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THE DEVELOPMENT OF SPATIAL UNDERSTANDING

An Inquiry into Some Relationships which Exist  
between Child Art and Adult Art in their  
Representation of Space

Catherine Simo

A Thesis  
in  
The Faculty  
of  
Fine Arts

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## ABSTRACT

### THE DEVELOPMENT OF SPATIAL UNDERSTANDING

Catherine Simo

Historic transformations of spatial understanding, and their reflection in individual experience, are investigated through adult art and child art. Relationships which exist between adult art and child art in their representation of space offer insight into the evolutionary process of spatial understanding.

The visual arts are records of the spatial aspect of experience. Systematic study of space symbols in art indicates that space has not always presented the same dimensions to those who inhabit it. The study of certain periods in Western art from pre-history to the present indicates that the concept of space has evolved from a primary and essential topographical knowledge of the shape, size and position of things perceived in the world. The concept of space has integrated knowledge of Euclidean and three-dimensional space; that is, knowledge of the planar and perspective aspects of space.

The representation of space in child art indicates that the evolution of the concept of space at the individual level parallels in many ways the general evolution of that understanding. There are many interesting relationships between child art and adult art in their representations of space. These are presented in this study, and their significance is discussed.

It is not possible to comment upon the common understanding of space and its historical development as represented in art, without reference to other symbolic forms of human understanding. Attention has been paid to the symbol systems of myth, science and religion which, together with art, form a basis for man's knowledge of the world. The interplay between art, society and the evolution of the concept of space is also considered.

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TABLE OF CONTENTS

	page
ABSTRACT .....	i
ACKNOWLEDGEMENTS .....	iii
TABLE OF CONTENTS .....	iv
LIST OF ILLUSTRATIONS .....	v
PREFACE .....	ix
INTRODUCTION .....	1
CHAPTER	
I. SPACE IN CHILD ART .....	5
II. TOPOLOGICAL SPACE .....	15
III. PLANAR SPACE .....	20
IV. PROJECTIVE SPACE .....	26
V. THE SPACE OF THE IMAGINATION .....	34
VI. INFINITY .....	40
VII. THE SPACE/TIME CONTINUUM .....	47
CONCLUSION .....	58
NOTES .....	65
BIBLIOGRAPHY .....	75
APPENDIX	

## LIST OF ILLUSTRATIONS

FIGURE		opposite page
1.	Scribbling Stage. 3 yrs. 8 x 11 ins. Felt pen .....	5
2.	Pre-Schematic Stage. 5 yrs. 19 x 13 ins. Felt pen ...	7
3.	Schematic Stage. 6 yrs. 8 x 11 ins. Pencil and felt pen	8
4.	Fold-over drawing. <u>Swimming Pool</u> . 6 yrs. 8 x 11 ins. Wax crayon .....	9
5.	Stage of Dawning Realism. <u>Future War</u> . 10 yrs. 9 x 12 ins. Felt pen .....	11
6.	Stage of Cultural Realism. <u>Houses</u> . 14 yrs. 12 x 18 ins. Oil pastel .....	12
7.	Single-point perspective. Adolescent Artist. 14 yrs. 12 x 18 ins. Oil pastel .....	13
8.	Cultural Impact Upon Spatial Values. <u>Space Ships</u> . 13 yrs. 12 x 18 ins. Poster paint .....	14
9.	Totemic Designation of Space .....	15
10.	Hunter Charged by Wounded Bison. Cave painting, Lascaux .....	16
11.	Shape: Primary Graphic Experience. 4 yrs. 11 x 7½ ins. Felt pen .....	19

12. Egyptian: Fowling in the Marshes. Copy of fresco from the Tomb of Nakht at Thebes. XVIII Dynasty. Schematic Drawing: Nativity, from My Children's Drawings ..... 21
13. Wrestlers from Tomb 15 at Beni Hasan. Beginning of Middle Kingdom ..... 22
14. Nakht and His Wife Tuvu Worshipping Osiris and Ma'at. Papyrus, XVIIth Dynasty, British Museum ..... 22
15. Scenes of War. Panel from the Standard of Ur, C. 2,700 B.C., British Museum, London ..... 22
16. Grid Drawing: Primary Measuring. 3 yrs. 11 x 7½ ins. Felt pen ..... 27
17. Space-cell Style. Our Drawing Room. 10 yrs. 22 x 21 cm. .... 29
18. Still Life With Peaches. Wall painting transferred to panel. Herculaneum, C. AD. 50, Museo Nazionale, Naples ..... 30
19. Adolescent Art: A tool to be used in the construction of a more scientific, objective world. 13 yrs. 12 x 18 ins. Felt pen and water colour ..... 33
20. Dawning Realism. Halloween. 10 yrs. 8 x 11 ins. Felt pen ..... 36
21. Byzantine: Christ Between the Angels and Saints. Apse Mosaic, San Vitale. Imaginary Space ..... 37
22. "The Surface of a Common Experience". Justinian and Maximianus detail. Apse Mosaic, San Vitale ..... 39



23. Detail from The Profanation of the Host. Paolo Ucello, Galleria Nazionale delle Marche, Urbino .... 40
24. The Dead Christ. Andrea Mantegna, C. 1490. Breia, Milan ..... 41
25. Self-Portrait. Rembrandt Van Rijn, C. 1660. National Gallery of Art, Washington, D.C. .... 48
26. Free Curve. Grande Odalisque. Jean-Auguste-Dominique Ingres, 1814, Louvre, Paris ..... 51
27. Sunday Afternoon on the Island of La Grande Jatte. Georges Seurat, 1884-86. Art Institute of Chicago ..... 52
28. La Montagne Sainte Victoire seen from Bibemus. 1898, Paul Cezanne, Museum of Art, Baltimore ..... 53
29. Daniel-Henry Kahnweiler. 1910, Pablo Picasso, The Art Institute of Chicago ..... 54
30. Dynamism of a Dog on a Leash (Leash in Motion). Giacomo Balla, 1912, Buffalo Fine Arts Academy ..... 54
31. Space/Time Presentation, Stage of Dawning Realism. 9 yrs. 8 x 11 ins. Felt pen ..... 55
- 31A Space/Time Presentation, Schematic Stage. 6 yrs. 8 x 11 ins. Felt pen ..... 55
32. The Melancholy and Mystery of a Street. Giorgio de Chirico, 1914, Private collection ..... 56
33. The Castle of the Pyrenees. René Magritte, 1959. Collection Harry Torczyner ..... 57
34. The Listening Chamber. René Magritte, 1953. Private collection, New York ..... 57

	opposite page
35. <u>Blue II.</u> Joan Miro, 1961. Pierre Matisse Gallery, N.Y. ....	58
36. <u>Night Ceremony.</u> Jackson Pollock, 1944. Collection Mr. and Mrs. Bernard J. Reis, New York .....	59
37. <u>Woman VI.</u> Willem de Kooning, 1953. Carnegie Insti- tute, Pittsburg, Pennsylvania .....	59
38. Intuitive quality-gestural style. Child art, Scribbling Stage. 3 yrs. 8 x 11 ins. Felt pen	60
39. <u>View of Paris, Life of Pleasure.</u> Jean Dubuffet, 1944. Collection Mr. and Mrs. David, New York .....	61
40. <u>Virtual Virtue.</u> Jean Dubuffet, 1963. Sardenberg Gallery, New York .....	61
41. <u>Hello.</u> Richard Lidner, 1966. Private collection, New York .....	62
42. <u>White and Greens in Blue.</u> Mark Rothko, 1957. Private collection, New York .....	63
43. <u>Homage to the Square: Apparition.</u> The Solomon R. Guggenheim Museum, New York .....	63

#### Appendix Illustrations

44. Descriptive Chart	
45. Earth Seen from Space: Map 6 yrs. 8 x 11 ins. Pencil.	
46. Curvature of Earth's Surface. 6 yrs. 8½ x 9½ ins. Pencil and felt pen.	
47. <u>Star Wars.</u> Cultural Input Determines Spatial Character- istics. 10 yrs. 8 x 11 ins. Felt pen.	

## PREFACE

This thesis grew out of an interest which originated in the study of Art History, which developed into an attempt to explain why there are such striking variations in the style of Western art and what these stylistic differences indicate.

These variations are compelling, and raise many questions concerning the experience which precedes and accompanies the creation of works of art. For example, why does Byzantine art not look real? The Classical and Renaissance periods which preceded and followed Byzantium produced naturalistic art forms. In comparison, Byzantine art looks positively other-worldly. Such differences, or discontinuities, as this study reveals are at once a cause and a consequence of the development of human understanding of the world. More specifically, they refer to that aspect of experience of the world which is accessible through the senses of sight and motion - the experience of space and time. The art of children, itself characterized by equally compelling variations in style, also reveals a great deal about the evolution of human understanding of the world. Child art has the additional value of offering, to those who study it, further insight into the meaning and function of art in the general human experience.

The study of the symbols of space in the drawings and paintings of children and mature artists has been both a discipline and a joy. It has been so revealing of art's true nature to me that I can only believe it must be so to those who choose to share my experience.

INTRODUCTION

## INTRODUCTION

Space, in normal experience, seems dimensionless, changeless, static and hardly worthy of second thought. It has, however, been a constant pre-occupation, for at every stage of human development space has been called to the attention of the consciousness, that it might be fully understood. Art and science both regard and work upon space "towards diverse ends in diverse ways".<sup>1</sup> These ends comprise the building up of knowledge of space, and a total experience of the real world. Space, even though it seems invisible, is as crucial a part of nature as matter itself.<sup>2</sup> Man's continual efforts to define its complex structure testify to his deep need to understand it completely.

Ernst Cassirer discusses at length the question of space and how man comes to understand it. He observes that there is no field of philosophy or theoretical knowledge into which the problem of space does not in some way enter, and in which it is not interwoven in one way or another.<sup>3</sup> All the great symbol systems through which men attempt to structure the world: myth and religion, language, art and science, each deals with space in its own way. "The painter and sculptor are the great teachers" in the area of spatial comprehension.<sup>4</sup> They interpret reality not by concepts but by "intuitions, not through the medium of thought but through that of sensuous forms".<sup>5</sup>

Visual artists have attested to their pre-occupation with space. For them, it is the "infinite deity" which surrounds them.<sup>6</sup> It is an

experience full of magic in which they try to catch a glimpse of that "fourth dimension which their whole being is seeking".<sup>7</sup> Filled with "tensions and functions", it sways and surrounds us.<sup>8</sup>

Suzanne Langer describes the plastic arts themselves as being concerned with the construction of an entirely visual, non-experiential "virtual space".<sup>9</sup> Works of art are non-verbal symbols which both articulate visual form, and convey the knowledge of feeling about space. The subjective and objective values of the visual arts are manipulated to this end, the delineation and demarcation of the visible world.

Changing spatial representations in art lends credibility to the idea that space has not always presented the same dimensions to those who inhabit it. Why indeed does space in the visual arts look so different at different times? Why are the spatial values of Mediaeval painting so obviously different from those of the Baroque period? Why does Renaissance space look so real? Why are the symbols, the representations of space, so dissimilar? Men have always had eyes to see, hands to feel, means of locomotion to move around in space. Why are the illusions so different? Why was space experienced differently? What can the spatial arts offer as explanation for such inconsistencies?

Works of art are themselves records of explorations of experience.<sup>10</sup> Filled with illusions and allusions, they convey more than aesthetic meaning. They could offer some indications of the feelings and attitudes of their creators, who are themselves men existing in a specific time and space. Assertions that space is "given to the artist to change if he can",<sup>11</sup> or mystical statements like Paul Klee's "this world at one time looked

different, and, in the future, will look different again", lend further substance to the idea that space, or the concept of space, is malleable.<sup>12</sup> Indeed, space cannot be perceived in its totality.<sup>13</sup> Experience of the world "leads to the selection of fixed and native optical space perceptions to be the bearers of reality".<sup>14</sup> Art itself appears to be a record of those space perceptions selected at any given time, and may offer some insight into how space was understood by men at different times, what their "real" space was like.

Alexander Dörner elaborates at length upon the role of art in historical transformations of human consciousness of the structure of the world. In addition to exploring these transformations, he suggests a further means by which the apparent changing nature of space may be investigated. He reminds us that in the mind of the child, "even under totally different conditions, we can catch an echo of that vibration" the energy and experience, the reaction to environment which resulted in pictorial art.<sup>15</sup> Not only is the art of children accessible, there has been extensive investigation into the spatial aspect of the child's graphic evolution. This aspect has been investigated precisely because it reveals so much about his space consciousness and his understanding of the world.

Rhoda Kellogg suggests that child art and adult art should be studied systematically as a guide to human self-knowledge, as well as for the light they throw upon the origins of all art forms.<sup>16</sup> Furthermore, taking advantage of what might be learned from the art experience of children helps guard against those errors which might arise from "interpreting the mind of primitive or archaic man through his art in terms of modern man's attitude to art".<sup>17</sup>

4

The art of children, like all art, stems from endowments common to the species: neural functioning and the co-ordination of eye, hand and brain which are as ancient as the human race.<sup>18</sup> In an extended and complex cross-cultural study of spatial relations in children's art, Betsy Hess-Behrens attaches "exquisite significance" to the formal relations existing between the art of children and that of all cultures at all times. These relations "attest to the equality of all men, to the basic mental structures which can be developed equally to whatever extent the environment inhibits, allows or stimulates, and the society chooses".<sup>19</sup> A child, when he draws or paints, is in many respects like all artists. He is constructing a symbol which will help him come to terms with his experience. It is a visual symbol dealing with the world perceived by the senses of sight and touch, and movement. It is a spatial symbol motivated by the same forces which motivate artists at all times to create spatial symbols, to assist and reflect human understanding of the world.

This inquiry will consider how spatial representations in art have changed. Where appropriate, it will touch upon significant relationships between child art and adult art. It will explore the possibility that the evolution or transformation of consciousness of space as represented in the visual arts finds its correspondence in the child's art and consciousness. It may offer some understanding of how space has been experienced, and how our understanding of it has been transformed. Finally, it will attempt to clarify the role that art itself has played in this transformation.



CHAPTER I

T&P UETS 3-4

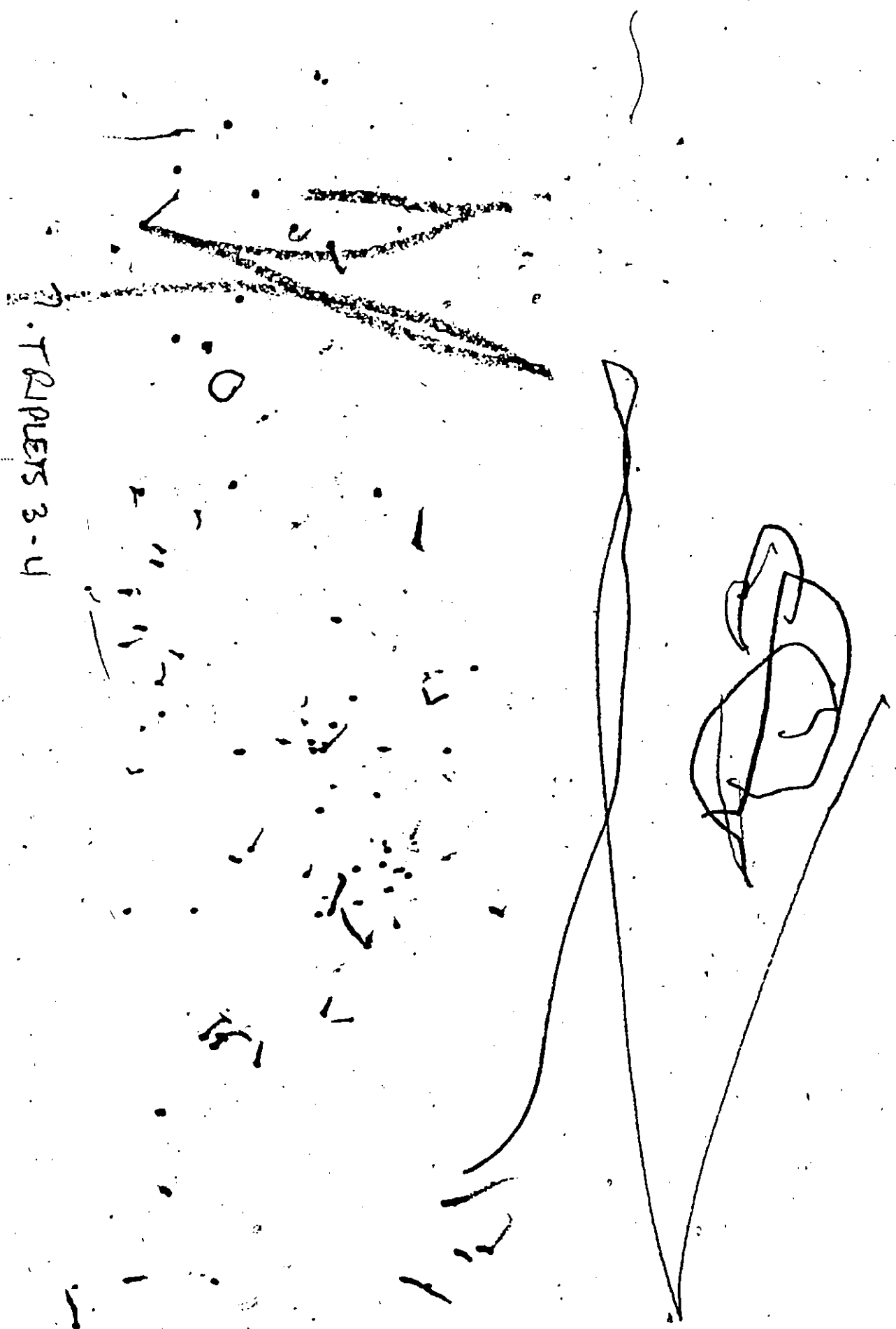


Fig.1. Scribbling Stage. 3 yrs. 8 x 11 ins. Felt pen .....

## CHAPTER I

### SPACE IN CHILD ART

The child's graphic representation of space moves through several distinct stages as he struggles to form the ideas which will determine his space consciousness at each period in his development. In his art, he attempts to represent both space in its environmental aspect, and in the visual appearance of objects in space. The former deals with the world and its directions: sky, horizon, ground: left and right, up and down, here and there; the latter with the shapes and relationships of objects in the world.

The individual child's emotional reactions to the world are of paramount importance in determining the selection of how and what he actually draws. His feelings about, and his visual experience of the world interact with the materials at his disposal. However, this subjective reaction manifests itself within the framework of a recognizable spatial symbolization which appears to embrace all cultures.

The observation of the art activity of very young children raises the possibility that there is some concrete, valid knowledge of space. This first stage, observable in the drawings of children aged from two to four years, does not, at first, appear to indicate the existence of a developed space concept. Viktor Lowenfeld has called this the Scribbling Stage (Figure 1), and describes the child's art at this stage

as manifesting no spatial symbolization, though the eventual emergence of simple forms indicates "purely imaginary" or "kinesthetic" understanding of space.<sup>20</sup> Lowenfeld contends that the child does not conceive of any law governing the inter-relationships of things in space, and that there is no experience of space that has general validity.<sup>21</sup> However, the scribbling motion, though often interpreted as instinctive or primitive, is often extremely consistent in direction from side to side and up and down. Forms are distributed within what appears to be a pre-determined area, and the appearance of mathematical grids indicates the presence of activity somewhat more directed than mere reaction could explain. That the child keeps his work within the boundaries of the paper upon which he works, and moves easily within these boundaries seems to symbolize a fairly well-developed space concept. The question of whether these symbolizations indicate possession of knowledge which is innate, or that this knowledge is acquired, is too complex to be discussed further at this point. It has been brought up primarily to underline the danger of assuming that young children have no real understanding of space, or that their art does not convey such knowledge. Certainly the extremely purposeful art activity of the young child seems to indicate possession of quite specific knowledge: up, down, around, here and there, without which, indeed, his existence in the world would be extremely handicapped. Moore and Salome refer to the "experimental" aspects of the child's art work at this stage which, they say, may have "meaning" in terms of his spatial understanding.<sup>22</sup> It is difficult to imagine any child activity without meaning - meaningless activity is the province of adults, not children. At this stage, the

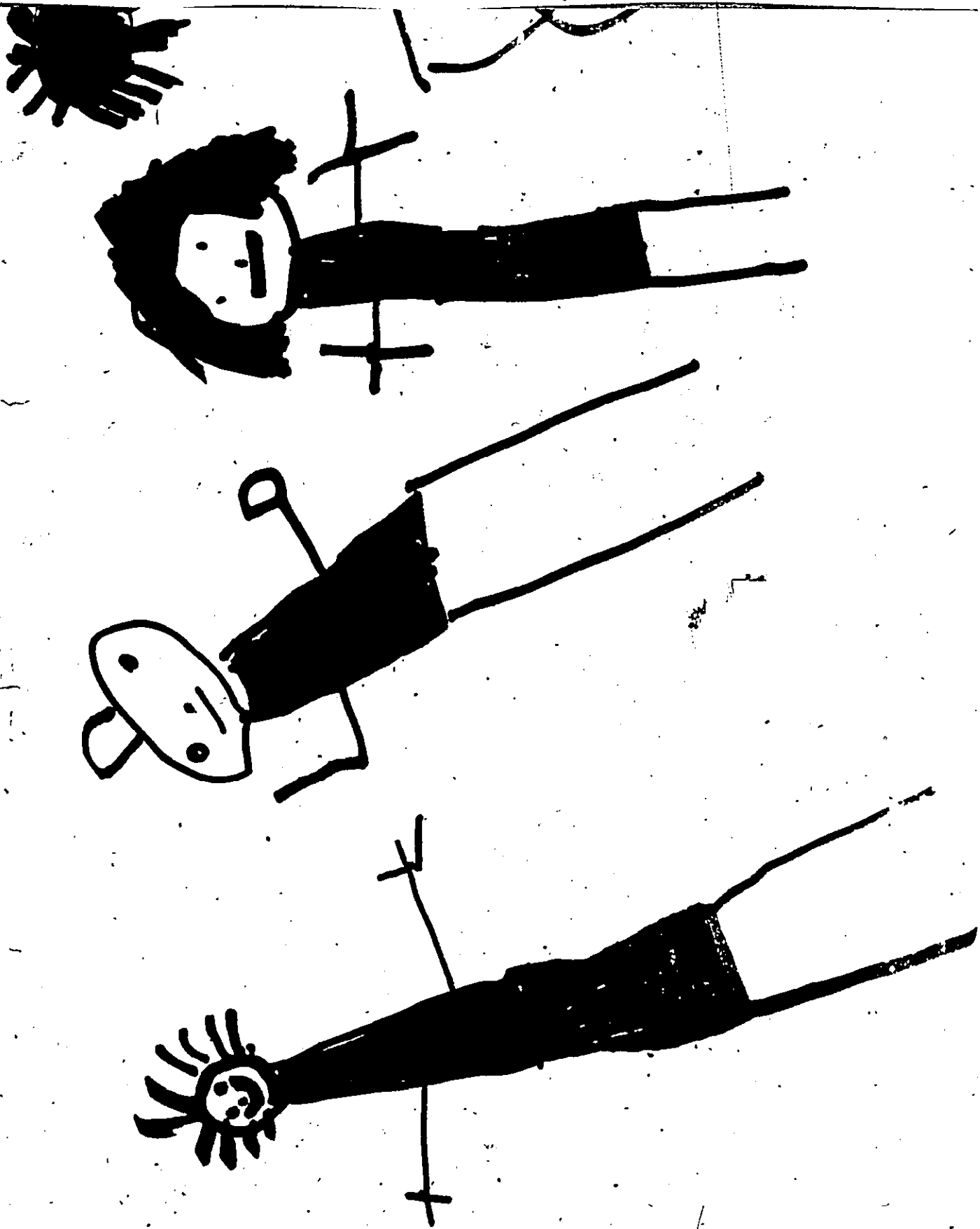


Fig.2. Pre-Schematic Stage. 5.yrs. 19 x 13 ins. Felt pen ...

scribbling, the emerging simple forms and the physical activity itself are essentially inseparable. The symbolic forms of spatial understanding are found both in the activity, the physical movement; and in the resultant art work.

