the work itself and definitely incomplete; there are many layers of formal detail in the work that had to be ignored or glossed over but even a very full and lengthy description would not capture its full essence. The complexity of a presentational piece is clearly not limited in the same way as a discursive piece. A discursive structure is necessarily restricted by what can be remembered from the beginning of a piece to its end and such limitations clearly set boundaries to the length and complexity of a work. It becomes obvious therefore that there is a whole section of experience and culture where language is inadequate. As we have seen, discursive language cannot adequately be used to describe a presentational work. It is also clear that presentational pieces cannot be broken down into the sequential rules of discursive reason but is that the same as saying that they do not conform to reason? This needs further examination.

The DEVELOPMENT of REASON

Within the gestalt concept of organisation is the notion that the functioning of the nervous system always displays a tendency towards balance. The balance to which they refer is not a static symmetrical balance typified by a pair of scales, but is rather a constantly shifting balance more typical of the circus acrobat balancing on a ball. In the latter situation the equilibrium of the system is subject to continual adjustment as the forces outside the system impinge and tend to upset the established equilibrium. This kind of constantly shifting balance, the gestalt psychologists refer to as dynamic equilibrium.⁹ The forces of the environment impinge upon the nervous systems of each individual and the nervous systems exhibit a spontaneous tendency towards the natural equilibration of these

6 Quoted in Wilson, C., *Architectural Reflections: Studies in the Philosophy and Practice of Architecture*, Manchester University Press, Manchester, 1992, 'Apologia', p. viii.

7 The analysis of Byker was part of a fuller study of Ralph Erskine's work. It was instrumental in setting up some of the questions that this book seeks to address.

8 In truth architecture is often read as a series of related wholenesses as we wander from one aspect to another.

9 Kohler, *Gestalt Psychology*, p. 77.

forces. The nervous system thus arranges the flux of sensory stimulations impinging upon it into coherent orderly forms. These would be the kind of orderly forms we described earlier, emerging out of the nervous system's spontaneous tendency towards balance.¹⁰

EQUILIBRATION

The tendency towards equilibrium is not only a quality of visual organisation but is a characteristic of all forms of conception. It is in fact a characteristic of intelligence. The Swiss child psychologist Jean Piaget developed this basic gestalt theory.¹¹ The tendency of the mind to continually move towards a state of equilibrium is not only characteristic of the higher levels of mental development, but is evident at each stage in the evolution of human mentality. Research has identified such characteristics in each stage of the mental development in a child from the '*sensori-motor period*' of a child's development between the ages of 0 and 2 years old to the '*logical functioning*' of a fully developed mind.¹² Each phase throughout this development displays a greater tendency than those preceding it, to a more stable equilibrium, but it is only in the final stage of logical thinking that some kind of stability in thinking might be said to have been achieved. Piaget does not, however, limit the term '*intelligence*' to this final phase but rather he defines intelligence as the process of equilibration that is characteristic of each of the phases of mental development.¹³ Intelligence is however not only seeking a state of equilibrium within each stage of its growth but is also progressively developing the ability to handle the reversibility of operations in each of its phases. Such reversibility turns out to be an important characteristic of intelligence and it gives us a useful articulation to move our argument forward.

10 "Dynamic self-distribution in this sense is the kind of function which Gestalt psychology believes to be essential in neurological and psychological theory. More particularly, it is assumed that the order of facts in a visual field is to a high degree the outcome of such a self-distribution of processes. From this point of view, a stationary visual field corresponds to a balanced distribution of underlying processes. When conditions change, resulting developments will always be in the direction of balance." Ibid., p. 78.

11 "Every response, whether it be an act directed towards the outside world or an act internalised as thought, takes the form of an adaptation or, better, of a re-adaptation. The individual acts only if he experiences a need, ie: if the equilibrium between the environment and the organism is momentarily upset, and action tends to re-establish the equilibrium, ie: to re-adapt the organism. A response is thus a particular case of interaction between the external world and the subject," Piaget, J., *The Psychology of Intelligence*, Routledge and Kegan Paul Ltd., London, 1950, p. 4.

12 Piaget, J., *Logic and Psychology*, Manchester University Press, Manchester, 1953, pp. 9–22.

13 "Furthermore, intelligence itself does not consist of an isolated and sharply differentiated class of cognitive processes. It is not, properly speaking, one form of structuring among others; it is the form of equilibrium towards which all the structures arising out of perception, habit and elementary motor mechanisms tend . . . Every structure is to be thought of as a particular form of equilibrium, more or less stable within its restricted field and losing its stability on reaching the limits of the field. But these structures, forming different levels, are to be regarded as succeeding one another according to a law of development, such that each one brings about a more inclusive and stable equilibrium for the processes that emerge from the preceding level. Intelligence is thus only a generic form to indicate the superior forms of organisation or equilibrium of cognitive structurings." Piaget, *The Psychology of Intelligence*, op. cit., pp. 6–7.

REVERSIBILITY

Evidence of reversibility is first seen in the sensori-motor phase of development, up until the age of about 1 year old, an object in the child's world does not have permanence. Experiments have confirmed that at first, objects are never thought of as permanent for the child. As soon as the object is hidden from view, the infant gives up any attempt to find it. For example, when a handkerchief covers a watch, the child instead of lifting the handkerchief withdraws their attention. This condition prevails in the infant until the end of the first year and only thereafter does the object start to take on permanence in the spatial field. The object's permanent character results from the organisation of the spatial field, which starts to emerge when the child learns to co-ordinate their own actions. Such co-ordination presupposes that the infant is able to return to the starting point of an activity, or in other words, '*reversibility*' is introduced into the repertoire of the child's mental processes.¹⁴

The ability to reverse mental operations takes several years to develop in the child; from the age of 2 to 7 years old there is an absence of reversible mental operations. For example if a child aged 4 to 6 pours liquid or beads from one glass bottle into another of a different shape, they would believe that the quantity in the recipient bottle had increased or decreased in the process. They believe that two sticks of equal length are equal if their ends coincide but if one is pushed a little way in front of the other, they think the stick has been lengthened. When equal parts are taken away from two equal whole figures, they refuse to believe that the remainders are equal if the perceptual configurations are different. All these phenomena are attributable to the same mental deficiency in the child of this age, namely the inability of the child to construct reversible mental operations.¹⁵

It is only between the ages of 7 to 11 years old that these conditions start to change. At this age mental development in the child achieves a new equilibrium, when thought activity acquires the character of reversibility. At this stage reversibility is recognised when a thought process is able to return to an original state or starting point. This marks the beginning of logical operations, though at this stage of development, we are still only dealing with operations carried out on the objects themselves. With such concrete operations established the child is able to deal with classification and the logic of relationships but is not able to consider all the possibilities for combination. Although this phase marks the beginning of the child's ability to act logically, the logic is limited compared with the period that follows. Firstly the child has not acquired a full formal conception of the operations they perform; they are still to some extent dependent on the concrete data with which they are dealing. Secondly although they are able to classify, create serial organisations and form equalities, such operations are partial and localised; they may have been arranged as part of an organised system without the child grasping the total structure of the whole.¹⁶ For example, two balls of clay, of similar weight, shape and size, might be shown to the child. One might then be rolled out into a sausage or pancake shape in full view of the child. Prior to the concrete operational phase, the child would deny that each pile of clay contained the same amount of substance, since the perceptual

14 Piaget, *Logic and Psychology*, op. cit., pp. 9–22.

15 Ibid., p. 11.

16 Ibid., pp. 15–17.

configuration had changed. They would claim, for example, that there was more clay than before because it was larger, or less because it was thinner. During the 'concrete operational' phase, however, between the ages 7 to 8, logical necessity would make the child recognise the conservation of substance. They would say for example that the object has only been lengthened or shortened and that it is easy to restore it to its former shape, a mental operation that calls for simple reversibility. However, although the child might be able to mentally organise the concept of the conservation of substance, the same child will believe that although the substance remains the same, the weights have actually changed and they will not admit the conservation of weight until they are about 9 or 10 years old. Finally, still dealing with the same two pieces of clay, the same child will not understand that the volumes of the two pieces have remained constant until they are 11 or 12 years old. Hence, although the child grasps some operational systems, which suggest the presence of logical thinking when the child is only 7, or 8 years old, we realise that such operational systems are fragmentary.¹⁷

LOGIC

The final period of operational development begins around the age of 11 to 12, reaching a state of equilibrium at about 14 to 15 years old, and so leading into adult logic.¹⁸ This phase Piaget calls the phase of '*propositional or formal operations.*' The new feature marking the appearance of this fourth stage is the ability to reason by hypothesis. In verbal thinking, such hypothetico-deductive reasoning is characterised by the possibility of accepting any sort of data as purely hypothetical and reasoning correctly from them. From this it follows that the subject's logic is now concerned with propositions as well as objects. This development that allows the individual to handle operations at the level of the mind is logical. However he goes on to affirm that logic is not limited to verbal sequential thinking but also comprises operational mechanisms made up of structured wholes that also have a psychological existence. Given that logic has developed out of such operational activity in childhood as we have just seen, it is not surprising that it has this holistic quality that is irreducible to linear deduction.¹⁹ Logic used in this way might be defined as the logic of structured wholes, to be contrasted with the logic of sequential reasoning. In this sense Piaget makes the same distinction that Langer makes with her descriptions of '*discursive*' and '*presentational*' thinking that we saw earlier. We are thus beginning to realise that logic is simply a basic reflection of all mentality. "Logic is the mirror of thought, and not vice versa,"²⁰ Piaget tells us, and elsewhere he

17 Ibid., p. 18.

18 Ibid., p. 18.

19 "A third difficulty is that axiomatic logic is atomistic in character and the order of its demonstrations necessarily linear. A formalised theory starts from atomic elements (propositions, classes, operations, independent axioms, undefined concepts, etc.) and ends with a closed or completed system built up from these atomic elements. Operational mechanisms, however, have a psychological existence, and are made up of structured wholes, the elements of which are connected in the form of a cyclical system irreducible to a linear deduction. In fact, we have here something that resembles more a system involving biological organisation than a linear sequence of demonstrations." Piaget, *Logic and Psychology*, op. cit., p. 24.

20 Piaget, *The Psychology of Intelligence*, op. cit., p. 27.

writes, "Logic is not isolated from life; it is no more than the expression of operational co-ordinations essential to action."²¹

We have now recognised that logical thinking is the most stable form of intellectual equilibrium and not limited to discursive reason. We have also established that this equilibrium is characterised by the reversibility of a process or operation. Such reversibility might be defined as the permanent possibility of returning to the starting point of an operation in question.²² The ability of the individual to set up a series of hypotheses, and to establish links between these hypotheses such that they can move forward from one to the other and then return to the starting point without destroying them or meeting a contradiction, means that they have established a logical equilibrium. Let me quote Piaget directly here,

This equilibrium can be quite shortly defined as the reversibility of the operations in the balance. A non-contradictory operation is a reversible operation. . . . A mental operation is reversible when, starting from its result; one can find a symmetrically corresponding operation, which will lead back to the data of the first operation without these having been altered in the process. . . . Logical operations . . . are reversible. If I divide a given collection of objects into four equal piles, I can recover the original whole by multiplying one of my quarters by four: the operation of multiplication is symmetrical to that of division. Thus every rational operation has a corresponding operation that is symmetrical to it, and which enables one to return to one's starting point. Contradiction may therefore be detected in the irreversibility of any particular process, in the fact that no exactly symmetrical relation could be found whereby to control the original operation.²³

Reversibility is a very simple quality of formal organisation yet it turns out to be the essential quality of intelligence.²⁴ Reversibility surfaces in two distinct yet clearly complementary forms, which Piaget calls '*inversion*' and '*reciprocity*.'²⁵ Firstly, negation or '*inversion*' allows one to return to the starting point of an operation by simply cancelling an operation that has already been performed. In this instance an individual will return a particular system to a state of equilibrium by introducing an operation that has the negative effect of the operation that needs to be cancelled, introducing the opposite form into the mix returns the system to balance. Using '*reciprocity*,' the second form of reversibility, the individual returns a system to a state of equilibrium, not by cancelling the previous operation but by compensating the system for the difference. In other words, the equilibrium of the system is restored by introducing a new operation that balances the effect of the first. The total effect of two reciprocal operations is

21 Piaget, J. and Inhelder, B., *The Growth of Logical Thinking*, Routledge and Kegan Paul, London, 1958, p. 342.

22 Ibid., p. 272.

23 Piaget, J., *Judgement and Reasoning in the Child*, Routledge and Kegan Paul, London, 1928, p. 171.

24 "This reversibility is no doubt the most clearly defined characteristic of intelligence." Piaget, *The Psychology of Intelligence*, op. cit., p. 41.

25 Piaget, *The Growth of Logical Thinking*, op. cit., p. 272.

therefore not a nullity, but an equivalence.²⁶ Both these characteristics are basic to the whole field of intelligence and are thus identifiable at each stage of mental development, from the basic sensori-motor operations of the infant through to the logical operations of the adult. Hence we find '*inversion*' evident when opposite elements are added or taken away and '*reciprocity*' when similarities and symmetries are used.²⁷

From FORMULATION to PRESENTATIONAL LOGIC

So let us re-group for a moment; form we have established is a creation of the mind. The very act of perception is a process of *form*-ulation. Each mind in its relation with the world is in a constant process of creating form; personal forms for touch, for the eye, the ear and for the mind. Such abstract formulation is the basis of rationality. From such basic formulations, the mind, the ear and the eye build their structures; the disciplines of reason, music, poetry and the arts. We have established that logic is a mature expression of mental processes, with equilibrium as its basic characteristic. Adult logic therefore emerges as a process of mobile equilibrium, in which various hypotheses might be tested in a striving towards a new understanding, which is a new state of equilibrium within a process of '*equilibration*.' A particular line of thought will lead from one state of equilibrium to another, passing through multiple non-balances and re-equilibrations before a particular problem is solved. Each of these equilibrations, we have observed, possess the characteristic of reversibility, of which we have identified two forms; the reversibility of '*inversion*' or negation, and the reversibility of '*reciprocity*.'

Since we now understand that the principles governing the process of formulation and the structures and relationships between forms are common to all disciplines, we realise that the boundaries of rationality must be extended to include much more than has been traditionally associated with the word. Access to rationality from areas previously considered pre-rational or intuitive emerges almost as a by-product of the gestalt teachings, but it is a by-product which leads to a completely new conception of cultural organisation.²⁸ This new understanding brings aesthetic judgement '*within the compass of reason*' and '*reason*' in its most mature form is expressed in logical form. Developing our argument along its natural course, we should therefore expect to find artistic material complying with the formal organisational principles of logical formulation.

26 Ibid., p. 273.

27 "Inversion and reciprocity are necessary conditions of equilibrium for the most elementary behaviour as well as for the most highly organised operations. Thus, with variations in form, they are found at all developmental stages. Even at the perceptual level (although there is as yet no complete reversibility), we find inversion operative when elements are added or taken away and reciprocity in symmetries and similitudes." Ibid., p. 273.

28 "A tendency to organise the sensory field into groups and patterns of sense-data, to perceive forms rather than a flux of light-impressions, seems to be inherent in our receptor apparatus just as in the higher nervous centres with which we do arithmetic and logic. But this unconscious appreciation of forms is the primitive keynote of rationality; so it appears that the conditions for rationality lie deep in our pure animal experience – in our power of perceiving, in the elementary functions of our eyes and ears and fingers. Mental life begins with our mere physiological constitution." Langer, *Philosophy in a New Key*, op. cit., p. 89.

