

7-1-2000

Greek Color Theory and the Four Elements [full text, not including figures]

J.L. Benson

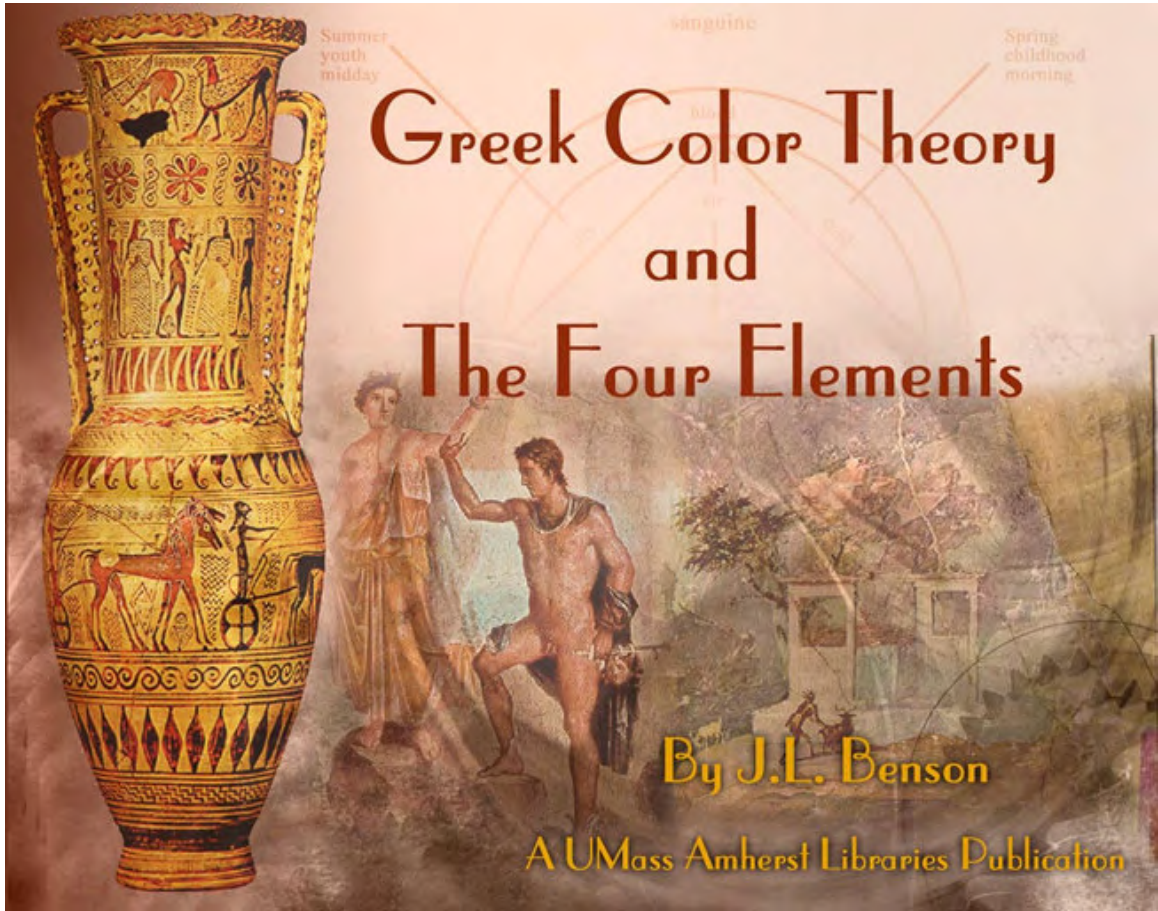
University of Massachusetts Amherst

Follow this and additional works at: http://scholarworks.umass.edu/art_jbgc

Benson, J.L., "Greek Color Theory and the Four Elements [full text, not including figures]" (2000). *Greek Color Theory and the Four Elements*. Paper 1.

http://scholarworks.umass.edu/art_jbgc/1

This Article is brought to you for free and open access by the Art, Architecture & Art History at ScholarWorks@UMass Amherst. It has been accepted for inclusion in Greek Color Theory and the Four Elements by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.



Cover design by Jeff Belizaire

ABOUT THIS BOOK

Why does earlier Greek painting (Archaic/Classical) seem so clear and—deceptively—simple while the latest painting (Hellenistic/Graeco-Roman) is so much more complex but also familiar to us? Is there a single, coherent explanation that will cover this remarkable range? What can we recover from ancient documents and practices that can objectively be called “Greek color theory”?

Present day historians of ancient art consistently conceive of color in terms of triads: red, yellow, blue or, less often, red, green, blue. This habitude derives ultimately from the color wheel invented by J.W. Goethe some two centuries ago. So familiar and useful is his system that it is only natural to judge the color orientation of the Greeks on its basis. To do so, however, assumes, consciously or not, that the color understanding of our age is the definitive paradigm for that subject.

But could it be that the Greek understanding of color, if we can recover it in rational terms, has itself a paradigmatic quality offering unformulated but real reaches of meaning? And if so could we expand our consciousness of the nature of color and its evolving manifestations in history?

Greek philosophers thought in terms not of three, but of four, basic colors: black, red, yellow and white: yet little or no attention has been paid to this conception as a system of thought. Almost ironically, it is again Goethe's experiments in color, made in quite conscious opposition to Newtonian principles, which not only led him to color triads, but which also reveal that the Greek system of four colors is theoretically balanced by a second group of four colors: white, blue, violet and black. The earlier Greek painters were thoroughly absorbed in the first “tesserad” of colors, while later painters increasingly experimented with the second group.

Professor Benson has for the first time formulated in scientific terms a comprehensive explanation of four-color painting as well as of the larger issue of a Greek color theory implied in the cosmological vision of Empedokles. The theory itself is anchored in the essentially Greek concepts of polarity and complementation, which of themselves foster definite parameters of meaning for each color. This allows a completely new interpretation of Greek painting.

Copyright 2000, J. L. Benson. *With appropriate attribution, permission is granted for the scholarly use, distribution and reproduction of this work in full, excepting those illustrations and figures for which the author does not hold the copyright. (See Credits in the text for image copyright owners.)* A complete listing of all of the Figures used in the text is available for easy viewing from:

<http://www.library.umass.edu/benson/jbgcimages.html>

**GREEK COLOR THEORY
AND THE FOUR ELEMENTS**

A Cosmological Interpretation

J. L. Benson

Amherst, Massachusetts: University of Massachusetts Amherst Libraries, 2000

HYMN TO THE FOUR ELEMENTS

Sirenen

Welch feuriges Wunder verklärt uns die Wellen,
Die gegeneinander sich funkelnd zerschellen?
So leuchtet's und schwanket und hellet hinan:
Die Körper, sie glühen auf nächtlicher Bahn,
Und ringsum ist alles vom Feuer umronnen;
So herrsche denn Eros, der alles begonnen!

Heil dem Meer! Heil den Wogen!
Von dem heiligen Feuer umzogen!
Heil dem Wasser! Heil dem Feuer!
Heil dem seltnen Abenteuer!

All-Alle

Heil den mildgewognen Lüften!
Heil geheimnisreichen Grüften!
Hoch gefeiert seid allhier,
Element' ihr alle vier!

Sirens

The waves are transfigured with fire-laden wonder,
They glitter in impact, in flame leap asunder
Here's shining and swaying, and spurting of light,
With forms all aglow in the track of the night,
And lapping of fire touches all things around:
Let Eros who wrought it be honoured and crowned!

Hail to the Ocean! Hail to the wave!
The flood with holy fire to lave!
Waters hail! All hail the fire!
The strange event hail we in choir!

All voices in concert

Hail light airs now floating free!
Hail earth's caves of mystery!
Held in honour evermore
Be the elemental four!

— JOHANN WOLFGANG VON GOETHE

Faust II, Act 2, "Klassische Walpurgisnacht"

Translated by Philip Wayne

TABLE OF CONTENTS

- Preface
- List of figures
- List of schematic illustrations
- Credits
- Introduction
- Chapter I: How May We Understand Four Elements Philosophy Today? The Idea of Macrocosmos (World) and Microcosmos (Human Being)
 - The Concept of a Fourfold World
 - The Four Elements
 - The Four Members
- Chapter II: Greek Color Theory
 - Prologue: What is Greek Color Theory? An Attempt to Systematize the Dynamics of a Four Elements/Four Colors Theory
 - The Problem
 - The Ancient Sources (Testimonia)
 - Basic Considerations
 - The Four Elements and the Four Colors in their Macrocosmic and Microcosmic Relationship
 - Paradigms and Explanations
- Chapter III: Aspects of Ancient and Modern Understanding of Color
 - The Evolutionary Aspect of Colors
 - Color Usage and Microcosmic Periodicity
 - Clarification of Color Relationship
 - The Emergence of Redfigure Style
 - The Other Colors
 - The Two Spectra of Goethe's Color Theory
 - An Attempt at a Holistic Interpretation of Color Meaning
 - Expanding the Basic Four Color Paradigm
 - Concentrating on Black and White
 - Preliminary Remarks on the Meaning of White in the Classical Period
 - Hellenistic Painting in the Light of the Cycles
- Chapter IV: Greek Artists and their Colors (apart from ceramics)
 - General Considerations
 - Panel Painting and Wall Painting: Mainland Greece
 - The (Late) Archaic Period
 - The Classical Period (with the Use of White and Yellow by Polygnotos and Some Aspects of the Use of Blue)
 - The Protohellenistic and Early Hellenistic Period (with The Art Historical Setting, The Coloristic Complexity of the Lefkadia

Facade, The Still Conservative Cast of Beginning Protohellenistic,
The Fluid Boundary between Late Classical and Proto-hellenistic)

- Summary
- Panel Painting and Wall Painting: Italy
 - Introductory Observations on Hellenistic and Graeco-Roman Painting
 - Color Analyses of Selected Graeco-Roman Paintings (of Second and Third Style)
 - Conclusions
- Chapter V: Observations on the Coloration of Sculpture
 - Introduction
 - Archaic and Protoclassical Periods
 - Classical Period (and Protohellenistic)
 - Hellenistic Period
- Appendix A: Observations on the Technique of Paintings and Mosaics
- Appendix B: Color Technicalities: An Introduction to Goethe's Theory of Color for Non-Specialists
- Appendix C: The Four Elements and the Origin of Fixed Colors
- Bibliography
- Notes

LIST OF FIGURES

Abbreviations follow Select Bibliography.

HALF-TONES

- Fig. 1** Alabaster vessel Iraq Museum, Baghdad from Warka Third quarter of fourth millennium B.C. H.o.92.