The space of his immediate surroundings is significant for the child in the second stage of his graphic development.<sup>23</sup> Lowenfeld referred to this as the Pre-Schematic Stage, and it generally includes children from four to six years of age (Figure 2). The child's space expands, and is conceived differently as he develops. In the art work of the Pre-Schematic Stage, simple shapes are arranged in space, singly or in combination, in relationship to the self as centre.<sup>24</sup> Lowenfeld specifies that there is no orderly arrangement of these shapes or objects in space - they are simply "floating".<sup>25</sup> Others have referred to the left to right orientation of the shapes in Pre-Schematic organization.<sup>26</sup> This orientation could be the result of the classroom educational process, for it is at this stage in his development that the child is first introduced to the symbolic functions of reading and writing which are structured, in Western cultures, from left to right.

The organization of objects in space may be described as floating, whether from left to right or not. However, in most cases it appears that these objects are structured vertically, especially as the child develops. The orientation of the forms is understood in terms of the child's own orientation in the world. It is belaboring the obvious to point out that the child knows which side is up, and that he applies this knowledge consistently, as the space of his art reflects his understanding of the space of his experience.

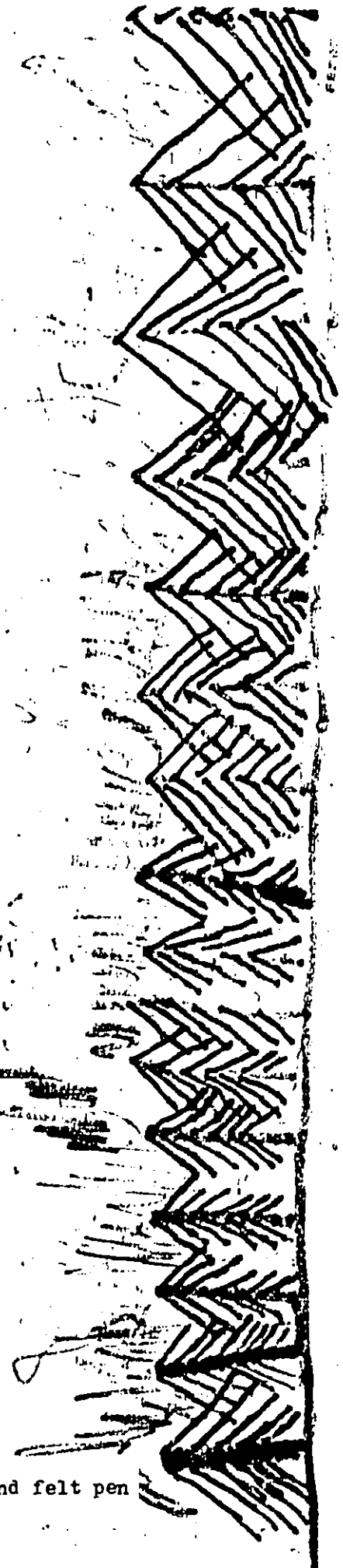
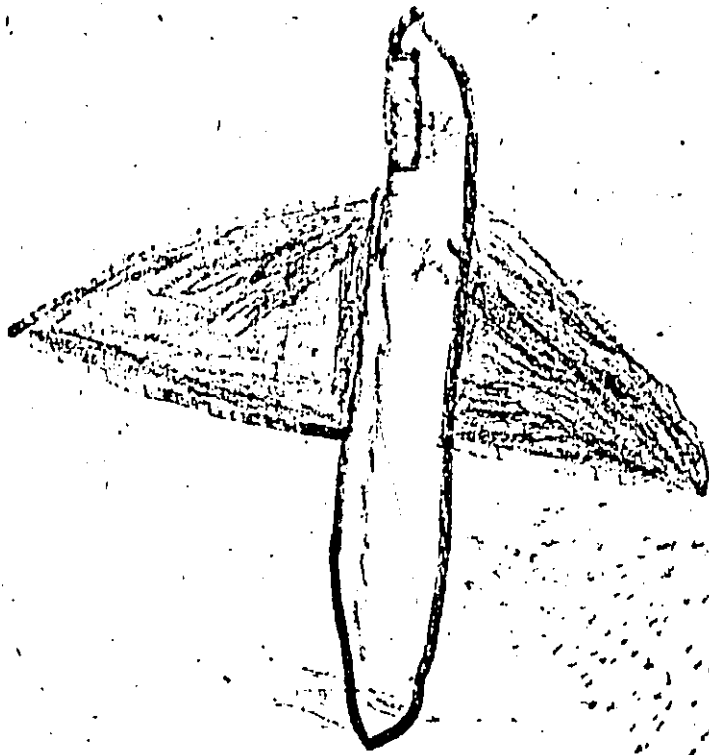


Fig.3. Schematic Stage. 6 yrs. 8 x 11 ins. Pencil and felt pen

The relationships of objects in space at this stage are determined on an emotional basis. The most important object is usually shown as the largest in size - larger than perception might normally allow. Those people who are familiar with children's art will remember drawings in which the mother is the largest of a group of figures, quite contrary to the reality of her size in relationship to other objects in the environment. Space, and the objects in space, are understood on a most personal basis.

Children from seven to nine years old begin to systemize the world around them. Their art becomes analytic and not, as it was formerly, total and syncretistic, or global.<sup>27</sup> This third stage, designated the Schematic Stage (Figure 3), is one which expresses the richest and most diverse indications of an evolving space consciousness.<sup>28</sup> There are easily recognizable spatial representations which imply not only emotional reaction to the world, but intellectual understanding. The base-line appears for the first time in children's drawing. Either the bottom of the picture page is used, or a line is drawn along the bottom, representing ground, earth or floor. This symbol indicates the presence of a highly developed space concept not only of the structure of the environment itself, the ground, earth; but of this ground as a common spatial element.<sup>29</sup> Objects are arranged on this base-line. They are conceived as sharing a common space. Earlier in this stage, repetition of objects along this base-line is characteristic, although they remain side by side and do not overlap. As the child's understanding of space develops further, a line representing the sky will appear at the top of the drawing. The appearance of multiple, often curved, base-lines predicts the eventual evolution of the understanding of projective space.





Fig.4. Fold-over drawing. Swimming Pool. 6 yrs. 8 x 11 ins.  
Wax crayon .....

Treatments of space at the Schematic Stage include what are known as "fold-over" drawings.<sup>30</sup> In these, the projected space of perception is brought up against the surface plane of the drawing as if for analysis. A swimming pool, for example, will be described in planar geometric terms as a square or complete circle, the objects around it folded over to show them in their entirety (Figure 4). Roads moving away in space will be laid out as though on a map, signs and houses laid out along them. "X-ray" pictures show the outside and inside of objects simultaneously. Multiple views or transformations of objects, such as simultaneous front and profile views of people or houses appear in art work at this stage. It has been suggested that these deviations from simple base-line expression, such as "X-ray", "fold-over" or even space-time representations are subjective spatial experiences.<sup>31</sup> Such a description of these phenomena robs them of their full meaning. Of course, all experience of space is fundamentally subjective. But added to this subjectivity, at this stage and in these cases, is a very real and successful attempt to analyze the structure of space, and the world, objectively.

The intellectual content of the child's art experience, the matching of detail to detail, the analysis of shapes, the efforts to deal with the projective aspect of space is a vital process. In the artistic activity of the Schematic Stage, analysis of parts replaces totality of experience. This substitution leads to a certain rigidity, an apparent loss of vigor. The spontaneity so characteristic of the earlier, undifferentiated vision of the world seems lost for ever. Here, in place of spontaneous representations of space felt, space is described. At present, when the value of spontaneity in expression is recognized, the

analytic practices and the intellectual orientation of the Schematic Stage are regarded by many art educators as disastrous. The art work of this stage is often judged according to aesthetic values, which are themselves carried over from the earlier, more spontaneous stage of child art, values not applicable to the analytic art of older children. Such judgements denote a lack of understanding both of the child's maturing spatial knowledge, and the role of art in this process. The real meaning of child art is misunderstood. Younger children are seen as creative artists, which they are not; their spontaneity of expression, measured against adult art practices, is falsely endowed with a maturity of purpose. The painstaking, thought-influenced efforts of older children to measure and understand their universe is often considered to be uncreative, not really artistic behaviour, and disallowed. Art itself offers ample proof of the viability of the analytic view of the world. It also offers proof of the survival of the earlier, syncretistic vision; for those adult artists who work in this mode have, presumably, passed through the Schematic Stage as children. Anton Ehrenzweig discusses the problems which arise as a result of the analytic tendencies of the Schematic Stage of child art. He observes, rather pessimistically, that "art education seems helpless to stop the rot" resulting from the loss of the vigorous characteristic of the younger children's art.<sup>32</sup> In the face of this situation, it is vital that art teachers understand that each stage in the child's graphic development reflects a change in attitude towards the world. The child's art work should not be judged according to irrelevant values. Furthermore, the art experiences which are made available to the child should be adjusted most carefully to take advantage of his continually changing orientation.



FIG. 5. Stage of Dawning Realism. Future War. 10 yrs. 9 x 12  
ins. Felt pen .....



Space, as the child understands it in the fourth stage of his graphic development, is more complex. This is the Stage of Dawning Realism, to which the child comes at the age of nine, and which lasts until he is eleven.<sup>33</sup> Now, the base-line takes on a more sophisticated aspect and extends upwards to reach the horizon. There are often multiple base-lines. The space between sky and ground is filled. The line representing the sky in the earlier Schematic Stage extends downwards to become a plane, joining the horizon. The space between the base-lines fills up, these themselves overlap. Objects in space overlap - space seems to be understood as something tangible (Figure 5). There is an effort to imitate adult art, accompanied by what Lowenfeld terms "difficulties in spatial correlations as the result of more ego-centric attitudes and lack of cooperation".<sup>34</sup> Moore and Salome also describe the "contradictions and anomalies" of this stage (which they refer to as "transitional", remarking upon the great variety of its spatial expressions).<sup>35</sup> It is possible that the contradictions and difficulties in spatial correlations are due to the emerging realization of the perspective deformations of nature, and constitute the child's attempts both to internalize and render graphically this complex and difficult idea.

The spatial representations at this time in the child's graphic development seem naive and contradictory. A child's representation of linear perspective or of cubic space, in drawings of roads and houses and fences, for example, seem unsophisticated, if not illogical. The child himself seems unaware of the anomalies. But this very naivete, which might better be described as ambiguity, underlines the ambiguity of space itself, and of the concept of space. The apparent lack of sophistication

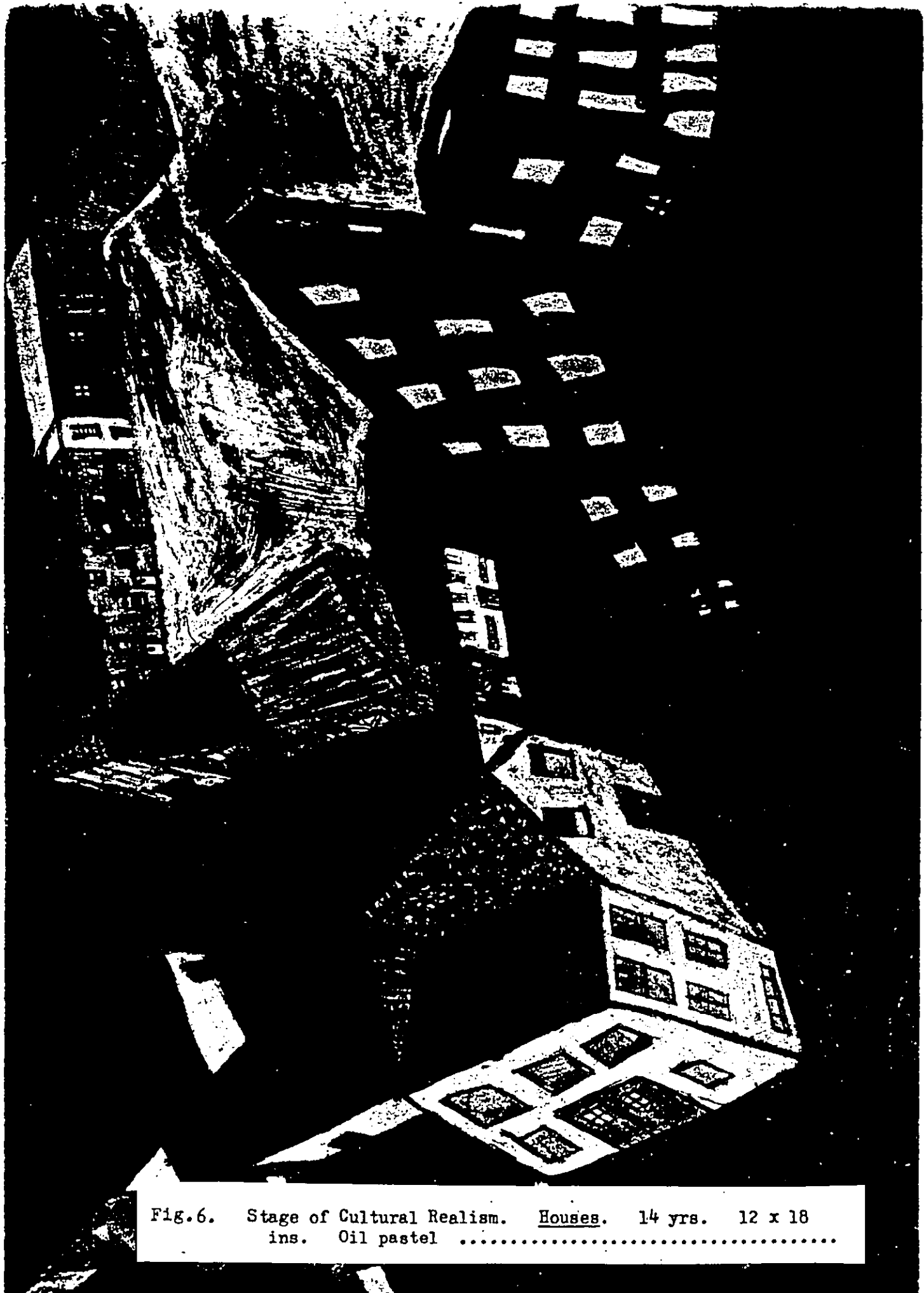


Fig.6. Stage of Cultural Realism. Houses. 14 yrs. 12 x 18  
ins. Oil pastel .....

cannot conceal the knowledge implicit in the symbol; things are not what they appear to be. What are generally accepted as valid visual symbols, three sides for a cube; an ellipse for a circle; parallel lines which meet even though they never really do; a man represented as larger than the house behind him which patently contains many times his mass; these, and many other contradictory perceptual and cultural dogmas, must be reconciled. Even then, space is not fully described. Vision is a treacherous indicator of the true dimensions of space. The child, with a kind of sophisticated spatial intuition, continues to draw upon his total, though primarily subjective, knowledge of the world. The tactile and kinesthetic aspects of spatial experience, together with the subjective and imaginative, determine space consciousness. Even more, it seems, than those aspects which are purely visual or objective.

A more mature understanding of the spatial environment and the appearance of objects within it occurs during the last stages of the child's graphic evolution. These stages bring him to adolescence and maturing of his space consciousness. Lowenfeld's Pseudo-Naturalistic Stage lasts from age eleven to thirteen, and the Stage of Adolescent Art, from thirteen to seventeen.<sup>36</sup> These have been joined by Moore and Salome into one stage, that of Cultural Realism<sup>37</sup> (Figure 6). This whole time corresponds to that normally spent in secondary schools in industrialized societies. At the end of this period, the normal graphic evolution is considered to have been completed.

These last stages are characterized by a continuing urge for three-dimensional representation. There is a more correct rendering of cubic and spherical objects in space, together with an interest in

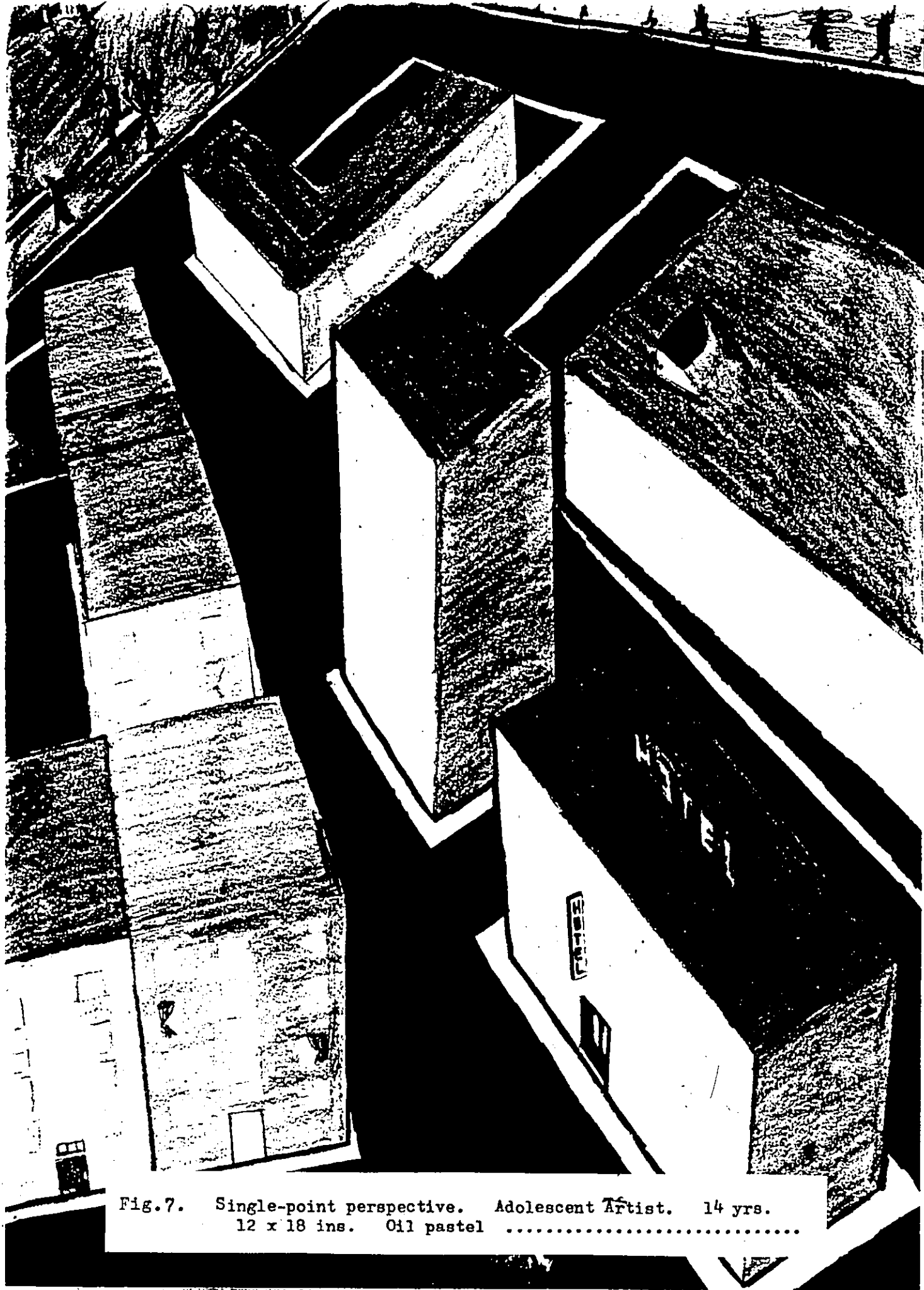


Fig.7. Single-point perspective. Adolescent Artist. 14 yrs.  
12 x 18 ins. Oil pastel .....



chiaroscuro. Objects are represented as diminishing in size according to their position in space, there is overlapping (objects one behind another), and linear perspective in the form of multiple point perspective. At the Stage of Adolescent Art, attempts are made to render visual perspective or perspective of value.<sup>38</sup> In addition to these representations of space external to the adolescent, Hess-Behrens makes special mention of the "psychic and expressive space taken up by the objects within the confines of the picture boundaries", which indicates a knowledge of space which is at once intuitive and intellectual, personal and objective.<sup>39</sup> All of the spatial representations found in the work of mature artists in Western culture can be found in the work of children and adolescents. These representations occur during the natural course of the graphic evolution. All, that is, but one. This symbol, single-point perspective, does not appear spontaneously, but remains to be learned, often as the highly-regarded culmination of the childhood-long art experience (Figure 7). For the majority of young people, space hereafter becomes, as it is for most adults, a cliché. It is the invisible and ubiquitous medium which surrounds them. Their concept of space, corresponding as it does to the one currently acceptable to the society in which they live, will serve to allow them to experience the world as a system, or an illusion, of rational, continuous space.<sup>40</sup>

The stages which have been described, and the ages at which they occur, are generally accepted as descriptive of the graphic evolution of the child, as it refers to purely spatial representation. As with all systems which deal with human activity, they do not necessarily describe with the greatest accuracy the individual child's experience. In many ways they appear somewhat arbitrary, especially when dealing with the age

Fig. 8. Cultural Impact Upon Spatial Values. Space Ships.  
13 yrs. 12 x 18 ins. Poster paint .....



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of the child at each stage. In the quarter century which has elapsed since Professor Lowenfeld completed his work, our children's conception of space has been radically altered by their exposure to images of the world, and the universe, seen from a totally new perspective. Recent research supports the possibility that we should adjust the chronological aspect of Professor Lowenfeld's findings.<sup>41</sup> These adjustments should take cognizance both of the child's earlier physical and intellectual maturing; and of the cultural impact upon his concept of space, which is derived from such human experiences as riding the great rockets, floating in space, and walking on the surface of the moon. These are experiences which the child will accept as being as normal as taking a train or swimming in a pool. Even if he has not experienced them personally, he has, vicariously, through communications systems of great power.

These considerations help us to understand how and why the concept of space changes.\* They show in a very concrete and immediate fashion the process of those changes (Figure 8). Professor Lowenfeld's work is still a valid and valuable description of how the child represents space in his art. It constitutes a useful reservoir of information which, together with further investigations in the area of spatial representation in child art, may be drawn upon with confidence.