LOGIC and the POST-MODERN WORLD

The development of the argument has legitimately brought us to this point, yet it may still seem somewhat strange to be using the term '*logical organisation*' in relation to art-related disciplines. We saw in chapter 1 how the historical structure of mathematics and science was indeed built within a relative structure that we understood to conform to a logical framework. In chapter 2 we explored the relative nature of other cultural disciplines and explained how novelty could only be introduced to culture via the history of the discipline. We now understand that the historical structures of all cultural disciplines must share the same ordering principles albeit applied within either discursive or presentational forms and in their highest forms, those disciplines should be found to display rational qualities. Contemporary culture now acknowledges the relativity of knowledge and experience, an understanding that brings us close to a post-modern position. On the face of it '*logic*' seems to fly in the face of the post-modern but a little further thought will reveal that a better understanding of '*logical organisation*' will give a more solid foundation to the post-modern position.

We are told that today we live in a post-modern world; a world defined by relativism. The critical search for truth and certainty, which has so characterised the modern era, from the Renaissance through to the '*logical positivism*' of the twentieth century, has within post-modernism given way to a less certain, more open, and perhaps more vulnerable condition. The reductive, deterministic and mechanical characteristics of the modern era are being replaced by a more pluralistic world view that is inclusive and accommodating. In this relative world, of no absolute meaning, existing structures are challenged, literature is deconstructed and belief systems exploded.²⁹ Ihab Hassan tells us that, "The pretence of any form of omniscience – philosophical, religious, scientific – must be abandoned. Grand theories and universal overviews cannot be sustained without producing empirical falsification and intellectual authoritarianism. To assert general truths is to impose a spurious dogma on the chaos of phenomena."³⁰

The post-modern world is therefore disturbing, but aspires to be more human than the calculated, measured world of modernism. An acceptance of error, as we examined in the last chapter, instead of the relentless search for precision and definiteness and an openness to the sensual and the experiential, as a foil to the abstract and conceptual, are to be welcomed as a re-assertion of perhaps forgotten dimensions of our humanity. Visitors to the '*Sensation*' exhibition at the Royal Academy in 1997, an exhibition potentially positioned to celebrate our neglect of sensuality, could however be forgiven for reeling back in disgust when they realised that the sensual in the post-modern world includes the perverse, the necrophilic, the brutal and the generally tasteless. The post-modern absence of certainty makes for an unassuring, almost anarchic world, in which everything is tolerated and almost

29 According to Ihab Hassan, post-modernism is "an antinomian movement that assumes a vast unmaking of the Western mind . . . deconstructing, decentring, disappearance, dissemination, demystification, discontinuity, difference, dissension etc." Hassan, Ihab, in Albrecht Wellmer, *The Dialectic of Modernism and Postmodernism*, Praxis International 4, 1985, p. 338. Quoted by Tarnas, *The Passion of the Western Mind*, p. 490.

30 Ibid., p. 401.

anything goes. Those not intimidated by the parade of post-modern art shout out from the roadside that '*The Emperor has No Clothes*,' but the parade marches on re-defining and re-inventing itself as it goes. Within the art world, there are now almost as many movements as there are artists, each one potentially defining art's role differently and within the definition of post-modernism, legitimately.

The first books on Post-Modernism in architecture did not appear until the late 1970s³¹ but Robert Venturi's seminal book *Complexity and Contradiction in Architecture* of 1966 had already set a theoretical agenda for a post-modern architecture. He opens the book with what he calls a gentle manifesto, "I like complexity and contradiction in architecture. . . . I like elements which are hybrid rather than 'pure,' compromising rather than 'clean,' distorted rather than 'straightforward,' ambiguous rather than 'articulated,' perverse as well as impersonal, boring as well as 'interesting,' conventional rather than 'designed,' accommodating rather than excluding, redundant rather than simple, vestigial as well as innovating, inconsistent and equivocal rather than direct and clear. I am for messy vitality over obvious unity. I include the non sequitur and proclaim the duality."³² As we develop this argument I will be discussing dualities more fully but in a subtly different way to the way Venturi addresses them here. The dualities which Venturi describes and which run through much post-modern work are as he describes them, the dualities of the non sequitur and the contradictory. Contradiction is what Venturi chooses to celebrate; it is what he builds his theory upon. But although the human condition can tolerate a great deal of contradiction and though there is arguably a case for artists and architects to give expression to these contradictions, unless the contradictions are resolved they cannot form part of culture. We will be examining this in more detail later but at root, contradiction denies the meaningful and a meaningless world is ultimately terminal.³³

In the field of architecture, the pluralism of post-modernity has given rise to a proliferation of architectural languages in a similar way to the way that artistic styles expanded in the arts. As in the arts, the preoccupation with the iconoclastic and contradictory has generated a movement towards almost violent expression on some fronts, although as Jencks has pointed out, architecture stopped short of Dada and its contemporary equivalents, because architects "could not bear the contradiction of building a better world for a nihilistic world view."³⁴ The deconstructivist movement in architecture, which in terms of precedent owes more to Russian '*Constructivism*' than to Derrida's philosophy of '*Deconstruction*,' might be considered the most extreme in this regard. It continues the antinomian role of the post-modern, setting up incongruent juxtapositions and breaking down formal orthodoxies. Its language has an aggressive violent energy, "like

31 Jencks Charles, *The Language of Post-Modern Architecture*, Academy Editions, London, 1977.

32 Venturi, *Complexity and Contradiction in Architecture*, p. 22.

33 "Tautologies and contradiction are the limiting cases – indeed the disintegration – of the combination of signs. Admittedly the signs are still combined with one another: ie they stand in certain relations to one another: but these relations have no meaning," Wittgenstein, L., *Tractatus Logico-Philosophicus*, Trans. Pears and McGuiness, Routledge and Kegan Paul, London, 1921 (1961) pt 4.466 and 4.4661, p 36.

34 Jencks, Charles, 'The Post-Modern Agenda', in '*The Post-Modern Reader*,' Edited by C. Jencks, Academy Editions, London, 1992, p. 24.

a knife cutting through butter,"³⁵ and like many of the parallel movements in the art world, seems to speak in an iterative way of the violence in our society, of the cacophony of unresolved, perhaps irresolvable, collisions of image and meaning to which we are exposed daily in our media-rich post-modern world. You might be forgiven for feeling that the post-modern world is beginning to seem unsafe. Its pluralism, freedom and openness to all, rather than serving a positive function as they earlier promised, can now also be seen to be potentially threatening. Its iconoclastic mission and its continual challenge to orthodoxy is in danger of undermining the very ground on which it stands. Ultimately there can be no post-modern gauge; if it is subversive of all positions, then finally it must subvert its own status.³⁶ So is there a way through the post-modern maelstrom, which will enable its positive qualities to be kept whilst excluding its self-destructive drive? Well, I would like to suggest that there is, and it seems to turn on the way that dualisms are used.

How LOGICAL FORMULATIONS STRUCTURE the ARTS

Dualities can be used as Venturi suggests to set up contradictions, ambiguities³⁷ or non sequiturs but such relationships, if we take his words literally, do not promote cultural growth. On the other hand, as we will now explore, dualities can be used to open up meaning, forming as they do a critical position in the operation of presentational intelligence and logic, and as such form a pivotal role in the evolution of culture. So let us now look more closely at the structural characteristics of logic, if they were applied to the arts. We have seen that logic is not only concerned with the clarity of the objects but more importantly with the relationships between them and that a logical operation, as a sequence of relationships, is always a reversible operation. We have also seen that for a relationship to be reversible a state of equilibrium needs to be established, that is the two parties in the relationship, in one way or another, need to be judged to be equivalent. Logical relations are therefore always equivalent relations,³⁸ and equivalent relations as we have seen, can be established

35 Hadid, Zaha, Statement in support of the competition entry for the 'Hong Kong Peak Competition', 1983.

36 "Properly speaking, therefore, there is no *"post-modern world view,"* nor the possibility of one. The post-modern paradigm is fundamentally subversive of all paradigms, for at its core is the awareness of reality as being at once multiple, local and temporal, and without demonstrable foundation." Tamas, *The Passion of the Western Mind*, op. cit., p. 401.

37 This issue is discussed in more detail later. I am aware that *'ambiguity'* is a term used and considered valid in much art criticism. See for example William Empson's classic work *'Seven Types of Ambiguity.'* Empson's analyses would however remain largely valid if the term *'equivalent'* was used in place of *'equivocal'* or ambiguous. And even Empson feels the need to distinguish between what he calls good and bad ambiguity. Empson, William, *Seven Types of Ambiguity*, Chatto and Windus, London, 1930.

38 I used Piaget's work earlier, but the same point is made here by Wittgenstein. "If two expressions are combined by means of the sign of equality, that means that they can be substituted for one another. But it must be manifest in the two expressions themselves whether this is the case or not. When two expressions can be substituted for one another, that characterises their logical form" (6.23), and slightly earlier in the same work he writes, "The logic of the world, which is shown in tautologies by the propositions of logic, is shown in equations by mathematics." *Tractatus Logico-Philosophicus*, Trans. D. F. Pears and B. F. McGuiness, Routledge and Kegan Paul, London, 1922, p. 65 (6.22).

either through '*inversion*,' by introducing the opposite, or through '*reciprocity*' by setting up similarities and symmetries.

When expressed in these terms it is relatively easy to understand how such types of relationships cannot only be used to form the basis of discursive reasoning and mathematical argument, but it is also possible to see how the same types of logical relationships can form the structure of aesthetic organisations. It is reasonably straightforward for artists, musicians and architects to understand how visual and musical formal relationships can be judged to be equivalent. It is fundamentally what they are doing all the time in the creation of a work, balancing one form against another, and creating equilibrium within equilibrium until all the elements of the composition hang together to create a coherent whole. Such judgements are in the final analysis a matter of aesthetic judgement for the eye or ear, but as can now be seen they are nonetheless conforming to the laws of logic. In this sense aesthetics can be understood to be the '*logic of the senses*,' a definition which comes close to the ancient Greek meaning of the word.³⁹

LOGICAL ORGANISATION expressed through SIMILARITIES and OPPOSITES

The way that similar forms and symmetries are used in the arts was to some extent set out in the description of gestalt organising principles in the last chapter and is generally self-evident. The use of relationships of opposition is less well understood. In a moment I will give examples of how each of these relationships is used in specific works. But at this juncture it will be good to remind ourselves of the over-arching qualities that apply to gestalt forms and their relationships. Firstly, gestalt principles were found to apply not only to three-dimensional forms but also to the fourth dimension of time. We should therefore expect to find similar and oppositional relationships working within three-dimensional artistic, sculptural and architectural works but also through time in musical pieces, in narrative, in logical argument as we have just seen and in the history of the disciplines themselves. Secondly, we saw that similarities are non-discriminating, in other words similar relationships can be set up between any two or more objects provided that a similar dimension can be found, it does not matter what that quality is provided that similarities with other objects can be identified, similar brightness, colour, shape, size, texture, sound, material, shoe-size, species type, racial feature and so on; there is no limit to the possible dimensions that can be used. So too with opposites, formal opposites are also non-discriminating, any form can be used provided that its opposite can be found and balanced with the first. Finally, as with similarities and all other gestalt formal relationships, oppositions work with imprecise forms, but although the forms may be imprecise the balance that needs to be struck is non-negotiable, reversible relationships do not function if there is a lack of equivalence, so although the forms that are used are imprecise, the relationships between them must be rigorous. Within the world of aesthetics such relationships are a matter of judgement for the eye or the

39 Popularized in English by translation of Immanuel Kant, and used originally in the classically correct sense "the science which treats of the conditions of sensuous perception." Source online etymological dictionary www.etymonline.com.

ear, but the relationships are nonetheless precise for that. We only need to think for a moment about how carefully an artist, poet or musician balances the forms in a work. Sometimes such balancing of forms can be a lengthy and painstaking process; form after form, draft after draft, sketch after sketch being tried and rejected until a balanced composition is found.

SIMILARITIES in SPACE and TIME

The fact that similarities can be used in both space and time is relatively well understood by most artists and architects. Similar forms can be positioned side by side to create patterns of rhythm or repetition. Or similar forms can be set either side of an axis to create symmetrical arrangements. These configurations are very familiar to us all, but we can now see that such configurations are establishing *equivalent reversible relationships* within a work, relationships which are as a consequence reversible for the eye and therefore visually logical. Similar relationships set up through time, through history, are also very familiar to us. Such relationships can be used in a number of ways. Firstly, a similar form can be created simply as an iteration of an earlier form, thus reinforcing the idea behind the earlier work. This is done almost unconsciously by many of us; we simply adopt and thereby reinforce ideas developed by other artists and architects. Secondly, in traditional building, this is a very common form of development. Vernacular traditions all over the world have evolved by such a process of formal iteration.⁴⁰ Forms are repeated time and time again and are only slowly changed as the basic type is evolved. A further striking example of similarity used through history is seen in the way that similar forms are maintained through time, even though the basic underlying structural and constructional techniques are drastically changed. The famous example is of course the Greek temple, which though built in marble, nevertheless, copied the structural form and detail of its timber precedents. And in the eighteenth century in Poland, we get the opposite of this, where Baroque church forms are built in timber to look like marble.⁴¹ Thirdly, an architect may use or reuse a group of forms that they or some other architect had once used in the past, with a view to perhaps developing the idea, or expressing the same idea more coherently. Hence in Ipswich, Foster reworks ideas introduced by Mies,⁴² and in Erskine's work Aalto regularly shines through. For example in the Stockholm University Library plan there are echoes of the Finlandia Concert Halls and in the roof tops of the Byker Wall, the strange double-pitched roof forms of Aalto's Seinajoki Town Hall are recalled. Such iteration is not plagiarism but evolution; it is not static repetition but a dynamic development of ideas. When an idea is picked up by a second-generation artist the personality and characteristics of that artist will always modify the original, sometimes in a modest way, at other times with much greater effect.

40 Rapoport, A., *House Form and Culture*, Prentice Hall, New Jersey, 1969.

41 See for example the late Baroque interior of the church at Huta Krzeszowska 1766 within a traditional timber exterior, Pokropek, M., *Guide to Folk Art and Folklore in Poland*, Akady Publishers, Warszawa, 1980, p. 75.