COLOR REPRODUCTIONS

- Fig. 2** Sample of Mediterranean marbles Antikenmuseum Berlin. After H. Mielsch, *Buntmarmore aus Rom im Antikenmuseum Berlin* (1985) pl. 15.
- Fig. 3** As fig. 85 (pl. 11)
- Fig. 4** Attic Protogeometric amphora British Museum London. 11th century B.C.
- Fig. 5** Attic Geometric amphora Kerameikos Museum inv. 2146 Athens. 9th century B.C.
- Fig. 6** Attic Geometric amphora NM inv. 804 Athens: detail of frieze. 8th century B.C.
- Fig. 7** Middle Protocorinthian IB kotyle British Museum 60.4–4.18: crouching hound by the Hound Painter. 2nd quarter 7th century B.C.
- Fig. 8** Protoattic amphora (loutrophoros) Louvre inv. CA 2985 Paris: procession, etc by the Analatos Painter. First quarter 7th century B.C.
- Fig. 9** Attic neck-amphora British Museum inv. B210: Achilles killing Penthesilea, attributed to Exekias. 3rd quarter 6th century B.C.
- Fig. 10** Attic blackfigure amphora Vatican Museum: Achilles and Ajax by Exekias. Ca. 530 B.C.
- Fig. 11** Opposite side of fig. 93 with Return of the Dioskouroi.
- Fig. 12** Attic bilingual amphora Staatliche Antikensammlung, Munich: symposia, attributed to the Andokides Painter Ca. 525 B.C.
- Fig. 13** Attic redfigure shoulder amphora Antikenmuseum Berlin: satyr and Hermes; attributed to the Berlin Painter. 500–490 B.C.
- Fig. 14** Attic blackfigure krater on white ground Badisches Landesmuseum Karlsruhe: Odysseus and ram. Late 6th century B.C.
- Fig. 15** Attic white ground cup Staatliche Antikensammlungen inv. 2645 Munich: maenad; attributed to the Brygos Painter. 500–490 B.C.
- Fig. 16** Attic white ground lekythos NM inv. 1818 Athens: deceased and living; attributed to the Achilles Painter. 3rd quarter 5th century B.C.
- Fig. 17** Roman mosaic NM Naples: Battle of Issos. 1st century B.C.

- Fig. 18** Terracotta pediment plaque NM Syracuse: Gorgo holding offspring. Late 7th century B.C.
- Fig. 19** Wooden panel NM Athens from Pitsa: scene of sacrifice. 3rd quarter 6th century B.C. H. EAA V, opp. p. 202.
- Fig. 19 bis** Domenico Veneziano Panel Uffizi Gallery, Florence “Madonna and Child with Saints”, ca. 1445
- Fig. 20** Attic white ground lekythos NM Athens: figure and stele, assigned to R Group. Ca. 430 B.C.
- Fig. 21** Hellenistic tomb painting at Kazanlak.
- Fig. 22** Hellenistic tomb painting at Kazanlak.
- Fig. 23** Limestone tomb facade Lefkadia, Greece Painted architectural forms. Ca. 300–275 B.C. H.8.15.
- Fig. 24** Detail of fig. 23: Hermes.
- Fig. 25** Limestone tomb facade Vergina, Greece Painted architectural forms of “Philip’s Tomb”. Ca. 340–330 B.C. H.5.3. See M. Andronicos 1989, fig. 57.
- Fig. 26** Interior tomb wall Vergina, Greece Portion of “Tomb of Persephone” showing Demeter. H.2.50. Ca. 350–340 B.C. Andronicos 1989, fig. 46.
- Fig. 27** Interior tomb wall. Detail from “Tomb of Persephone”: head of Hades. Andronicos 1989, fig. 51.
- Fig. 28** Detail of fig. 23: bust of Rhadamanthys.
- Fig. 29** Roman fresco NM Naples from Pompeii: Perseus liberating Andromeda. 1st century B.C./1st A.D.
- Fig. 30** Roman fresco NM Naples from Pompeii: Theseus triumphant. 1st century B.C./1st A.D.
- Fig. 31** Roman fresco Vatican Museum Vatican City: Odyssey Landscape I. Second style, 1st century B.C.
- Fig. 32** Roman fresco Vatican Museum Vatican City: Aldobrandini Wedding. 1st century B.C./1st A.D.
- Fig. 33** Oil on canvas Galleria Doria Pamphili: Aldobrandini Wedding by N. Poussin 17th century A.D. H.2.42 G. Torselli, La Galleria Doria Pamphili (Rome 1969) fig. 385.
- Fig. 34** Roman mosaic NM Naples from Pompeii: stage scene. 1st century B.C.
- Fig. 35** Mosaic Terme Museum Rome inv. 171. Nilotic scene from Via di Porta Lavernate, Rome. Ca. 250 A.D. H. (field) 1.85
- Fig. 36** Roman fresco NM Naples from Pompeii: Rocky sanctuary. 1st century. A.D.
- Fig. 37** Terracotta figurine NM Athens inv. 1986.271 Pella: lady in heavy garments. Hellenistic period. See *The Search for Alexander* (1981) New York Graphic Society, number 148, pl. 22-D.
- Fig. 38** Goethe’s Dark Spectrum Photo Hetzel

- Fig. 39** Goethe's Dark Spectrum Photo Hetzel
Fig. 40 Goethe's Light Spectrum Photo Hetzel
Fig. 41 Goethe's Light Spectrum Photo Hetzel
Fig. 42 Diagram clarifying rule of atmospheric colors in light/dark conditions Photo Hetzel.
Fig. 43 View illustrating principle: red results from dark before light Photo Hetzel.
Fig. 44 View illustrating principle: blue results from light before dark Photo Hetzel.
Fig. 45 Diagram illustrating additive colors Photo Hetzel
Fig. 46 Diagram illustrating subtractive colors Photo Hetzel.
Fig. 47 Preliminary form of Goethe's color wheel Photo Hetzel.
Fig. 48 Diagrammatic articulation of Goethe's color wheel Photo Hetzel.

LIST OF SCHEMATIC ILLUSTRATIONS

- Ill. 1** Directionality of water
Ill. 2 Directionality of air
Ill. 3 Combination of water-air directionality
Ill. 4 Density of the directions
Ill. 5 The four elements in form of a rectangle
Ill. 6 Indications of density added to rectangle of Ill. 5
Ill. 7 Sense qualities of the four elements
Ill. 8 Five elements in the form of a circle
Ill. 9 Kandinsky's axes
Ill.10 Sense qualities and elements in circular scheme
Ill.11 Sevenfold organization of man and heaven
Ill.12 Macrocosmic processes
Ill.13 Microcosmic processes
Ill.14 Comparison of macrocosmic and Hippokratean microcosmic processes
Ill.15 Hippokratean processes after Schlepperges
Ill.15 bis Black and white as bridge colors
Ill.16 Qualities associable with the Dark and Light spectrums
Ill.17 Expanded version of the basic, four color paradigm
Ill.18 Color relationships in the Classical period

CREDITS

- Hirmer Fotoarchiv, Munich: 1, 8–10, 17, 20, 34
- Staatliche Museen zu Berlin: 2–3, 13
- British Museum, London: 4, 7, 37
- Saskia Cultural Enterprises, Freeport (Maine): 6, 19 bis
- Deutsches Archaeologisches Institut, Athens: 5
- Smeets Lithographers, Weert (Holland): 11
- Staatliche Antikensammlungen und Glyptothek, Munich: 12a-b, 15
- Badisches Landesmuseum, Karlsruhe: 14
- National Archaeological Museum, Athens: 19 copyright Greek Office of State Policy (Department of Revenues for Electronic Works)
- Museo Regionale Archeologico “Paolo Orsi.” Siracus: 18 (su concessione dell’ Assessorato Regionale Beni Culturali e Attivita della Regione Sicilia)
- Author’s sketches: 16, 21, 25, 37
- Prof. Vincent Bruno, Brooklyn: 22, 28
- Dr. Photias Petsas, Athens: 23–24
- The Archeological Society at Athens: 26–27
- Soprintendenza Archeologico delle Provincie di Napoli e Caserta: 29–30, 36
- Biblioteca Apostolica Vaticana: 31
- Éditions d’Art Albert Skira, Geneva: 32
- Galleria Doria Pamphili, Rome (www.doriapamphili.it): 33
- Museo Nazionale Terme, Rome: 35
- Hans-Georg Hetzler, Basel: 38–48

Besides individuals mentioned in the above list, I wish to acknowledge the generous cooperation of the following in establishing my illustrations:

Dr. Gertrud Platz (Berlin); Dr. Dyfri Williams (London); Dr. Friedrich Hamsdorf (Munich); Dr. Jutta Stroszeck (Athens); Prof. Dr. Klaus Fittschen (Athens); Dr. Michael Maas (Karlsruhe); Dr. Vincent Brinkmann (Munich); Dott. Giuseppe Voza (Siracusa); Stephano de Caro (Naples); Don Raffaele Farina sdb (Vatican); Prof. Ronald Wiedenhoef (Littleton, Colorado).

PREFACE

Besides presenting the theoretical framework on which my views on Greek painting as a scientific and historical phenomenon rest, I offer a detailed analysis of the colors of selected vases and wall paintings as a demonstration of that framework. In some cases a matching analysis from the side of pure form will be presented in a companion volume on periodicity in Greek sculpture (see Introduction).

In carrying out this project I was constantly reminded how deeply indebted I am to my students in the Art History Program of the University of Massachusetts, particularly those in my seminars, and to the students in my seminars in the Division of Classical Archaeology and of Art History at the University of Freiburg-i-B (1976 and 1984) for their sympathy, empathy, criticism and enthusiasm for my ideas. Because of them it seemed worthwhile—and even imperative—to work out, after my retirement, the philosophical underpinnings of my views in written form. Moreover, I am indebted to my colleagues, particularly Laetitia LaFollette and Mark Roskill in Amherst and Eric Forssman in Freiburg, for help and encouragement, and not least to the enlightened policy of former Provost Richard D. O'Brien in providing secretarial assistance to retired professors on a generous scale. I am also indebted to the Deutsches Archäologisches Institut in Berlin, which supported the project by granting me two sojourns, in 1988 and 1989, for the use of its superb library facilities. There have been many others along the way both in this country and Europe who have contributed in minor but never unimportant ways to the completion of this work. These cannot all be named, but it would be most inappropriate not to mention Professors Arthur Zajonc and Bodo Hamprecht of the Physics Departments of Amherst College and the Freie Universität in Berlin, respectively, who patiently suffered my questions about optics and color theory, which I had to understand in order to make sense of the statements of early Greek philosophers. A course in optics at the 1983 summer session of the Rudolf Steiner Institute taught by the late Hans Gebert also stood me in good stead. Moreover, I am deeply indebted to Hans-Georg Hetzel, formerly of Freiburg-I-B, for many stimulating

conversations about Goethe's color theory, practical demonstrations of various facets of it and discussions of it before paintings in various museums. Two of the fruits of this are the interview recorded in Appendix B and the color plates 40–50 generously prepared by him. I am grateful for useful suggestions about organization of the text to Dr. Karl-Martin Dietz of the Friedrich von Hardenburg Institut (Heidelberg), who read the manuscript at a critical stage and particularly to Professor J. J. Pollitt of Yale University, who convinced me that my ideas on color should be presented as a separate volume.