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\*Refer to Appendix illustrations

CHAPTER II

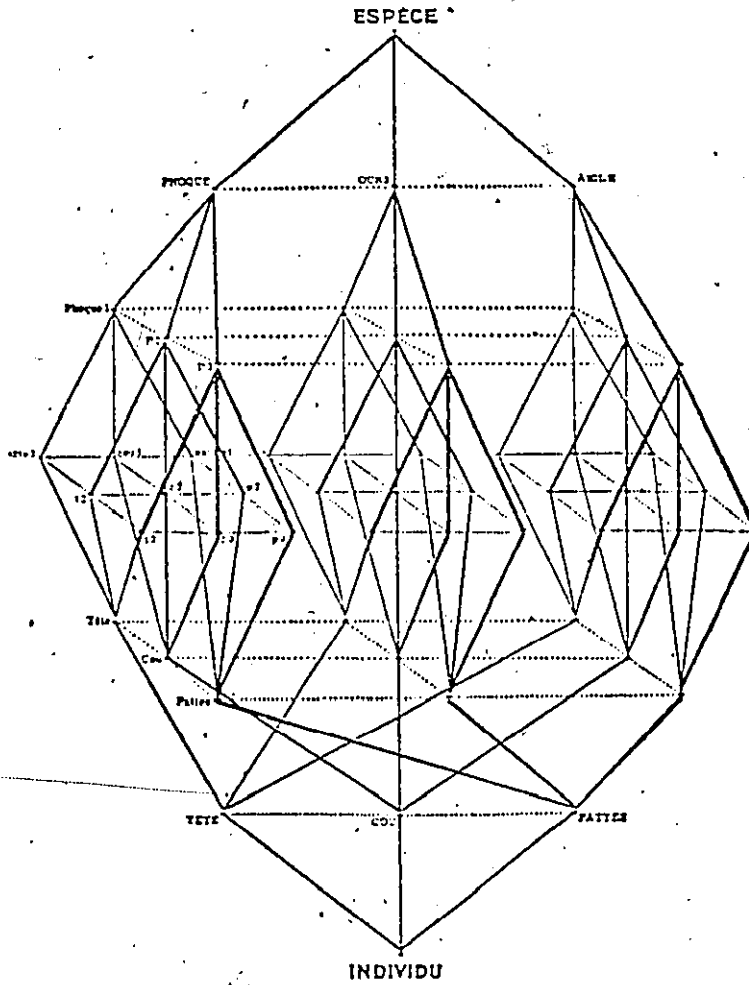


Fig.9. Totemic Designation of Space,  
 after Claude Levi-Strauss  
La Pensée Sauvage.

## CHAPTER II

### TOPOLOGICAL SPACE

The world of the mythic consciousness was a world of purely irrational, intuitive experience. At first, primitive man hovered between the world of dreams and objective reality. There was no fixed dividing line between mere representation and "real" perception, between wish and fulfillment, between image and thing.<sup>42</sup> In this world, fraught with potency and meaning, primitive man struggled to construct a system, a means of knowing, to bring order into the chaos of his existence. This experience was first expressed in terms of ritual and unchanging repetition, the building of a symbolic wall against the overpowering forces of life. Ritual was an abstraction of those first experiences whose abundance threatened individual existence, whose power and intensity men felt too weak to overcome.<sup>43</sup> Art has its origins in those generalized categories which primitive man constructed from his experience.<sup>44</sup> In their basic form as elements or constituents of ritual activity, plastic art and music played a decisive role in the internalization and objectivization of purely sensory experiences of space and time.

Space was first understood in direct reference to the bodily self, in the demonstrations of "you and I", "here and there".<sup>45</sup> Further experience expanded knowledge of space, as primitive man struggled to regulate and adjust the unreliable, shifting perceptual images with which his environment



Fig 10. Hunter Charged by Wounded-Bison. Cave painting,  
Lascaux .....

presented him.<sup>46</sup> Spatial knowledge was acquired in the same way that the child acquires such knowledge, as a result of direct action on the environment. At its most primitive and animistic, this action consisted of dividing and designating space in a most concrete manner. In "La Pensee Sauvage", Claude Levi-Strauss describes this expanded, empirical concept of space, in which each area exists by virtue of its totemic designation.<sup>47</sup> In this structuralization, the two fundamental qualities of the mythical feeling of space are recognizable: the qualification and particularization from which it starts, and the systemization to which it strives.<sup>48</sup>

Each of primitive man's visual experiences was limited to its own space and time. In the cave paintings of Lascaux, the representation is as an image arrested in space and time, or timeless. There is no reference to projective space, no consistent reference to the self. Only a symbol that could be a man, weightless in space. Only the magical shape, the topography, like the child's first conception of space.<sup>49</sup> In the image of the animal, in the extremely limited, abstract quality of the man symbols, and in the apparent disregard or lack of understanding of the spatial relationship which may have existed between them and the environment, we are able to recognize the primitive space consciousness. This does not seem to project beyond the momentary recognition of shape (Figure 10).

Shape is the spatial characteristic of Pre-Historic art; the selection of elementary forms, accompanied by only the vaguest approximation of spatial relationships between these forms. Rudolph Arnheim points out that such spatial representation is characteristic of art done at the earliest levels of mental development, such as that of children at the Pre-Schematic Stage of their graphic development.<sup>50</sup> Here also, spatial



elements may not be grasped in their interconnections, there may be no unified frame of reference.<sup>51</sup> The shape-making tendency is so strong and pervasive, however, that it appears to be innate.<sup>52</sup> Lowenfeld's description of the Pre-Schematic Stage's art work as having "space schema almost entirely abstract, and (having) only an indirect connection with reality", might easily serve as descriptive of Pre-Historic art.<sup>53</sup>

Whatever it lacks in exhibiting the complexity of spatial relations, Pre-Historic art is suffused with a vitality which is also seen as a striking characteristic of the child's primary graphic experiences. The immediacy and directness in both cases conveys a sense of a world experienced directly and aggressively, and captured momentarily and imaginatively. The primitive space experience, so mobile, vital and instantaneous, stands in direct opposition to the static spatial experiences of Greece and the Renaissance, and those of contemporary man.

In primitive experience, the systematic ordering of space was not lacking, as studies of primitive people have shown.<sup>54</sup> The floating organization of pre-historic painting, like that of the child at the Pre-Schematic Stage, was indeed that - organization of a given space. In fact, the spatial orientation in the daily life of primitive people may appear in some ways to have been more precise and detailed than that of civilized man. However, this experience was still on a purely concrete level. It depended not upon the understanding of spatial relations between, but upon recognition of, things in the environment. Whatever their knowledge of their location in space, of details of their surroundings, primitive people, like young children, are unable to draw maps. Map-making depends upon the ability to hold fast in the mind an unchanging and objective schema, and to

represent this graphically.<sup>55</sup> It depends upon perception of space and upon a more developed understanding of spatial relations; together with co-ordination of eye, mind and hand. Pre-Historic Art shows evidence that visual perception and neuro-physical co-ordination were abundantly present, together with the ability to retain an image. Arnheim reminds us that primitive people, like children, are very skilful.<sup>56</sup> What was absent was evidence of a real understanding of projective space extending behind the object,<sup>58</sup> and including it and the perceiver himself. This kind of transformation of spatial understanding implies an "authentic revolution in the mode of thinking".<sup>57</sup> Such revolutions appear to be linked to social revolutions of the most basic sort: those which, for example, changed hunting societies into agrarian societies. They also imply the integration of other general categories of experience, such as time and number.

Understanding of the world in any form, it appears, is hedged about by sheer necessity, by the very specific demands of life. The knowledge of space, like all human knowledge, must serve the ends of survival. In primitive experience, immediate recognition of shape was paramount. A successful hunter could scarcely spend time reflecting upon the relationships existing between the object of his perception, the animal, and the environment in which he perceives it. Whether he had, or had not, the intellectual potential to do so is irrelevant. The luxury of allowing images, and their relationships in space, to become the focus of consciousness depends upon parallel evolution in social structures.

The savage mind may appear, in terms of spatial understanding, to have been limited in breadth, but there is no doubt as to the depths of its experience. It may have been child-like, but the impressive vitality of

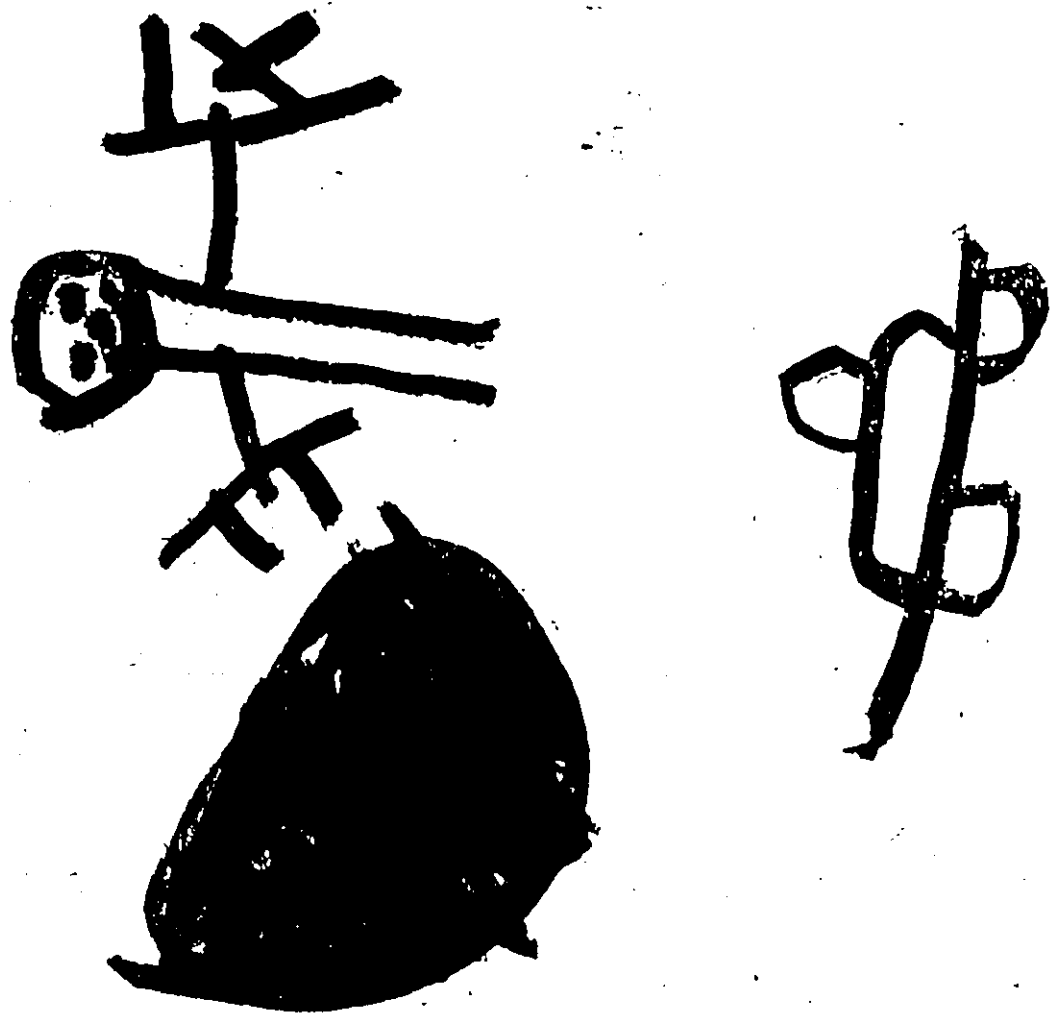


Fig. 11. Shape: Primary Graphic Experience. 4 yrs. 11 x 7 $\frac{1}{2}$  ins.  
Felt pen .....

its images testifies to a sophistication of the perceptions, and the physical and intuitive abilities, which helped to form it. Primitive art is a legacy of these intuitions. It allows us to understand how it was to live in a dreamlike world at the dawn of time.

There exist strong parallels to primitive art in the art of young children, so close in form and feeling. This is also an art which is the result of primary experience; of activity and movement in space; and of an irrepressible desire to construct the shape of that experience, regardless of intellectual or aesthetic considerations (Figure 11). The resulting images have value both of themselves and of the experience attached to the making. This making activity is concerned with the shape of things, whose organization in space is considered either instinctively or purely intuitively, and is not of primary concern.

Both primitive art and the art of young children are representations of mythic experience, of activity in space. Cassirer describes this experience as "bathed in the colour of feeling and subjective sensation".<sup>58</sup> It is through this activity and experience that the child and the man begin to understand the complex universe in which they live.

CHAPTER III

### CHAPTER III

#### PLANAR SPACE

We have seen that the existential spatial understanding of primitive societies is the recognition of the shape of things, space's topological aspect. An agrarian society must develop understanding of a different order to satisfy its needs. It must understand how the environment must be shaped and measured, or how space is organized two-dimensionally, which amounts to approximately the same thing. Another category of experience, time, is also recognized as essential and must be analyzed. All the activities and experiences of the agrarian society; ploughing, seeding and harvesting; the measuring of fields and seasons, repeated endlessly; help evolve the consciousness of space and time which finds symbolic form in that society's art. The symmetry and balance and order which Herbert Read called the laws of geometric composition replace the magical animal image.<sup>59</sup> Such a change or synthesis can only come about through a transformation of consciousness itself, a "leap forward into the apprehension of reality".<sup>60</sup> Such a transformation is apparent in the child's graphic evolution from the Pre-Schematic to the Schematic Stage.

The richness and complexity of the child's representations as he attempts to give graphic form to his evolving space consciousness take on added significance when these experiences are matched to the arts of the Pre-Classical world, the great agrarian civilizations of the Middle East

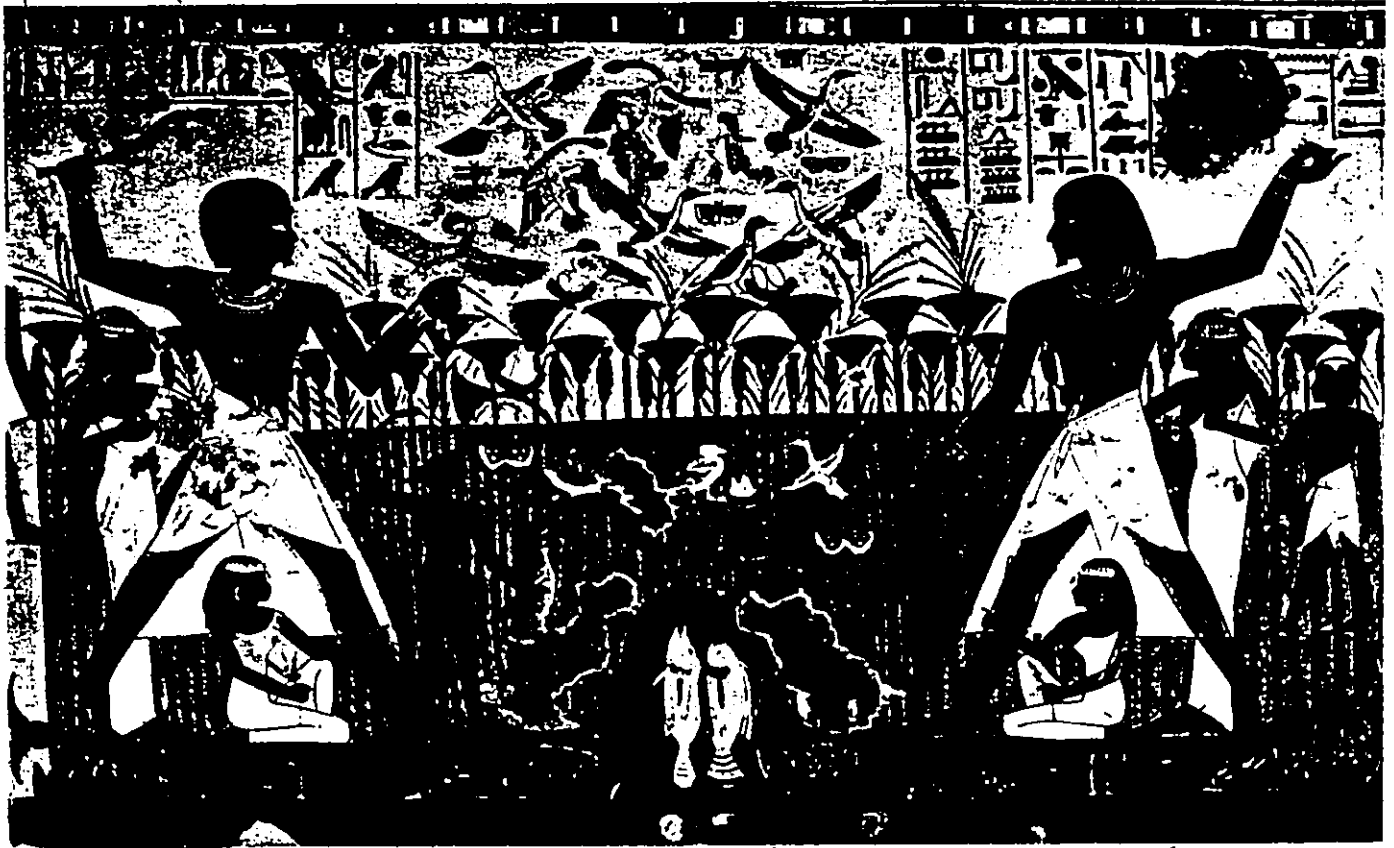


Fig.12. Egyptian: Fowling in the Marshes. Copy of fresco from the tomb of Nakht at Thebes. XVIII Dynasty.

Schematic Drawing: Nativity. From My Childrens' Drawings.



(Figure 12). The space of that art is also the flat, two-dimensional, non-projective space which is now called the Euclidean plane, symbolized in art and consciousness. The spatial arts of the Mediterranean world, the Etruscan frescoes at Tarquinia, the bas-reliefs of Assyria, the wall paintings of Egypt, still recall the mythic consciousness. But shape is now, as in child art, organized systematically in space. Ten centuries before the birth of Euclid, Ancient art directed a consciousness clouded by magic, struggling to give order to space and time, as it underwent a vital transformation. It shared with ancient astronomy the fundamental task of measuring the world, understanding it and so controlling it.

The Ancient artist, and the child, move their concentration from the object itself to the area at their disposal.<sup>61</sup> This area is organized in a way that is mathematical and analytic. Hierarchy of size, found also in child art was, in Ancient art, the first spatial scale. It has a structural correspondence to the scale of values. In child art, the value of size is "intimately associated to a hierarchy of power, strength and importance".<sup>62</sup> This primitive representation of mathematical relations of objects in space is a paradox, an analytic world view based on feeling. It seems that relations of space and time are not, at this level, completely understood. Dörner contends that:

Egyptian representation is not a "picture" in our sense, nor does it have a pictorial frame. It has no relation to space and time; that is, a distance is not yet a spatial abstraction. It is a complex sense experience ... its whole existence is made up of a vital, transformative sensuality.<sup>63</sup>

There are other spatial representations in Ancient art which show a correlation with the Schematic Stage in child art. The base-line is prominent in both art forms. In Ancient art it is ground, the earth,



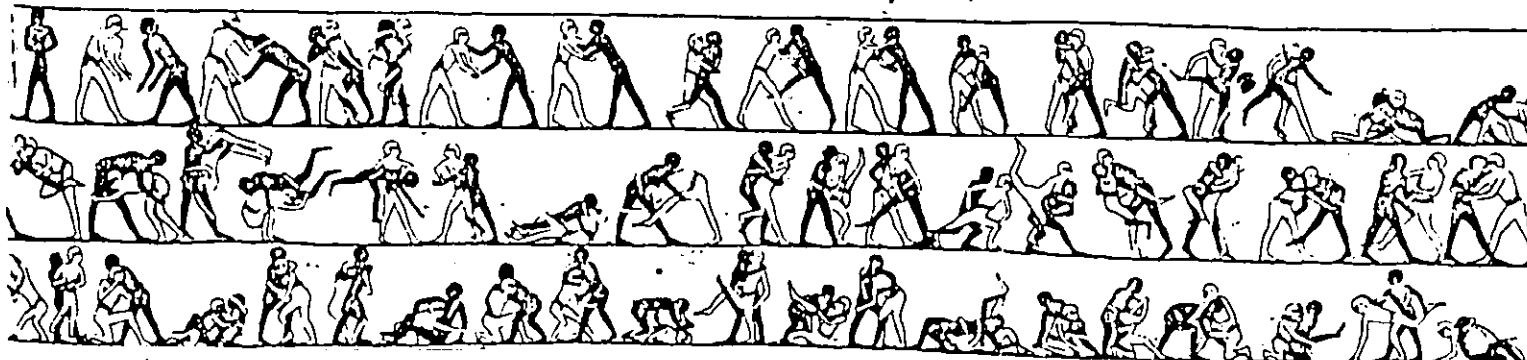


Fig.13. Wrestlers from Tomb 15 at Beni Hasan. Beginning of Middle Kingdom .....

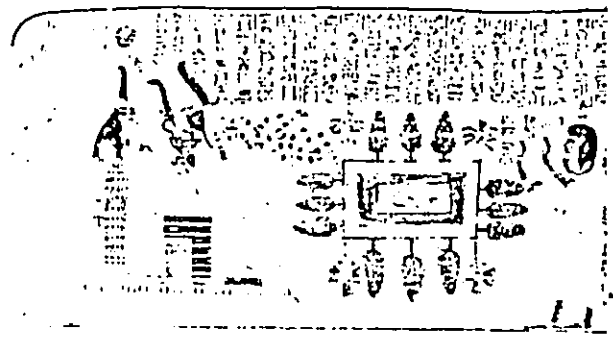


Fig.14. Nakht and His Wife Tuyu Worshipping Osiris and Ma'at. Papyrus, XVIIth Dynasty, British Museum .....

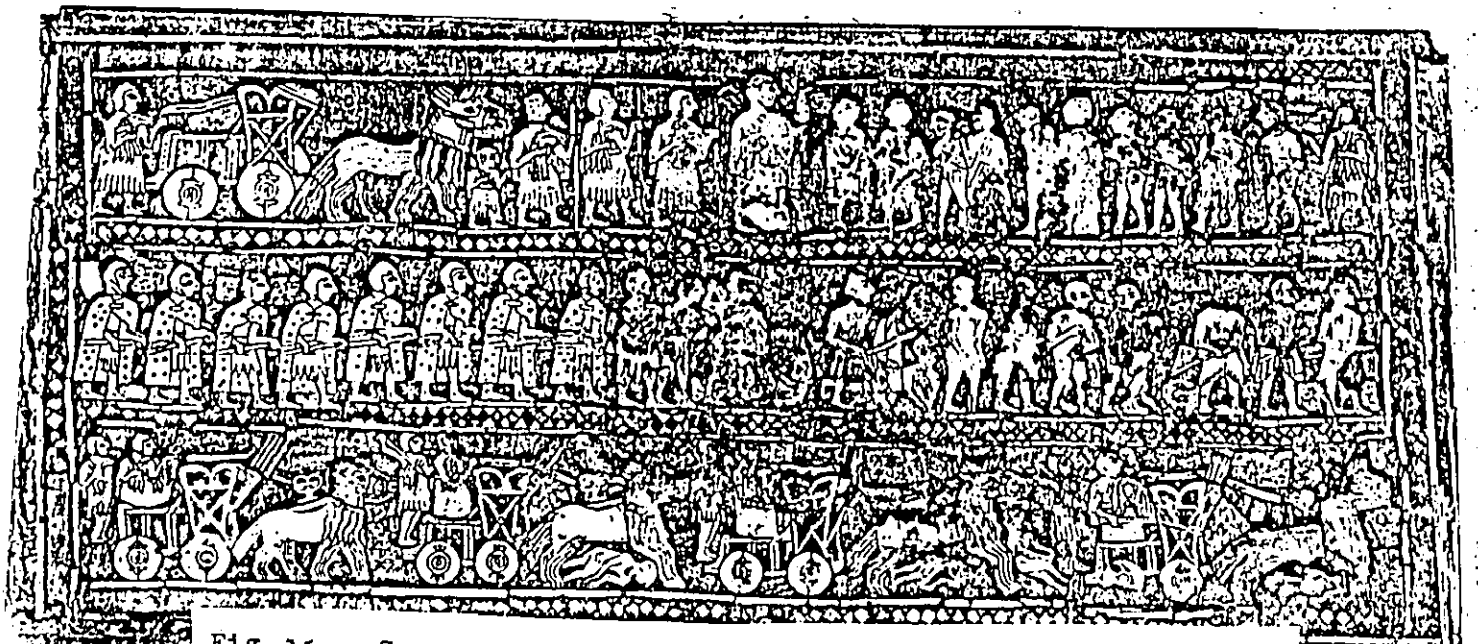


Fig. 15. Scenes of War. Panel from the Standard of Ur, C. 2,700 B.C., British Museum, London .....

the touchstone, which is itself measured as it is used to measure the stars. The repetition of schemata is a visual symbol of the recognition of the plurality of objects in space. It is possible that it represents the intuitive recognition of the rule that no two objects may occupy the same space at the same time. A wall painting from an Egyptian tomb at Beni Hasan shows wrestlers at various moments in a fight following very close upon one another (Figure 13). In this kind of narrative repetition, there is really no way of knowing whether we are seeing one object in many spaces, or an object in one space at different times. The Egyptian mind, according to Dorner "was not able to visualize the immutable extension behind the flux of sense impressions".<sup>64</sup> Nor had it yet come to understand fully the intimate and significant relationship between space and time. The "fold-over" technique, which is such an interesting and characteristic spatial symbol in child art at the Schematic Stage, is common in Ancient art. What we are presented with, in an attempt to deal with projective space, is a kind of abstract projection, rather like a map. In a XVIII Dynasty wall painting of the Pharaoh Nakt and his wife Tuyu, an oblong pool is represented by a kind of bird's eye view, a complete oblong, a diagrammatic expression (Figure 14). This is not as it would normally be perceived when viewer and pool share the same ground plane. These characteristic arrangements of objects in the spatial treatment within Ancient art have been explained as conventions adopted to solve perspective problems. Different conventions are adopted by different societies in response to the same problems. These spatial arrangements are, however, more than just conventions. They are vital indications of space consciousness at a

given time. The indications from Ancient art are that space was understood as two-dimensional, ordered, static, with objects sharing a common ground.