42 Sudjic, D., *Norman Foster: A Life in Architecture*, Weidenfeld and Nicolson, London, 2010, p. 125.

METAPHOR and NOVELTY

Finally, whilst dealing with relationships of similarity through time, there is one further and important group that we should examine. This group comes into play when the artist or architect is trying to say something for the first time. Unlike the examples above, in this instance the artist is unable to repeat a group of existing formal ideas, since the new idea they are trying to express has not yet been formulated. In these circumstances they are required to express the idea by comparing it with a similar existing form. In other words they create a formal analogy. In poetry, the poet's use of metaphor is precisely such an analogous relationship. A metaphor is used precisely to highlight the similarity between phenomena, by using one word of common usage to describe a similar aspect in another phenomenon. Aristotle summarises this phenomenon clearly. Metaphor he says "is a sign of genius, since a good metaphor implies an instinctive perception of the similarities in dissimilars,"⁴³ and Langer suggests that "if ritual is the cradle of language, metaphor is the law of its life. It is the force that makes it essentially *relational*, intellectual, forever showing up new abstractable *forms* in reality."⁴⁴ To explain this statement she adopts Wegener's⁴⁵ argument that all discourse involves two elements, which she calls the '*context*' and the '*novelty*.'⁴⁶ The '*novelty*' is what the speaker is trying to say and to achieve this they may use any word they feel appropriate. The meaning that this word expresses will be modified by the '*context*' in which the word appears, which would of course include the other words or gestures used in the communication. Now, it is when the speaker is unable to find the precise word to express the novelty they wish that the function of metaphor comes into play. In this situation the speaker resorts to the powers of logical analogy. They use a word, which denotes something else, but they use it to stand in for the thing to which they are referring. The context of the situation means that it will not be construed literally and therefore must mean something else metaphorically. As an example Langer suggests that we could say of a fire that '*it flares up*' and be clearly understood, as referring to the character of the fire. But if we said '*the King's anger flares up*' we know immediately from the context that the flaring up cannot refer to the sudden physical appearance of flames and therefore that this term must have been used metaphorically to describe what the King's anger is doing. The use of a familiar word in a new '*context*' thus gives rise to further opportunities for novelty. The expression '*to flare up*' therefore acquires a wider meaning than its literal reference to flames. After constant use in its new metaphorical contexts, the metaphorical meaning would become gradually more fixed in its general usage and would be interpreted almost as literally as the primary meaning of the word or expression. This is what Wegener refers to as a '*faded metaphor*' and in a lengthy argument he demonstrates how our literal language could have evolved on a metaphorical basis.⁴⁷ Langer therefore concludes that,

43 Aristotle, *The Poetics*, Trans. C. J. Potts, Cambridge University Press, Cambridge, 1959.

44 Langer, *Philosophy in a New Key*, op. cit., p. 141.

45 Wegener, P., *Untersuchungen über die Grundfragen des Sprachlebens*, Halle, 1885, John Benjamins Publishing Company, Amsterdam, 1991, quoted in Langer, *Philosophy . . .*, ibid, p. 139.

46 Langer, *Philosophy . . .*, ibid, p. 139.

47 Ibid., p. 140.

Metaphor is our most striking evidence of *abstractive seeing*, of the power of the human minds to use presentational symbols. Every new experience, or new idea about things, evokes first of all some metaphorical expression. As the idea becomes familiar, this expression “*fades*” to a new literal use of the once metaphorical predicate, a more general use than it had before. It is in the elementary, presentational mode that our first adventures in conscious abstraction occur. The spontaneous similes of language are our first record of *similarities* perceived.⁴⁸

The use of metaphor is thus revealed as an essential ingredient of a vital language; poetry can therefore be viewed as the seedbed of linguistic development. One of the poet’s responsibilities is thus seen as the extension of linguistic boundaries by bringing to light new metaphorical relationships between familiar objects.

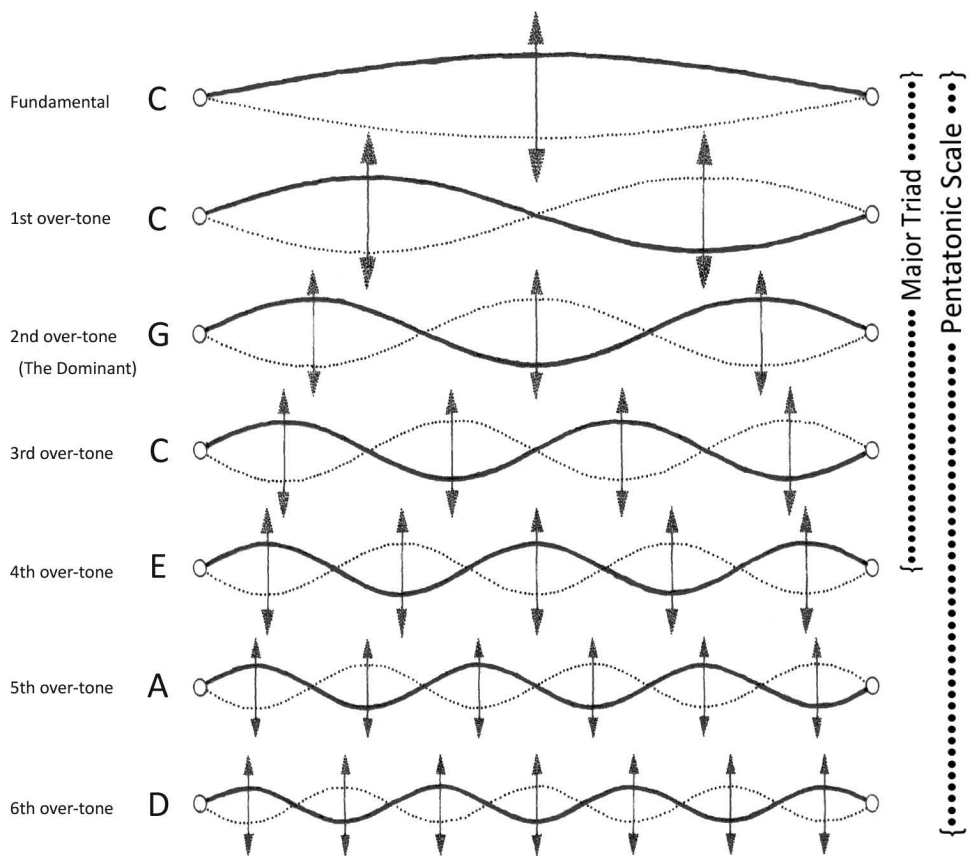
LOGICAL RELATIONS in MUSIC

If we are saying that the structural characteristics of logic can be applied to the arts then we should expect to find evidence of this within all disciplines including music. To make such a statement does not suggest that each discipline has identical structures, we should not be tempted to look for words in music⁴⁹ or indeed syntax in architecture⁵⁰ as some have done. The logical structure of cultural disciplines lies deeper and the differing subject areas have evolved their own peculiarities to express the specificities of their way of seeing the world. Hence music ‘*sees*’ the world through the ear, it does not need to be translated into words for us to feel its expression. Music speaks of feelings perhaps more directly than any other discipline and just as words can take us into realms we have never experienced, so music can take us into feelings beyond ourselves. It does not name the place it has taken us to, as a story might do but we nevertheless know where we have been. It will not describe the fantasy castle in which we stand or the sword held by the hero but it will create for us moods and emotions and reveal within us passions and feelings perhaps more powerfully and with greater detail and articulation than any of the other arts. Music cannot be translated into words nor any other discipline into another; each discipline speaks of its own realm of concerns, its own range of perception, attempts to translate these one to another are futile and to misunderstand the nature of culture. It is precisely because we cannot articulate the subtlety of feelings within language that music is necessary, music quite literally articulates what is unspeakable in other disciplines. But although it expresses its own content its formal language shares a logical structure with the other cultural disciplines.

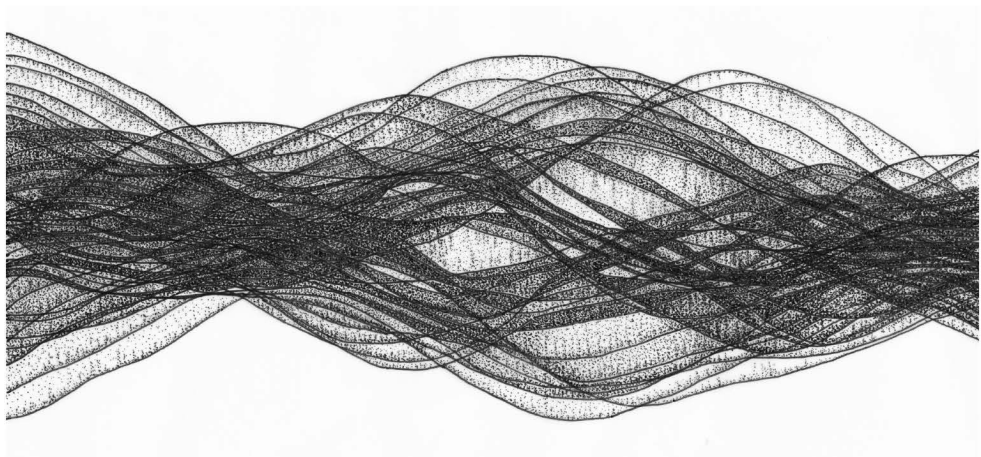
48 Ibid., p. 141 and she further emphasises that “Speech becomes increasingly discursive, practical and prosaic, until human beings can actually believe that it was invented as a utility, and was later embellished with metaphors for the sake of a cultural product called poetry.” p. 142.

49 For an excellent survey of the history of musical philosophy and the mis-comparisons of music with language see Langer’s discussion *On Significance in Music*, *ibid.*, pp. 204–245.

50 “the fact that the architectural language like the spoken one must use known units of meaning. To make the linguistic analogy complete we could call these units architectural ‘words.’” Jencks, C., *The Language of Post-Modern Architecture*, Academy Editions, London, 1977, pp. 60–73.



i When the piano string is struck it not only vibrates to its full length to generate the fundamental note but also vibrates in fractional segments of that string. The string is almost infinitely divisible into increasing fractions, each smaller fraction creating higher and higher frequencies, generating higher and higher tones.



ii String Vibrations: The fundamental and over-tones (harmonics) shown together.

Over-tones occur naturally and are governed by the universal laws of physics.

Fig 4.1 The PHYSICS of HARMONY.

The ROOTS of MUSIC

Music therefore is fundamentally not involved in '*sound painting*,' as some musical theorists and philosophers have suggested,⁵¹ even though the occasional bell or cuckoo will turn up in a piece, and even though a composer may have been prompted by such familiar sounds.⁵² In his celebrated series of lectures on music Leonard Bernstein is very clear on this point. He asks is it possible to hear Beethoven's '*Pastorale*' Symphony without hearing the extrinsic non-musical sounds. And he suggests that it should be because Beethoven had said that his cuckoo calls and thunderclaps were not to be read, to use his words, as '*tone painting*' but should rather be read as feelings and therefore not taken too literally.⁵³ Bernstein suggests that the real reading of the music should be in terms of the basic forms of music which over the course of his six lectures he describes in a great deal of detail.

His analysis begins with an explanation of the basic tonal structure of music (Figure 4.1i and ii). Any fundamental tone when struck on a piano or other similar musical instrument will set up vibrations in the air that we hear as sound. But when the note 'C' is struck, for example, we hear more than one pure tone. The string vibrates over its whole length to create the basic 'C' sound but that sound is also accompanied by other spontaneously occurring sounds. These additional sounds appear naturally and are governed by the universal laws of physics. When the piano string is struck it not only vibrates to its full length to generate the fundamental note but also vibrates in fractional segments of that string. The string is almost infinitely divisible into increasing fractions, into two halves, three thirds, four quarters and so on in smaller and smaller divisions; each smaller fraction creating higher and higher frequencies and consequently generating higher and higher tones (4.1i). These higher tones are called over-tones, or harmonics and they are all sounding together with the fundamental sound of the full string (4.1ii). This sequence of over-tones is the basic sequence from which the entire harmonic series is generated starting from any fundamental tone. The over-tones are less audible than the base note and the higher the note the less audible they become, generally speaking the lower the note the more audible the harmonic series becomes which accounts for why a low 'C' has a fuller or richer sound.

Much of this we will remember from our school days, the first over-tone of the fundamental 'C' arises from the string being divided into two and it creates a second 'C' tone exactly one octave above the first. When the string is vibrating as a third of the length we get the next over-tone which gives us a 'G,' this is known as the dominant because of its special relationship with the tonic 'C.' The next over-tone as a quarter of the string's length generates another higher-pitched 'C' and with the string divided into five segments we obtain 'E.' Of these first four over-tones, together with the fundamental, three are of a different pitch, C, G and E and these three notes arranged in scalar order constitute what is known as the '*major triad*,'

51 See Langer's discussion of this point, Langer, *Philosophy in a New Key*, op. cit., pp. 220–224.

52 The apparent contradiction here between the argument being presented and the description of a piece of work by the artist or the composer themselves will be considered more fully when we examine meaning in the next chapter.

53 Bernstein, Leonard, *The Unanswered Question*, Harvard University Press, Cambridge, MA, 1976, pp. 157 and 186, 187.

which is the cornerstone of Western tonal music, whether it is symphonic, choral or blues.⁵⁴ The over-tones become a little more complex as the series develops, the next generates something close to 'A' and then after that 'D' giving us five different tones C, G, E, A and D, which constitute the five-note or pentatonic scale. Bernstein describes this as a '*substantive universal*,' as this five-tone scale has emerged from the basic physical reality of Nature and turns up in music all over the world, from Scotland to China, from Africa to Native American Indian cultures, from Central and South America to Australia and Finland. From the pentatonic scale the over-tones continue to create yet more new tones to be added to the collection until six- and seven-note scales are established, the major and minor diatonic scales and eventually as the semitones are included, we have all twelve tones of the chromatic scale.⁵⁵

METAPHOR in MUSIC

Having established the roots of tonality firmly in the objective world of physics, Bernstein's formal analysis of Western music is both lucid and masterful; each piece broken down into a series of simple, though sometimes complex formal relationships comprising repetitions, symmetries, similarities and what he calls metaphors and ambiguities. I will return to a discussion of ambiguities later but first let us look at his analysis of some of these other formal techniques. Metaphor we have just seen is a technique used in language for poets or writers to talk about something new; to talk about something for which the words have not yet been established in language. We have already seen that the content of music is somewhat elusive, music speaks of feelings beyond or between words; it speaks of a world where words cannot reach. But although we cannot name the content of music, just as we could not name the novelty in language, Bernstein suggests that we can be aware of how the content is being expressed and to explain this, he adopts from language the idea of metaphor. He writes:

But whichever is true, the basic point remains: music does possess the power of expressivity, and the human being does innately possess the capacity to respond to it. Everyone agrees on that in one way or another. . . . Where they disagree is in making the distinction between what music expresses and how it expresses it. The "*what*" is very hard to pin down, as we've seen; but the "*how*" we do know about: and that is Metaphor. In any sense in which music can be considered a language (and there are some senses in which it cannot be so considered) it is a totally *metaphorical* language. . . . Metaphor is the generator, the power plant of music, just as it is of poetry.

He continues by quoting first Aristotle and then. . .

Quintillian says, even more strikingly, that metaphor accomplishes "*the supremely difficult task of providing a name for everything.*" By "*everything*" he obviously meant our interior lives, our psychic landscapes and actions, where

⁵⁴ Ibid., pp. 21–23.

⁵⁵ Ibid., pp. 27–31.

names elude us. It is thus that poetry and music – but especially music, because of its specific and far-reaching metaphorical powers can name the unnameable, and communicate the unknowable.⁵⁶

Bernstein's analysis provides examples of how musical metaphors are expressed and he goes on to describe other types of logical relationships in music. He gives examples of how symmetries are set up within a musical piece and how repetition based on similarity plays a critical role in music. Over and above the repetition of the rhythmic structure of a piece, repetition of elements within the musical sequence set up relationships of similarity within a work that hold the piece together. Such repetitions however are not static and identical but as we saw within the natural world, the repetitions are subject to variations or transformations as they adjust themselves to the context in order to perform the specific task required of them. Hence Bernstein whilst sitting at the piano is able to describe the opening of Beethoven's '*Pastorale*' Sixth Symphony; we will have to do without the demonstration of his points on his piano but I hope the structural principles he is describing will be clear:

Let's begin at the beginning (. . . he plays the opening bars on the piano . . .). These first four bars are the material out of which the whole first movement is going to grow, and it's not just the main material but the *only* material. Every bar and phrase to come and I mean every one, without exception will be some kind of transformation, some metaphorical rendering, of the elements present in these four little bars. And what are those elements? On the face of it, they seem to comprise a blithe little tune in F major, beginning on the tonic and ending on the dominant with a pause, or as we say, a *fermata*.