It is a great pleasure to express my gratitude to the Libraries of the University of Massachusetts at Amherst which, through the good offices of Linda Seidman, Head of Special Collections and Archives, Rachel Lewellen, Librarian for Digital Initiatives, and Charity Hope, Research Library Resident, all of the W.E.B. DuBois Library, have demonstrated the high degree of commitment to humanistic studies characteristic of the University of Massachusetts.

Not the least I am grateful to J.A. Burton, whose lawyer's mind reviewed the manuscript and persuaded me to recast not a few obscurely expressed thoughts.

INTRODUCTION

A COSMOLOGICAL INTERPRETATION OF GREEK COLOR THEORY

WHY COSMOLOGICAL?

For the unimpaired human being, color is the most constant, inescapable and omnipresent of the sense impressions. The world is simply always colored, even at night, even in outer space. Therefore, any systematic attempt at explaining the phenomenon of color necessarily presupposes a world view and thus has real cosmological implications, whether these are recognized and spelled out or not. By the same token, such an attempt is in itself a symptom of considerable intellectual sophistication. We find this precondition in Greece at the time Empedokles provided the culmination of the philosophical speculation which had been carried on by the so-called Ionian School. In a poem (or poems) he undertook to explain the nature of the world as consisting of the four elements called earth, water, air and fire, each one being the expression of a deity as the divine force behind its dynamic manifestation in the visible world.

There is written evidence that he and other thinkers of the time associated four colors: black, white, yellow and red with those elements, although the pairing off is not immediately clear. They also took black and white to be the primal colors, all remaining colors being mixtures of these two in some way. That is approximately the extent of what one can compare with the modern physics of color which, with some historical distortion, is generally referred to as Newtonian color theory.

Leaving aside Newton's own, not inconsiderable cosmological speculations, which proved to hold little interest for those who accepted his physics, we find the irreducible core of his theory in the claim that all colors (excepting black and white which were not regarded as colors) are contained in light. A very real cosmological implication of this view—surely not foreseen by Newton himself nor articulated in the scientific tidal wave that followed upon his work—is that denial of a role to darkness in the genesis of colors devaluates darkness in all its other manifestations to a state of non-being. It may not be immediately apparent, but I believe it is inevitable, that acceptance

of this hypothesis has come with a heavy philosophical price: it obfuscates the role of the tragic, the dark, side of human existence. This might be apparent in the oft heard reaction to tragic events: if there were a God, he would not would have let this happen. The Greeks were under no such preconceptions about the role of divine powers, as Gertrud Kantorowicz and others have pointed out. That ancient people, perhaps more than any other, accepted the dark side of life as an integral part (rather than as a senseless interruption) of reality, just as they accepted darkness (black) as an integral part of color. It cannot, therefore, be surprising that it was they who invented the tragic drama as an artistic expression of the way human beings live, learn and die.

Even if one senses the importance of the gulf between the Greek and the modern orientation to color discussed above, it may seem an intellectually daunting task to try to use it as a basis for interpreting Greek painting. Thus it was not until, in the pursuit of my own avocation of painting, I became aware of the depth of the color theory (*Farbenlehre*) of J.W. Goethe (and began, as he recommended, to experiment with a prism), that I started to understand how that scanty tradition mentioned above can be focused, as it were, onto a fully intelligible image of reality out of which the Greeks seem to have worked.

Nevertheless, in order to pursue such a goal, which by its own terms has to be approached in an unusual way, I had literally to invent new methods and new concepts which may at first sight seem strange. But the operative question is, would these methods and concepts have seemed strange to the ancient Greeks themselves? While, of course, no answer to that question is possible, it at least suggests what I have tried to do, that is, expunge from consideration all of our own preconceptions (many of which might well seem outrageous by the standards of ancient peoples) and follow carefully what clues exist. Yet this does not need to be tantamount to abandoning the perspective we enjoy by being so far away from the ancient world in time.

Written documentation is not abundant and what exists is to a great extent incomplete or even fragmentary. The corpus of terracotta colored materials, especially pottery, offers many specimens for consideration, but there is a dearth of evidence in most other media, especially painting on panels and walls, at least until the later fourth century B.C. From this evidence in its totality I succeeded in making certain inferences which came together in the form of various diagrams and charts. I strove for a *theoria* in the ideal sense of philosophical speculation which might lead directly to empathy with the philosophical and artistic concerns of creative Greeks; for the mere fact that philosophers and artists associated each of the elements with its own specific color bespeaks an objectivity which is totally foreign in our age of individualism and subjectivism. The reader ought to bear this in mind in judging my efforts at color interpretation (of works of art). This factor, and all it implies, is surely the reason why ancient artists, in contrast to some contemporary artists, neither could nor would have explained why they used this or that color; they (and everybody) knew at some level why they did. If we are disappointed with the apparent vagueness of references to color in ancient poetry and even (in late times) treatises on color, that is surely to be explained on the basis of different cultural expectations.

In this latter respect my hope is that this study will complement and supplement the best of modern color studies, in which one will certainly include Vincent Bruno's *Form and Color in Greek Painting*: this has been an indispensable companion to my own wrestling with the subject of color. To go from that book to mine requires, I think, not so much any "leap of faith" as a willingness to go on reasoning on a different level, but one that was prepared for.

My suggestion, therefore, is that readers not turn at once to my interpretation of the meaning of colors in specific works of ancient art, but rather at first give some attention to my systematic examination of the color qualities of each of the four elements (see illustrations 12 and 13, Chapter II) and to my discussion of the polaric nature of spectral phenomena (see Chapter III, *The Two Spectra of Goethe's Color Theory* and *An attempt at a Holistic Interpretation of Color Meaning*). Since even classicists, let alone general readers, may not be accustomed to think in terms of the strict polarity which is implicit in much of Greek thought, it would be appreciated if readers would consider this before passing judgment on my application of the polarity principle. I have provided various inducements to do this in the text, in sometimes lengthy notes, and in the Appendix.

A MODERN APPROACH TO FOUR ELEMENTS PHILOSOPHY

So far I have discussed the relation of the canonical four colors to the four elements. But what about the elements themselves? What do the words earth, water, air and fire mean to the person of our era? Let me assume, for the moment, that these constituents are not registered as parts of a philosophical system but as figments of fifth century lore. In that sense, at least, they do survive in modern consciousness and might justifiably be regarded as ghosts of once living concepts, their vitality having been dissipated. The reason is not too far to seek. Elite academic thought, as reflected by historians of ancient science, has a world view that is unaware of, or else discounts, the dynamic quality of the microcosmic aspect (that concerning organisms) of Four Elements philosophy, an aspect that interacts at every level with the macrocosmic aspect (environment in the widest sense). Yet it is precisely this microcosmic aspect that has lived on just below the surface, as it were, of western consciousness. This will be explained in detail in Chapter I, but there is an easy way to form a preliminary impression of the dynamic interaction between the macrocosmic/microcosmic spheres. Instead of thinking about earth, water, air and fire as four substances, we can regard them as four principles basic to existence: the material (nourishment), the liquid (irrigation), the gaseous (atmosphere), and warmth. If an organism (a microcosm) is deprived of all food, it will normally consume itself and starve; if totally deprived of liquids, it will dehydrate quickly and die; if deprived of air, it will suffocate in a very short time; and if totally deprived of heat (as in technologically produced extreme refrigeration), it would die almost instantly. In an anthropocentric world view like that of the Greeks, the relevance of reasoning of this kind (not this particular reasoning is being ascribed to them) would be at once apparent.

It may perhaps also provide a starting point for an understanding of the macrocosmic/microcosmic orientation that led to the synthesis made by Empedokles.

Since we live in an age in which science (the equivalent of philosophy in ancient times), clothed in immense authority, undertakes to understand life as a system of chemical reactions steered by infinitely small microorganisms which have, from the human point of view, beneficent or hostile intentions (all of this in a universe which is openly regarded as baffling and the subject of constant new speculation), some readers may need some help in trying to grasp my detailed reasoning about actual qualities that can be associated with various levels of macrocosmic/microcosmic activity (summarized in Ills. 12–13). As this help I present in Chapter I a systematic explanation of how I understand both the historical and the derivative philosophy of the four elements, together with a single striking example of visual form (Figure 1) which shows how the views being developed here can be helpful in understanding the form and content of an early work of art.

That statement brings me to the subject of form, now mentioned for the first time (except in the title of V.J. Bruno's book). It is, of course, obvious that the core of Greek artistic activity cannot be reached on the basis of color alone: a way must be found to correlate color with form. The converse is also true: form cannot be fully grasped without color. Yet just this latter is constantly attempted. Art historians are generally disinclined to delve into color theory (although since the beginning of the 19th century various *artists* have done that). That disinclination probably rests on the abstractness of the Newtonian color theory with its mathematical concepts that have no obvious cultural connections. Again, fortuitously, Greek sculpture can and must be dealt with as pure form because whatever color it may once have had is gone. Despite this, form implies color and color implies form. This means that I should also look at Greek sculpture in the light of Four Elements philosophy, and I have indeed spent much time and energy doing so. It has turned out that the great problem involved in this is the nature of periodicity. The emphasis and methods required to deal with that subject are so different from those of color study that it must constitute a totally separate book: *Greek Sculpture and the Four Elements*. Suffice it to report here that, on the practical side, the terminology and dating listed below (and henceforth used) are fully explained and justified in that study.

Early Archaic	720–ca. 630
High Archaic	630–ca. 560
Late Archaic	560–ca. 525
Protoclassical	525–480
Early Classical	480–460
High Classical	460–430
High Classical Reaction	430–400

Late Classical	400–ca. 340
Protohellenistic	340–ca. 300
Early Hellenistic	300–ca. 230
High Hellenistic	230–ca. 160
Late Hellenistic	160–ca. 50 B.C.