The appearance of the base-line in a child's graphic development indicates the emergence of the Schematic Stage in his graphic evolution, and presents evidence of his first thinking about space.<sup>65</sup> It is a stage rich in representations and significance. It is fruitful not only in terms of the child's own experience and understanding of space, but because it reveals so much about the formation and transformation of human understanding. This is especially so when it is considered in relation to the historical and social aspects of art itself. The child draws a line which represents the ground, or uses the bottom of the paper as this base-line. He draws objects, normally perceived as resting on the ground, along this base-line. This activity indicates knowledge of two things. First, that there is a common ground of spatial experience; second, that there exist common spatial relationships between objects. The child no longer considers objects as unrelated to each other and to the environment as he has in the past. Now he thinks "I am on the ground", 'the car is on the ground', 'Bob is on the ground', 'we are all on the ground'."<sup>66</sup> This unifying idea directs all the objects which the child perceives or imagines, to be arranged on a flat plane, non-projectively. It substitutes system and order for randomness and undifferentiation. The objects in space, recognized and coped with so readily and efficiently at the Pre-Schematic Stage, are now understood as existing in a common environment. Arnheim describes this synthetic process as occurring when the shapes of direct experience (those of the Pre-Schematic Stage), interact with the concept of that same

experience, while consciousness strives to order this process into a formal arrangement. This activity matches itself with the perception of the world in which these shapes move. The child experiences objects (and feels himself) in a world that is flat, surmounted not by limitless space, but by a hemispherical dome.<sup>67</sup> At this point, the child has acquired vital knowledge of space, that it is balanced, stable and unified.

The base-line is used constantly during the Schematic Stage of child art, together with a variety of other, equally interesting spatial characteristics. These include hierarchy of space, "fold-over", multiple views of objects in space, attempts at profile, mixed front and side views and repetition of schemata. The system and symmetry at this stage differ so radically from the much looser organization of the earlier Pre-Schematic Stage that it can only be explained as being the result of an equally radical change in spatial understanding. This new space consciousness is the result of long, arduous perceptual and mental processes by which the child finds order in observed disorder.<sup>68</sup>

The multiple view of objects in space, noted in child art, is also evident in Ancient art. The mixed front and side views of the war chariots in the Sumerian Standard of Ur show the two wheels of the chariot depicted beside one another, instead of behind one another as they would normally show themselves (Figure 15). The passengers are represented beside and not behind one another. In this mosaic, there are also base-lines, and repetition of schemata. The teams of horses, however, are shown with the closer ones overlapping those further away. This overlapping can be found in Egyptian and Assyrian bas-reliefs. Overlapping is not characteristic of child art at the Schematic Stage, but occurs later. What is most.

striking in these paradoxical spatial arrangements is their implicit functional order. As in all Ancient art, system and symmetry are paramount and symbolize space as ordered and unified. This juxtaposition of views in an ordered system is indicative of a space-consciousness at once analytic and subjective.

The multiplicity and variety of spatial representations in Ancient art and in child art reflect the difficulty involved in the transformation of consciousness. The complexity of the selective process through which knowledge is acquired, and the significance of each stage in this process, can be better understood if the correspondence between the two art forms is considered. Ancient art and child art of the Schematic Stage inform one another in the same way that the art of the very young child offers insight into the nature of Primitive art. During the Schematic Stage, the child attempts to leave the world of purely subjective experience. He begins the task of constructing the symbolic forms, of acquiring the knowledge, which will allow him access to the world of reason. We see reflected in his art how the child's mind changes itself, like the still magical mind of pre-Classical man. By virtue of its own activities, that mind "also derived from merely sensory experiences rational concepts".<sup>69</sup>

The significance of these human visual experiences cannot be underestimated. In historical terms, the transformative processes reflected in Ancient art acted as midwife at the birth of the scientific consciousness of the world. They performed the vital functions, those first measurements and orderings of the observed world without which the Greek experience, with all that it signifies for Western civilization and humanity, would have been stillborn.

CHAPTER IV

## CHAPTER IV

### PROJECTIVE SPACE

The evolution of the Greek civilization, and the brilliant expansion of mind with which it was accompanied, marked the emergence of the rational element in human thought. The stunning and hypnotic power of Greek ideas illuminates Western civilization. That civilization is still content to base its art, its architecture, its political and educational systems on some idealized model taken from the Classical world. We still bask in its reflected glory, while emergent cultures aspire to the same conditions.

The emerging scientific-rational consciousness of the world which was the new element in human thought, attempted to organize a world previously experienced in mythical and intuitive terms. The Greeks attempted for the first time to give the categories of existence, space and time, matter and energy, an objective basis. Pythagorean geometry had established a fundamental characteristic of space, that it may be subjected to numerical laws, numbers which bind the universe.<sup>70</sup> The early Greek pre-occupation with the magical aspect of number, its fundamental ordering quality, is manifested in the graceful orderings of its architecture. The temples at Paestum and Segesta are architecture not as interpretations of space, but as a basis for how space must be measured if it is ever to be fully understood. Art historians of the late Nineteenth and the Twentieth centuries

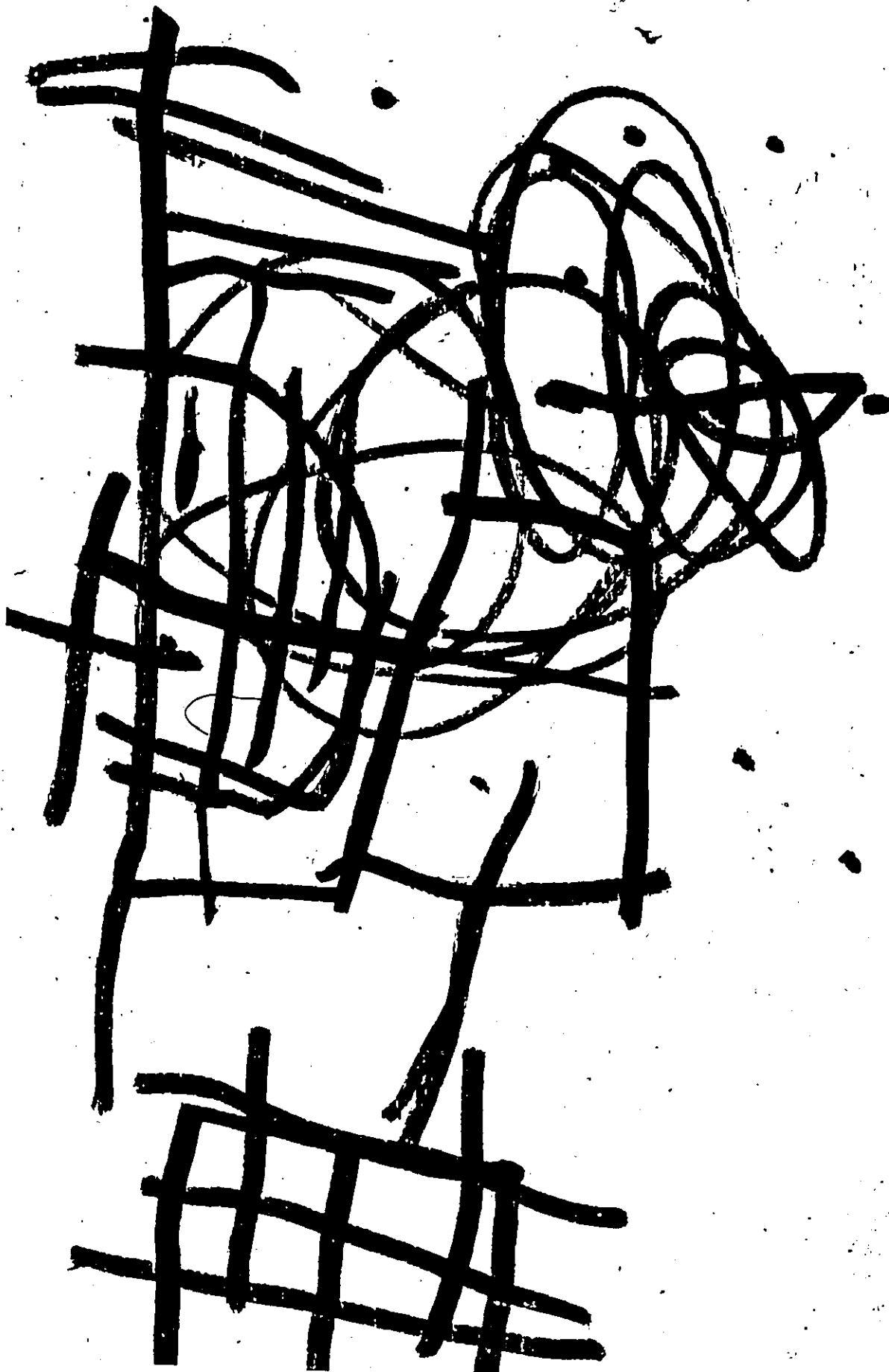


Fig 16. Grid Drawing: Primary Measuring. 3 yrs. 11 x 7½ ins.  
Felt pen .....



have imposed upon the remains of Greek temples an interpretation which corresponds to their own conception of Greek life and art: open, gracious and highly intellectual. Though in their ruins they seem open, these structures are, in fact, monuments without space.<sup>71</sup> They are avenues of pillars which attest to the Pythagorean belief that the gods are in number. It is interesting to note that the young child at the Pre-Schematic Stage seems to re-live this same pre-occupation when he assembles aggregates of geometric shapes, organizing his drawing into straight lines assembled into grids.<sup>72</sup> Long before there is any rational understanding of the mathematical relations in space, there is an intuitive apprehension of these relations expressed in the most primitive terms (Figure 16).

The scientific consciousness of the world, as it emerged from its mythico-religious matrix, attempted for the first time to organize space, or forms in space, in rational, objective terms. The basic condition to objective consideration of the world is that the perceived world be held static in space and time. Ancient art previously reflected this consideration by an intuitive or subjective diagrammatic representation of the space/time experience. While there seems no urge "inherent in human nature to conceive forms or space in three-dimensional terms", the historical periods during which the world view has been most objective were characterized by experiencing the world three-dimensionally.<sup>73</sup>

The Classical Greek method of spatial representation, while it dealt with visual experience in a certain form of perspective, becomes "peculiarly unstable and incoherent" when compared with modern perspective.<sup>74</sup> Examination of Greek painting will reveal that the artist brought space "to our perception by arranging one thing above another, or object behind

object, without ever being able to control the distance. Space is never, as in single-point perspective, a system, but remains an aggregate".<sup>75</sup>

Greek art, even at its most highly developed, described a view of the world, a spatial experience, which remained through and through discontinuous.<sup>76</sup>

These first attempts at the three-dimensional representation of objects in space lacked the co-ordination of Renaissance art. Greek art reflects the presence of many specific ideas about space. These are also observed in the art of Lowenfeld's Pseudo-Naturalistic Stage, and Stage of Adolescent Art. These ideas range from the most basic, topological understanding, to Euclidean notions of up and down, left and right, and to knowledge of the projective relations of near and far, front and behind. Further, more advanced knowledge manifests itself in the representation of the appearance of the volume of objects in space, and awareness of the perspective changes in the size of objects according to their distance from the observer. The feeling about space did not, apparently, necessitate the representation of correct mathematical relations between objects in space. It seems that knowledge of these relations was not yet formed. Complete understanding of these latter relations appears to have as its basis a fuller understanding of that other critical and sophisticated relationship between space and time. The projective spatial symbolization in Greek art is better described as Panofsky describes it, as "quasi-impressionistic", rather than realistic.<sup>77</sup> In a very real way, though, it combines the shape-recognition factor of primitive consciousness with the two-dimensional, intuitively diagrammatic spatial consciousness of the Ancient world. When it is considered in this way, it loses its instability and incoherence, for its space, like the space

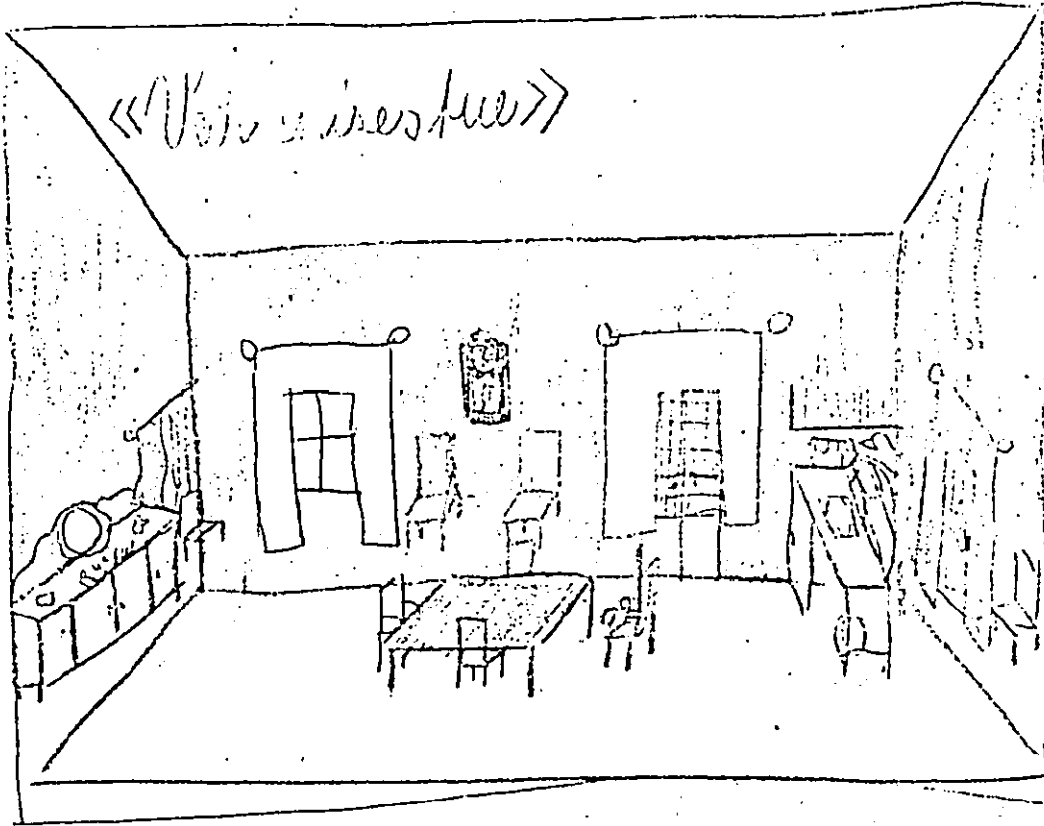


Fig.17. Space-cell Style. Our Drawing Room. 10 yrs.  
22 x 21 cm. ....

of mythic experience, is still bound by feeling and magic, rather than by logical systems.

The "space-cell" style of classical Greek art is an attempt to focus on a moment in space and time.<sup>78</sup> Such moments are points of transition during which a period of objectivization begins. This "intuition of the objective apprehension of the world of sense impressions" is still rooted in the world of myth, and its spatial rendering child-like and magical.<sup>79</sup> Greek artists could no more conceive a completely systematic space than its philosophers could, since the idea of infinity was not yet present. Although its artists seemed incredibly close, during the late period of the Greek civilization, to a symbolic form of mathematically systemized space, their intuitions, like those of Aristarchus with his heliocentric universe, remained essentially unfulfilled.

The culminating stage in the development of Greek art is reflected in the most advanced stage in drawing behaviour possible in the course of the child's innate or untutored graphic development (Figure 17). Betsy Hess-Behrens explains this "space-cell" method of spatial representation as characterized by:

An arrangement of objects in a psychological cube of space, not yet a homogenous whole, in which objects are represented three-dimensionally but lacking the systemization of single-point perspective.<sup>80</sup>

Space, both in Greek art and in the art of the Pseudo-Naturalistic and Adolescent Stages, is filled with inconsistencies and contradictions and a great variety of illusions. Objects which diminish in size as they move away in space, the use of linear perspective in the form of multiple-point perspective, represent a spatial symbolism common to both art forms.

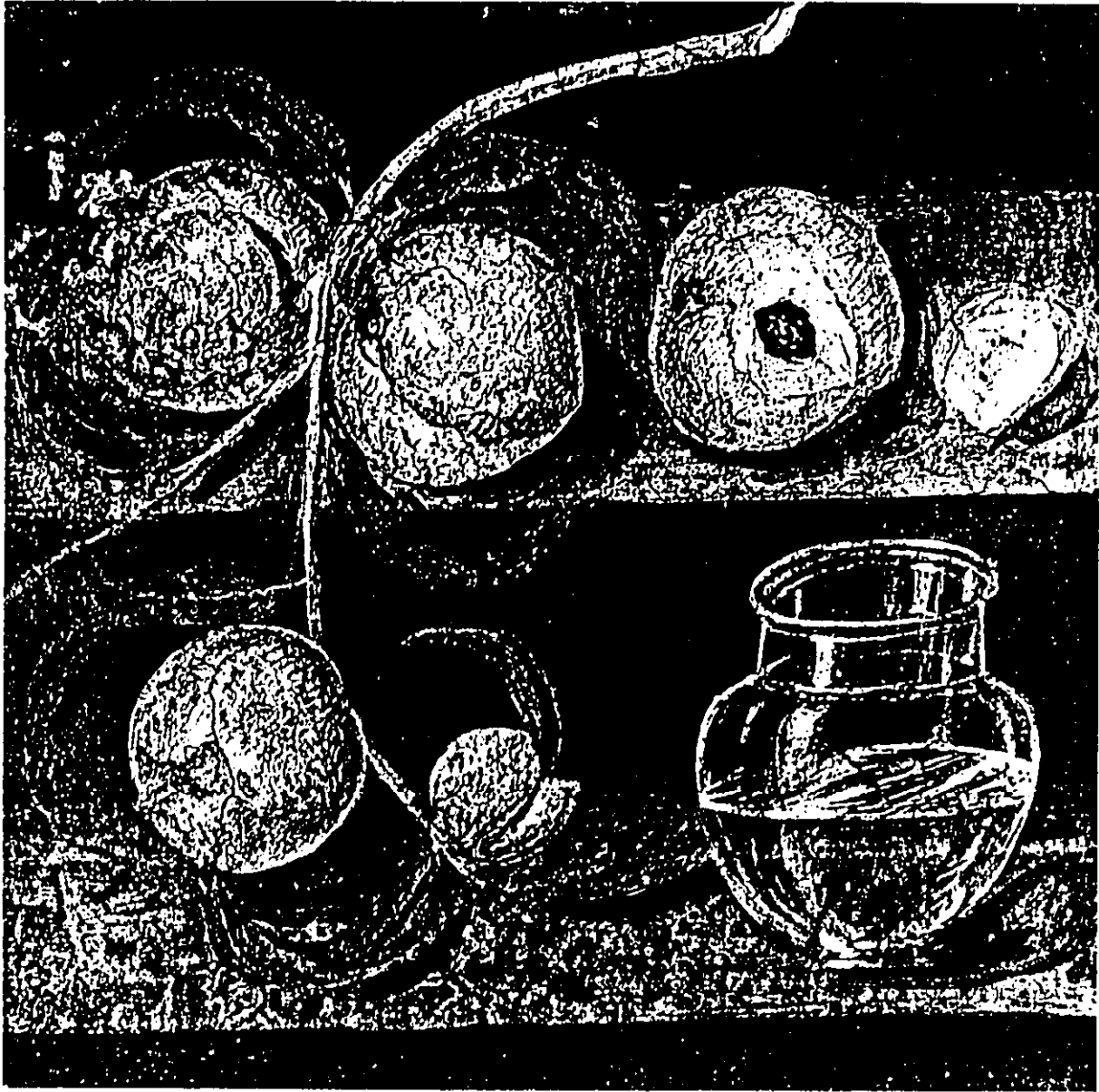


Fig.18. Still Life With Peaches. Wall painting transferred to panel. Herculaneum, C. AD 50, Museo Nazionale, Naples .....

The representation of cubic space in the art done by the children and adolescents, and by the artists, conveys a startling sense of the way they apparently experience and understand space. Each object in this projective space is held as if for analysis of its spatial characteristics - its plasticity, hardness, roundness and its spatial deformations. Each analysis, however, is unrelated to every other within the same visual experience, or the same projective space.

In "Still Life with Peaches", we are left with the impression that this represents an experience of objects in space that is quite different from our own (Figure 18). There is no doubt as to the technical skill of the rendering of the structure, the volume of the objects, the roundness of the peaches, the folding of the leaves, the transparency of the glass and its volume. In spite of this accuracy, the total spatial feeling is one of inconsistency, of unco-ordinated viewpoints and of objects only momentarily at rest. The feeling is one of concurrent stability and instability, of what appears to contemporary sensibilities, spatial paradox. It is unacceptable to assume that mature artists at this, or any other, time did not have the technical or perceptual ability to represent a co-ordinated spatial experience such as we find symbolized in later art forms. We might then conclude that spatial representation in Greek art, and in the child art with which it shares common spatial symbolizations, is not the result of a lack of skill, or of an alien sensory experience, but is a true indicator of a different consciousness of space.

One of the most interesting and significant aspects of the relationship between child art and adult art is that, in the use of spatial representation, a consistent chronological pattern develops during the

early stages of both art forms. When child art meets Classical Greek art, this pattern or correlation breaks down. After the Schematic Stage of child art, corresponding to Ancient art; and before the Pseudo-Naturalistic and Adolescent Stages, sharing common spatial characteristics with Greek art; there appears another stage in the child's graphic development, that of Dawning Realism. This stage corresponds, in terms of its spatial representations, to the historically later post-Classical periods of Mediaeval and Byzantine art.

In order to take into consideration this chronological deviation, it is appropriate to refer to the basic function of art in human experience. We have seen that art is one of a number of symbol systems through which men come to understand the world. When the scientific consciousness first emerged, its strength and dynamism were irresistible. Through it, men began immediately to re-structure the world of the senses, to re-interpret experience, to re-create the symbol systems. But, in doing this, they neglected to integrate fully the mythic consciousness of the world. The first successful integration of the mythic and the rational in Western thought finds its form in a fully developed religious world view which is not encountered in Western civilization until the post-Classical era. The Greek world view, as it may be interpreted through Greek art, attempts to describe the spatial aspect of experience in objective, scientific terms. More precisely, it refers to the correct appearance of individual objects. In later, post-Classical art, it appears that there is a re-assertion of the mythic space consciousness, a non-scientific attitude, which challenges the validity of a purely objective interpretation of the world.