But is that really all? By no means. Just look at the bass line, which you'd hardly notice as a line, although it is: tonic F to dominant C. (..piano..) And this F-C, or *fa-do* (..piano..) turns out to be the real motto of the whole movement, and by extension the whole symphony; it's as much the motto of the Sixth Symphony as this (..piano..) is the motto of the Fifth. And it will keep reappearing, over and over, in the base (..piano..), or up on top (..piano..), or hidden in between (..piano..), or transposed (..piano..), or transformed (..piano..), or speeded up (..piano..), or whatever, as a constant running metaphor throughout like the '*Figure in the Carpet*' in Henry James' great story. The whole piece is virtually an essay on the subject of *fa-do*.⁵⁷

His description of the piece is developed further adding more and more layers of musical transformations. He describes examples of '*inversions*,' '*retrogrades*' and '*augmentations*'; each of these new layers based on the Gestalt organisational principle of similarity;

You can see those conjoined intervals of an ascending third followed by a descending second. (..piano..) Now our metaphorical viola line simply *inverts* those intervals, to a *descending* third followed by an *ascending* second, (..piano..)

56 Ibid., pp. 139–140.

57 Ibid., pp. 157–159.

and are a direct *reversal* of the head motive itself, whose intervals are a second followed by a third. (..piano..) Hence the term '*retrograde*,' or going backwards. As for '*augmentation*,' we simply mean an increase of note length. In other words, the viola tune proceeds in quarter notes, whereas the head motive from which it is derived moves in eighth notes, twice as fast (..piano..). Thus the viola tune is twice as slow, its notes *augmented* to double duration. And so through these three devices, this triple transformation, a rich metaphor is created, a particularly strong example of this-is-that. If you think of the viola line as 'this,' and the violin music on top as 'that,' and then hear them together, the whole complex metaphorical structure will become clear. (..piano..) . . . For this reason, music (especially music by a genius such as Beethoven) provides what is probably the clearest linguistic model you can find. That is the unique miracle of music: that it enables us to perceive 'This' and 'That' *simultaneously*; there can be no stronger or richer presentation of metaphor.⁵⁸

It may be difficult to follow this description of Beethoven's genius without the support of music, but I think we can recognise in Bernstein's description how similar relationships have been used to set up symmetries, metaphorical references and repetitions in order to give the piece an ordered and coherent structure that enables the piece to communicate with its audience. The relationships allow ideas to move through the fabric of the piece from one place to another via the medium of similarity and reversible relationships – the very same relationships that allow the logical movement of ideas within language and thought.

REPETITION in ARCHITECTURE: the WINSLOW HOUSE

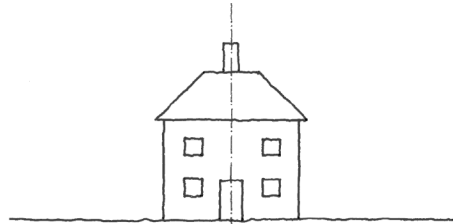
In the field of architecture relationships of '*similarity*' are also used to formally structure a design. To examine the idea of formal reinforcement and repetition in architecture I propose to look at some of Frank Lloyd Wright's early houses. In this chapter I will begin with the Winslow House, River Forest, Illinois, 1893, one of his earliest commissions. To make these early points I will take just the front façade of the building, it is remarkably simple, to all intents and purposes little more than a rendering of a prototypical house, the type of house that a child might draw at school. Yet for all its simplicity it is strikingly beautiful. Why? In terms of architectural content, apart from the traditional elements of roof, chimney, eaves, windows and door there is little to engage us. His contribution is unassuming; in formal terms he addresses just two simple ideas that he develops over many years, firstly, he seeks to emphasise the centre as perhaps a symbol of hearth or home and secondly to emphasise the horizontal to express extension into the world.⁵⁹ Let us look at the first of these. To emphasise the centre he uses two or three organising ideas, firstly the elevation is designed symmetrically, so the windows are balanced each side of the central

⁵⁸ Ibid., p. 169.

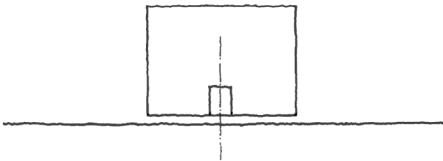
⁵⁹ In terms of content these same points give emphasis to the hearth at the centre of the home and a connection with the infinite space of the landscape as an extension of the personal space of the interior. As we will see in subsequent chapters these two simple formal ideas preoccupied Wright for most of his career.



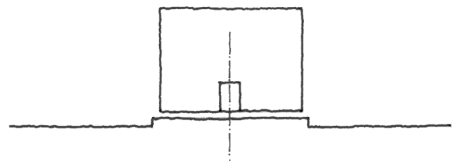
i A child's rendering of a house.



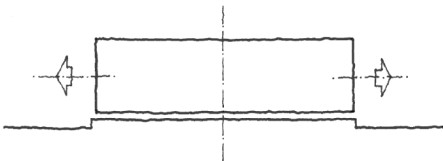
ii The prototypical house serves as the basic generic for Wright's design.



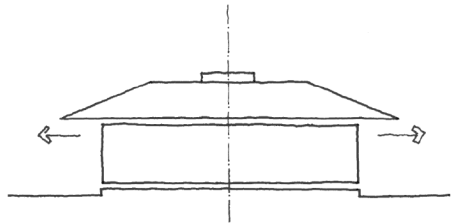
iii The centre is emphasised by maintaining a central entrance.



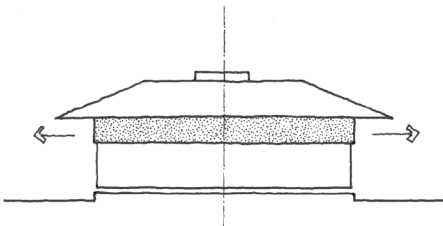
iv Raising the house on a stone plinth gives further importance to the centre.



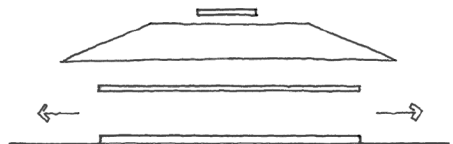
v The static square form of the generic is stretched to give the house horizontal emphasis.



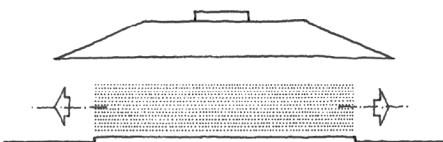
vi A shallow pitched roof is adopted with extended eaves. A dummy chimney replaces the traditional.



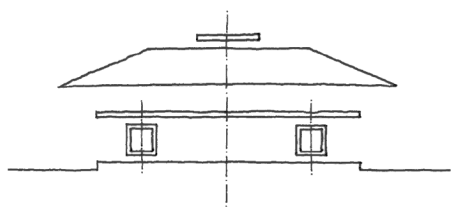
vii Terracotta tiles build the shadow line of the roof to further emphasise the horizontal.



viii Stone string-courses reinforce the horizontal theme.

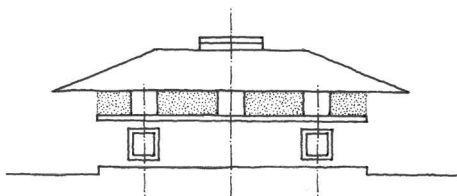


ix The resultant panel of brickwork has an horizontal form and uses special elongated bricks.

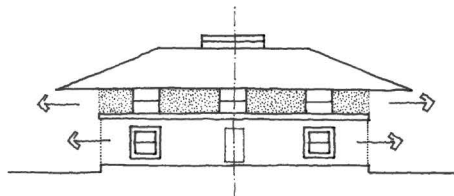


x Stone-lined square windows on the ground floor introduce a static element to resist the horizontal.

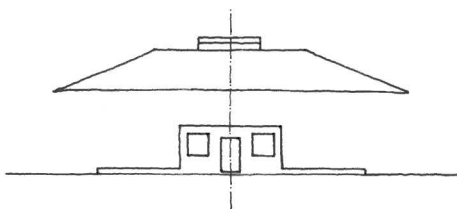
Fig 4.2 REINFORCEMENT and REPETITION in ARCHITECTURE.
Winslow House: River Forest, Chicago, Illinois. Frank Lloyd Wright 1893.



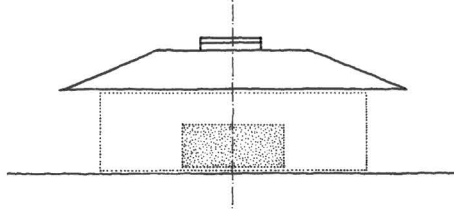
xi First floor windows reinforce the stasis but are subsumed into the horizontal terracotta band.



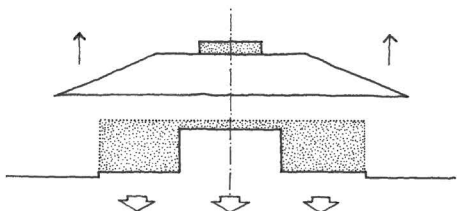
xii Transoms are introduced into both ground and first floor windows to reintroduce the horizontal.



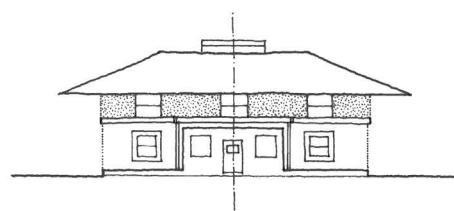
xiii A white stone panel strongly re-emphasises the centre, transoms are omitted from the windows.



xiv The entrance panel takes on similar proportions to the horizontal house form.



xv The brick and stone lower elevation sits heavily on the ground, whilst the roof seems to float.



xvi The entrance panel is pulled forward of the main facade, further emphasising the centre.



Two contradictory ideas of a 'Static Centre' and 'Lateral Movement' are constantly balanced in the design.

axis, the roof is hipped to reinforce the symmetry and the chimney is placed on the same axis. Perhaps more importantly the main entrance is placed centrally on the axis with a first floor window above. The interest of the visitor is therefore very well engaged, the front door of the house is quite literally the centre of attention. The layout of the garden reinforces this elementary composition; a footpath is laid out on the same central axis leading to a raised terrace in front of the house. The other element in this symmetrical composition is the stone surround to the main entrance. This pale limestone surround is dressed around two windows, one either side of the door, and it stands slightly forward of the darker brick façade, thereby increasing the scale and importance of the entrance in the overall composition. The proportions of this stone element in the design are also interesting in that they are similar, though not identical, with the proportions of the elevation as a whole. The entrance surround with its two square windows and door thus sets up a sort of pulsing resonance with the larger elevation; it almost feels like a house within a house (Figure 4.2 i to xvi).

The second elevational idea is equally simple, the emphasis of the horizontal. The basic form of the elevation is already horizontal, a wide and low rectangle and we have already seen how the entrance surround gives emphasis to that basic form. The horizontality is however further emphasised by a number of other devices. Firstly the rectangle is slightly raised to sit on a low white stone stylobate. Then a similar white stone string-course is introduced just below the first floor windows (4.2viii), strong horizontal bands of stone therefore effectively contain the horizontal stretch of orange brickwork (4.2ix) along its upper and lower edges and thereby suggest potentially infinite horizontal extension. The roof plays a part in this game of horizontal extension, unlike traditional roofs the eaves of this house are wide and deep, they stretch out far beyond the edges of the building. The hips of the tiled roof drop back to adopt a shallow pitch thus further emphasising the horizontal elongation (4.2vi). Below these broad eaves and above the horizontal string-course the space between the windows is filled with dark brown profiled terracotta tiles, they effectively give confirmation to the shadow line cast by the over-hanging roof with its crisp eaves board (4.2vii). The overall effect is that the roof seems to hover above the elongated orange brick elevation below (4.2xv). If all these manoeuvres are not enough, the details in support of the elevation follow the same rules. The bricks that are used have a purposely extended horizontal profile. The chimney as we have seen sits on the central axis but unlike a traditional chimney that stands loftily above the roof, this one sits wide and low, almost hugging the line of the roof. The windows too play an interesting game; they are more or less square with just a slight gesture to the dominant horizontal, the lower floor windows have been given a white stone surround, thus emphasising the stabilising role that a square form can play in this shifting horizontal elevation (4.2x). But within the stable form of the square the horizontal transoms re-establish the dominant horizontal theme (4.2xii).

What we are seeing here is an essay in the way that similar forms can be used firstly to set up symmetries but also repeated and transformed to play differing roles as windows, brickwork, roof forms, chimneys and entrance. As we have seen such relationships are reversible, visually reversible, they allow the eye to move backwards and forwards within the work and although this is a remarkably simple example, it demonstrates how such simple logical structures can not only give coherence to a

work but also as we will see later, how from such coherent architectural thinking further steps can be taken into unknown architectural territory.⁶⁰

METAPHOR in ARCHITECTURE

Bernstein adopted the term '*metaphor*' from language to enable him to describe the way that similar relationships can be used to structure a piece of music. Others have adopted the term '*analogy*' to make exactly similar points. An analogy is also used to make a comparison between two things that are similar in some way; it uses a fuller description in the comparisons than the single word used in metaphor but fundamentally they are both setting up relationships of similarity and equivalence between experienced things or events. It does not take a great leap of the imagination to see how the same types of relationships that Bernstein has been describing in music can be found in architecture. Of course it is similarly difficult to talk about them in words but there is one clear example that has been described by Colin St John Wilson (Figure 4.3i to iii). He does not call the relationships metaphorical but adopts the term '*analogy*' from the critical writings of T S Eliot. He is using the concept to describe how in the designs of the church of St Andrea in Mantua, Alberti combined medieval and classical forms to set up and establish Renaissance ideas in architecture. Hence, in the plan of the church the medieval idea of the '*path*' (to heaven) is maintained in the traditional nave of the church but by placing emphasis on the crossing with the transept, he combines this medieval idea with the Renaissance idea of '*man as centre*.' Furthermore by expressing the medieval nave together with a portico in the form of a Roman Triumphal Arch on the main façade of the building, he again brings together classical and medieval ideas in a new and revealing combination⁶¹ (4.3i). Describing this building Wilson writes,