To speak proleptically for the moment, it can be said that certain factors in the history of Greek color usage themselves have a strongly indicative effect on the problem of periodization and these will be discussed at the appropriate points in my text. However, the greatest benefit in concentrating specifically on color theory in one volume may be that the difference between the zeitgeist of the Greeks and that of our own time emerges in a particularly clear and untrammelled way (or at least so I hope). I refer with that term to what makes it difficult for us to get outside the assumptions of our own age and see them as time-bound (how will they look to the 27th century A.D.?), that is, not necessarily even on the right path. May we not gain something by looking back sympathetically at the experiences leading, as far as we can reconstruct them, to the quite different assumptions of an earlier age?

I.

HOW MAY WE UNDERSTAND FOUR ELEMENTS PHILOSOPHY TODAY

THE IDEA OF MACROCOSMOS (WORLD) AND MICROCOSMOS (HUMAN BEING)

“And first he (Bacchus viewing the doors of the palace of Neptune) saw, depicted with a wealth of colour, the confused features of primeval chaos, with a representation of the four elements about their divers functions. Above was fire, sublimely independent of matter and, ever since Prometheus stole it, the source of life to all living things. After it, soaring lightly and invisibly, came air, that found its habitat more readily and left no corner of the world, however hot or cold, unfilled. Earth, disposed in hills and valleys, was clad in green swards and blossoming trees, whence the beasts that inhabited it derived their varied sustenance; while, scattered about the land mass, water was clearly to be perceived, not merely nourishing many a species of fish, but supplying the humidity essential to existence.”

—Camoens, *The Lusiads* Canto VI (W.G. Atkinson translation).

THE CONCEPT OF A FOURFOLD WORLD

There are overwhelming obstacles to assured understanding of Presocratic philosophy—the mental equivalent to Greek art in the generations from the High Archaic to the High Classical Periods. First, our knowledge of it depends entirely on fragments preserved by later, sometimes very much later, authors and their commentators. There is not even certainty in many cases that the preserved fragments were actually written by the philosophers with whose names they are associated and, in any case, the context is lost.¹ How disastrous that is need hardly be insisted upon. All this gives rise to an ample secondary literature interpreting, at a vast distance of time, a large body of fragments of ancient secondary literature.

Secondly, the potentiality for misinterpretation of the intent of words was already formidable in the last mentioned and is increased by an inverse ratio in modern

secondary literature; for any words we use for translation and interpretation are freighted with a ballast of associations accumulated over thousands of years² and—what is more problematic—filtered through minds which can hardly escape being affected by a skeptical, materialist-positivist world view. However much we may feel that the Presocratics form the first link in the chain leading to this view, it would have been historically impossible for them to have had anything like it. Their rather poetic musings on how divine forces actually operated physically in the world are reminiscent of the way Galileo and Descartes emerged from a religious cocoon while hoping to enhance the glory of God with their discoveries. Yet in Greece there was no powerful church to restrain natural philosophers and public opinion was largely tolerant. To the outside world their ideas, if noticed at all, must have seemed as strange as the constantly changing style of the statues gracing temples and public places. In this milieu the Four Elements philosophy and contrapposto were in place by the middle of the fifth century (close dates are hard to come by³ but see Chapter II, *The Ancient Sources*, Demokritos section D, paragraph 3): on the one hand the first scientific method for a profound exploration of reality and, on the other, a formula (the Canon) for a profound understanding of the human body-mind interaction, a subject never previously brought to full consciousness. The two men responsible for this climax, Empedokles and Polykleitos, might be called midwives who delivered the two perhaps most revolutionary impulses that informed mature Greek culture and its ever widening influence.⁴ Yet the Four Elements philosophy, though ultimately prevalent, was to some extent misunderstood and contested by contemporaries of Empedokles, whereas the contrapposto stance invented by Polykleitos seems to have been immediately and instinctively grasped and became the touchstone for all later Greek sculpture (and beyond).

Although some generalizations about Presocratic philosophy can be made, there is no help for the verbal impediments to interpretation pointed out above. It has seemed to me therefore to be useful to consult the uncontaminated non-verbal record afforded by Greek art: at least theoretically and *grosso modo* a richer experience of the two categories should be attainable by allowing ideas derivable from the one to reflect onto the other and vice versa. That will be the method pursued in this study. Given that the current wisdom says that these are two unrelated aspects of Greek culture which should be kept apart, my results may seem unfamiliar to those who expect, after all, pure art historical analysis with perhaps a few references to what was going on in contemporary philosophy, or else a review of Presocratic philosophy with a few happy parallels from sculpture and painting. I will not fulfill either of those expectations, especially since others could do that better. My whole purpose in writing is to see whether it is feasible to pursue consistently the philosophical quality of Greek art and the artistic quality of Greek philosophy—both as vital aspects of “Greekness”.

It is not within my competence to enter technically into the dispute as to how much Presocratic schools owe to influence from Oriental sources. The prevailing tendency, with notable exceptions, seems to be to deny this as much as possible,⁵ whereas in regard to art the opposite tendency has long been characteristic of archaeologists. This question of the Greekness of Greek creativity, in whatever category,

is obviously of profound significance for accuracy of historical interpretation but at the same time demonstrates, in the hefty divergences of opinions about the same facts, that feeling and willing in individual coloration play no less a role in modern scholarship than they did in the sixth century B.C. In this light I present my opinion as to what was really different about the modality of thought introduced in Miletos and Ephesos, Samos and Croton from what had previously prevailed. It will be well initially to set aside the well-worn formula: from mythical to rational thinking, the complexities of which G.S. Kirk⁶ has graphically demonstrated. More generically, the Greek tendency was to pursue a line of creative endeavor tenaciously over generations, until the “right form” for it was attained, after which creativity expressed itself horizontally rather than vertically, in variants. Rhys Carpenter’s⁷ derivation of this judgment from the history of the orders seems to me to throw light also on the history of figure style in Greek ceramics. While each of its stages, beginning with silhouette style in Greek pottery, continuing with blackfigure in Corinthian and Attic pottery, and ending with Attic redfigure style, had its own rationale, collectively they represent an unceasing striving to find the most effective way of depicting in two dimensions the naked human form, simultaneously being worked out in an unbroken series of three dimensional stone statues. It is not without interest that the development of redfigure is generally considered to have peaked in the first half of the fifth century when the final struggle to achieve what we call *contrapposto* in sculpture was taking place. Thereafter redfigure drifted into a more theatrical stance and was exploited, especially in Magna Graecia, rather than developed further in the original sense indicated above. To some extent this parallels the exploitation of the orders once they were finally crystallized.

The kind of formal order which emerged in Attic Geometric and Archaic painting has less tangible but certainly recognizable parallels in the literary endeavors of Hesiod—and then in the next stage in the parallel stream of Orphic inspiration: Pherykydes and Pythagoras, and then in the Ionian School. It is not difficult to see that each of these was searching for the “right” explanation of the experiential world, but their methods differed so greatly that to find a common denominator is not easy. Certainly what did not change from an earlier stratum of experience is that in all of these the foundation of existence was felt to be divine, even if traditional religious formulae could be put in doubt or even discarded.⁸ It is exactly this which removes them furthest from our intellectually self-eviscerated age. To assert that Antiquity, no less than the Middle Ages, was an Age of Faith (even though, of course, the definition of faith has to be broadened accordingly) is not to help anyone understand that. But to visualize through art that, in the critical period we are considering, the “unbroken” world of the Archaic Greeks became the “broken” world of the Classical Greeks,⁹ might help.

THE FOUR ELEMENTS

*The stones (sc. minerals) have a fixed condition
and the plants have their growth.*

*The dumb beasts have all that and their soul pictures as well
but the power of reasoning (is) peculiar to human-kind.*

—Adapted from Chrysippos as quoted by Clement of Alexandria
(*I. von Arnim, Stoicorum Veterum Fragmenta*, no. 714 Leipzig 1903)

By the middle of the first millennium B.C. cumulative human experience with the basic structure of the earth and its denizens was evidently sufficiently extensive and inwardly absorbed that a “philosophy”—a rationalization—of that structure could be formulated. Based on well over a century of tentative ideas and speculation¹⁰ about the elementary composition of the world, a literally classic theory of four equal and commensurate elements was formulated by Empedokles at the latest and taken up by Plato and Aristotle. They pointed out that earth, air, fire and water do not only exist in recognizable isolation but also are constantly combined in nature by mixing into innumerable inorganic and organic compounds, giving the basis for substances and beings that came to be summarily classified as mineral, plant, animal and man. The order is hierarchical with mineral having only one element (earth) and man having all four.

The elements were understood equally as substance or the processual activities associated with it (solidification, liquefaction, rarefaction and combustion)¹¹ and certain qualities were seen as inherently associated with the four: hot, cold, wet, dry; and the four temperaments and perhaps more. The interdependence and commensurability of the microcosmic and macrocosmic forms of the elements under the influence of attraction and repulsion (love and strife) were fundamentally assumed. But I must stress that this summary is an *ideal* description of what was in ordinary life probably more felt and instinctive than articulated. In the light of this specific schema we become aware that, by the time of its formulation, in art the division between man and god was still being drawn with self-evident precision. The consciousness of an earlier millennium about it is reflected in the well-known ritual vase from Warka (Figure 1).¹² Earth—or the mineral realm—is represented or at least implied by the supporting base of the receptacle itself, above which the realm of water is depicted as a conventional design. Over that is a frieze depicting the realm of plants—which live from water into air—and then above the plants a frieze showing the realm of warm-blooded animals who also live from water and air into warmth through their blood and breath. Above this again is a taller frieze of men, servitors, who embody the sublimation of inward warmth to self-conscious activity in the service of the gods. Then towering over all this is a taller frieze depicting the goddess (or her priestess) toward whom all the activity and resources of the world flow. The divine world honored by the height of the frieze floats above the tangible world. At this stage it

must have been impossible to conceive of the fourfold world without divine overseers, as is equally evident in the art of the Pharaonic state, the First Babylonian Dynasty and in the Biblical account of the Hebraic theocracy.

This is the conception inherited by Greece from the past and still vitally and visually alive in the pediments of Olympia. Yet what the Ionian philosophers as a whole achieved was the detachment of the concept of certain individual underlying elements from the total scheme so that these could be individually scrutinized and evaluated as to their qualities. The process of intellectual inquiry thus initiated was *prima facie* specialized and one-sided, a tendency that appears to be reflected also in the concentration of Archaic sculptors on a narrowly defined schema of the human body—the youthful male or *kouros* type—as the key to unlock the fundamental riddle of the body-soul relationship. Other themes, even the female body, were neglected accordingly. This creation of philosophical inquiry and of a basic statue type of consummate perfection constitutes *ipso facto* a new stage of human self-consciousness that separates the Greeks from anything in the older civilizations, however much they may have taken materials from these.