It is not necessary to go further than considering the history of the civilizations of the world at a most superficial level to realize that these civilizations emphasize differing, often diametrically opposed world views, even while existing in the same time period. One devotes itself to science, and neglects morality. Another allows itself to be drawn into metaphysics, neglecting the material world. T.S. Eliot asserts that the evolution of human culture is a dynamic process during which mankind considers many aspects or modes of experience.<sup>81</sup> These are continually being refined, though not always at the same rate. It is a rare culture or civilization which affords equal importance to intellect and feeling, to material and moral welfare. Often, what are represented as crises of thought or consciousness are the result of the fragmentation inherent in this dynamic process, with the lack of integration of states of consciousness.

The creation of the symbols of art takes place within the structure of a civilization. The Classical Greek society's scientific orientation effected an initial separation of thought and feeling. The artistic pre-occupation with three-dimensional representation is a reflection of this orientation. But, while the Classical spatial representation is realistic in a certain sense, it fails to consider the relationship between object and environment. Byzantium, whose concerns were of a more subjective nature, rejected the symbolic forms of three-dimensional experience, or assimilated them into a more unified spatial representation which is based strongly upon feeling and intuition - the attributes of the mythic consciousness. This spatial rendering corresponds to that of child art of the Stage of Dawning Realism.



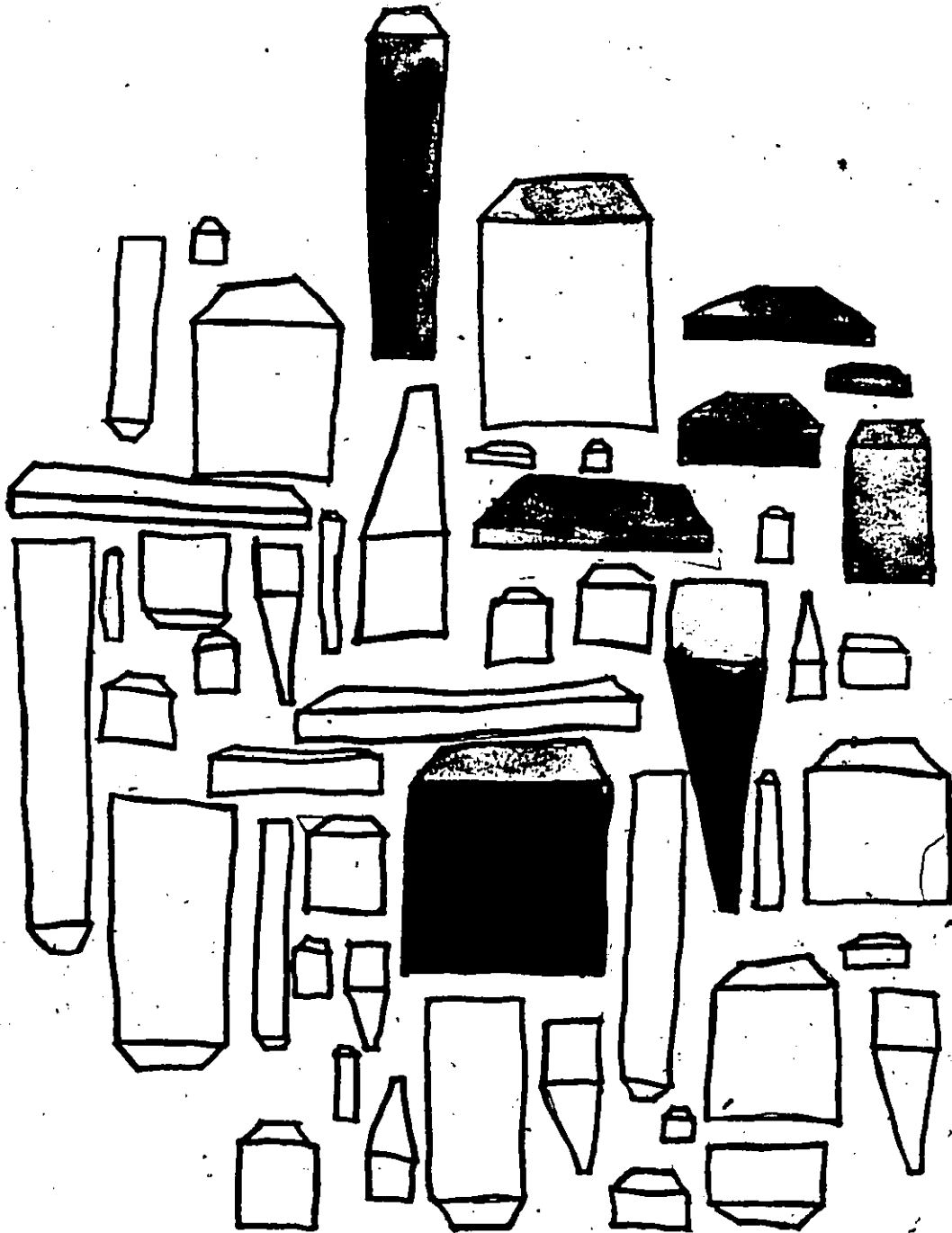


Fig. 19. Adolescent Art: A tool to be used in the construction of a more scientific, objective world. 13 yrs. 12 x 18 ins. Felt pen and water colour .....

The child's graphic development reflects an evolving spatial understanding which appears not to effect a separation of the subjective and objective, of feeling and intellect. Apparently it is only when the child has considered the relationship of object to environment (during the Stage of Dawning Realism) that he begins to concern himself with the plastic qualities of the object itself. Whether this is because his consciousness of space evolves in a more direct, possibly more efficient manner is a question which is too complex to answer here. The problems raised by the forms of art deal with the very essence of the nature of the acquisition of knowledge, and of the meanings which are attached to the symbols of art. It is these symbols, laden with complexity and meaning, which hold the answers to the questions they themselves raise.

The adolescent, whose graphic development has moved through the Pseudo-Naturalistic to the final Adolescent Stage, uses his art as a tool to construct a more objective, scientific space and world (Figure 19). This implies, in contemporary terms, a mature, adult understanding. In the child's striving to imitate the forms of adult art, we sense the value of this understanding to him. The adolescent's maturing awareness of spatial relations, his efforts to reconstruct his experience in objective terms, his frustrations and his failures might be considered as analogous to the Greek experience. Like the Greeks, the adolescent exists in a world and a space which is, in spite of its rational content, imbued with feeling. Like them, he strives to build a logical and systemized environment within which he might find himself, and his maturity.

CHAPTER V

## CHAPTER V

### THE SPACE OF THE IMAGINATION

The spatial renderings of Byzantine and Mediaeval art, in comparison with the naturalistic, three-dimensional renderings of the earlier, Classical period, seem stylized and unrealistic. They appear to have more in common with the art forms of the pre-Classical world, the two-dimensional representations of Ancient art. While there are references to three-dimensional forms, the total impression is of a planar, rather than a projective, understanding of space. A kind of lip service is paid to Classical art in the treatment of the draperies, in the ubiquitous Greek robes, and in the stylized references to modelling of form. However, the whole idea of matching against appearances, which is central to Classical art, appears to have been put aside. It is as if a more primitive method of spatial organization and understanding had re-asserted itself, denoting a mythical orientation to the world.

The understanding of space during a specific period cannot be separated from the existing zeitgeist. Primitive art reflected the hunter's pre-occupations; Ancient art, those of an agricultural civilization. Classical art assumed an objective orientation towards the world. In spite of the magical feeling which accompanied these art forms, they all dealt, fundamentally, with direct sensory experience in the world. The whole post-Classical world lived by a different set of connections.<sup>82</sup> Christian Europe was pre-occupied with the inner self in relation to God and the world.

Its artists dealt with the expressive aspects of space felt as much as with space seen, with a metaphysical as well as a physical world. The Mediaeval representation of space attempts to interpret a profoundly religious experience of "reposing in the shell of the Empyrean, of the divine, super-essential light".<sup>83</sup>

How is it possible to construct a world which is closed to sensory experience yet real in terms of belief? For all practical purposes, this space is immeasurable, like the wisdom and power of its creator; it is imaginary and purely subjective. At the centre of this changing attitude to the world of experience there is a paradox. Whatever his metaphysical pre-occupations, man must understand space first in physical terms. This is his human birthright which he may never forego. Whatever heavenly city he, his artists and his theologians may wish to construct, it is irrevocably modelled against the image on the retina, the feel of the earth, the shape of the thing. The great Mediaeval cathedrals symbolize perfectly man's "super-sensuous, mystic feeling" of space.<sup>84</sup> But this feeling, like those buildings, must take into account the physical laws which rule all human activity in the world.

This post-Classical experience of the world is concerned with the assimilation or integration of two forms of consciousness, and with the resolution of a paradox. The evolving scientific consciousness must be integrated with the powerful and essential mythic consciousness of the world; and the space of the imagination must be given form.

Jean Piaget, dealing with the child's evolving spatial conceptions, makes the significant observation that "to extend space beyond the confines of the perceptual field is the task of the imagination".<sup>85</sup>



Fig20. Dawning Realism. Halloween. 10 yrs. 8 x 11 ins.  
Felt pen .....

While it was his intention to deal with the mind of the child from a purely psychological point of view, this observation carries a more profound meaning. Post-Classical man, like the child, found himself in a position of having to extend the space of his experience beyond the confines of that perceptual field which had, until then, defined it.

In the spatial representations of the art of children at the Stage of Dawning Realism, there are phenomena which correspond to the spatial representations of Byzantine and Mediaeval art. In the child's art, the base-line is raised to form a horizon line. There are often multiple base-lines upon which objects, most often rendered two-dimensionally and frequently overlapping, rest (Figure 20). There is no longer just a line to represent the sky, but the whole sky area is filled, down to the horizon. The space in both child art and in post-Classical art is no longer empty but filled. That environment which was non-existent in earlier art forms, and which was defined in Classical art only by the objects in it, is given symbolic form in the blue of the child's sky, as it was in the golden domes of the Byzantine mosaics (Figure 21). This filling of space implies a different spatial understanding, one which can only be arrived at through purely imaginary means. The consistent use of overlapping, the massing of objects one behind another, indicates that space is understood as existing between objects and joining them. It is an imaginative and subjective representation of the spatial relations in projective space. In a very real sense, any other space apart from that which is perceived at a given time exists by virtue of the imagination, not by virtue of perception. This space between two objects, one of which overlaps the other, is given form through an act of the imagination. This knowledge is based upon the

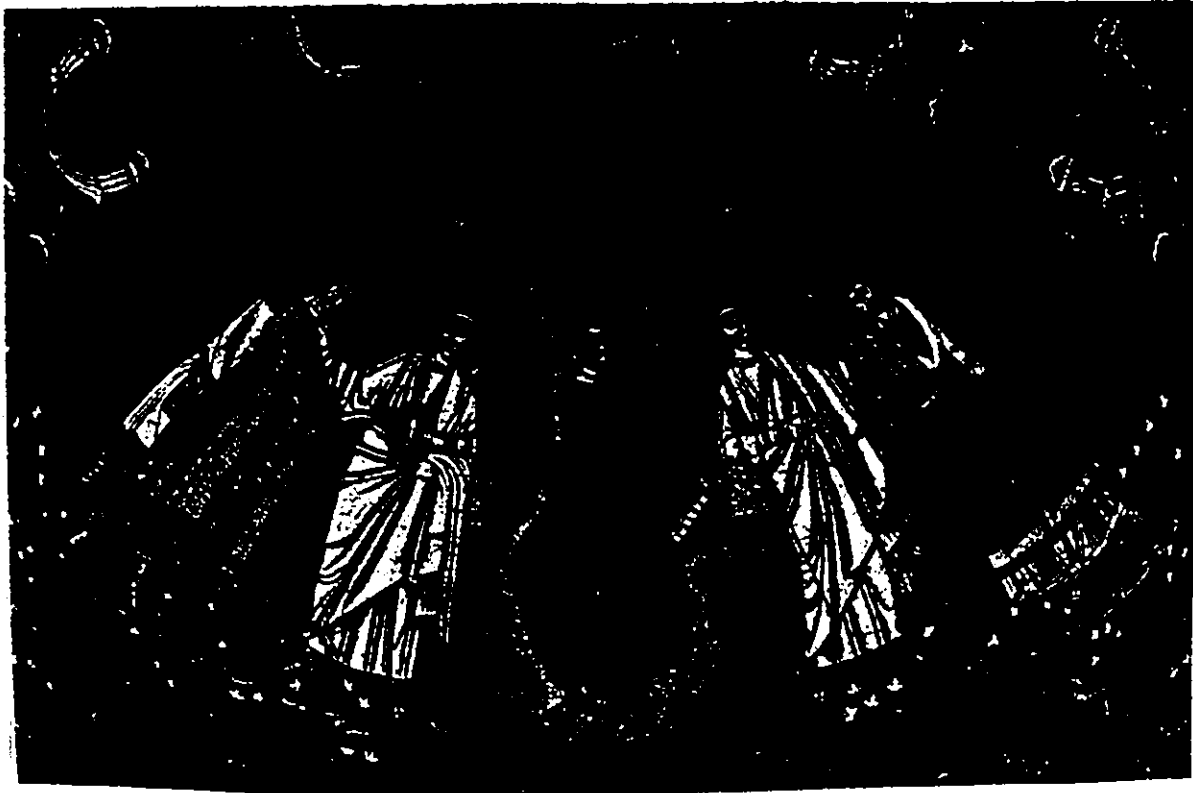


Fig21. Byzantine: Christ Between the Angels and Saints.  
Apse Mosaic, San Vitale. Imaginary Space .....



child's and the man's, experience in the world. It results in space understood as tangible and uniform, though still subjective.

In child art at the Stage of Dawning Realism, and in post-Classical art, the projective aspect of space does not include the realistic rendering of the volume of objects in space such as we have seen in Classical art. The representation of cubic space tends to structure the object in the context of divergent perspective. This kind of perspective is an elementary device which allows the draughtsman to reveal those sides of the object which are hidden from view.<sup>86</sup> It is an imaginative representation found in Byzantine and Mediaeval art, and is common in child art.<sup>87</sup> This imaginative and subjective spatial rendering does not incline the eye to move backward in space, nor does it correctly reveal the mathematical relations between objects in space. The plane is still the stronger spatial pre-occupation.

Irwin Panofsky agrees that Byzantine art concerns itself with the reduction of space to a flat surface, in a certain sense as it was in Ancient art. However, there is a difference, in that this space "becomes a uniform or uniforming fluid without measure or dimensions ... a world of bodies in space, though everywhere referred to a plane".<sup>88</sup> Panofsky goes on to contend that this pre-occupation with the plane is essential to the later discovery of Renaissance perspective. It is not space "to be looked through, but to be filled".<sup>89</sup> When these spatial pre-occupations are considered in practical terms, the elegant logic of the process of the evolution of space consciousness reveals itself. In order to measure correctly the relationships between objects in space, that space must be known to exist and must be correctly understood. It may itself be first conceived without measure or dimension, but it must be presented to the mind. The accomplishment of

post-Classical art, and of child art at the Stage of Dawning Realism, is this imaginative reconstruction of the tangible aspect of space. It is only necessary to compare two examples of children's art, one from the earlier Schematic Stage, and one from the Stage of Dawning Realism to realize that implicit in the evolution of the symbols of space is the evolution of an expanded concept of space.

The post-Classical world could not reject all past experience of space. Hierarchy of size, that most expressive and subjective symbol of measurement, recurred, together with repetition of schemata. The reappearance of these symbolic means cannot be considered merely a regression, nor even a copy of previous techniques. It seems more likely that they are highly efficient means of interpreting spatial values in their numerical context, at the level of feeling. It is interesting to note that the child, when he reaches the Stage of Dawning Realism, no longer employs the hierarchical symbol, despite many other commonly held spatial representations. This seems to be another indication of the direct and possibly more efficient manner in which the child's spatial understanding develops. Having mastered a symbolic form of understanding, he does not refer to it again. This efficiency does not disguise the difficulty that the child has in dealing with spatial correlations. These difficulties are "a result of a more ego-centric attitude".<sup>90</sup> Each object that the child puts into the space of his picture is seen from his immediate point of view, as if it were level with his vision, or as if he were viewing it from slightly above. There is that same pre-occupation with the self vis-a-vis the world which characterizes the life and art of Christian Europe, an art "without solid bodies or



22. "The Surface of a Common Experience", Justinian and Maximianus detail. Apse Mosaic, San Vitale .....

cast shadows, with blank, golden spaces, with the perspective of Paradise, which is nowhere and everywhere".<sup>91</sup>

Increasing naturalism in art does not automatically imply a progressive understanding of space.<sup>92</sup> Nor, indeed, is there in "the space of immediate perception, any strict uniformity of places and directions".<sup>93</sup> The activity of art in response to the latter, during the post-Classical period with which we are dealing, was to provide the expressive and subjective symbolic form of unifying space. This had little reference to the earlier, more rational, realistic or naturalistic experience of objects in discontinuous space. After such rational experience, art added a further dimension of understanding, an intuition of things related to one another and the viewer. The symbols, shared with child art, are of objects massed in space, in rows, overlapping. These are objects related, in physical contact on a plane, as though on the surface of a common experience (Figure 22). As the consciousness of space evolved, objects once more began to project themselves into space, each with its own perspective, in its personal space which it shared with the viewer. Combined in a dreamlike unity, these forms awaited the command of mind which would allow them to partake in yet another transformative experience. Static, but charged with energy, they waited to bring themselves, and man, into another space, and another time.

CHAPTER VI

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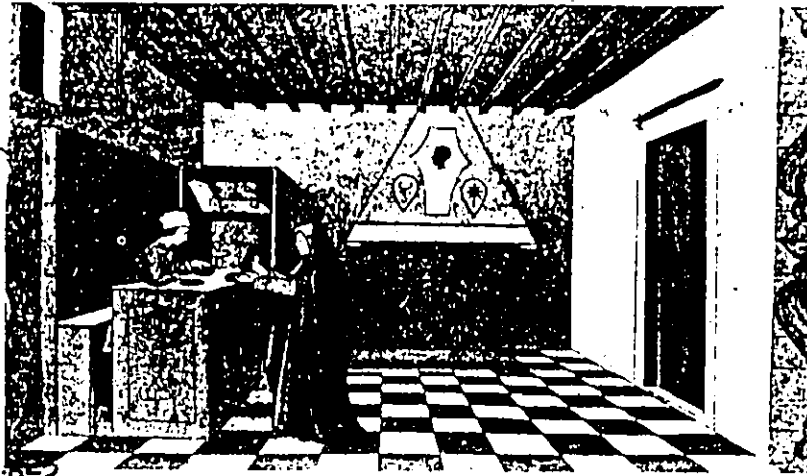


Fig. 23. Detail from The Profanation of the Host. Paolo Uccello, Galleria Nazionale delle Marche, Urbino ....

## CHAPTER VI

### INFINITY

When the young child asks "What is outside the sky?", his question reveals that he conceives space as a tangible, enfolding entity, not infinite, as adults conceive it. The child's words indicate that there are indeed in his mind echoes of prior states of consciousness, and we hear again the music of the spheres.

Of course there really are no star-studded spheres. In place of that metaphor of crystalline order, there is another, more rational concept to describe the structure of space. The rational idea of an infinite, changeless, homogenous space is a legacy from the Renaissance, which still determines the way in which Western man conceives space.<sup>94</sup> This concept of space finds its most potent symbolic form in Renaissance single-point perspective (Figure 23).

Copernicus is credited with having instigated the change in the Western idea of the structure of the universe. With a prodigious leap of the imagination which allowed him "to place himself wildly and speculatively in the sun", he re-arranged space.<sup>95</sup> But, before the imaginative insight, before the orbital calculations and the measurements of trajectories, Leonardo da Vinci scribbled in his notebook, "The sun does not move".

It is almost impossible to imagine the amount of work involved in this expansion of consciousness that so altered man's conception of space.



Fig. 24. The Dead Christ. Andrea Mantegna, C. 1490. Breia,  
Milan .....



In direct opposition to a subjective, magico-religious, earth-centered space, there was brought into existence an ordered, measurable and rational universe. An objective, scientific experience of the world was finally substituted for one grounded in myth and magic. The result of this objectivization was the replacement of the psychophysiological space of pre-Renaissance experience by mathematical space, firmly based in an "infinite yet measurable reality".<sup>96</sup>

Contemporary spatial understanding remains essentially that constructed during the Renaissance. Visual experience under ordinary circumstances is determined by Euclidean and projective geometrical relations. The appearance of objects changing in size according to their arrangement in space is accepted as normal. Feelings about space reflect this visual experience and this new knowledge; sky extending limitlessly, earth revolving predictably around the sun. The three-dimensional experience is all-pervasive, substantiating the conception of the universe as arranged in static order. This space becomes "a scaffolding within which the most violent change is enclosed, measurable and uniform".<sup>97</sup> Geometrically determined, objects and the space between them are, as in the great works of Renaissance art, unified.

The spatial representation in Renaissance art is so close to contemporary experience of the world, its symbols match so perfectly the Euclidean and Newtonian interpretations of nature still generally accepted, that Western man accepts these symbols as being totally realistic, corresponding totally to experience (Figure 24). Single-point perspective, the idea of infinity, the mathematical ordering built through so much effort on so valuable an intuition, still supports a space consciousness

barely changed since the Fifteenth century, a real feeling of man at the centre of the universe.

There is some disagreement as to the truly objective quality of Renaissance art. It has been criticized as being a potent artistic illusion and a "slavish imitation".<sup>98</sup> Ehrenzweig holds that it is a highly subjective art, fixing an object for one viewer in a moment of space and time.<sup>99</sup> In "The Transformative Vision", José Arguelles points out that "single-point perspective is one of the most powerful means of image fixing yet to be conceived.... (which) gave to European man the leverage to fix the world according to his will".<sup>100</sup> It should not be forgotten that, in spite of its power and pervasiveness, this symbol remains only one effort among many by a culture to come to terms with a changing universe.<sup>101</sup> This symbolic space, however, still determines and reflects current consciousness of space and the universe. Objective or not, the spatial illusion with which the Europe of the Renaissance was presented has become the space in which we live.

Historical familiarity with the Renaissance experience allows a clearer understanding of how space is transformed and understood. In this process, Panofsky indicates, "the 'aesthetic space' and the 'theoretic' space of our perceptions are transformed by one and the same experience, which in the one case appears symbolized to sense, and on the other, as a concept of reason".<sup>102</sup> Herbert Read contends that the Renaissance was pre-occupied with the intellectual content of experience, with techniques of representing external reality and the exclusion of subjective experience in art. This pre-occupation has led to confusion which has frustrated Western art for centuries.<sup>103</sup> More than this, it has, as Arguelles points out, encouraged

the analytical bias of a technologically oriented European society.<sup>104</sup>

Single-point perspective is a mechanistic, rationalistic way of measuring space, the "sword of techne, by which psyche is subdued".<sup>105</sup>

The whole question of the separation of intellect and feeling, which is rooted in the Renaissance, parallels the art experience of the child. Children are unable to draw in single-point perspective unless taught to do so.<sup>106</sup> At the age of adolescence, a child undergoes what could be called a personal renaissance, which involves a real and active attempt to investigate the laws of nature, rather than accepting without question rote learning and social conventions. However, while their drawings at this time show:

Divergent cultural space styles, conscious abstraction and the emergence of unique philosophical discussions. ... true understanding and use of the vanishing point, with the concept of infinity, apparently never arises spontaneously out of the child's drawing development, but must be taught when the child is ready to understand the formal rules of perspective rendering.<sup>107</sup>

Between the ages of nine and eleven, the child's visual symbolization becomes more naturalistic than ever before, because the child's concept of spatial relations is more accurate than it has ever been.<sup>108</sup> There seem to be innate mechanisms which allow the child to move through several prior spatial representations which describe, reflect or parallel his general concept of space. Apparently, these mechanisms stop short of allowing him to symbolize a space consciousness which corresponds to the one found in Western society at large, in a manner in which that society has designated as accurate and desirable. At this point, the society must provide the training for the acquisition of a specific skill to create a specific symbol which reflects a co-ordinated, three-dimensional space experience.