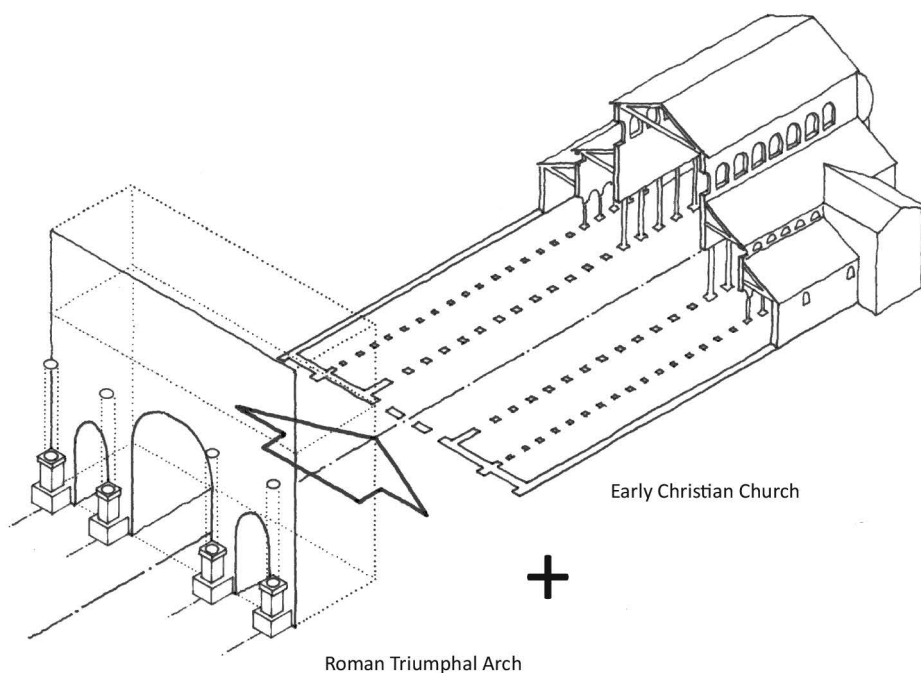
The analogy . . . can be simply analysed as a relationship between two terms; the originality and power of Eliot's formulation is to suggest that it is a *two-way relationship*, that the precedent is changed by the new term as much as the new is informed by analogy with the old. . . . Thus when Alberti transposes the Roman Triumphal Arch onto the facade of the Christian Church at St Andrea in Mantua, the analogy is very rich. It brings together the New Learning, Christian Theology and the Roman Celebration of Victory, at the same time that it announces a rediscovery and reassessment of the classical language of architecture. Both of the terms are changed by the relationship and gain in their range of significance.⁶²

This is an excellent example of an architectural analogy, but it is all the more fascinating because Wilson's interpretation through Eliot reinforces the thesis that such

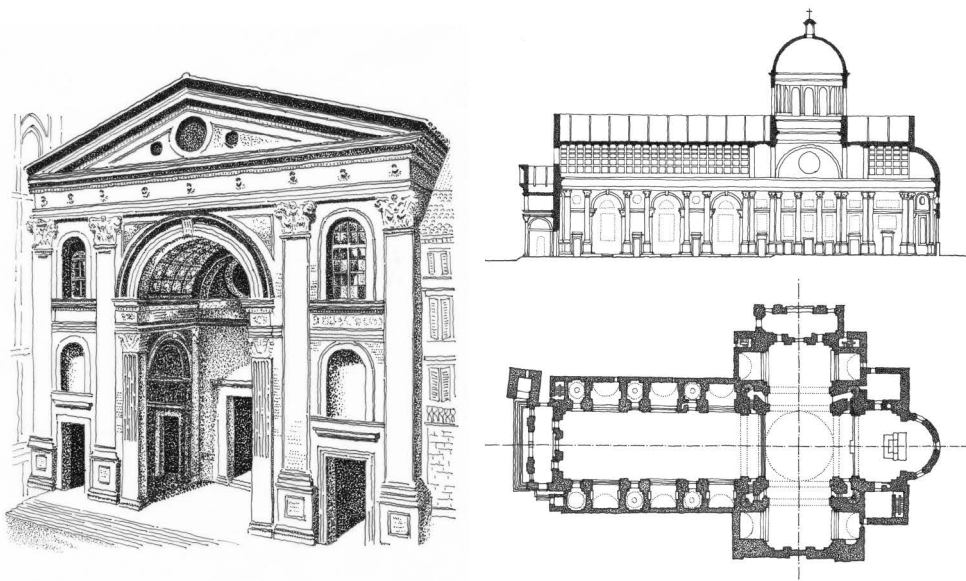
60 In chapter 6 I will show how Frank Lloyd Wright in his later works uses relationships of balanced opposition to develop such basic formal relationships into a new conception of architecture for the twentieth century.

61 For a fuller description of these ideas see Norberg-Schulz, C., *Meaning in Western Architecture*, Studio Vista, London, 1975, pp. 122–123.

62 Wilson, C. St J., 'The Historical Sense: TS Eliot's Concept of Tradition and its Relevance to Architecture', *Architectural Review*, 1052, October 1984.



i By incorporating the idea of the path to heaven, as expressed in the medieval nave, together with a portico in the form of a Roman Triumphal Arch on the main facade of S Andrea in Mantua, Alberti brings together classical and medieval ideas in a new and revealing combination.



ii External View of Portico from South-west

iii Longitudinal Section and Plan

Fig 4.3 METAPHOR in ARCHITECTURE.

Basilica of St Andrea, Mantua, 1472–94, Leon Battista Alberti (Transepts and Crossing 1597–1600, Dome added 1732–82).

formal relationships are reversible and therefore logical, not only spatially reversible, but also reversible through time. Let me quote the original piece from Eliot

what happens when a new work of art is created is something that happens simultaneously to all works of art which preceded it. The existing monuments form an ideal order among themselves, which is modified by the introduction of the new work of art among them (the really new). The existing order is complete before the new work arrives, for order to persist after the supervention of novelty, the whole existing order must be, if ever so slightly, altered; so the relations, proportions, values of each work of art toward the whole are readjusted; this is conformity between old and new. Whoever has approved this idea of order . . . will not find it preposterous that the past is altered by the present as much as the present is directed by the past.⁶³

Eliot's fascinating observations here not only give us an explanation of how novelty is integrated into culture but also confirm the types of logical relationships that our argument had led us to expect. Furthermore he demonstrates how the same types of relationships are able to function through time, to create a logical organisation for the history of a discipline. The identification of similar dimensions captured by the use of symmetries, retrogression, similes and metaphor are all ways of relating ideas logically within culture and as we have seen can be explained by Piaget's term '*reciprocity*,' but as we encountered earlier, Piaget's analysis of logic also suggested that we should be able to find reversible equivalent relationships presented as '*inversion*' or opposition. Let us now take a look at that.

RELATIONSHIPS of OPPOSITION

Reversible equivalent relationships of opposition are on occasions such fundamental organising principles of the arts that they sometimes go unnoticed. The relationships that we saw earlier in the organisation of the elevation of the Winslow House were for example based on relationships of formal opposition, in that instance the balancing of dynamic horizontal movement against the stability of the symmetrical centre. Dynamic movement, even though in architecture we are simply talking about implied aesthetic movement, is only knowable relative to visual stability, in that example, established by the still centre of the composition. Such balanced opposite forces however, form equally valid connections, and as with symmetries and similarities can be found organising both spatial and temporal dimensions. In this form of relationship, equivalence is maintained not by identifying a similar element, but by identifying an element opposite in form to the first. In the field of music Bernstein has described how both symmetry and the technique of balancing opposed phenomena can be used to structure a work. With particular reference to the balancing of these opposed forces, he writes

We are . . . dualistically constituted, in the systole and diastole of our heartbeats, the left-rightness of our walking, the in and outness of our breathing, in our

63 Eliot, T. S., 'Tradition and the Individual Talent', 1919, published in *TS Eliot Selected Essays 1917–1932*, Harcourt Brace and Company, New York, 1932, pp. 3–11.

maleness and femaleness. This dualism invades our whole life, on all levels; in our actions (preparation/attack, tension/release) and in our thinking (Good and Evil, Yin and Yang, Lingam and Yoni, progress and reaction); and all these find musical expression in such oppositions as downbeat versus upbeat, half note versus quarter note and especially in the elementary musical structure of $2+2=4$, $+4=8$, $+8=16$, etc. ad infinitum.⁶⁴

Langer similarly suggests that the fundamental relationships in music are those of 'tensions' and 'resolutions' and she too suggests that musical form is ideally positioned to reflect the dualistic nature of our inner life which she suggests has "formal properties similar to those of music, patterns of motion and rest, of tension and release, of agreement and disagreement, preparation, fulfilment, excitation, sudden change etc."⁶⁵ Both Bernstein and Langer are suggesting that musical form uses balanced opposite relationships to reflect the dualities of everyday life. Bernstein chooses to call the balancing of such oppositions ambiguities; although 'ambiguity' is a term used in other branches of culture to describe such relationships, I would like to suggest that such descriptions are unhelpful and even erroneous, but before I unravel that argument, I would first of all like to explore in more detail the way that Bernstein uses the term in his musical analyses.

AMBIGUITY in MUSIC

In the Eliot Norton Lectures Bernstein takes us on a very detailed exploration of Western music; it is a rare and valuable glimpse into the heart and mind of a great musician. His passion for music is infectious and though most of us may not grasp the whole significance of the works he describes, the way that he analyses and presents the music, as a concatenation of coherent relationships, is lucid and accessible. He uses the term 'ambiguity' throughout the series of lectures; it turns up time after time after time as one of the primary organising tools of music. To enable you to get a sense of the importance of such relationships I will allow Bernstein to speak for himself where possible:

This great system of tonal controls was perfected and codified by Johann Sebastian Bach, whose genius was to balance so delicately, and so justly, that these two forces of chromaticism and diatonicism, forces that were equally powerful and presumably contradictory in nature. This point of delicate balance is like the still centre in the flux of musical history a condition of such stability that it was able to continue without remarkable change for almost a century, a century which became a Golden Age.⁶⁶

It's a curious thing, and a crucial one, that through this perfect combination of opposites, chromaticism and diatonicism, there is distilled the essence of ambiguity. Now this word 'ambiguity' may seem like the most unlikely word to use in speaking of a Golden Age composer like Mozart, a master of clarity and precision. But ambiguity has always inhabited musical art (indeed all the arts),

64 Bernstein, *The Unanswered Question*, pp. 91–93.

65 Langer, *Philosophy in a New Key*, op. cit., p. 228.

66 Bernstein, *The Unanswered Question*, op. cit., p. 37.

because it is one of art's most potent aesthetic functions. The more ambiguous, the more expressive, up to a certain point. Of course there is a limit, which we're going to run into in the course of these lectures.⁶⁷

You can already hear in Bernstein's words some surprise that '*ambiguity*' can be used to describe the clarity and precision of a master like Mozart and also the reservations that he has about the limits to which it can be applied but he persists with his use of the term. He goes on to show how such balanced ambiguous relationships can be used in a variety of other ways. Here in part of Mozart's G Minor Symphony he is describing how Mozart plays with symmetry to create another level of balanced ambiguity,

And if you think this analysis is complicated, it gets even more so on the tenth bar, which is both strong and weak. This is a new ambiguity, setting up a new order of strong-weak pairs of bars.

So the performer must understand what Mozart has done – that he takes our universal instinct for symmetry and plays with it, violates it, ambiguifies it, by using the equally universal process of deletion to operate counter to those instinctive symmetrical forces that operate in us. And therein lies the creativity; that's what makes it art.⁶⁸

Bernstein's exploration of the ambiguous continues into the beginning of the nineteenth century with examples of Schumann setting up ambiguities within his rhythms,⁶⁹ and Chopin returning to his own form of chromatic ambiguity. By the time he gets to end of the nineteenth century, ambiguity has been used to open up almost every aspect of chromaticism, it has exhausted the possibilities within the chromatic–diatonic relationship and music is hanging on the edge of a new century and in a new compositional direction.

And so music can never be the same again. The gates of chromaticism have been flung open – those golden gates of the Golden Age, which were the outer limits of ambiguity standing firm in diatonic majesty. But now that they are open, . . . we are bounding and leaping from one ambiguity to the next, from Berlioz to Wagner, to Bruckner and Mahler, to Debussy and Scriabin, and Stravinsky. It is a dizzying adventure, this Romantic romp, shedding one inhibition after another, indulging in newer and ever more illicit ambiguities, piling them on, stringing them out, daring them to take over, for nearly a whole century. But how ambiguous can you get before the clarity of musical meaning is lost altogether?⁷⁰

I have lingered here for a while with Bernstein's analyses of music, outside my own discipline of architecture, in order to show how a musician within his own discipline has also identified the types of reversible relationships found in logic. Of course it could be suggested that such relationships belong only within the framework of

67 Ibid., pp. 39–41.

68 Ibid., pp. 103–105.

69 Ibid., p. 207.

70 Ibid., p. 238.

classical tonality, but as Bernstein's analyses move into the pluralism of the twentieth century he continues to identify similar structural relationships, suggesting that the relationships have their roots in mentality, rather than in the rules of a particular branch of a discipline. He charts the breakdown of tonality, Schoenberg's eventual development of the twelve tone-row, and the rise of atonality as a new form in music. But even at this point he describes how musicians continued to use balanced ambiguous relationships in order to give coherent structure to their works. The primary opposites being used to create these new ambiguities are no longer the old adversaries of chromaticism versus diatonicism but are now the new field of atonality being played off against the background of tonality. By way of a specific example he uses work by Alban Berg, one of Schoenberg's most fervent disciples, and to make his case he starts by making a comparison with Schoenberg:

But it's not only in his operatic works that Berg has succeeded so remarkably where others have not. His sense of drama, his deft and just balancing of the incompatible elements, tonal or non-tonal, carry over into all his compositions. For example, his very last work, the beautiful Violin Concerto of 1935, solved that agonizing ambiguity to-be-or-not-to-be-tonal, in an equally satisfying way.⁷¹

The edge between these two poles of experience is the crucial moment in the creation of a piece, how deftly the musician deals with that edge condition is what determines the success of the work; in chapter 6 I will explore more carefully this edge condition when I examine what I refer to as '*the phenomenal gap*.' But staying with music for a moment, musicologists have found that strictly speaking we cannot tolerate ambiguity, their work takes us back to one of the phenomena we encountered when we explored the ideas of the gestalt school in the last chapter. I will let Philip Ball describe their work:

People who listen primarily to Western music have mental '*boxes*' metaphorically labelled '*major second*,' '*minor third*' and so on. Of course many people do not even know what these terms mean, but they come to recognise the pitch relationships between the various notes of the scale. Our cognitive faculties will '*place*' in each box any pitch close enough to that box's '*ideal*' interval size, just as we divide up the continuous colour spectrum into chunks labelled '*blue*,' '*red*' and so on. We hear a slight mistuning of a major third, say – but we classify it as such and not as an entirely new and unknown pitch class. We know what it is '*supposed*' to sound like.

This has been demonstrated by playing to people harmonic intervals that are increased in small microtonal steps – say, gradually changing a minor to a major third. Listeners experience the change as sudden, not gradual: what is heard at one point as a marginally sharp minor third becomes, with a further small sharpening, a somewhat flat major third. This seems to be an intrinsic aspect of the way we process sound; the same rather abrupt transition is found, for example when two distinct syllables, such as '*da*' and '*ba*,' are manipulated electronically

71 Ibid., p. 301.

so as to mutate one incrementally into the other. There is a visual analogy with optical illusions such as the Necker Cube, which flicks back and forth between one interpretation or the other but won't rest in between (Figure 3.6iii). Our brains won't tolerate ambiguity.⁷²

We will return to discuss the correct or incorrect use of the term 'ambiguity' shortly. But what we have just seen above in Bernstein's descriptions of such relationships we saw earlier forming the basis of logical mentality, and such relationships in music are not just found here and there in one or two pieces, but as a general structuring device that has run through music from at least early eighteenth-century Bach, right into the twentieth-century atonality. The fact that such balanced reversible relationships enable an observer to move backwards and forwards through the relationships means that musical relationships conform to the same deep logical structure that frames mental life and language. Before we return to some architectural examples let us re-engage with the opportunities that such balanced relationships offer to twentieth- and twenty-first-century culture.