It is again altogether in keeping with the Classical mentality that the discovery of substance *per se*, at the price of one-sidedness, should have been drawn back by Empedokles into a dynamically balanced philosophical system. He at least is the first thinker we know of who specifically proclaimed the commensurability of the four elements and their incessant interaction (this includes human thinking). Yet there is no reason to doubt that Empedokles and, in fact, most philosophers, continued to recognize the existence of a higher spiritual realm and the compatibility of the highest expression of the *four* elements: man himself, with it.¹³ Nevertheless, consciousness henceforth began to be drawn subtly and inevitably to phenomena and processes of the visible world; in effect, the divine factor came to be relegated to an extraterrestrial sphere considered to be, as it were, a fifth element—*aither* in Aristotle's *De Caelo*, then *quinta essentia*—obviously more subtle than warmth. As the quadripartite conception showed itself increasingly useful and versatile, the elimination of the divine factor from practical considerations (the quintessence becoming eventually the bailiwick of the alchemists) brought a certain freedom to downgrade or even ignore it.

In Hellenistic times a kind of pallid forerunner of modern “secular humanism” may have arisen; but Greek sculpture, drama and mainstream philosophy never totally lost a sense of spiritual realities, in whatever shading these might find expression. Paradoxically, from an early stage of its development onward, the Greek mind was also instinctively and creatively turned to the physicality of the world by the Four Elements theory, an explanation so deeply rational and fundamentally apposite to the human condition, that it could still today be profitably taken into account by the scientific establishment which all too often remains in a maze of mathematical abstractions as it pursues power over nature (see *Select Bibliography*, paragraph 2).

THE FOUR MEMBERS

At least two historians of ancient art have found it necessary in their analyses¹⁴ of Greek sculpture to refer to various “levels” or “souls” inherent in the human make-up. And they did not do this theoretically or as a quaint theory of the past. However, since their use of this concept was not systematic—and could not have been without full scale discussion of the Four Elements theory—I shall attempt to provide that systematic investigation here. The concept of souls is undoubtedly the least understood aspect of the parallel structuring of the macrocosm and microcosm although hardly the least known. There are enough references to it in Plato and Aristotle to guarantee that, in some way, the total system existed in antiquity as experience and perhaps tradition. In fact, once it is grasped, indications of it—even fairly systematic ones—can be recognized in earlier cultures, particularly that of Egypt. Yet modern scholarship on the whole has not shown much interest in that subject.

There are gaps, sufficiently plentiful that one can proceed only by analogy and deduction. On the one hand we have in the *Timaeus* Plato’s description of the earth as an organic World-Soul enveloped by a (physical) body. As Cornford¹⁵ then put it: “The parallel of macrocosm and microcosm runs through the whole discourse...and the soul itself is a counterpart, in miniature, of the soul of the world.” But for us too much is assumed to understand this easily. We also have the Empedoklean, Platonic and Aristotelian total commitment to the inter-mixing (*krasis*) of the four elements as the basis of all physical and organic reality. On the other hand, we have Aristotle’s description in *De Anima* of the structure of the human being, whose parts bear a relationship to the processual spheres of the four elements. If not much else is spelled out, we can assume either that it was too obvious to need comment, or was discussed in lost writings or—perhaps most likely of all—that the full systematic implications of the microcosmic-macrocosmic four elements theory lay beyond the particular interests of ancient philosophers. After this we find rather its traces, as a world view taken totally for granted, in such things as medicine and alchemy, for centuries, even millennia to come.

Stated in the most reduced terms the system requires that the members of each living being correspond in quality to subsuming similar members of the living world organism in which they in fact exist and without which they would perish. This is, for example, most easily understandable in the case of the individual physical body, which cannot be conceived of without its mineral component—for there would be no skeleton or, in the lowest echelons, visible substance. The recurring fantasy in films about “invisible men” demonstrates, moreover, that in the modern artistic imagination, at least, the human being is not limited to physicality but is shot through with invisible processes on which sentience and consciousness rest. It is precisely these processual systems, of which only the *effect* can be observed, and without which the physical body becomes a corpse, that comprise the upper three levels or souls of the four member system. The four member system is most concretely documented by Aristotle (although he tends to take the physical level for granted and thus does not actually speak of four). Though at present the least regarded aspect of the Four Elements theory, this

quadripartite articulation of the human being has remained as the essential frame of reference of the western world and still survives—largely unexamined and uncoordinated—in our conceptual life as physical anthropology (study of skeletal systems, among other things), physiology (study of the vital systems, particularly glandular), psychology (study of the emotional and mental capacities, particularly as carried by the nervous system) and ego. Since modern psychology has no concept of soul as such, it overlaps into conclusions about the ego, which in the Greek system corresponds to a separate fourth member, *nous*, the cogitative faculty, not present in animals. In effect, the crowning term of the four—all derived from the Greek language and fossilized in our time—should be philosophy. The latter, deprived of its former relation to peoples who understand themselves in fourfold terms, has had no choice but to become increasingly abstract and peripheral in human affairs.

Despite the present tattered condition of the system, it was used in a dynamic correlative sense as late as the 19th century by Ignaz Paul Troxler (Basel) and others for medical and philosophical conclusions¹⁶ and even later by Nikolai Hartmann (1882–1951) as a framework for his philosophical system.¹⁷ It has been used for the interpretation of ancient Near Eastern art by Walter Andrae (see note 12). To the historian's eye the full integration—or re-integration—of this system by Rudolf Steiner (1861–1925) as the basis of his cosmology indicates that the four elements theory is still evolving.¹⁸ To my knowledge Steiner, working closely with concepts from Goethe's scientific work, is the only modern thinker to give full weight to the macrocosmic aspect of the microcosmic foursome. Above the physical body (which Aristotle dealt with *en passant*: de An. 411a he uses the term etheric body for Aristotle's *threptikon* or nutritive soul, astral or sentient body for the *aesthetikon* or sensitive soul and ego for *nous*. His subordinate parts of the *nous* are likewise documented in Aristotle (see my study of Greek sculpture). The etheric body of an individual (plant, animal, man) regulating the vegetative, liquefying processes of life is dependent on the etheric body (roughly atmosphere) of the earth organism as a whole. The individual sentient body (of animal, man), seat of the feeling life, is correlative to the sentient body (a collective phenomenon, from the individual point of view) of the earth. The ego (of man alone) is related to a macrocosmic ego of divine nature.

All of this is, explicitly or implicitly, a Hellenic view¹⁹ of human reality. It is probably safe to say that its existence, in varying degrees of explicitness and understanding, was never seriously challenged in principle until the intellectual effects of the nominalistic controversy of the Middle Ages began to condition the definition and practice of natural science. Even then it was too massive to be totally displaced, as noted above, and it has also had a succession of powerful defenders, e.g., Kepler and Goethe. Nevertheless, the nominalistic world picture that originated in medieval philosophy and culminated in the materialism of the 19th century has us all in its grip, despite our perhaps valiant efforts to escape it²⁰—even though 20th century quantum physics and relativity theory have discredited much of it (in a manner, unfortunately, too abstruse and impersonal to penetrate or fructify public consciousness²¹). The natural sciences each pursue their own agenda to infinite particulars while the social sciences make what they can of the results of the elite sciences. Nor can ancient studies stay above this

obtrusive intellectual turmoil. This is not said in a spirit of criticism of its practitioners but to explain why I am impelled to offer this study: it is my way of trying to make sense of the crisis ²²sketched out above.

II.

GREEK COLOR THEORY

PROLOGUE: WHAT IS GREEK COLOR THEORY?

In General

The term color theory no doubt brings to mind for many people only Newton's theory that colors are created by the refraction of (white) light. So pervasive is this doctrine in contemporary life that the existence of other explanations of color—if one has heard of them at all—is considered at best a matter for historians of science.

However, historical research cannot be objective if it proceeds on the basis of Newtonian paradigms and vocabulary as a standard of legitimacy. For one imposes thereby criteria which are, or may be, alien to the thinking that produced different paradigms and vocabulary. Obvious as this proposition may seem in the abstract, the history of scholarship on Greek ideas of color, recently reviewed by Heinke Schulz in *Die Farbe Purpur im frühen Griechentum*, makes it clear that taking that proposition seriously has proceeded only in slow stages.

It is equally clear that an attempt to understand the way Greek thinkers dealt with color on their own terms has the best chance of resulting in some enlightenment if undertaken by someone who has a personal standpoint out of which a question has arisen, giving rise to more questions. This is likely to require a certain inventive capacity, for what one researcher sees as a vital sign may figure hardly at all in the thought structure of another. This is obvious enough in the differing approaches likely to be used by the philologist, historian of science and historian of art; but on this complex subject, it might not be less operative in the work of any two practitioners in the same field. Yet all may add a few tesserae to the mosaic of ancient reality that can never be fully restored.

In Particular: at the Documentary Source

In the case of the book mentioned above the motivating question was the role played by literary references to a color which is usually translated into modern languages as purple. The author begins with a concise discussion of passages in ancient authors referring to the nature of color. This offers a good starting point for me as well: prior to presenting my own review of the ancient testimonia from the point of view of the particular question that motivates me, I shall retrace Stulz' path¹ briefly to bring readers directly into what is a sphere of reasoning and observation that needs much thought. For what is at once evident is that in that sphere the tools of thought are the four elements: fire, air, water and earth. These broad terms need to be defined with the utmost precision—and will be in my own study. However, for the present, I shall introduce them by reviewing the discussion of Stulz.

It is not accidental that Alkmaion of Cretona, one of the earliest sources for a theory of perception, was a Pythagorean physician. His work is known from references in Theophrastus which plunge into a profound physiological problem: how does the eye see? It sees through the water that surrounds it (*dia tou perix hudatos*). But that statement raises a host of other questions, hardly answered by further references to fire “which the eye (also) has” and to that which gleams, and to translucence.² In effect, one is confronted by a philological maze from which exit is possible only by rather arbitrary interpretations. Stulz' conclusion: the ray which transmits the color of an object to the eye is a kind of fire.

However obscure to us, the ideas of Alkmaion provided the frame of reference in which the later Presocratics: Empedokles and Demokritos, moved. The teaching of the former is summed up in his famous simile comparing the eye to a lamp. As the lamp radiates rays of light, so does the eye, which contains eternal fire shut up within it—though able to emerge through channels in the surrounding water. Earth and air can easily be factored into this process (as described in a fragment). Empedokles relates this to perception of white and black by the eyes for the purpose of explaining blindness by day and by night. Stulz found no other discussion of color perception by him and denies that a famous passage in which the philosopher mentions color practice of artists (see Chapter II, *The Ancient Sources*, Empedokles, E) proves that he entertained a theory that four colors were a basis for creating further colors by mixture. Yet it must be granted that he had developed a theory of perception which—combined with his principle of “like gravitates to like”—would indeed offer the framework for a four color theory.