Children in Western cultures do attempt perspective drawing, matching their skills against examples of adult art. These attempts, however, generally correspond to a period of regression during which the child either stops drawing or draws in a more primitive manner.<sup>109</sup>

We have seen how spatial symbols are determined and constructed within the limitations of a culture. This symbol for infinity, so beloved of Western society, was born out of a desire to construct a realistic or naturalistic art, to match form against an external reality, to hold the world once more static in space and time. Renaissance perspective does more than this. It "creates a visual field in which 'single vision' becomes fixed in space distinct from the flow of time, so that one visual event follows another in linear sequence. It is this sequentiality, of course, that is the basis of mechanization".<sup>110</sup> Symbols themselves play critical roles in the transmission of a culture.<sup>111</sup> They assume their true meaning only within the context of that culture. Spatial symbols that appear realistic to members of Western cultures will seem extremely arbitrary and quite unrealistic to people of other cultures. Certain primitive people are unable to accept as realistic, conventional Western symbols for the naturalistic rendering of objects in space.<sup>112</sup>

Single-point perspective occupies a rather unusual position among spatial representations in art. Other cultures react to it negatively; for primitive people it has no meaning. It does not appear to be an integral component of the child's artistic vocabulary, and yet it is greatly admired by both children and adults. Finally, at an age when the child would be able to deal with this symbol, and integrate it into his

artistic means, he often ceases to make art altogether. Such ambivalences demand explanation.

The first possibility that occurs is that Renaissance spatial representation is not an artistic symbol, but should more properly be categorized within the symbolic forms of science and discursive language. It is not a sensuous symbol for, but an intellectual description of, space. Like other scientific symbol systems - algebra, geometry - it must be taught by the culture when the child's ability allows. Its responsibility is not primarily to the world of myth and feeling, but to that of logic and science. Conversely, the difficulty that the child has in regard to the ability to integrate this symbol into his artistic vocabulary may be one which is founded in contemporary attitudes to art and artistic activity, which are more often judged to be unconcerned with rationality and intellect. This is especially true in the area of art education, which often rejects, as somehow detrimental to creativity, rational or taught aspects of experience. Maynard Gunter, in a study which deals with Suzanne Langer's explanation of the nature of art, as it applies to art education, points out that in a studio art class, an adolescent with newly developing mental skills, powers of generalization and abstract reasoning "is expected to perform almost exclusively in the particularized, concrete level of his grade school days which in high school he has newly outgrown".<sup>113</sup> Mary Rouse is more specific when she discusses sequence and structuring in art education, pointing out that students entering high school are often:

Forced to sample a bit of this media and a bit of that, rarely being allowed to go into anything with any depth or seriousness ... Dabbling with "unimportant" things may well seem childish and embarrassing, like playing with dolls.<sup>114</sup>

While there is no doubt that activity in the particular mode of art seems in direct opposition to much of the adolescent's school work, the experiences of art and science indicate that the "scientific" mode and the "artistic" mode are not necessarily incompatible. The field of art education is one in which these modes might truly come together, as they did in the Renaissance. If children wish to match their art against the appearance of the world, or against the symbols they admire in the work of adult artists, they should not be discouraged. Rather, their art experience should be constructed in such a way as to give them the chance they deserve to develop fully all the relationships which exist in the space in which they live. Included in these relationships is the one which so pre-occupied the Renaissance, the relationship between the individual and the universe.

The Renaissance was one of the two periods in the course of Western art during which the perspective view of space has been dominant. These two periods have been characterized by a driving desire to integrate man more fully into nature and the world, and their symbolic forms must be understood in this context. In Greece, art and science ended the hegemony of the gods over men; in the Europe of the Renaissance, they took part in an effort to afford man his rightful place in the world.<sup>115</sup> They were periods of such astounding creativity that they did something more profound than changing religious or social systems. These explosions of creativity profoundly changed man's concept of space and the universe.

CHAPTER VII

## CHAPTER VII

### THE SPACE/TIME CONTINUUM

It is now one hundred and fifty years since the axioms of Euclid were proved to be neither self-evident nor necessarily exact. The "well-mannered space" of our understanding, challenged by relativity theory, assumes dimensions more complex than were ever imagined.<sup>116</sup> Neither vision nor mechanical devices will allow perception of this space, centered in the nucleus of the atom, and limited only by the edge of the universe. The old ideas of up and down, and the geometry of the plane, have no value in a space capsule.<sup>117</sup> Here and there, front and behind and the plasticity of the object have no meaning in a world of sub-atomic particles, where it cannot be known for certain where matter is at any given moment, and where space and time combine into another dimension.

The process by which space is understood had, until the Renaissance, relied upon the senses of sight and touch, and upon movement. Two inventions, the telescope and the microscope, extended the limits of purely visual perception. These devices support the idea that the nature of space, and the objects in it, is fully revealed to those who can hold it fast, and examine its parts in the greatest detail. The telescope, supported by Newtonian physics, sustained a concept of material and spatial unity, while the microscope underlined the particularity of matter. This classical point of view exaggerates the importance of visual perception, and the





Fig. 25. Self-Portrait. Rembrandt Van Rijn, C. 1660. National  
Gallery of Art, Washington, D.C. ....

appearance of the world, and the role of intellect in spatial understanding, at the expense of intuition, and the more primitive, but equally important, sense of touch and motion.

As a knowledge base, this standardized or mechanized process of visions has severe limitations.<sup>118</sup> It focuses the mind upon the object and, like single-point perspective, insists finally upon the single point of view, specialization, fragmentation, single time, single space and finally, alienation. The savage reaction of the Renaissance cognoscenti to Galileo, the telescope's inventor, is symptomatic of the dismay with which this coming fragmentation, and the expansion of the technological society, was regarded. Although Galileo's invention was overtly suspect, because its application threatened the power structure of Christian Europe, it seemed also to provoke an intuitive realization of the difficulties inherent in a dependence upon a purely visual experience as a way of arriving at a true understanding of space.

The spatial values of the Sixteenth and Seventeenth centuries seemed very close to those of the Renaissance, although there were early indications that reveal intuitions of a new kind of space, slightly different in dimensions, less rational, more imaginative and mystical (Figure 25). Roger Fry describes Rembrandt's paintings as depicting "a spaceless world of psychological entities (together with) the apprehension of spatial relations".<sup>119</sup>

The visual arts struggled to divest themselves of the structures of space and time which were so deeply imbedded in human consciousness, still so closely related to scientific descriptions of the world. Even those painters whose work seems so intuitive and expressive, such as

Turner, were pre-occupied with the structure of this great space. The energy and tension of Turner's work demonstrates his pre-occupation with the appearance of natural phenomena.

Space, defined visually and subject to the laws of optics, expanded from a sub-microscopic world to a visible star, a universe of suns and planets held in formal order, open to direct observation to anyone. Descartes laid claim to a rationalistic world view, and Newton revealed the lawful, mechanical basis of this universe. In daily life, the infinite, measurable Renaissance space concept described experience. Predicting and reflecting Newtonian and Euclidean systems, artists had arrived at an interpretation of space so definitive as to appear unshakeable and unchangeable.

Investigation of spatial representations in art reveals the presence of a consistent and common factor - change. Space is represented, understood upon the basis of this representation but, inevitably, the symbols change. The different methods of spatial representation in art, and their reflections in individual graphic development, and indeed the structures of science, are all part of a dynamic process which "prepares the soil for the great synthesis from which our mental creation, our unified vision of the cosmos, springs".<sup>120</sup> Art, as it evolves, seems to contradict the very concept of space which it helps to form. No sooner is one aspect of space revealed, than another transformation begins.

During the period since the Renaissance, Western art has emerged as a free collaborator in the process by which man understands the world. Katherine Gilbert observes that historically, art was first bound to a pre-aesthetic existence, submerged in a religious, mythical and biological

matrix, "it led for centuries a servile life. First as a servant of things, when it is interpreted as imitation, and second, as a servant of reason, when it is interpreted as analogue".<sup>121</sup> Modern art is no longer tied to tasks of analogy and imitation, and the profusion of its symbols predicts a new kind of space, the evolution of a new kind of concept. Examination of the transformative processes of spatial understanding, as they are revealed in art, has shown that the appropriation of new concepts is neither instantaneous nor, necessarily, easy. The unsophisticated visitor to an exhibition of modern art reacts nervously, "I don't understand it". More sophisticated viewers have often to depend upon an intermediary to reveal the meaning of new works of art. Among modern art forms, realistic styles are received with an understanding which is not evoked by abstract or non-objective work. It seems almost unbelievable that Renaissance art, and single-point perspective, were received with as much dismay and disbelief as any ambiguous or non-realistic art form.

In art, as in science, classical and neo-classical interpretations of the world are no longer valid. The supposedly self-evident axioms of Euclid, the unshakeable laws of Newtonian mechanics, and the harmonious inner structure of Renaissance art cannot describe the inter-galactic space of a new civilization. Marshall McLuhan, concerned with radical changes which characterize contemporary existence, observes that artists have:

The power to probe and explore new environments even when most people are uneasy and unhappy about them. Theirs is not so much the power to foresee as the readiness to recognize that which is immediately present.<sup>122</sup>

It was the expressive line and the intuition of Romanticism which developed a new autonomous form, and began to describe a new kind of

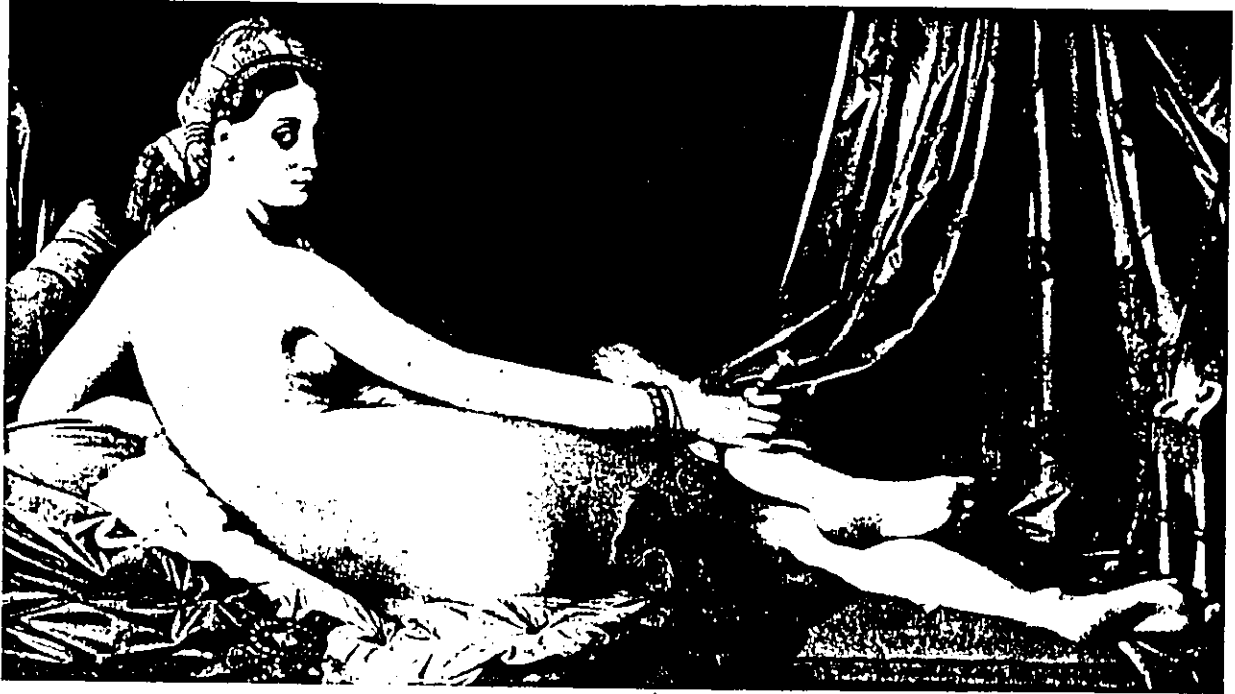


Fig. 26. Free Curve. Grande Odalisque. Jean-Auguste-Dominique Ingres, 1814, Louvre, Paris .....

space. Alexander Dorner claims that the Romantic inventive power aimed at the destruction of perspective space. Its spatial values are not valid in terms of perspectival reality:

But of shapes which hover within the spatial frame. (In Romantic art) there is a dynamism which resulted from the tension between the old perspective reality and a new stylistic reality of the hieroglyph (free curve), (Figure 26). It resulted from a distortion of space and its symbols ... which led ... logically to a pictorial type without spatial depth which seems close to magic art and also, the same thing for all practical purposes, the art of children ... what primitive man in his flat thinking had already dimly divined, the tremendous creative energy of the world, now returns in a deeper form ... a much vaster conception of a wholly self-changing world of pure energies.<sup>123</sup>

Art attempts to interpret this space, no longer neutral and analogous to experience. Beginning with Manet, art conveys a sense of space as manipulatable; Seurat and the Impressionists represent its tangibility, filled with matter in its other form, radiant energy.

We are, as McLuhan points out, the primitives of a new civilization.<sup>124</sup> While men dream in child-like sleep of an illusion of spatial order, the intuitions of art and of science reveal the structure of a new space, a space of pure imagination. The aesthetic vitality, "the unique philosophical solutions, the psychic and expressive space" which help form the necessary new space concept are found in the art work of adolescents, as well as in that of mature artists.<sup>125</sup> This activity is not bound to the experiences and representations of the past, but searches for a basis for understanding the immediate present, which is the space of the future.

Suzanne Langer observes that new conceptual forms are crowding out the old ideas which served as a basis for man's understanding of the world. These new forms are themselves in the mythical phase, the 'implicit' stage of symbol formation".<sup>126</sup> Modern art movements have as



Fig. 27. Sunday Afternoon on the Island of La Grande Jatte.  
Georges Seurat, 1884-86. Art Institute of Chicago.

a common denominator the desire to represent a new space concept.<sup>127</sup> The artists who comprise these movements have set out upon a journey through space and time, during which they are re-exploring the mythic bases of art, often creating child-like or primitive representations of space.

The first step on this journey was the rejection of the intellectual and unified space of Renaissance art. Seurat's divisionist technique makes each dot of colour a separate light source. This device reverses traditional perspective, and makes the viewer the vanishing point. By "pushing visual modes to their most extreme, Seurat returned to the most ancient forms of space and time, the paratactic Egyptian image".<sup>128</sup> Seurat's paintings have the static spatial feeling of the first analytic child art, the formal rigidity of the Schematic Stage of graphic development (Figure 27). It would be highly inaccurate, however, to describe this intuitive interpretation of space as a regression to previous art forms. Where the space of the child and the Egyptian artist have no real substance, in Seurat's art it is filled with light waves reduced to their components, with energy that takes form to become images in the mind of the observer. Cezanne's paintings recall a classical concept of objects in discontinuous space. His paintings from still life share the ambiguous spatial structuring of Classical art. His objects are presented as though each one were being viewed separately from above. This is actually very close to visual experience in the world.<sup>129</sup> As a spatial representation, it is reminiscent of the somewhat naive and illogical methods used by older children to represent objects in space. Cezanne's landscapes represent an experience of things apprehended simultaneously from near and far away, piecemeal, with relative proportions varying rather than subject to strict





Fig. 28. La Montagne Sainte Victoire seen from Bibemus. 1898,  
Paul Cezanne, Museum of Art, Baltimore .....

mathematical rules.<sup>130</sup> This breaking up of Renaissance space, and concurrent simplification of shapes, is preliminary to a synthesis of a pictorial space which is extremely ambiguous, shifting beneath the gaze, a dynamic world of autonomous change (Figure 28). The Cubists shared Cezanne's concern with the destruction of purely visual Renaissance space, with the re-structuring of the object in a dynamic spatial experience. This represents objects not in carefully measured temporal sequence, as in the realism of previous art forms, but as it would be perceived in many spaces and times, simultaneously. It conveys:

Not a world of fixed, solid objects as they are perceived and imagined, but a changeable world which interacts with us, moves and changes as we perceive it, and cannot be separated from our knowledge of it.<sup>131</sup>

This assimilation of the dimension of time into that of space recognizes the interdependence of these two basic experiences (Figure 29). Einstein's equally intuitive vision formalized this interdependence into relativity theory.

The Futurists also attempted to symbolize the space/time experience by offering a dynamic interpretation of one object in many positions in space at one time. This particular spatial representation is also encountered in children's art. A child will represent a bullet being fired from a gun as a line determined by its trajectory, or by a line of dots which is the situation of the bullet both moving and at rest. This experience has no visual counterpart. Under ordinary circumstances, a bullet cannot be seen when it is moving, nor is a bullet a line, except as a purely imaginary experience. Like the legs of the dog, and the leash, in Balla's "Dynamism of a Dog on a Leash" (Figure 30), the child's lines and dots



Fig. 29. Daniel-Henry Kahnweiler. 1910, Pablo Picasso, The Art  
Institute of Chicago .....



Fig. 30. Dynamism of a Dog on a Leash (Leash in Motion). Giacomo  
Balla, 1912, Buffalo Fine Arts Academy .....

attempt to symbolize an integrated space/time experience. Of course, the sources of the child's imagery, films and comics and television, will influence the choice of symbols. The child will sift through these representations and use those which he feels are appropriate. It is unlikely that such choices are purely arbitrary. The matter of fact and consistent way in which children in different age groups use such representations implies that they accept them as suitable means to describe the way in which they understand the world to function (Figures 31-31A).

The modern art movement has not neglected to represent the most subjective aspects of human experience. The newly interpreted inner space of the dream and the unconscious is represented in Surrealist art. It is another of the paradoxes of art that this influential movement chooses to represent these most subjective of experiences in a manner which owes so much to the architectural and objective spatial representations of Renaissance art, although in the work of many Surrealists there is just enough distortion of perspective space and of objects to lend an air of unreality (Figure 32). This discontinuity sets this spatial representation apart from infinite Renaissance space. Magritte's spatial symbols are skilful, super-realistic descriptions of objects and space. But the space and the object rarely correspond to normal experience. The floating rock in "The Castle in the Pyrenees" and the room-sized apple in "The Living Chamber" correspond not to visual experience but to the imaginative activity of the dream (Figures 33-34). The realists of the Twentieth century adopt this same attitude to the mathematical quality of Renaissance space. It is an environment in which they juxtapose the objects of normal experience in a way which forces the mind to reject the rational basis of that same experience. We are

FIG. 31. Space/Time Presentation, Stage of Dawning Realism.  
9 yrs. 8 x 11 ins. Felt pen .....



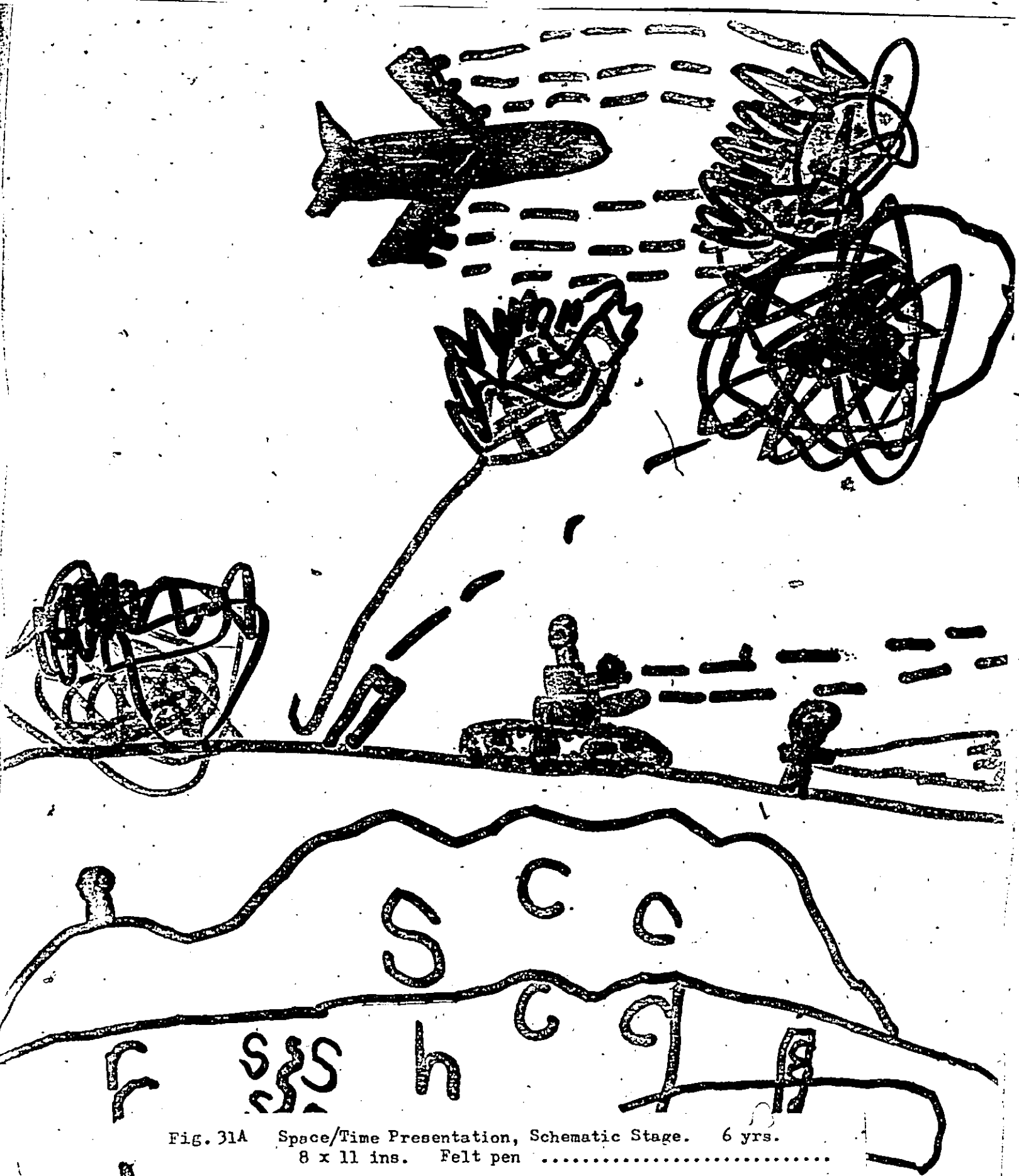


Fig. 31A Space/Time Presentation, Schematic Stage. 6 yrs.  
 8 x 11 ins. Felt pen .....

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forced to see, or understand, the world in a completely different way. Miro's explorations of the environment of the unconscious led him to represent space in a manner reminiscent of the most primitive styles of art, in which "abstract and organic shapes float in a dreamlike, non-projective space", the space of Pre-Historic art, and of the child's first graphic experiences<sup>132</sup> (Figure 35).