The ROLE of BALANCED OPPOSITE RELATIONSHIPS in CONTEMPORARY CULTURE

The relationships that Bernstein discussed were relationships of the ear, balanced aural relationships that created an aural logic to a work. When we move from music to architecture, the discussion needs to move from a discussion of aural logic to one of visual and perhaps even haptic logic. The relationships that are dominant in architecture are predominantly, though not exclusively, visual relationships. When we look at architecture in terms of balanced opposite relationships, we are therefore looking at balanced and reversible visual relationships. The great opposites that have engaged architects are solid against void; inside against outside, movement against rest (place and path), and light against darkness. We could write a history of architecture in these terms, describing how architecture important enough to be considered sacred moved from the Egyptian preoccupation with solid earth-bound structures; their mastabas, pyramids and even the pylons of their temples all ranged against the void of the sky, to the sacredness of interior spaces balanced against the profanity of the exterior in early Egyptian and in Greek and Roman temples, to the builders of the medieval cathedrals whose preoccupations were with route (movement and rest) and light and darkness, and so on into the twentieth and twenty-first centuries.

We have already seen how pluralism has been dominant in the twentieth century and potentially threatening to cultural coherence. When anything is possible, when everyone's opinion is as valid as the next, when contradiction is not only tolerated but also celebrated, then the coherence of culture is challenged. Pluralism however is also the hallmark that distinguishes the second half of the twentieth century, freedom to express our individuality, freedom to create beyond the restraints of established styles; freedom to think for ourselves outside the shackles of religion, politics or social norms is clearly the twentieth-century contribution to human evolution.

72 Ball, *The Music Instinct*, op. cit., p. 75.

Maintaining coherence in the midst of such freedom has however been the challenge for architects and for all other contributors to culture; it is hoped we will now be able to see how the use of balanced opposite relationships has been one of the ordering devices that has enabled freedom to exist within this pluralist culture. We should be able to see how some architects have been able to create coherence in their work whilst expressing individuality and responding to the particularity of context, environment and programme. And despite the cacophony of the architectural milieu, to find architects that have simultaneously been able to maintain their connection with the wider culture.

OPPOSITIONS in ARCHITECTURE

One of the architects who possesses the creative freedom that is able to respond to the variety of programme and contextual demands, whilst simultaneously retaining coherent orderliness in his work, is Alvar Aalto. Aalto's work provides a master class in the reconciliation of the opposite formal relationships that we have been describing. His works abound in oppositions reconciled, and clearly his writings show that he was consciously aware of the need to appease such oppositions. He writes:

Whatever our task, large or small, starting from the day to day ugliness or the most sensitive emotional element, a town or part of it, a building, a traffic network, or then a painting or sculpture or everyday object, there is one absolutely vital condition that must exist for its creation before it can take on the significance that makes it culture. There are other conditions too, but we will start with this. In each and every case, there must be a simultaneous reconciliation of opposites.⁷³

Aalto's words help to confirm our argument and his own work is a master class in this regard; his work is full of reconciled oppositions, and Juhani Pallasmaa's recent analysis of Villa Mairea beautifully demonstrates this point.⁷⁴ We find the same types of relationships elsewhere, the analysis that I mentioned earlier of Ralph Erskine's work at Clare Hall Cambridge and at the Byker Development in Newcastle showed similar types of formal relationships that ultimately provoked this study. Yet to speak of Erskine or Aalto's work as displaying any form of logical structure will be controversial. For many people the work of architects like Aalto and Erskine are not conventionally thought of as being logical or even orderly. In the 1967 edition of *Space, Time and Architecture*, Sigfried Gideon⁷⁵ actually goes as far as to describe Aalto's work as irrational, and the example we will dwell on here to examine these relationships of opposition in architecture, namely, the pilgrimage chapel at Ronchamp by Le Corbusier, quite remarkably receives from Gideon virtually no attention at all.

73 Aalto, Alvar, 'Art & Technology: Inaugural Lecture at the Finnish Academy', 1955, in *Alvar Aalto 1898–1976*, the Museum of Finnish Architecture, Helsinki, Finland, 1978.

74 Pallasmaa, Juhani, 'Image and Meaning', in *Alvar Aalto: Villa Mairea*, Alvar Aalto Foundation, Helsinki, 1998, pp. 70–125.

75 Giedion, S., *Space, Time and Architecture*, Harvard University Press, Cambridge, 1967.

The VISUAL LOGIC of RONCHAMP

Le Corbusier used relationships of opposition from early in his career, but the early use can sometimes be cerebral and polemical, rather than wholly integrative and architectural in the sense described above. In his early writings as we saw in the last chapter, he used the '*Five Points for a New Architecture*' to negate the damp basements, dark attics and narrow streets of the 1920s.⁷⁶ However his use of opposites feels more spontaneous outside his polemics. When he expresses himself through architectural form, his work is more open and altogether more integrative; this was especially so in his later work and particularly so in the chapel at Ronchamp (Figure 4.6 i to iv). Le Corbusier was fundamentally areligious and was initially disinterested in the commission for the chapel,⁷⁷ however as his writings reveal⁷⁸ he did have a deep sense of the spiritual that continually inspired his work. Let us now examine the forms at Ronchamp as they present themselves to us in all their nakedness.

The Chapel of Notre-Dame at Ronchamp (1950–55) is often considered to be an expressionistic structure and therefore, unworthy of comment; even James Stirling in his article of 1956 '*Ronchamp: Le Corbusier's Chapel and the Crisis of Rationalism*,' finds little to which he can address himself and calls into question its position in history:

it is important to consider whether this building should influence the course of modern architecture. The sensational impact of the chapel on the visitor is significantly not sustained for any great length of time, and when the emotions subside there is little to appeal to the intellect and nothing to analyse or stimulate curiosity.⁷⁹

With the benefit of greater historical perspective I would like to suggest that Ronchamp has a great deal to be analysed and much to appeal to the intellect as well as to the senses. Organic and curvilinear it may be, but such forms arranged in very carefully balanced, intentional relationships give the building a profound kind of orderliness, that being rooted in the basic characteristics of the nervous system, must be far from the "*unique and personal order*," described by Stirling, and perhaps accounts for why it was, again in Stirling's words, "*so readily accepted by the local inhabitants*."⁸⁰

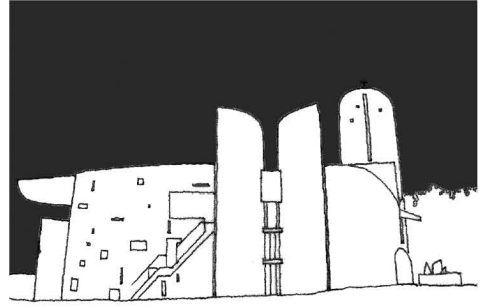
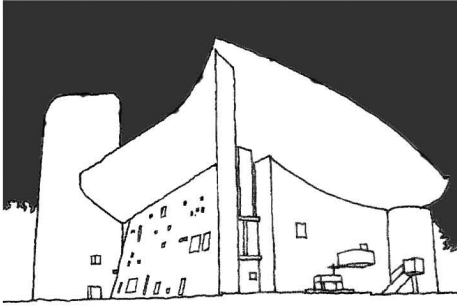
76 Le Corbusier, *Vers une Architecture*, translated into English under the title *Towards a New Architecture*, by Frederick Etchells, Warren and Putnam, New York, 1927.

77 Baker, G., *Le Corbusier: An Analysis of Form*, Van Nostrand Reinhold, Abingdon, Oxon. and NY, 1984, p. 186.

78 Le Corbusier's engagement with the spiritual shows through in much of his work and surfaces particularly in his early study tours. See Baker, G., *Le Corbusier: The Creative Search*, E&FN Spon, London, 1996. Le Corbusier goes further suggesting that it is our ability to perceive order that determines our spiritual values, "Are we sufficiently aware that it's all here, that our ability to perceive proportions, and this alone, determines our spiritual values?" Le Corbusier, *Une Maison-un Palais*, Paris, 1926, p. 3. Trans Guitart, J. J. and M., *The Ideas of Le Corbusier*, George Braziller, New York, p. 19.

79 Stirling, J., 'Ronchamp, Le Corbusier's Chapel and the Crisis of Rationalism,' *Architectural Review*, March 1956, pp. 151–156.

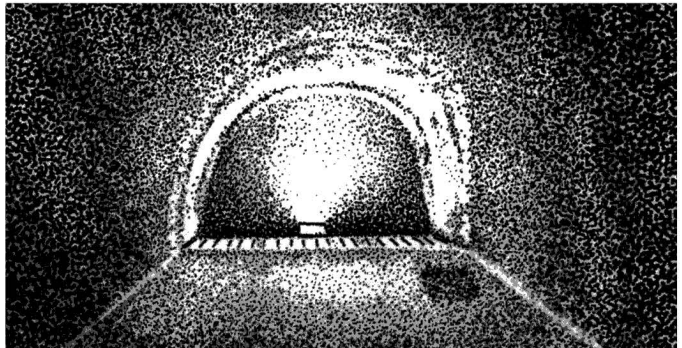
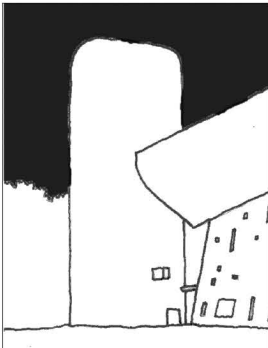
80 Ibid.



i The Exterior

The roof dominates the front two facades.....

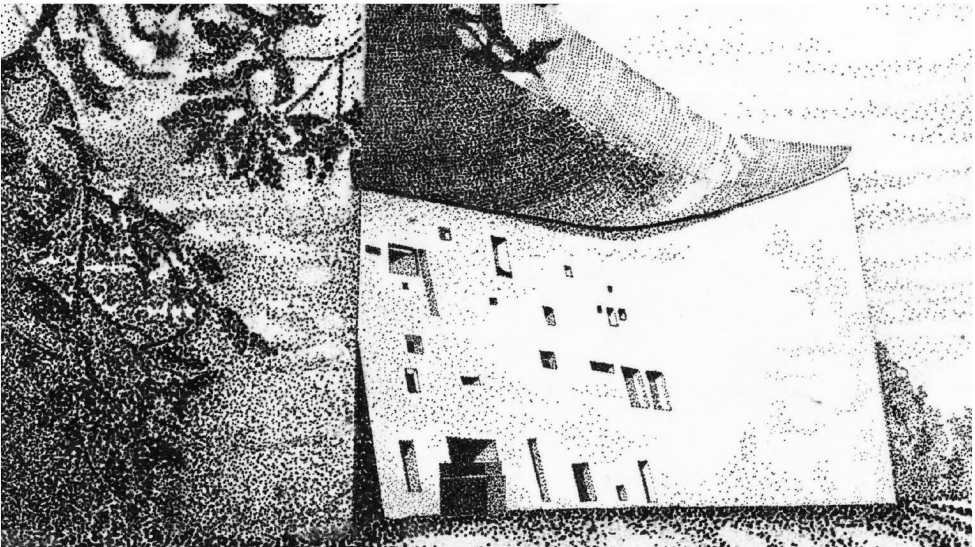
..... in contrast the roof disappears on the north and west.



iii The Towers

Externally, the towers stand erect against the sky,

...whilst internally they wrap the worshipper in an intimate womblike chamber.

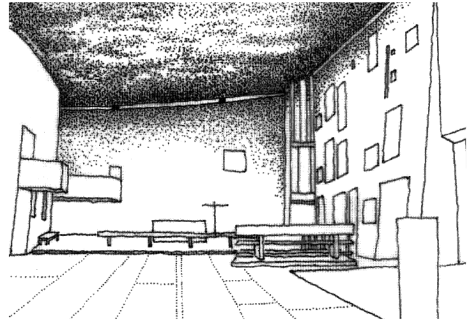
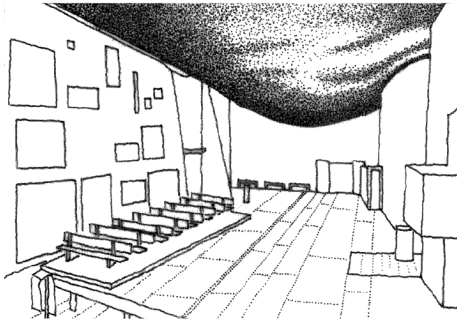


v The South Wall

Externally, the south facade has openings reminiscent of masonry construction

Fig 4.4 The RECONCILIATION of OPPOSITES.

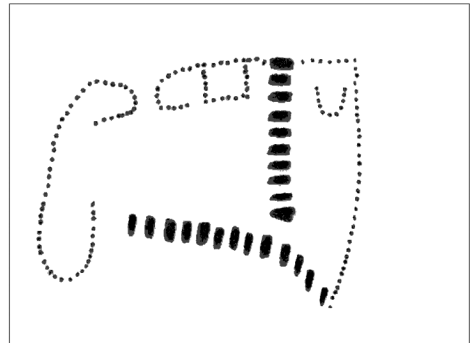
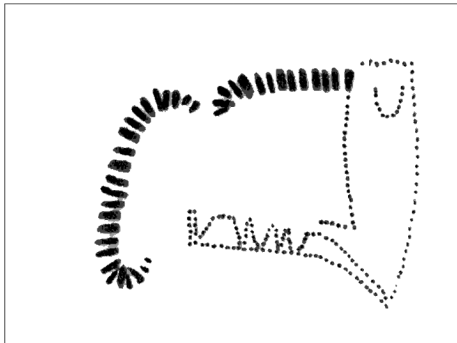
The Chapel of Notre-Dame at Ronchamp: Le Corbusier 1950-55. © FLC/ADAGP, Paris and DACS, London 2018.



ii The Interior Roof

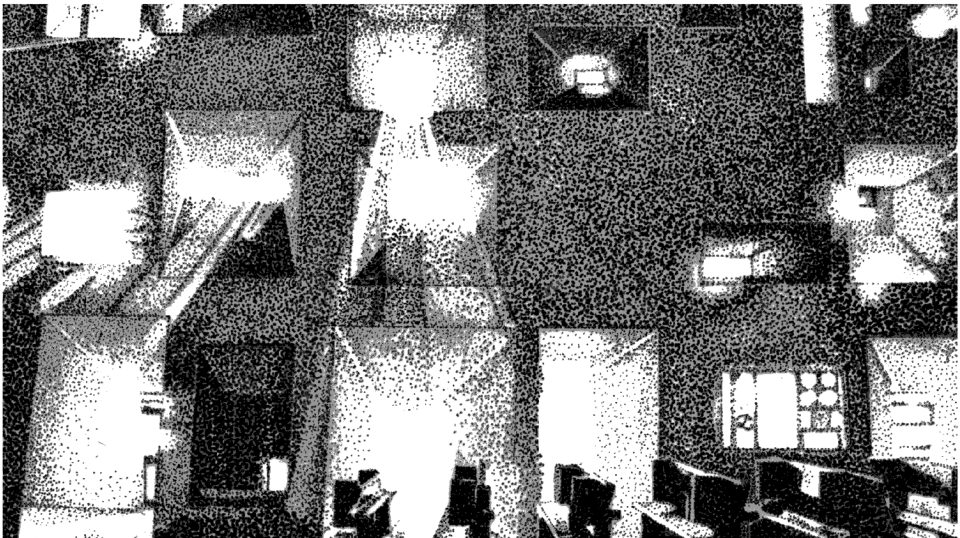
Internally, the roof weighs down heavily on the north and west sides

...and in contrast floats over the walls to the south and east.



iv The Plan

In Plan the convex forms of the north and west facades oppose the concave forms of the south and east.