Furthermore, even though there is no record of an Empedoklean perceptual theory for senses other than sight, his basic principle of emanation would obviously be applicable to them: there are emanations of all things that ever came into existence (*panton eisin aporroai, hosa egenonto*). Moreover, the emanations from the eye are corporeal (even light is). But while we might conceive of these as particles, they are not material in the sense of something dead; rather they are compounded of the active principles of the four elements—ultimately, divine forces. A famous passage describes how these forces, quasi nature forces, operate in the world with each one controlling

certain basic emotional responses in the human psyche (see Chapter II, *The Ancient Sources*, Empedokles, A).

If Empedokles did not produce a recognizable color theory, Demokritos did insofar as he attempted to explain the characteristics of particular colors by reference to the characteristics of the atoms constituting them. Thus the color called white has perfectly smooth atoms which cast no shadows; the nearest analogy being mother of pearl, which suggests not only light but also lustre. Translucence is also to be connected in some way with white. The fact that canals are postulated somewhere in the complex of atoms impresses on us how difficult it is really to understand the technicalities of fifth century thought. Black also has such canals but in combination with rough-surfaced atoms, whereas red is allowed to consist directly of fire (light) atoms. Thus in the required mixture for purple: white, red and black, it is white that provides the lustrous quality. Warmth is associated with red, not merely because fire was the only source of energy known to the ancient world, but also because it denoted for Demokritos the interchangeability of the atoms associated with warmth, soul, *nous* and movement. Thus the element fire is not defined as a specific force in nature but as an unstable constellation of atoms (at least as implied by Aristotle—but other statements of that author cast some doubt on this).

In any case Demokritos conceived of colors as so many quantities of energy (light), ranging from a pure form of it to a total lack of it (black). Such reasoning comes from a quite different sphere from the idea of colors laid on an artist's palette: colors are not something laid on objects but energy equations of the objects themselves. In fact, Demokritos would deny the existence of artists' colors as such. To complicate matters for us, Anaxagoras—without being an atomist—had the same opinion about the nature of color.

Like Demokritos, Plato also reckoned with self-radiating objects; but Plato thought that their rays meet and mingle with the pure fire (rays) placed in all human eyes by the gods. Thus seeing (or not seeing) depends on the size, strength and speed of the rays emanating from the objects, while perception of the various colors depends also on that process. The most dynamic confrontation with the eye results in the effect called *lambron* (see Chapter III, *The Evolutionary Aspect of Colors*, paragraph 6), while the least dynamic reaction results in white. A reaction weaker than that of white fails to reach the eye at all, which produces black. Thus a scale is established running through *lambron*, *erython* (red), *leukon* (white) and *melan* (black). In effect, for the colorless neutral atoms of Demokritos, Plato substituted a system of fire (light) reactions as color products. The most potent of these, *lambron*, actually overwhelms the fire of the eye like a lightning flash—and expels it. This leads Stulz to say that color intensity seems more important than hue. The spiritual nature of the color experience is underlined by the words of the dying Sokrates that, in the ideal world, hues are the same but more *lambron* than in our world [But if physical eyes are required for the experience of color, how is this possible?] The dynamic quality of Plato's particles depends partly on their being tiny, with sharp corners, and swift. These qualities allow them to activate the blood, split up and digest food, generate movement and in effect constitute the life processes of all creatures. Colors are a (graduated) effect of this principle.

Aristotle rejected the notion that a fiery ray emanated from the eye and reflected back from the objects to create sight—on the grounds that if this were so, night vision would be normal. By the same token he objected to the theory of emanations from objects, since the eye does not perceive them when the objects are pressed against the closed eye. Still, he did not attempt to eliminate the idea of physical context altogether, for he postulated the necessity of a medium between the eye and its percept, and reached back to the Presocratic translucence (*diaphanes*), which exists in water, air and translucent objects. Light is the agent (*energeia*) that reveals translucence as an incorporeal state ranging from bright to dark. Insofar as this flows into objects it ceases being mere light and reveals color as well as their substantiality. The color of the object in turn puts the medium itself in motion and this is transmitted to the eye. Thus color, like light itself, is immaterial and a state or form of energy. However simultaneous this process may seem to be, conceptually it involves several distinct stages: object activates medium, medium become translucent, medium activates eye. Obviously, the role of light is to make this process possible, but Aristotle attributes no movement to it, whereas the resulting color is an activator (*kinetikon*) of the medium.

Aristotle also deals with the way colors arise. Objects consist of a mixture of elements with colors that reproduce said mixture. Colors are a mixture of black and white (light and darkness). These two colors strike the eye with such velocity as not to be perceptible as such. Color probably arises from superimposition (in accordance with the distribution of elements) taking place on the basis of arithmetical principles. Among the five colors (besides black and white) recognized by Aristotle is purple—comparable to a chord in music. Since this is the point of departure for Stulz, I append her comment (her pp. 61–63):

Since yellow is apparently bracketed with white, the first degree of diminished white is purple. Its origin from black and white is demonstrated in various cosmic phenomena. For example, the sun appears purple behind smoke or mist. In the sky the impact of white and black should often provide the occasion to observe the play of bright colors, but by day the light of the sun prevents this and by night all shades of blue and green are swallowed up by the darkness with only purple being light enough to be seen.

Purple does not eclipse blue and green through its lightness (*value*)—in which case we would be weighing colors—but through its glow (*saturation*), that is, its color intensity. This is quite alien to our way of thinking. Since for Greek eyes color intensity replaces value as the most important color characteristic, purple can appear in that context as the weakened but still second most important color of light. Also, Aristotle proposed purple as the strongest color-energy after light itself.

The author of the post-Aristotelian *De Coloribus* assumes the reflection of the sun from objects as colored light to be the origin of color but resorts to the definition of light as a stream of small particles rebounding off objects—in contrast to Aristotle and also Plato. Pure colors are never seen because of the consistent modification of (visible) objects

through light and darkness. The colors themselves are dependent on the mixture of elements in the objects and—in the case of organisms—additionally by the influence of heat and moisture.

Stulz concludes:

Even within this final document, the two characteristics of Greek color sensibility appear:

Color is rays of light or fire.

Color reflects the state of the object to which it belongs.

At this point the reader may well ask what I have gained from preparing the preceding summary of another scholar's work. This has, in fact, brought clearly and forcibly to mind exactly that side of Greek color experience which the modern mind will most readily grasp, namely, the intellectual continuum from the Greeks to ourselves in the concept of light—with which (to say the least) color is involved—as consisting of rays; for rays were taken up by Arabic science and converted into essentially a mathematical abstraction, as it were, which lay to hand for Newton, whence it has come to form an integral part of modern optics. And, despite the up-front ubiquity of chromatic colors in human vision, their specific existence had an ancillary position to light (and, as we have seen, could even be denied) from the beginning investigations of the Greeks onward. Their speculations were, then, also the beginning of the science we know as physics. I mean this in the following way. Greek ideas on light and color played out against the larger scientific concept of a four elements world. Because there is no ancient treatise specifically analyzing that conception—a little reflection will suggest that there could hardly have been such—even historians of science glide over it. My contribution is to have “thought out to the end” the implications of the interaction of the elements both in general and specifically in relation to color. This is presented in pictorial form in Chapter II.

Nevertheless, in contrast to the preceding, what is not of great interest to modern commentators (including Stulz) but cannot be sufficiently stressed, is that Greek color science evolved from direct consideration of human vision as processes of fire and water in the functioning of the eye-structure itself. It rested therefore on an organic-anthropocentric foundation, whereas the problem has since become—and especially since Newton—a matter of quantifiable abstractions; there are only hints of this direction in a few Greek thinkers, particularly Aristotle. Present day physiology has to make the best of these abstractions and obviously has to go in a direction opposite to that of holistic concepts.

In the ongoing development of color theory over the centuries only one creative mind really set itself against the last-mentioned view and thereby rejuvenated the problem, so to speak, in the original Greek sense: J. W. von Goethe. His inspiration to do so, however, did not come from a knowledge of Greek color history but from very contemporary considerations. But in due course he did acquire that knowledge in as much detail as was possible in the late 18th and early 19th centuries and was well aware of his historical position in regard to it. Indeed, his predilection for the “Greek way” was

so marked that the concept “Goethe and the Greeks” has evoked much literature in its own right. What I believe has never been systematically investigated is the degree to which Goethe’s own organic-anthropocentric standpoint created a color theory that appears to incorporate and to expand much for which the basic attitudes of Empedokles, Hippokrates and Plato laid the basis.³ This will be a secondary theme that emerged from my primary motivation.

THE PROBLEM

Although the theory of the four elements is well known, the concept of a theory of four colors is virtually unknown, even among many scholars in the ancient field. What is that concept? It refers first of all to a seemingly insoluble problem in the history of Greek painting, arising from references in Pliny the Elder and Cicero, to the use of *quattuor colores*: black, white, yellow, and red in certain Greek paintings (see note 1). Attempts have been made to understand these references on the basis of philology and art history as well as of the actual remains of ancient painting. Some very valuable and plausible results (to which I shall refer as needed) have indeed been obtained. My interest in this subject, however, is much more comprehensive, that is, to understand what it is that makes these four colors so special (this, of course, involves the other colors!)—insofar as this can be gathered from the natural philosophy of the Greeks themselves and from modern exoteric and esoteric conceptions of the nature of color.

The ancient tradition in regard to a connection between the Four Elements theory and the Four Colors theory—for so it must be called—is not only meager and sketchy but, on the face of it, enigmatic. Yet the parallel positioning of the two concepts, e.g., in Empedokles, Demokritos and Plato, is so noticeable that one cannot really doubt *whether* the Greeks regarded them as being correlative, but only whether they connected each of the four elements to a particular one of the four colors.

It would naturally be ideal if the writings of the ancient philosophers answered this question directly. However, the absence of a single unmistakably attested commitment in this regard, though discouraging, does not have to mean that no such connections were made. It could, for example, have seemed so obvious to the authors concerned that they never thought to mention it, or the point might never have figured in their arguments. Or their theorizing might not have reached a stage that suggested any systematic discussion of the matter. I refer here to the sphere of physics; at least in the sphere of physiology—thus indirectly—we have some information on the problem.