This exploration of fundamental spatial representation is characteristic of the work of many of the most influential modern artists. Jackson Pollock experimented with a most basic experience of space which involves proprioception and kinesis, as well as visual experience.<sup>133</sup> His drop technique recalls the Scribbling Stage of child art, representative of the most basic spatial understanding. Out of these experiences, simple shapes emerge, much as they do in children's art (Figure 36). Naturally, in the case of the mature artist, this activity is highly controlled. It is part of a sophisticated process by which the artist searches for a new pictorial space. The evolution of new symbolic forms does not take place in a vacuum, and the artist realizes this when he refers to the past in an effort to understand the future. Willem de Kooning shares with Pollock and other Abstract Expressionists the intuitive quality and gestural style reminiscent of the child's first graphic experiences. In de Kooning's work, forms emerge from a mass of apparently random graphic activity (Figure 37). This most personal approach adopts the elementary, syncretistic, global mode of spatial apprehension (Figure 38). Jean Dubuffet deliberately used the art of children as a model upon which to fashion his art:

His spatial representation (is) composed as in primitive and archaic painting, with depth indicated symbolically by stratification, and people drawn in a child-like manner.<sup>134</sup>

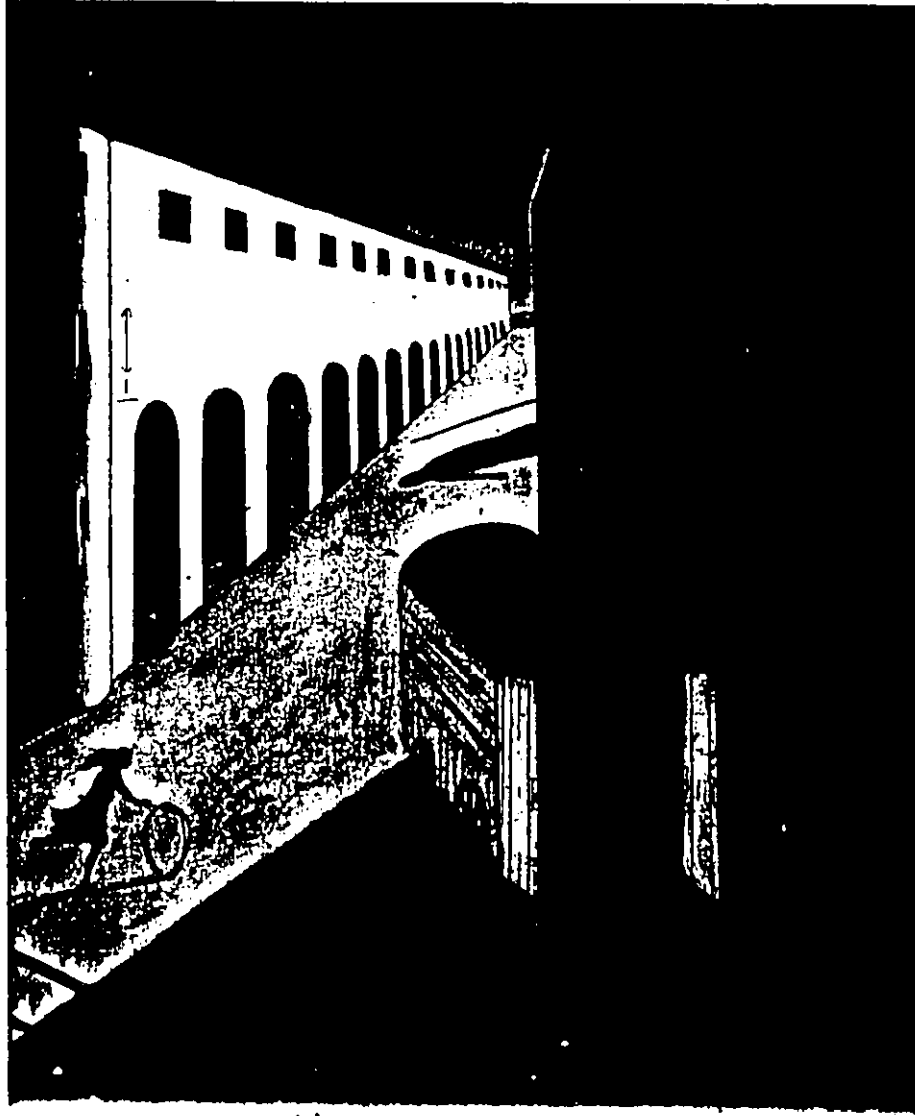


Fig. 32.. The Melancholy and Mystery of a Street. Giorgio de  
Chirico, 1914, Private collection .....



Dubuffet's "View of Paris, Life of Pleasure" adopts a method of spatial representation evocative of the Schematic Stage of child art (Figure 39). He searched for a new "truly life-giving and life-enhancing pictorial space", anticipating the American Expressionists, was climaxed in paintings and drawings comprised of free-form abstract shapes "flowing and changing like amoeba", (Figure 40).

Modern art movements continue to investigate the relationship of object to environment. The concerns of Classical and Renaissance art, the representation of the appearance of objects in space, are adopted by the Op artists, and especially by Pop artists. Op art is concerned with the proto-scientific aspect of art and with the ambiguous role which perception plays in spatial understanding. Optical artists experimented with "devices which dazzle the eye and bewilder sensation" to create a constant sense of change and movement.<sup>137</sup> The spatial representations of Pop art, whatever their objective concerns, are highly ambiguous. Allan D'Arcangelo, in his highway paintings, uses Renaissance devices to represent fluctuating space. In Richard Lindner's "Hello", the object, a woman, is floating in an environment which could only be described as a void, were it not for the ambiguity imposed upon it by the black area on the woman's thigh, and the red stripe at the side of the painting (Figure 41).

Searching to express new concepts of space and time, modern artists have chosen to create work which is completely independent of any reference, reflection or imitation of the external world as we understand it at present. Suprematism, Constructivism, de Stijl, neo-Plasticism and the many other formal, non-objective styles which succeed them are esoteric art forms. Their space has little connection with the space of normal

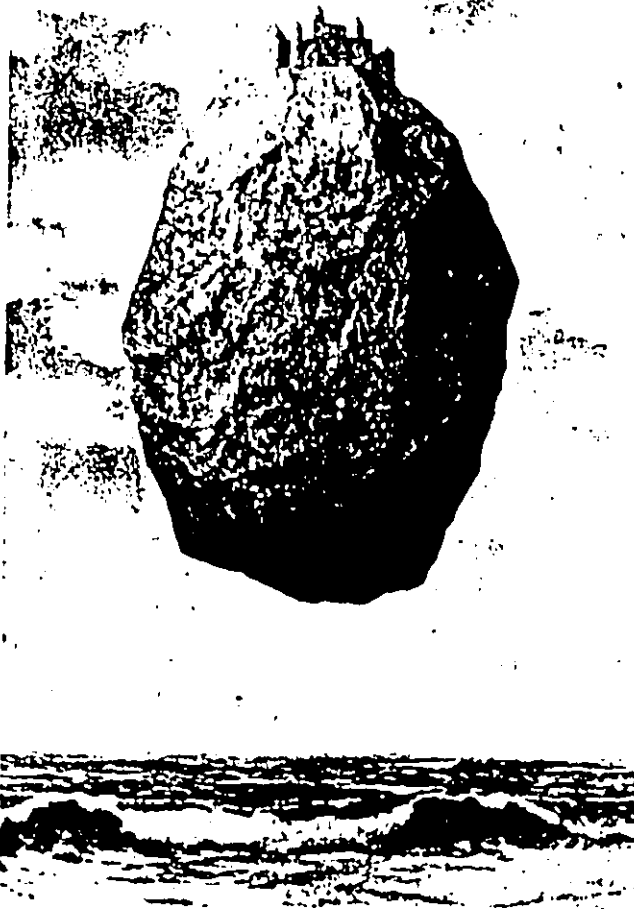


Fig. 33. The Castle of the Pyrenees. René Magritte, 1959.  
Collection Harry Torczyner .....

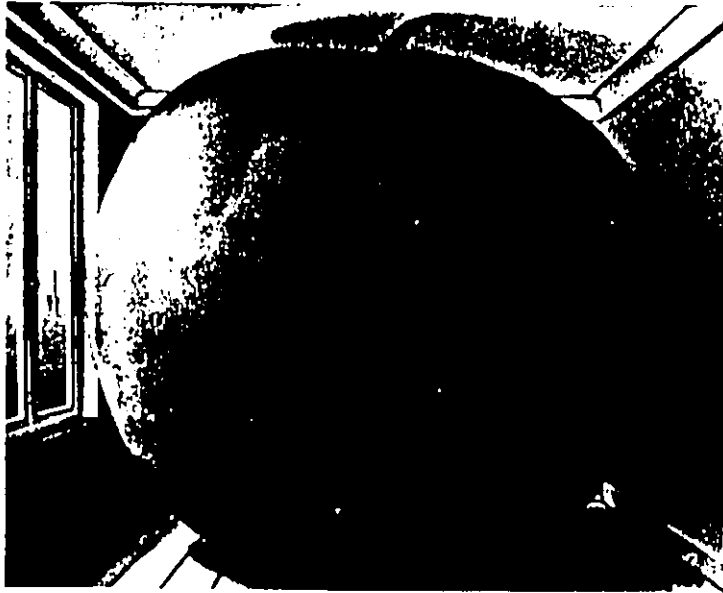


Fig. 34. The Listening Chamber. René Magritte, 1953. Private  
collection, New York .....

experience. The annihilation of spatial depth in the styles of non-objective art, Minimal Art and Color-field painting, suggest, according to Ehrenzweig, a return to "a dream-like level of experience where our common-sense concepts of space and time have no meaning".<sup>138</sup> He suggests, though, that the work of painters like Albers and Rothko in which the weakest of forms, such as insubstantial circles and quadrangles "insecurely suspended against a more solid ground", conveys a "mystic-oceanic" feeling expressive of individual existence lost in the universe.<sup>139</sup> These spatial symbolizations at once express the most subjective feeling about space, and describe a space not yet experienced or understood (Figures 42-43). They represent simultaneously the stage of human development at which the concept of space was extremely limited, and a stage yet to come, during which a new concept will describe a totally different experience of space. Then, the world indeed will look different, and the esoteric spaces of contemporary art will become the everyday space of normal experience.

CONCLUSION

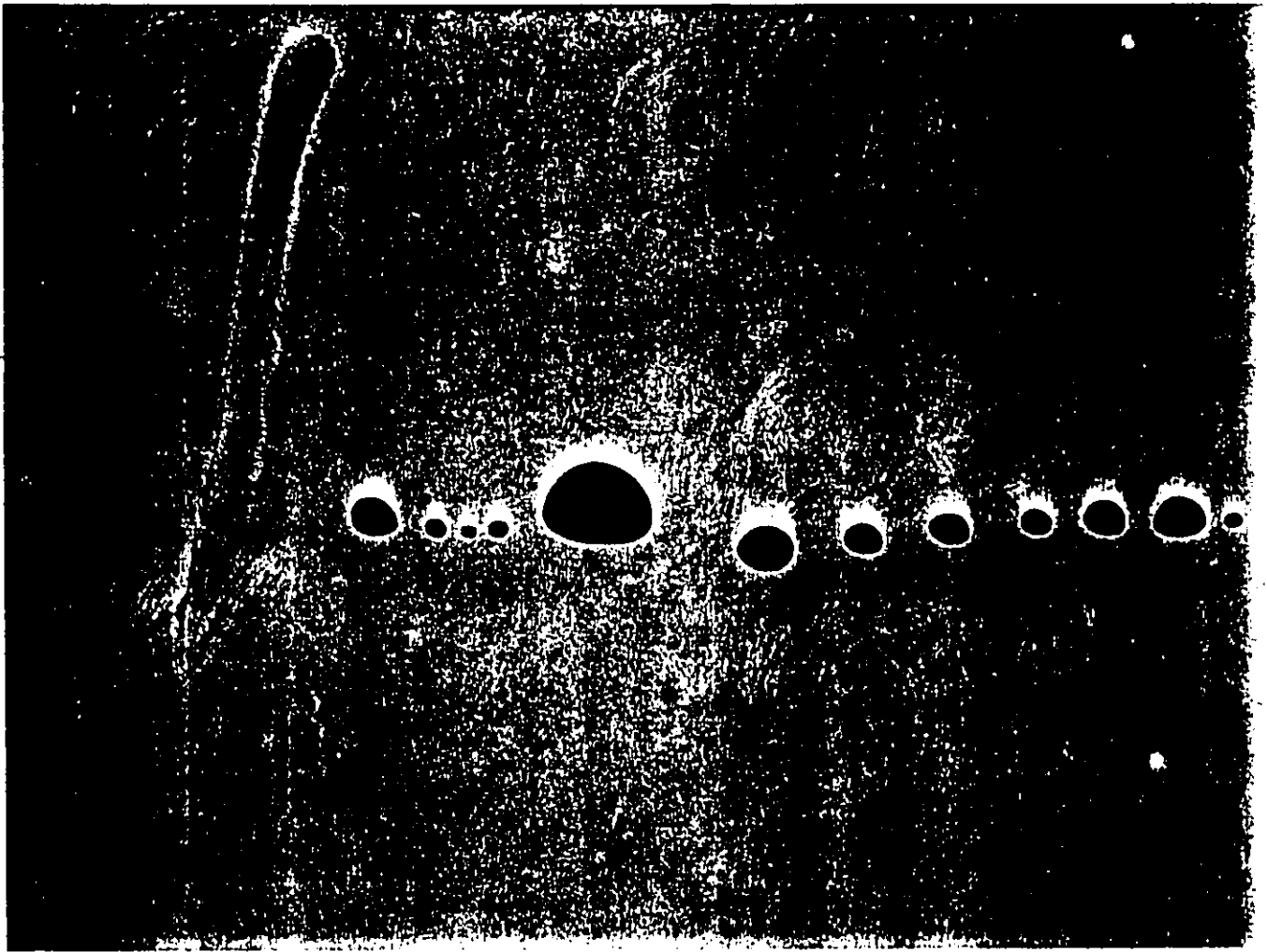


Fig. 35. Blue II. Joan Miro, 1961. Pierre Matisse Gallery.  
N.Y. ....

## CONCLUSION

The process of evolution moves from the simple to the complex. This basic principle regulates human activity, as it reflects the organization in nature. Evolution "proceeds through a series of steps, each stable in itself" while progressively more complex.<sup>140</sup> The principle which determines that matter be built up from simple elements to complex molecules also determines the process of the evolution of knowledge, of societies and of the arts of space and time.

For example, the oldest and most primitive forms in music are simple. They consist of rhythm and sound in their most basic states. Primitives, and children, express their first understanding of their aurally perceived world in simple repetition of sound. In doing this, they also begin to understand the nature of time. It is upon this fundamental activity that the most complex musical forms evolve. Similarly, no advanced understanding of the mathematical sciences is possible without first having understood that one and one make two.

The same principle which directs the understanding of mathematics, music and time also directs the evolution of the concept of space, a concept based upon a primary idea of topographical relations. Such an idea must be present before knowledge of more complex Euclidean and projective relations may evolve. Basic topographical knowledge is not contingent upon mathematical knowledge - reference to straight lines or measurement -



Fig.36. Night Ceremony. Jackson Pollock, 1944. Collection  
Mr. and Mrs. Bernard J. Reis, New York .....



Fig.37. Woman VI. Willem de Kooning, 1953. Carnegie Insti-  
tute, Pittsburg, Pennsylvania .....

and is accessible to those at a very early level of mental development.<sup>141</sup> This first idea of space, with its integral components of boundaries and regions, of interior and exterior, of limits and continuity, is vital. Without it, there can be no safe existence in the world. The knowledge of Euclidean and projective relations, and the structuring of the space of the senses and the imagination, evolve from topological knowledge of the shape, the size and the position of things perceived in the world.

In this study, I have attempted to bring together the many kinds of experiences which determine the common understanding of space. The forms of art, scientific activity and the demands of simple existence all play their part in this understanding. Attitudes towards space have changed during man's evolution. These changes have been accompanied, even predicted, by changes in the way in which spatial relations have been symbolized in art. The most interesting and intriguing aspect of the child's graphic representation of space is the way it seems to highlight these evolutionary changes.

Representations of space in art reflect an evolutionary process from basic topological understanding to an advanced understanding of mathematically-determined spatial relations. The earliest art forms are concerned with shape as a component of spatial understanding. As societal structures evolved, the concept of space became more complex, expanding to absorb the components of number and linear measurement. Child art indicates evolution from knowledge of topographical relations to understanding of complex mathematical spatial relations. The representations of space in the last stages of child art indicate the existence of a concept of space which corresponds to that present in the society at large.



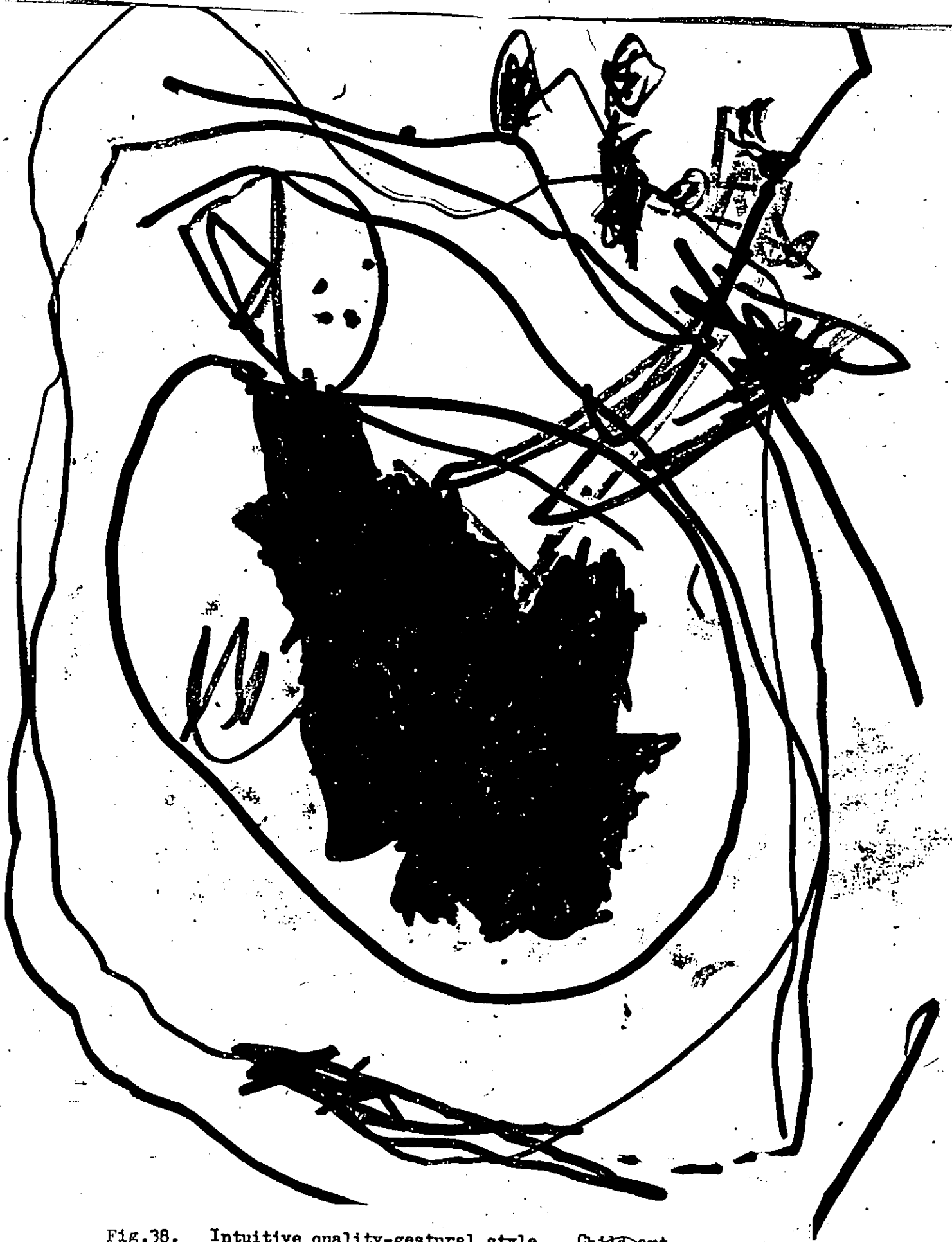


Fig.38. Intuitive quality-gestural style. Child art,  
Scribbling Stage. 3 yrs. 8 x 11 ins. Felt pen

Specific representations may be observed as common to adult art and child art. These include shape as a primary graphic symbol of space. The base-line, together with repetition of schemata, fold-over and hierarchy of size, indicate awareness of planar, mathematical spatial relations. Subsequent graphic representation of the three-dimensionality of objects implies the evolution of knowledge of the projective aspect of space. The imaginative understanding of space as fundamentally unified is symbolized by massing of objects, multiple base-lines and multiple-point perspective. These symbols indicate that spatial relations are first understood subjectively. The understanding of space as three-dimensional, ordered, continuous and infinite, which determines the current space concept, is symbolized by single-point perspective. Children are capable of representing increasingly complex stages in the evolution of their concept of space without formal training. However, the objective symbol for infinity, single-point perspective, does not evolve naturally during the course of the child's graphic development, but must be taught.

There is a general chronological relationship in the process of the evolution of the consciousness of space, as it is interpreted through the evolution or appearance of these specific space symbols in child art and adult art. A child's space concept is first based on topological knowledge. When he becomes an adult, assuming that his development has been normal, his concept of space corresponds to that which is prevalent in his society. In Western cultures, this is the concept of infinite rational space, which we all experience. We have noted that in Western art, the symbols of space imply that man first understood space in the way a young child does, and that during the historical evolutionary process, the



Fig.39. View of Paris, Life of Pleasure. Jean Dubuffet, 1944.  
Collection Mr. and Mrs. David, New York .....