..... internally, the same wall is a mass of space, a blaze of light.

Ronchamp is built above ground but designed in such a way that its forms suggest strong connections with the earth. You must decide for yourselves, whether in this sense the building is above ground, below ground, or in between, as I unravel for you some of the relationships of opposition and reconciliation that make this building what it is (Figure 4.4i to v). The first striking point that we notice as we approach the chapel is that the front two façades are crowned and almost dominated by the incredible curving roof that sits and hovers over them. Set against this powerful remembered experience, the two rear elevations are in contrast apparently roofless, with the walls flowing out to meet the sky without interruption (4.4i). Internally, the roof also poses oppositions; oppositions that are introduced and then resolved. As we enter the chapel, the dark concrete roof, cave-like in feeling, curves down heavily towards us, exerting a heavy downward pressure that one almost feels on one's shoulders. At the rear, this great heaviness rests solidly on the north and west walls. As the roof moves towards the south and east however the convexity is gradually eased. But it is not until the roof meets the two front façades that the pressure is finally released and the opposition resolved. Unlike the roof as it sits heavily on the north and west walls, here light separates the roof from the walls. Thus the dynamic upward movement of the roof thrusts itself out over the edge of the dark interior, barely seeming to touch the south and eastern walls as it goes (4.4ii).

In scale the chapel is rather modest; in terms of content the programme too is modest, a simple chapel that in the Christian tradition aligns itself on an east–west axis. The scheme has been arranged to cater for an area for outside worship to the east and three smaller chapels and sacristy internally. Breaking with Christian tradition the main entrance is on the south, a secondary entrance gives access from the north and a third door for the clergy links the sanctuary area with the external area of worship. A statue of the Virgin Mary sits in a small window in the east wall, allowing it to be seen during both inside and outside services.⁸¹ The three chapels and the sacristy are housed within what feels like a deep wall on the north and west sides of the chapel, as the chapels rise they open themselves to the light, performing rather like periscopes to bring the sky into the chapel. The towers express and reconcile opposite formal qualities; externally these chapels stand erect against the sky but internally they wrap the worshipper in an intimate womb like chamber (4.4iii). The largest of these three chapels stands to the west of the main entrance, its tower acting as a marker that draws the visitor to the interior. The towers of the two remaining chapels stand sentry-like either side of the northern entrance, the curvilinear forms squeezed together to create a sensuous entrance to the dark interior. This play between opposites continues as we move inside the building.

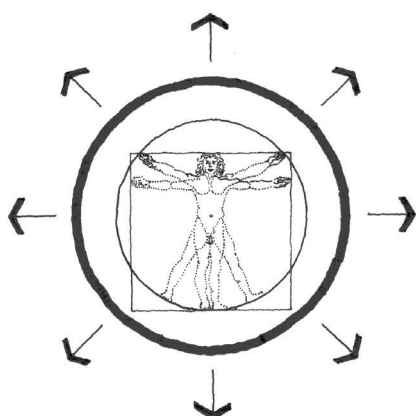
When we look at the plan of the building we find that the north and west façades are presented as taut and impenetrable skins, wrapped around the chapel towers and as such present a convex and reflective surface to the immediate woodland landscape. In contrast, the south and east façades present concave surfaces to the horizons, and aided by the overhang of the roof, invite a positive rapport with the distant landscapes that are to be seen from these two sides of the building (4.4iv). If we now examine the southern façade itself, we find the antithetical character of

81 For a full and thorough analysis of the chapel in terms of its location, context, access, movement, topography, composition and environment, see Baker, G., *Le Corbusier: An Analysis of Form*, Van Nostrand Reinhold, Abingdon, Oxon and NY, 1984, pp. 187–212.

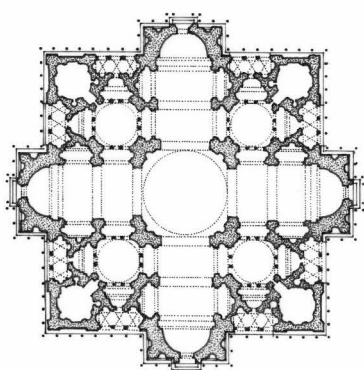
the chapel retained. The wall which is a solid raking structure viewed from the outside, pierced only by the tiny holes expected in heavy masonry construction, is on the inside turned into a framed and porous form, that is a mass of space, a blaze of light. The same wall is used to hold and reconcile these two opposite forms, with the image of the one hanging and lapping over the image of the other in the observer's mind (4.4v). The user is therefore left to hover in that creative and vital middle ground experienced in nature between the two halves of a seed, between male and female or between earth and sky.

Such then is the formal orderliness at Ronchamp. The spaces are organised by the balancing and reconciliation of opposite forms which are in turn reconciling oppositions experienced in life and presenting reversible visual relationships that make the work coherent. But, there is one final point to be made. We have seen, and demonstrated quite convincingly I hope, that relationships of opposition can be used to organise space visually. We can further suggest that such relationships can also be used to organise history. At Ronchamp we can see that, consciously or unconsciously, when Le Corbusier created that downward thrusting roof and those inward curving walls, he was creating the antithesis of the Renaissance domed and centralised space; and by doing so was thus establishing a relationship with this very tradition. The architectural forms of the Renaissance revealed a new relationship between humanity and the landscape. From within, the centralised form gives emphasis to man at the centre of his building and at the centre of creation. The forms represent a conquest of nature, a mastery of the natural elements. However, from without, the round and domical forms present a hard, robust and impenetrable surface to all horizons and to the heavens. The convex surfaces, rather like a chicken's egg, create a protective environment for the interior and a reflective shield to the world. The forms that express Renaissance man's individuality and supremacy over nature, therefore also act as barriers against the natural world. Any arch form is always most vulnerable from within, as the chick quickly learns when it is ready to hatch. Renaissance forms were therefore always arranged such that no weak point was presented to the outside world. Renaissance buildings thus stand in the landscape, but they stand there not so much as a part of it, but as masters over it (Figure 4.5i to v).

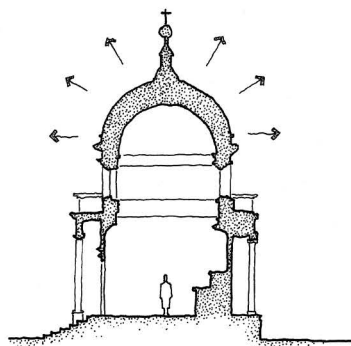
In contrast, Ronchamp both stands against nature, yet simultaneously yields to her pressures. The reflective walls to the rear turn their back on the landscape but the roof and the south and eastern flanks bend in its presence. Nature is excluded, even repelled on the north and west but the receptive forms welcome and embrace her on the south and east. It is as if the form feels the pressure of the distant landscapes and adjusts its posture accordingly. Ronchamp is thus making a fresh interpretation of humanity's relationship with the landscape, a more ecological position in which the interdependence of humanity and nature are revealed (Figure 4.6i to iv). Ronchamp therefore serves as an icon not for the certainty and perfection of modernism but rather speaks of a more open, balanced and uncertain world that somewhat prophetically heralds the post-modern condition. At Ronchamp Le Corbusier is prepared to reveal humanity's vulnerability. It is in this sense that this chapel is the antithesis of the Renaissance domed and centralised space and the certainty that this tradition sought to represent. At Ronchamp it is this very opposition that sets up a relationship with the earlier traditions. In this chapel, we thus see a building that not only uses relationships of opposition to organise itself within the three



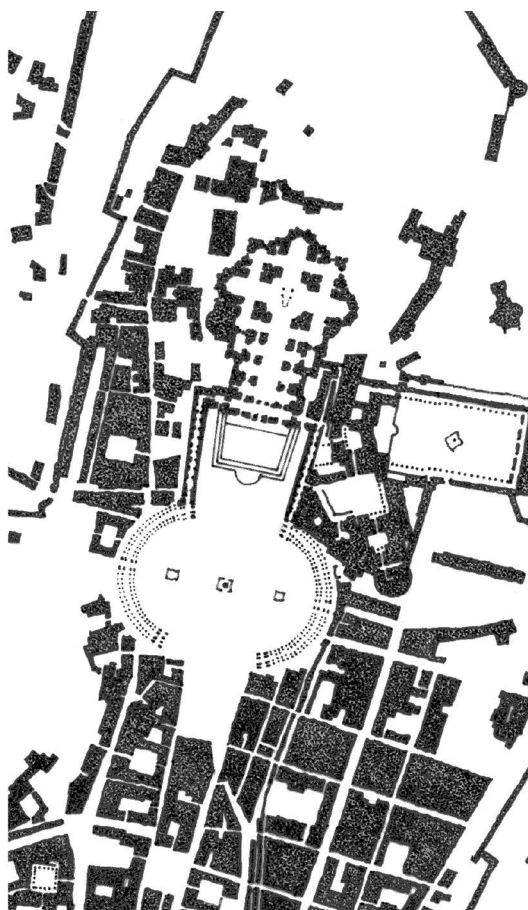
i Vitruvian Man, c 1485
Leonardo da Vinci,



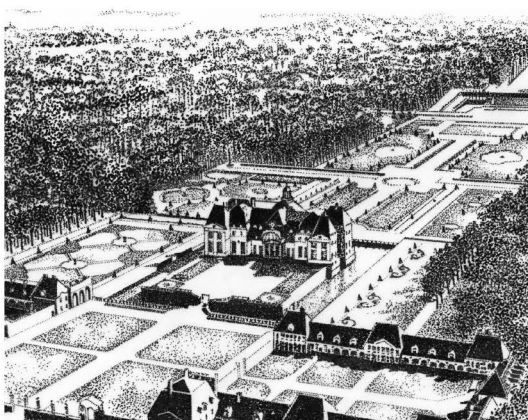
ii Bramante's Plan for
St Peter, Rome, 1506.



iii Tempietto, Rome, 1502-10,
Bramante.



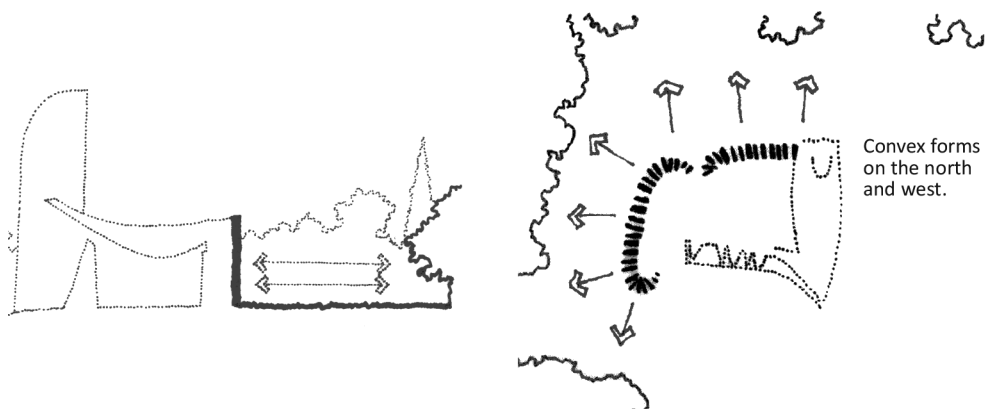
iv Piazza St Peter, Rome, Bernini 1655-67



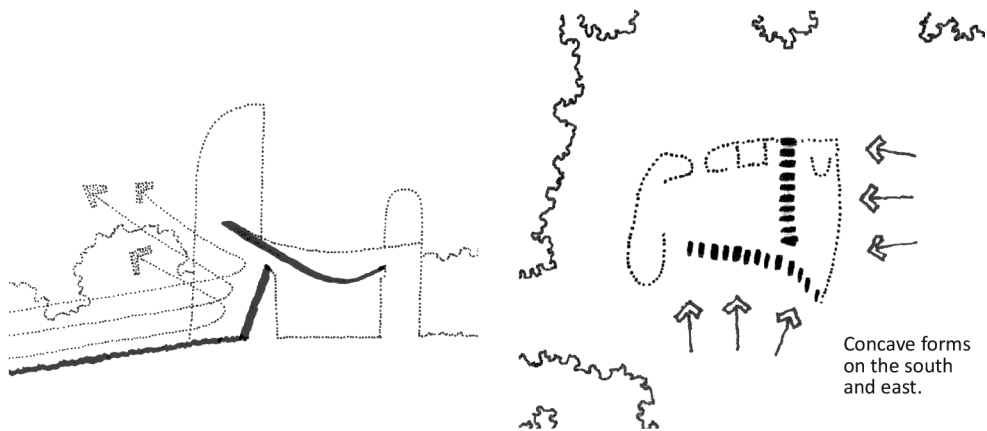
v Vaux-Le-Vicomte, Andre Le Notre, 1661.

- i Renaissance architecture used centralised forms to effectively place man at the centre of creation.
- ii Bramante's winning competition entry for the Cathedral of St Peter adopts a centralised plan.
- iii In section the domical forms of the Renaissance also serve to protect man at the centre.
- iv The formal dominance of the Cathedral of St Peter is extended into the urban landscape by Bernini's piazza.
- v The formal gardens designed by Le Notre in the 17th century extend man's control of the surrounding landscape.

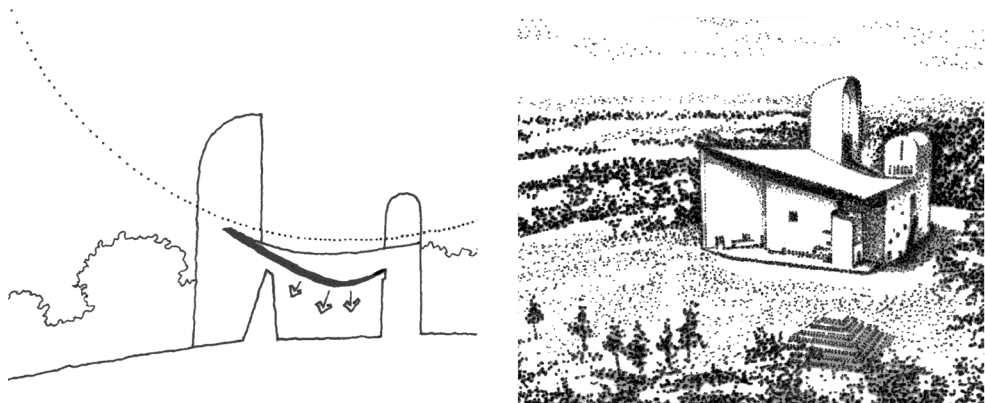
Fig 4.5 RENAISSANCE and BAROQUE FORMS stand in the LANDSCAPE as MASTERS over it.



i In conformity with Renaissance tradition, the convex forms of the north and west facades stand against Nature.



ii In contrast to the Renaissance tradition, the concave forms of the south and east facades give way to the pressure of the horizons.



iii In contrast to the Renaissance tradition, the arch of the sky is inverted in the roof at the rear of the chapel.

iv Ronchamp stands in the landscape open to the horizons.