One should also take into account that the Four Elements theory itself apparently did not achieve a systematic form until the poem of Empedokles in the Classical period. Its basic components were certainly recognized in the Archaic period, but not brought together. Moreover, this theory was expressly a concern of the intelligentsia, which at the time of Empedokles was beginning to turn away from the physical science of the Ionians to explore other aspects of philosophy: thus there would have been no urgency about such a tangential aspect of Empedokles’ thought. In fact, we might suppose that

philosophers could have been less interested in pursuing such connections than artists (for purely artistic reasons). On the basis of all this the appropriate question seems to be—not whether there was any conscious equating of the two quaternary series but—whether such an equation can be logically posited. In order to begin work on this problem, we may turn our attention once again to testimonia concerning color.

THE ANCIENT SOURCES

It is essential to have an overview of those ancient passages that throw any light whatsoever on the problem of how the four colors were combined in any way with the concept of four elements. To this end I reproduce and comment on such passages either with original text and translation or with translation alone; in a few cases of longer arguments summaries are used. My concerns, of course, are not purely philological, as in the basic studies of W. Kranz, H. Dürbeck and others. Unless otherwise indicated, translations are my own.

Empedokles

The passage that serves as keystone for this entire study is a fragment of the works of Aëtius, a physician of the late 6th century A.D. Herman Diels 1964, 31, 21 A92 cites Aëtius, I, 15, 3 (D. 313:)

Ἐ. χρώμα εἶναι ἀπεφαίνεται τὸ τοῖς πόροις τῆς ὀψεως ἐναρμόττον. τέτταρα δὲ τοῖς στοιχείοις ἰσάριθμα, λευκὸν μέλαν ἐρυθρὸν ὄχρῶν.

to Plato, *Meno*, 76D: “SOC. Well, do you speak of certain effluences from things, in agreement with Empedocles?—MENO. Certainly.—SOC. And pores into which and through which the effluences travel?—MENO. Yes, indeed.—SOC. And some of the effluences fit certain of the pores, others are too small or too large?—MENO. Yes.—SOC. And do you say that there is such a thing as sight?—MENO. Yes, I do.—SOC. Well, “take my meaning” from this, to quote Pindar. Colour is an effluence from shapes which is commensurate with sight and perceptible.” (Plato, *Meno* Edited with Translation and Notes by R.W. Sharples, Chicago 1985.) To this Aëtius commented: “(Empedokles) declared that color fits the pores of vision. And the four colors: white, black, red, yellow are equal in number to the four elements.”

It would seem that Plato and Aëtius are independently referring to the same passage in Empedokles’ works. Sharples, 136, notes that the definition of color given by Socrates is not specifically that of Empedokles. The second sentence of Aëtius is generally regarded as a further piece of information from the work quoted (as I have translated it), although in the absence of the complete context its relation to the first sentence is uncertain. However, the fact that Empedokles was here discussing a physiological question, and that Aëtius by his profession could be expected to refer to the same subject makes it doubtful that he was throwing in a proposition from the color physics of Empedokles’

day, particularly since in that sense the statement as worded would make a rather naive proposition. It seems more likely that the mention of the number four has a Pythagorean flavor (see Chapter II, *The Ancient Sources*, Pythagoreans, A, for a similar constellation in the writings of Aëtius). Therefore, I believe that the statement in question *may* have something to do with the (Pythagorean-derived?) Hippokratean *microcosmic* tradition of four colors and four humors. This would be weak evidence indeed to connect Empedokles with a definite system of color-element equations, especially since his own fragments offer no support for such an assumption.

A selection of passages from the *Peri Physeos* in the translation of Kathleen Freeman, *Ancilla to the Pre-Socratic Philosophers* (Cambridge, Mass. 1962) following Diels' compilation is offered to convey a sense of the manner of Empedokles' thinking and feeling as he presents his theory of the elements in a graphic, non-abstract way.

(A) Diels B21; Freeman, 54 "Observe the sun, bright to see and hot everywhere and all the immortal things (heavenly bodies) drenched with its heat and brilliant light; and (observe) the rain, dark and chill over everything; and from earth issue forth things based on the soil and solid. But in (the reign of) Wrath they are all different in form and separate, while in (the reign of) Love they come together and long for one another.....For these (Elements) alone exist, but by running through one another they become different; to such a degree does mixing change them." Empedokles here connects the sun, white and warmth in one all-encompassing conception. Yet λευκόν and even more δυσφοίνια—not very outspokenly a color term—are certainly used in this passage in a poetic sense, so that no technical conclusions can be drawn from them. In this connection note should be taken of a citation from Plutarch in the following:

(B) Diels B. 94; Freeman, 61 "And the black colour in the bottom of a river arises from the shadow, and the same thing is seen in deep caves." Here the shadow on the river bed is called black but not the water itself; this is a common sense observation, not color theory. In the following passage the technical color word μέλαν is more directly connected with materiality:

(C) Diels B.67; Freeman, 59 "For in the warmer part the stomach (i.e. the womb) is productive of the male, and for this reason men are swarthy and more shaggy." Here black is connected with firm substance measured by the density. The following passage summons up the lively intermingling of forms and color:

(D) Diels B.71; Freeman, 59 "But if your belief concerning these matters was at all lacking—how from the mixture of Water, Earth, Aether and Sun (Fire) there came into being the forms and colours of mortal things in such numbers as now exist fitted together by Aphrodite...." This proposition is illustrated by the following:

(E) Diels B.23; Freeman, 55 "As when painters decorate temple-offerings with colors—men who, following their intelligence, are well-skilled in their craft—these, when they make many-colored pigments in their hands, and have mixed them in a harmony, taking more of some, less of another, create from them forms like to all things, making trees and men and women and animals and birds and fish nurtured in water...." For

our (D) above suggests that Empedokles was familiar with a (Pythagorean?) doctrine of numerical proportions (of elements) in the composition of colored organisms; (E) shows that he was familiar to some extent with artists' practices. One can not make out exactly what is meant by ποικίλλωσιν (not translated by Freeman but given as "*bunt*" by Diels) or by πολύχροα φάρμακα (Diels: vielfarbige Gifte.) A final passage rounds out the nature of the system described in (A) above.

(F) Diels B.17; Freeman, 54 "All these (Elements) are equal and of the same age in their creation; but each presides over its own office, and each has its own character, and they prevail in turn in the course of Time. And besides these, nothing else comes into being, nor does anything perish..."

Aristotle on Empedokles:

(G) *Metaphysics* I iv 7 (985a, 30f.) from Loeb edition, 1975 "Empedokles, then, differed from his predecessors in that he introduced the division of the causes, making the source of motion not one but two contrary forces (Love and Strife). Further, he was the first to maintain that the so-called material elements are four—not that he uses them as four, but as two only, treating fire on the one hand by itself, and the elements opposed to it—earth, air and water—on the other, as a single nature..." This virtually implies that Empedokles emphasized the extraterrestrial source of all heat, the sun, as a force polar to the other, more earthbound elements.

Theophrastus on Empedokles:

(H) Diels A.69a: *De Sensu* 59 (D. 516, 9)

Ἐ. δὲ καὶ περὶ τῶν χρωμάτων (näml. λέγει) καὶ ὅτι τὸ μὲν λευκὸν τοῦ πυρός, τὸ δὲ μέλαν τοῦ ὕδατος.

On the subject of colors, E. said that white is that of fire, black that of water.

If this information was culled from such places as (B) above or from the following, it can have little bearing on color theory. Moreover what is suspicious in this sense is that no other colors are mentioned.

(I) Diels A.86: *De Sensu* 1ff. (D.500) 7

τοὺς δὲ πόρους ἐναλλάξ κείσθαι τοῦ τε πυρός καὶ τοῦ ὕδατος, ὧν τοῖς μὲν τοῦ πυρός τὰ λευκά, τοῖς δὲ τοῦ ὕδατος τὰ μέλανα γνωρίζειν· ἐναρμόττειν γὰρ ἑκατέροις ἑκάτερα. φέρεσθαι δὲ τὰ χρώματα πρὸς τὴν ὄψιν διὰ τὴν ἀπορροήν.

E. says the pores of fire and of water respectively are crossed, white things being recognizable by the fire pores, black things by those of the water. For they are adjusted to one another. And he said that colors are brought to the vision by effluence.

Empedokles here is speaking of physiological modalities, which can hardly have anything to do directly with color-element equations, especially since there are no more visual routes to accommodate red and yellow sensations. Yet it is highly interesting that he

proposed a cross-sensory functionality—quite in the mold of contrapposto with its three dimensional contrast of left-right, forward-back, and up-down.

Adding up the available evidence, we are in little doubt that Empedokles was acquainted with a four color physiological system, though the evidence is more indirect than direct. Despite a persistent tendency for water to be associated with dark effects, it does not seem necessary to suppose that he disagreed with the rational equation of black with matter (earth). See especially (G) above. Theophrastus' report on the color of fire and water in (H) may also be meant physiologically. In any case, it is tantalizing because the passage continues: “the other (thinkers with the exception of Empedokles) claim that white and black are the original colors and that the other colors arise from mixtures of these, and also Anaxagoras spoke only of these two.” Also, Aristotle still represented this view (see Chapter II, The Ancient Sources, Aristotle, paragraph 2) and it is not clear actually how Empedokles differed from it (for he too in the available passages speaks of only these). Krantz makes an inference from (E) that Empedokles derived warm and cool colors alike from mixing the four colors (see note 2). This seems to me (as also to Stulz, see above Chapter I, Prologue, *In Particular*, paragraph 3) to be an absurdity which one cannot foist on the words of Empedokles. I prefer to remain with the fact that Empedokles nowhere discussed the four colors in a philosophical way either in the macrocosmic or the microcosmic sense.

Anaxagoras

(A) Diels A97. Sext. Pyrrh. hypot. I 33

νοούμενα δὲ φαινόμενοις [näml. ἀντιτιθεμεν] ὡς ὁ Ἀ. τῷ λευκὴν εἶναι τὴν χιόνα ἀντετίθει ὅτι ἡ χιῶν ὕδωρ ἐστὶ πεπηγός, τὸ δὲ ὕδωρ ἐστὶ μέλαν, καὶ ἡ χιῶν ἄρα μέλαινά ἐστιν.

We are opposing contrived thoughts to appearances, just as Anaxagoras opposed to the fact that snow is white the fact that snow is frozen water, and since water is black, isn't snow also black?

(B) Diels A98 Schol. Hom. (A) zu 161

μέλαν ὕδωρ Ἀ., ἐπεὶ φύσει μέλαν· καὶ γοῦν ὁ καπνὸς μέλας ἐστὶν ἐκ τοῦ ὕδατος τῶν ξύλων ἀνιέμενος.