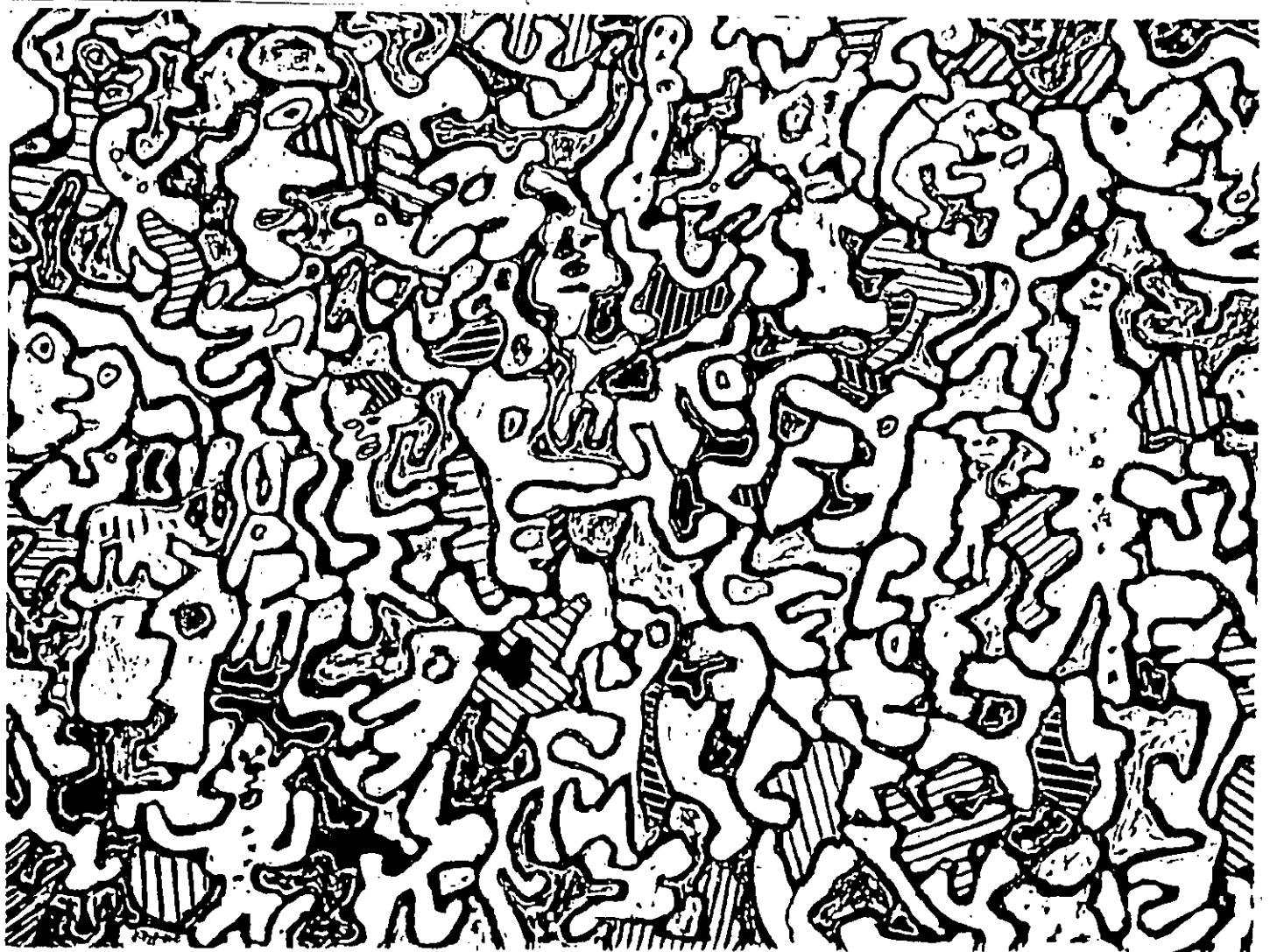


Fig.40. Virtual Virtue. Jean Dubuffet, 1963. Sardenberg  
Gallery, New York .....

symbols changed, indicating that the concept of space also changed. The chronological relationship, while it brings the child, and the society, from a space conceived in topological terms to one conceived in rational, objective terms, is inconsistent. Many correspondences or parallels may be observed when the space symbols of child art and adult art are studied systematically. However, chronological inconsistencies disallow any claim to an absolute, linear relationship. We may only say that the consciousness of space, as it is symbolized in the child's graphic experience, evolves from the simple to the complex. Space is understood at first intuitively and subjectively. As the child matures, a more objective and intellectual understanding evolves. Art, as it evolves historically, reflects in its space symbols a consciousness of space which has also evolved from simple to complex, from purely intuitive and subjective to objective and intellectual.

It has not been possible to discuss the interplay between art and space without considering the relationship between art forms and the society in which they take place. Nor is it possible to ignore the relationship between the symbol systems of science, religion and art, as they refer to the concept of space. A change in attitudes towards space will be expressed in religious and scientific terms, as well as in artistic terms.

The Renaissance experience is still close enough to allow a clearer understanding of the many facets of the interplay between art and science, and between their symbols and the evolution of the concept of space. The representation of mathematically-determined infinite space in art predated the birth of Copernicus. This symbol, single-point perspective, filled the general population with dismay. New space symbols in art



Fig.31. Hello. Richard Lindner, 1966. Private Collection, New York.

disturb current sensibilities in much the same way. We do not know whether symbols of art have always presented such problems with respect to the role they play in the common understanding. In retrospect, earlier ages seem characterized by their inherent unity, in which the world of feeling and the world of intellect integrated, and in which art and science and the common understanding were one.

The art experience of the pre-adolescent child may be seen as a metaphor for the experience of pre-Renaissance man. The child's art activity is characterized by its implicit unity. It is an expression of his feelings about and his understanding of the world. In the art of children, we are brought back to the work-a-day world where art once was, unseparated from everyday experience. Without pretension, the child constructs the symbols which mediate between his perceptions and his conceptions of the world. Each child undergoes his own Renaissance. As he enters adolescence, his own scientific consciousness of the world evolves, and there is some evidence that this evolution or transformation is accompanied by a personal crisis which manifests itself in the child's artistic behaviour, and often in other areas of behaviour. Art does not appear to have the value it had earlier, and becomes an experience no longer integrated, but full of tension.

The crisis which the adolescent undergoes, and which mirrors the cultural experience, is not necessarily inevitable. Much investigation needs to be made into the interplay between culture and art. The child is the recipient of certain cultural clues or directives. These are determined both by the current space concept, and by the value that the society places upon art. This situation must have direct bearing upon

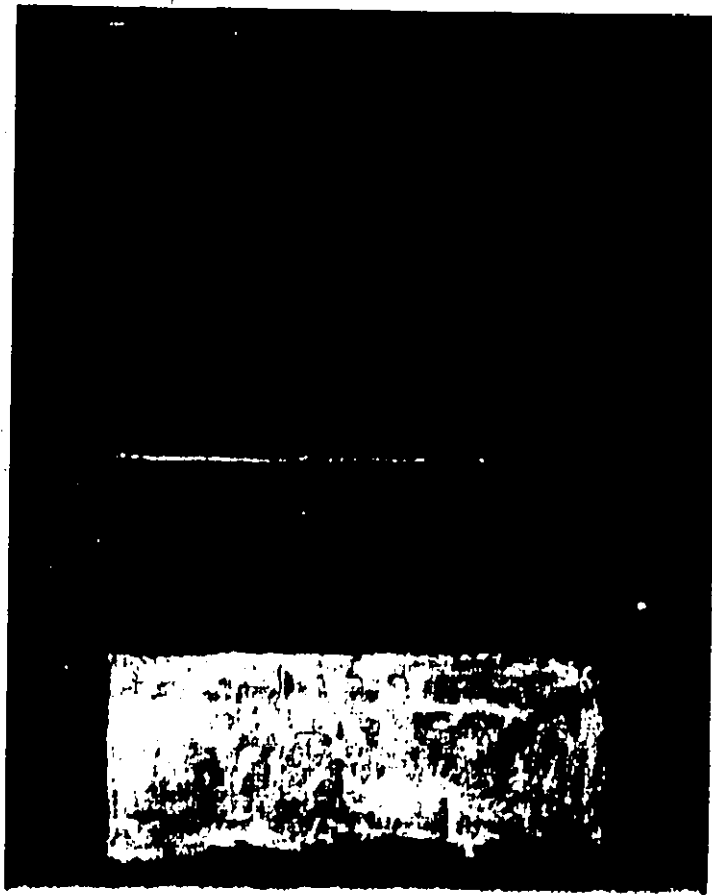


Fig.42. White and Greens in Blue. Mark Rothko, 1957. Private collection, New York .....

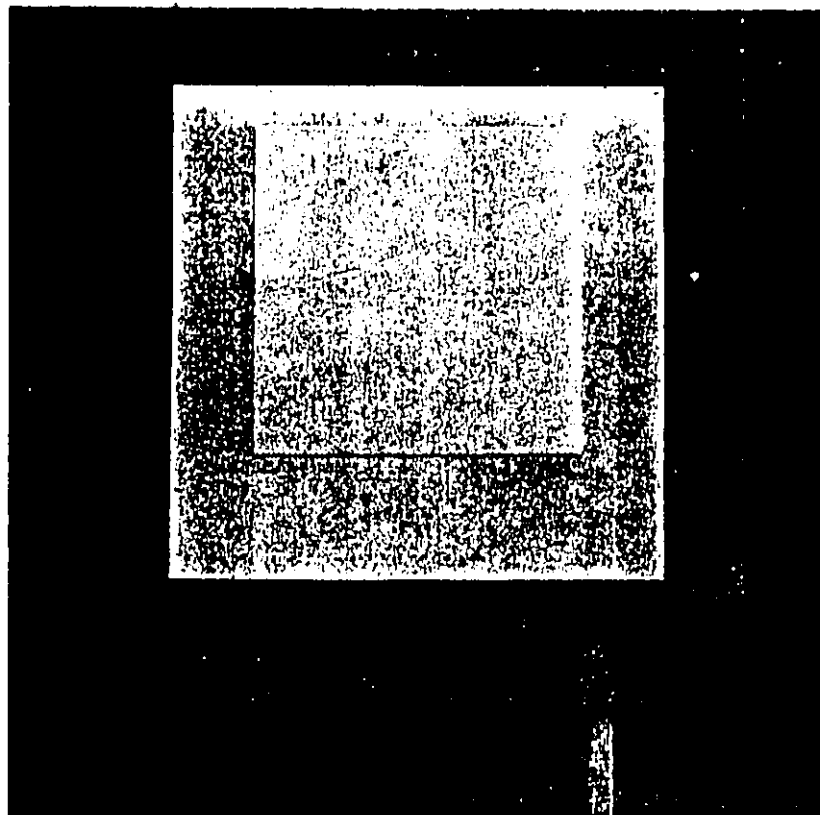


Fig.43. Homage to the Square: Apparition. Josef Albers, 1959. The Solomon R. Guggenheim Museum, New York.

the child's art activity, both in respect to the evolution of his concept of space, and to the value of art in his education. The adolescent is particularly vulnerable when he attempts to bring his capacity for scientific thinking to bear on all his activities. Cultures which, by and large, misunderstand the intuitive aspect of scientific activity, will almost certainly make the same mistake with regard to the intellectual aspect of artistic activity. The educational systems through which cultures impart their knowledge to each generation will reflect this lack of understanding. Western educational systems are shaken to their foundations by crises which are the result of an historic dualism which does not recognize the interdependence of art and science, and of intuition and the intellect.

The many assertions which have been made in this study might better be considered as questions. Once we begin to consider what space really is, and what constitutes the relationship between the symbols of art and the common understanding of space, more questions are raised than we can easily answer. However, it is clear that art itself is not simply an emotional or aesthetic activity, as it is neither simply imitation nor analogue. It is much more fundamental. All the forms of art are elements in a symbol system through which men come to understand the world. If any part of a symbol system is not integrated into human experience, then that experience is so much the poorer, and human knowledge less comprehensive.

Knowledge of space is vital to human existence. An undeveloped, or incomplete space concept makes individual existence more difficult, and may have severe pathological consequences.<sup>142</sup> On a general level, the evolution of the concept of space has brought man from the topological



limitations of the animal world to the space and time of the stars. Art has been a constant companion and a faithful advisor on this epic journey, and it accompanies and advises our children on their journey to their maturity.

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APPENDIX

CHILD ART			ADULT ART		
LOWENFELD	MOORE + SALOME		DORNER	DESCRIPTION OF SPACE	EPOCH.
STAGE	DESCRIPTION	STAGE	DESCRIPTION		
①	None None or only Kinesthetic	①	Experimental		
2-4 yrs.	SCRAWBLING	②	SCRAWBLING	Transient, sensuous images	
4-7 yrs.	PRE-SCHEMATIC	③	PRE-SCHEMATIC	Magical mind	Topographical, shape, outline Primitive, hunting societies
7-9 yrs.	SCHEMATIC	④	SCHEMATIC	Symmetry or regularity Abstract rigidity (Magical mind or organised agriculture)	Euclidean, geometrical shapes Aryan societies Egyptian, Assyrian Empires
9-11 yrs.	DAWNING REALISM	⑤	TRANSITIONAL	3-dim. dimensional forms Rational depth Immutable system of geometrical relations juxtaposition: finite forms + boundaries certainty + uncertainty	Projective Discontinuous Classical eg Greece
11-13 yrs.	PSEUDO-NATURALISM	⑥	TRANSITIONAL	Forms in supra-individual unity Spiritual unity in a coherent embedding medium. Religious = Magical + rational	Planar Two dimensional Essential + Non-projective Post-classical eg Byzantine Gothic
13-17 yrs.	ADOLESCENT	⑦	CULTURAL REALISM	Absolute space Immutable Unchanging spatial proportions and ideas.	Three-dimensional Continuous Mathematically correct Renaissance - (Scientific/rational)

Fig. 44 Descriptive Chart.

Indications of areas of centres of gravity

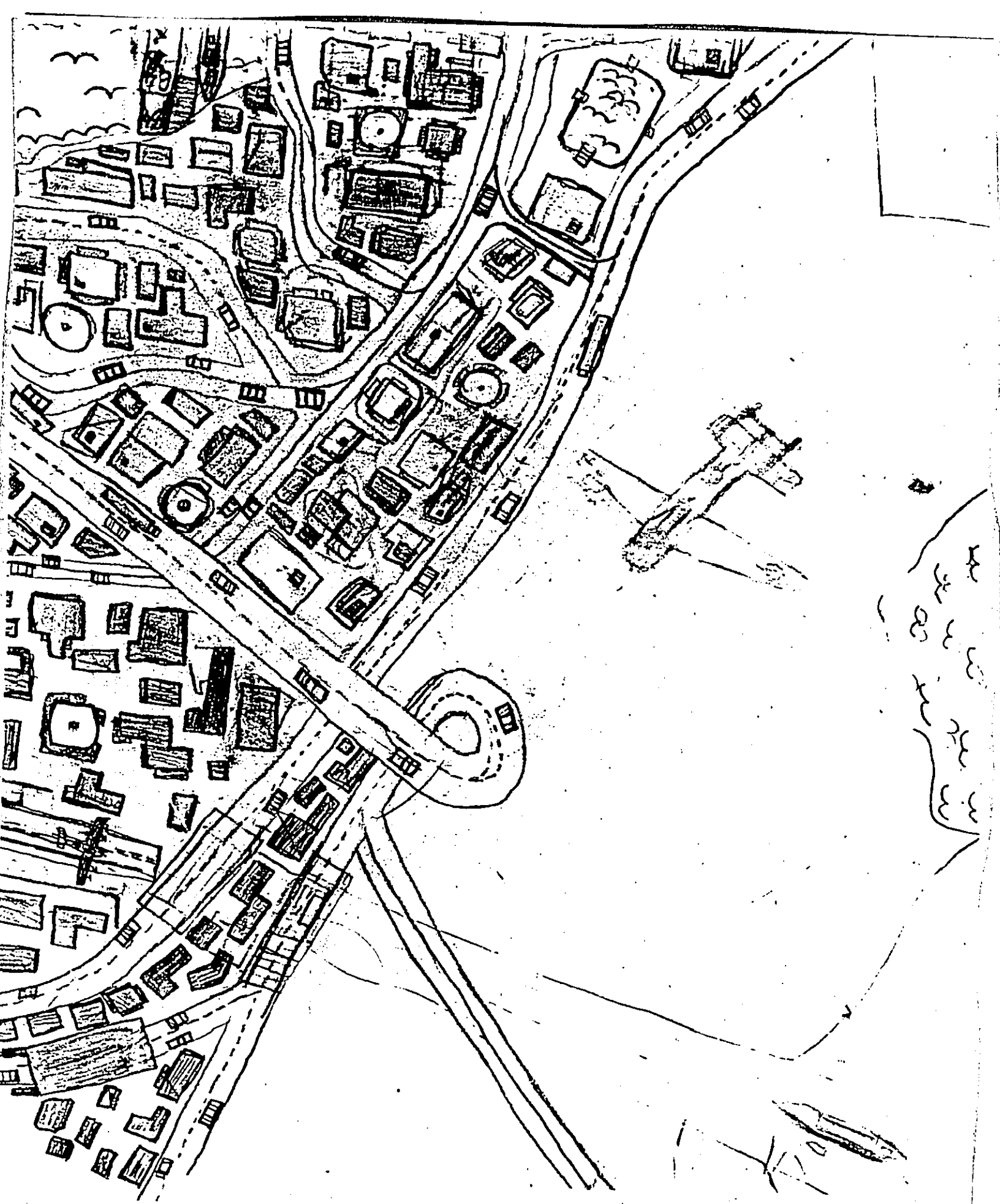


Fig.45. Earth Seen from Space: Map 6 yrs. 8 x 11 ins. Pencil.

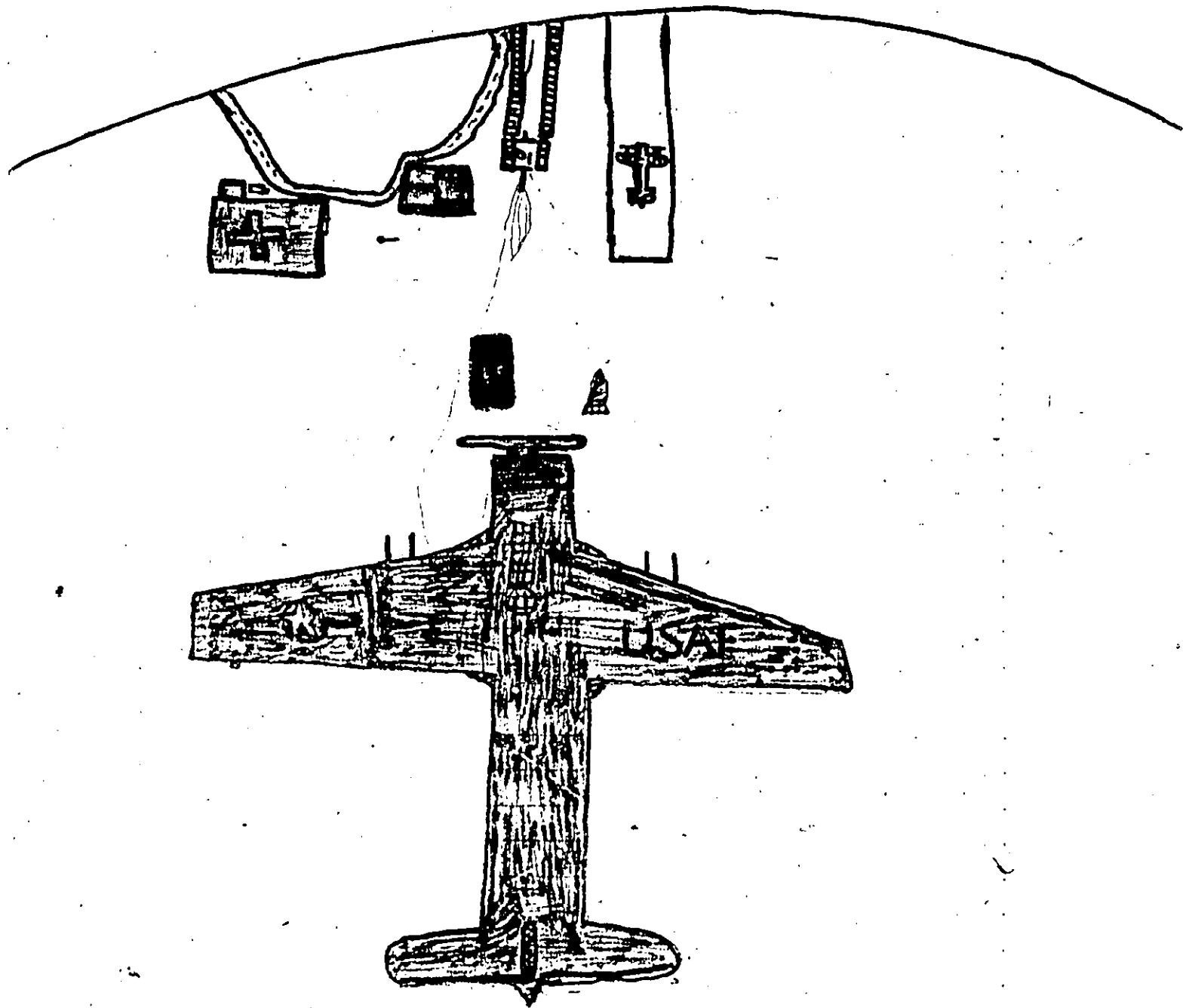


Fig.46. Curvature of the Earth's Surface. Note that the road goes over the horizon, following the curve of the sphere, as does the runway. Also, the closer aeroplane is larger than the one on the ground. 6 years.  $8\frac{1}{2} \times 9\frac{1}{2}$ . Pencil and felt pen on paper.

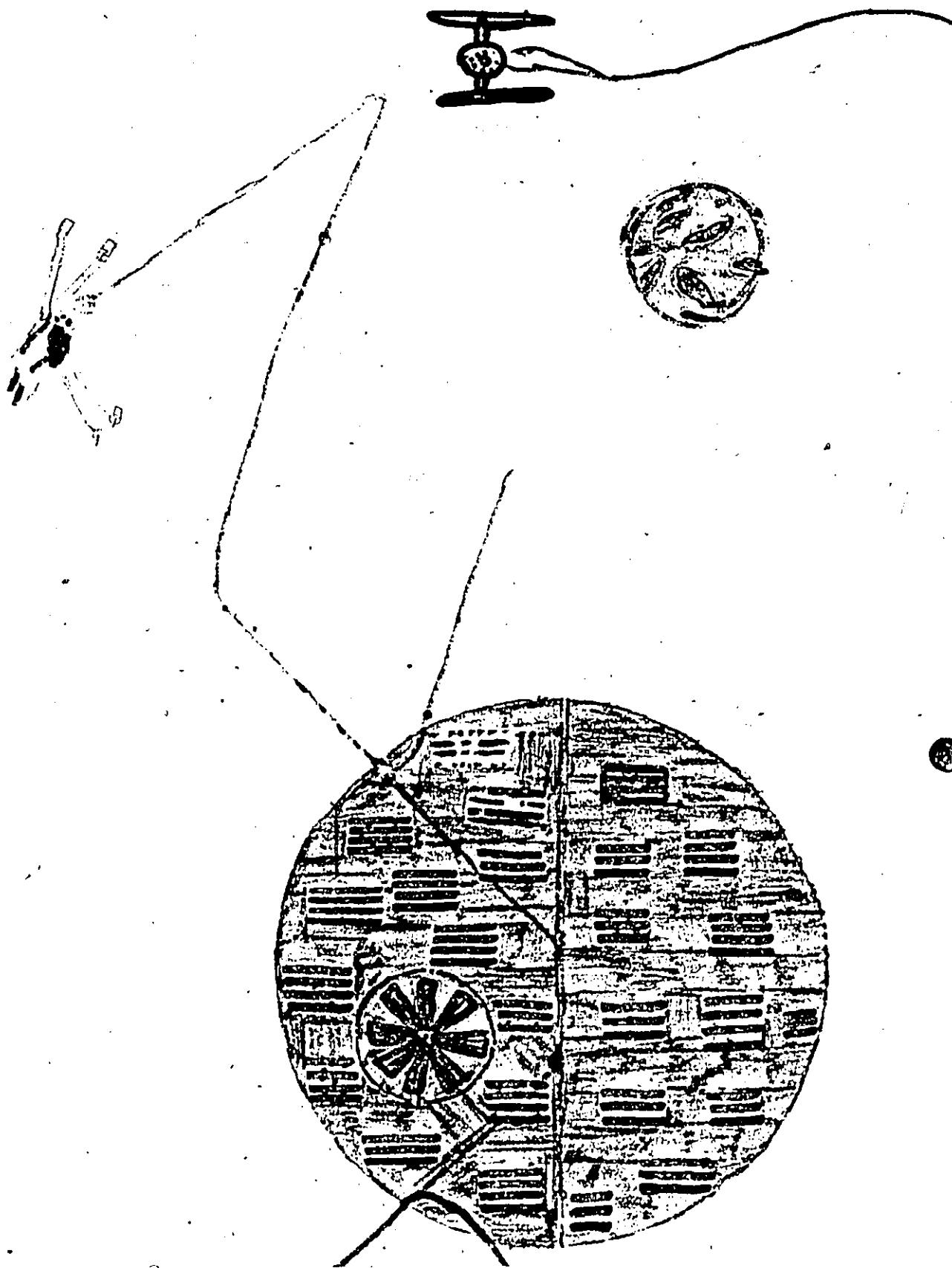


Fig.47. Star Wars. Cultural Input Determines Spatial Characteristics. 10 yrs. 8 x 11 ins. Felt pen.