At Ronchamp Le Corbusier is prepared to reveal humanity's vulnerability. It is in this sense that this chapel is the antithesis of the Renaissance domed and centralised space and the certainty that that tradition sought to represent.

Fig 4.6 RONCHAMP stands both against NATURE yet simultaneously yields to her PRESSURE.

The Chapel of Notre-Dame at Ronchamp: Le Corbusier 1950–55. © FLC/ADAGP, Paris and DACS, London 2018.

spatial dimensions of form, but also as Eliot suggested earlier, uses the same types of relationships to organise itself in time, within the Western traditions of architecture. It is perhaps not surprising that Le Corbusier called Ronchamp the pearl in his career.

LOGIC or AMBIGUITY: EQUIVALENT or EQUIVOCAL

The types of relationships that we have seen here with Le Corbusier at Ronchamp, in the work of Aalto and Erskine and in Bernstein's analysis of music were also described in poetry, not only as we have seen by T S Eliot in 1919 but also by William Empson in a seminal book that was published in 1949. Empson's study of poetry⁸² sought to identify in a systematic way the use of dualities in the works of many of the great poets. He chose to call the dualities '*ambiguities*' and identified seven different categories, which formed the basis of his study. More recently as we have seen in the field of music, Bernstein also chooses to describe the dualities in music as '*ambiguities*,' a term that he consciously acknowledges was adopted from Empson.⁸³ More interestingly in the field of architecture, the very influential book that we encountered earlier by Robert Venturi also followed Empson's lead⁸⁴ and chose to speak about ambiguity. He even adopted '*contradiction*,' Empson's sixth category of ambiguity, for the title of his book.⁸⁵ He writes, "Ambiguity and tension are everywhere in an architecture of complexity and contradiction."⁸⁶ When we seek a definition of ambiguity we find it defined as either of double meaning, or of more than one meaning. This suggests an element of confusion or uncertainty and applied to art it could infer that what the artist expresses is confused, muddled or indeed simply ambiguous. Even Empson acknowledges that ambiguity can be used to condemn the work of a poet. "Ambiguity may be used to convict a poet of holding muddled opinions rather than to praise the complexity and the order of his mind."⁸⁷ Hence Empson finds the need to distinguish between good and bad ambiguity. We already came across a similar dilemma in Bernstein's writings earlier, when he said that it might seem strange to be using a word like ambiguity "when speaking of a Golden Age composer like Mozart, a master of clarity and precision." His reservations continued even as he defined his terms, "the danger is that 'ambiguity' is in itself an ambiguous word, – that is, it has more than one meaning."

Webster gives these two definitions of 'ambiguous': (1) '*doubtful or uncertain*' and (2) '*capable of being understood in two or more possible senses*.' But that '*two or more*' presents an ambiguity of its own, so let's delete '*or more*'. . . . Our definition now reads: '*capable of being understood in two possible senses*.'

82 Empson, W., *Seven Types of Ambiguity*, Chatto and Windus, London, 1949.

83 "For instance, the famous example in Shakespeare's ninety-third sonnet which is quoted by William Empson in that marvellous book (which if you haven't read it I highly recommend), called *Seven Types of Ambiguity*," Bernstein, *The Unanswered Question*, op. cit., p. 111.

84 "And in *Seven Types of Ambiguity* William Empson . . . documents his theory by readings from Shakespeare, 'the supreme ambiguiest, not so much from the confusion of his ideas and the muddle of his text, as some scholars believe, as simply from the power and complexity of his mind and art.'" Venturi, *Complexity and Contradiction in Architecture*, op. cit., p. 29.

85 Empson, *Seven Types of Ambiguity*, op. cit., pp. 176–191.

86 Venturi, *Complexity and Contradiction in Architecture*, op. cit., p. 29.

87 Empson, *Seven Types of Ambiguity*, op. cit., p. 174.

Now we can make sense, everything we have been saying about puns, antithesis, zeugma, symmetry, chiasmus, Yang and Yin, Lingam and Yoni, upbeat and downbeat, strong and weak – all this has involved duality, and at some point we've always arrived, if you recall, at a manifestation of ambiguity which arose from the basic concept of two-ness.⁸⁸

The position, which we are arguing here, is that Empson and his disciples should not have referred to these dualities as being '*ambiguous*,' as Ball said above "Our brains won't tolerate ambiguity." Empson would have been more accurate if he had described the dualities as being equivalent. Ambiguity as Bernstein said a number of times in his lectures is a dangerous word, it leads to confusion and muddled meanings, it potentially includes everything and arguable excludes nothing, which in this post-modern world is less than helpful. To some extent it is understandable why Empson adopted the term. When opposites are balanced, they leave the mind of the observer in a new place, they leave the mind hovering in new territory, it sits as if on the equal sign in a mathematical equation between two established reference coordinates. This new place almost by definition will feel insecure, it may even feel threatening to be for the first time in new uncharted waters; observers may indeed feel dizzy and disorientated but this is not the same as confused, muddled and ambiguous. For an artist to take their audience to such new territory is not the same as abandoning them in nebulous confusion but quite the opposite, when an artist creates that union and reconciliation of opposites in their work the new territory is already established; the artist has established that territory on our behalf, and although it will be unfamiliar, its coordinates will have been clearly defined. Such equivalence as we have seen allows the relationships in the arts to be visually reversible and therefore allows the mind of the observer to move backwards and forwards between the polarities expressed; the great work of art thus shows the observer how those two opposite poles of experience can be reconciled. The arts are therefore functioning within the same logical framework used by science, mathematics and discursive reason. Genuine contributions to the arts are therefore coherent and precise just as we would expect of a mathematician or scientist and just as Bernstein expected of Mozart.

To speak of the arts as being contradictory and ambiguous is quite inadequate. A contradiction is the total denial of a relationship, as the definition of the word suggests. It is a word that should be used to highlight the inconsistencies in a work rather than celebrate its internal relations. To speak of ambiguity and contradictions in architecture or in any of the arts is therefore a misunderstanding and misinterpretation of the formal forces that we have discussed and confuses rather than clarifies our understanding of architecture and the arts. *Equi-vocal*, ambiguous and contradictory relationships allow for confusion and mixed meanings in a work, whilst reversible *equi-valent* relationships suggests an altogether more balanced and clearly thought-out expression, which I suggest reflects more closely the care taken by artists, and the precision they strive to achieve in the expression of their work. To be able to speak of the great artists as sharing the same rigorous intelligence as our great scientists is altogether more fitting and appropriate. As we saw earlier this new

88 Bernstein, *The Unanswered Question*, op. cit., pp. 193–195.

understanding places the arts within the sphere of reason. It is now clear that reason does not need to be named in order to exist; reason also exists beyond words, reason is simply the most coherent way that humanity can frame its experiences and it uses that reason whenever it is arranging discursive language, the objects of science and mathematics, aesthetic judgements as a record of our feelings in music or as a visual and physical description of our reality in architecture and the arts.

LOGIC is also a JUDGEMENT

So art and architecture, and music and poetry, involve the contributor in making a series of aesthetic judgements about what constitutes balanced reversible relationships. It is aesthetic judgements that establish the logical relations in the arts but is this significantly different to the way logical relationships are established discursively? We confirmed in the last chapter that all form making is a gestalt process and that of course included mental formulations. Consequently as we saw, reason and logic of course conform to the same organising principles, and since the gestalt process, as we saw in the last chapter, is a qualitative process that tolerates imprecision, so mental formulations and discursive reason must be similarly constituted. The act of building a logical argument out of such gestalt cast mental formulations, can be nothing other than a similar process. To begin with, coherent mental forms need to be recognised within the flux of form available and to build a discursive argument, balanced reversible relations need to be identified. The recognition of form and the identification of reversible relationships is a similar process to the operations that are happening in the arts. The forms and relationships used in a discursive argument are no more given than the forms and relationships in the arts; they have to be wrest from the flux of form and possible relationships available to the mind. This process is thus also a process of judgement, judgements about what constitutes an appropriate mental form and which forms balance with each other. The clarity with such judgements are made is of course important in all disciplines, there is a qualitative gradient between clear and muddled thinking in every discipline. Great philosophers need to operate with clarity in just the same way as great musicians and great artists. We can see therefore that both aesthetic judgements and judgements involved in the construction of discursive argument are both judgements of gestalt form and being judgements of equivalent reversible relationships must both be qualitative judgements of reason.

TEMPORARY OBJECTIVITY: a LOCAL FOCUSING of ATTENTION

At the beginning of chapter 2 we saw how it was necessary to intellectually separate ourselves from the world in order to gain a level of temporary objectivity. This intellectual separation is the privileged function of human self-awareness that does not extend in a significant way to the rest of Nature. The general condition of life on earth is one of balanced inclusion; we could describe it as one huge interactive gestalt of natural forces, which is continually striving within itself to maintain a state of equilibrium, each species totally wrapped in the whole, living in the moment and unaware of the future. Human objectivity is in contrast a temporary focusing of awareness within this greater whole. Human attention momentarily brings an object forward in consciousness, bringing it temporarily into focus as a '*figure*'

before releasing it back into the 'ground' of reality. The temporary objectivity we hold only in the moment, in the present moment, before we release it back into the world in order to focus our attention again on the next object of our interest. How much of the object we bring forward will vary depending on the person viewing the object, a mother may look at a table and immediately see it as perfect for her family, someone else will see it as a potential eight-place setting for a dinner party, a charity shop salesperson or Sotheby auctioneer as having a particular value and a joiner as a well-made piece of furniture. All these different readings of the same piece reveal that the meaning of the object never really stands still, because every person focusses their attention in a different way, each person sees a very different world. Each moment of consciousness is therefore just a temporary moment of attention; human beings can thus be seen as a local focus of attention, as a local gestalt of consciousness, if you like, within the greater field of life on earth.

The human ability to focus attention on the objects of perception in this way gives meaning to each individual; this is indeed how we each engage with reality and how we read the world into which we have been thrown. From our personal perspective we build up a very specific view of reality, an assembly of inter-related meanings collected over the course of a lifetime, which we seek to assimilate within our personal 'gestalt' of consciousness, if I may continue to use that term. This very personal engagement with the world remains always private to ourselves, we may see someone else in love or in pain but we can never really understand exactly how they feel; compared with our own very real feelings, we can only imagine. Even if we lived with a person for a lifetime we would never really understand the inner world they inhabit. Language and culture have evolved to facilitate a sharing of experience, but how we share the meanings that we have harvested from reality remains in many ways less clear. Plainly at one level we communicate yet at another we remain totally private, this is a paradox right at the heart of language and culture.

The READINGS of CULTURE and the EVOLUTION of CONSCIOUSNESS

By the same measure works of culture, as objects of perception, will necessarily carry different meanings for each individual. Presented with a piece of music, or art, a poem or indeed even a piece of science, mathematics or discursive logic, we cannot but read these in terms of our own personal meaning of the world.⁸⁹ Fortunately, in some ways this is helpful, this variety, like the variety that was created within meiosis allows growth to take place. If we all carried the same meaning for the objects that we encountered culture would have remained static, there would never have been the evolution of consciousness that culture has enabled. The fact that Richard Feynman saw the quantum world of physics in terms of his own peculiar 'Feynman Diagrams' enabled him to make great steps forwards in quantum understanding that other physicists had simply missed. Similarly, Einstein's childhood fantasy of imagining himself riding on a light wave allowed him later in life to see the physical world in ways that other physicists could never have envisaged. When we look at

⁸⁹ $500,000 + 500,000 = 1,000,000$ is just a mathematical equation until we learn that those numbers represent the money won when two of our lottery numbers were successful in the same week, at which point the equation takes on a very personal meaning for us.

these examples from physics we see them for what they are, personal experiences of reality that the physicist was subsequently able to articulate in terms of the objective language of science, or in other words in terms of the mathematical equations and arguments used to share those ideas. In the world of science we are happy to abandon our personal meanings associated with the forms in favour of the logical relationships that such forms offer. You would never hear Einstein saying that, 'I just love the light in this equation,' even though he has enjoyed riding on light waves in his mind since childhood; when the equation is laid down, his personal relationship with light is irrelevant. What is important is the precise relationship that he was able to establish between energy, mass and light, so you may have heard him say, 'I just love that equation.' The forms in the equation and the relationships between the forms in the equation are what are important and they are left in their own objective space. However when we look at the objects of the arts, even though, as we now know, they are constructed in the same way as the objects of science, we are sometimes unwilling to abandon the personal meanings associated with them. Instead of looking at the forms for what they are, that is forms in relationship with other forms, we may be caught talking about the forms in terms of our own personal meanings for them, so you might for example hear irresponsible commentators saying: 'Oh! I just love the light in this picture.' Arguably we could say that there is light in many pictures, so it is not the light of itself that is important, what is important is how the light has been balanced with shade and with the other elements in the painting. Or as Venturi said earlier, "I like complexity and contradiction in architecture, . . . I like elements that are hybrid"⁹⁰ and so on. If such subjectivity is accepted as a basis for culture, then since there can be as many '*meanings*' as there are commentators, or in truth as many '*meanings*' as there are individuals in the world, any meaning is as valid as any other. Or in other words, we arrive at the post-modern position that declares that anything goes. Consequently, terms such as '*ambiguity*' or worse '*contradiction*' become acceptable terminology. It should be clear from the arguments above that such a subjective base to cultural criticism must therefore be ill founded and that the arts have as legitimate a call on the clear arrangement of objective forms as any other cultural discipline. This distinction is crucial if we are to make headway in our understanding of culture. We need to be able to clearly distinguish between the forms used to express ideas in the arts and the private meanings those forms evoke.

What this chapter should have made clear is that the way forms are created by the mind and the way we assemble such forms into coherent relationships is no different in the arts than the sciences. The sciences use equations and the arts use equivalent relations but what is an equation if not an equivalent relation. When we are able to abandon the ideas of ambiguity and contradiction in the arts, we will open ourselves to a new and refreshing view of culture that is altogether more mature and substantial. This fresh view of contemporary culture gives us a way to view the post-modern world with more optimism. It seems therefore that there is a way through the post-modern maelstrom described earlier in this chapter, which will enable its positive, pluralist qualities to be kept whilst curbing its self-destructive drive, and it turns on the way that dualisms are used. In the light of the discussion

90 Venturi, *Complexity and Contradiction in Architecture*, op. cit., p. 22.

above, it should now be clear that the use of dualities to create logical structures is significantly different to the way dualities were proclaimed by Venturi and generally used within post-modernism. Contradiction and the non sequitur have been revealed to be the antithesis of the '*organic logic*' that we have demonstrated lies at the heart of all the arts. This understanding of the structure of cultural systems makes it clear that there are distinct parameters that limit what a cultural system can accept. It can no longer be true therefore '*that anything goes.*' Are we then forced to return to the deterministic and mechanical patterns of thinking and behaviour characteristic of a classical or modernist world in which meaning is once again reductively determined; a medieval-type world in which shared meanings are determined and handed down through hierarchy and authority? Interestingly this is not the case. From the arguments above there is nothing to suggest that '*meaning*' needs to be confined in this way. Indeed as we will see in the next chapter, meaning remains private to the individual, thus allowing as many meanings as there are individuals. We are now in a position to address the paradox at the heart of language and culture. Rather intriguingly, although meaning remains private to each individual, as we will now see, we do retain the ability to communicate with each other, thus allowing for individuality to be maintained in the midst of culture.