Since (water) is black by nature, says Anaxagoras, then smoke is also black from the water released from the (burning) wood.

These two passages recall the statement attributed to Empedokles (H). Anaxagoras (A) is, of course, a sophistic play with concepts which nevertheless implies that he routinely associated water with black. The source of all references to black water—not merely that of Anaxagoras(B)—must be the highly poetic and dramatic Homeric allusion to a pack of blood-sated wolves drinking from “the surface of the black water from a dusky spring” (Iliad, XVI, 161). That this became a proverbial trope even in the speech of philosophers is not surprising. What would be surprising would be an attempt on their part to justify the poetic usage in the sense of physical philosophy. That being impossible, I interpret

Anaxagoras (B) in the same sense as (A): a sophistic or ironic statement, for the statement in itself is almost irrational: the smoke from burning wood is normally white (even though enough of it can blacken other objects—from the residue of the chemicals of the wood, not the water in it). I have already suggested the true explanation for the image in the discussion of Empedokles (B). Of course atmospheric effects may also play a part in the effect of darkness of water.

Pythagoreans

(A) Aëtius (plac. I) H. Diels, *Doxographi Graeci* (4.ed. Berlin 1965) 313 Plutarchi Ept. I,15, 1–7)

Χρῶμά ἐστι ποιότης σώματος ὀρατῆ.

Οἱ Πυθαγόρειοι χροῖαν ἐχάλουν τὴν ἐπιφάνειαν τοῦ σώματος.

Οἱ ἀπὸ Πυθαγόρου τὰ γένη τῶν χρωμάτων, λευκὸν τε καὶ μέλαν ἐρυθρὸν *ὠχρὸν*· τὰς δὲ διαφορὰς τῶν χρωμάτων παρὰ τὰς ποιάς μίξεις τῶν στοιχείων·

Color is the visible corporeal quality. The Pythagoreans call the visible surface of the body skin-color...The followers of Pythagoras (regard) white, black, red and yellow as the elementary colors (the families of colors). The differences of the colors (of bodies?) derive from what mixtures of the elements are involved.

This highly important passage was included by Goethe in his history of color theory (see note 3). What is remarkable is the juxtaposition of a purely physiological consideration and a broad generalization that apparently may indirectly refer to macrocosmic colors, perhaps even to the Dark spectrum (see Chapter III, The Two Spectra of Goethe's Color Theory, diagram); for I believe that the word γένη in this particular context might be translatable as root, that is, root-colors, hence the four irreducible spectral colors involved in the creation of the physical earth (see Chapter III, The Evolutionary Aspect of Colors, paragraph 3). Certainly there has to be some deeper knowledge behind such an otherwise mysterious reference to these four colors. The fact that it seems never to have been explained may mean that it could not be explained at that time in publicly comprehensible terms. Yet we know that the concept was used in ancient medical practice in a way sufficiently definite that it survived many centuries. The two passages of Aëtius now cited complement each other and link Empedocles into the circle of the early Pythagoreans.⁴

(B) Aristotle, *Metaphysics* A.5 (986a) *The Works of Aristotle*, VIII, translated by W.D. Ross:

Other members of this same school (Pythagoreans) say there are ten principles, which they arrange by cognates—limit and unlimited, odd and even, one and plurality, right and left, male and female, resting and moving, straight and curved, light and darkness, good and bad, square and oblong. In this way Alcmaeon of Croton seems also to have conceived the matter, and either he got this view from them or they got it from him; for he expressed himself similarly to them. For he says most human affairs go in pairs, meaning not definite contraries such as the Pythagoreans speak of, but any chance

contrarities, e.g. white and black, sweet and bitter, good and bad, great and small. He threw out indefinite suggestions about the other contrarities, but the Pythagoreans declared both how many and which their contrarities are.

What is significant here for our theme is the fact that an interest in both light and dark *and* black and white as polarities was “in the air” at the time Empedokles must have been working.

Hippocratic Writings

(A) The most important passage occurs in Galen’s *On the doctrines of Hippocrates and Plato (Corpus medicorum Graecorum V 4, 1,2 Berlin 1980 mit Uebersetzung von Phillip de Lacy) Liber VIII 5, 9–12*:

For (Hippocrates) worked out in great detail the generation of the humors, their varieties, their powers, and what humor is dominant in any region, season, time of life or condition of the body. Yet there was no need for Plato to go through all these matters as Hippocrates had done, just as there was no need for Hippocrates to inquire why the humor phlegm is white, blood is red, bitter bile is yellow, sharp bile is black. Hippocrates himself gave a starting-point for the discovery of these causes, as for example when he diagnoses the states of the body from the colors of the tongue, saying that the tongue is blackened by a sooty burning. For just as soot outside (the body) is naturally produced from lamps, pine-torches, and many other oily substances, so also in the bodies of animals something akin to soot is often generated when the humors, especially the oily ones, are overcooked, etc.

The indications given summarily in this passage are also scattered through Hippocrates’ *Peri Physeos Anthropolou* e.g. IV, 1–4 (yellow, black), VII, 14–17 (white), V, 10–12 (colors in general). Also in *Peri Chymon* I, 1–2 (colors in general), XIX, 4–7 (color of skin). The continuous arguments of Hippocrates for the correctness of the Empedoklean synthesis of the four elements is the best proof of the power of conviction it inspires and at the same time a fascinating introduction into the intellectual climate of the later fifth century.

(B) Hippocrates *On Diet (Corpus Medicorum Graecorum I 2,4 Berlin 1984 mit Uebersetzung von Robert Joy) I 2,3–4. 1*:

L’homme et tous les autres animaux se composent de deux (éléments) différents par leur vertus, mais complémentaires dans leur action, le feu et l’eau. Ensemble, ils se suffisent à eux-mêmes et à tout le reste: séparés, ils ne suffisent ni à eux-mêmes ni à rien d’autre... Chacun de ces deux (éléments) a les attributs suivants: le feu a le chaud et le sec: l’eau le froid et l’humide. Chacun tient aussi de l’autre un attribut; le feu, de l’eau, tient l’humide, car il y a de l’humidité dans le feu; et l’eau, du feu, tient le sec; car il y a du sec aussi dans l’eau...

There is an unmistakable note of opposition to Hippocrates-Empedokles in these words. The author of the tract wants to stay with two and resists a quadripartite system. On

what is this dualism based—for it is operating with the same opposites: warm-cold and moist-dry with which Empedokles created his quadripartite scheme?

Demokritos

- (A) Diels 55A 123 Aristot. gen. gener. et. corr. A2 316a 1:

διὸ καὶ χροῖάν οὐ φησιν [Demokr.] εἶναι· τροπῆι γὰρ χρωματίζεσθαι.

And so D. thought that there are no colors as such, for color arises from change.

- (B) Diels 55A 124 Aët. I 15, 11 (D.314)

οἱ δὲ τὰ ἄτομα, πάντα συλλήβδην ἄχροα, ἐξ ἀποίων δὲ τῶν λόγῳ θεωρητῶν τὰς αἰσθητὰς ἀποφαίνονται γίνεσθαι ποιότητας.

Some say that the atoms, taken collectively, are quite colorless and that the feeling that (sensuous) qualities exist arises from things which must logically be without any qualities.

- (C) Diels 55A 125 Aët. I 15, 8 (D. 314)

Δ. φύσει μὲν μηδὲν εἶναι χρῶμα· τὰ μὲν γὰρ στοιχεῖα ἄποια, τὰ τε ναστὰ καὶ τὸ κενόν· τὰ δὲ ἐξ αὐτῶν συγκρίματα κεχρῶσθαι διαταγῆι τε καὶ ῥυθμῳι καὶ προτροπῆι, ὧν ἡ μὲν ἐστὶ τάξις ὃ δὲ σχῆμα ἢ δὲ θέσις· παρὰ ταῦτα γὰρ αἱ φαντασίαι. τούτων δὲ τῶν πρὸς τὴν φαντασίαν χρωμάτων τέτταρες αἱ διαφοραὶ, λευκοῦ μέλανος ἐρυθροῦ ὠχροῦ.

D. says that in nature there is no color. For the elements—solids as well as the void—are without qualities. Things compounded from them have acquired color on the basis of arrangement, proportion and movement, of which one resulting factor is their rank, another their shape and position. With these factors (outer) appearances are in accord. In reference to the impression of colors arising from them, there are four varieties: white, black, red, yellow.

- (D) Diels 55A 126 Aristot. *de sens.* 4 442b 11

τὸ γὰρ λευκὸν καὶ τὸ μέλαν τὸ μὲν τραχὺ φησιν [Demokr.] εἶναι τὸ δὲ λείον, εἰς δὲ τὰ σχήματα ἀνάγει τοὺς χυμούς.

Demokritos calls white smooth, black rough; he refers taste to the shape of the atomic figures.

Theophrastus⁵ summarized the color theory of Demokritos at some length and criticized it rather harshly. We learn that Demokritos reckoned with four root-colors (γέννη), and offered a long disquisition on the qualities of black and white, especially in the matter of rough and smooth, which were determined by atomic composition. Theophrastus objected specifically (79) that to assume more than black and white as root-colors—the usual procedure—was to invite difficulties. This must be a sign that Demokritos was the first, and apparently the only, thinker to attempt a scientific investigation of the relationship of the four canonical colors. That he did not achieve viable results is

understandable from the fact that he did not undertake this on the basis of spectral conditions—about which he probably had no inkling. Theophrastus, taking the position of the lofty critic, gave the results a proper drumming without himself suggesting any real solution to the difficulties he brought up or attempting an original defense of the two-color theory. If anyone else had made any significant attempt to explain the four colors scientifically, Theophrastus would surely have mentioned it here; in fact this is the best evidence that Empedokles totally avoided the problem, though he might have questioned the two color theory (see Chapter II, *The Ancient Sources*, Empedokles, I).

Can we in any case find the point of departure for the reasoning of Demokritos? First, we may notice that two of the testimonia (B, C) are from the writings of Aëtius, the physician. Secondly, Theophrastus (*de sens.* 78) remarks: “although (D.) holds that the colours, like the savours, are endless in number according to their combinations...” and he uses in this context the word *χυλούς*, which is exactly parallel with *χυμούς*; both can refer to juices or the smell of juices. The inspiration to mention explicitly the parallel cases of colors and juices is easiest to explain in terms of the medical equation of four colors and four humors, while in both cases the innumerableness of instances is owed to the possibility of subtle and subtlest variations in the atomic composition (in other words, through structural *krasis!*).

If this reasoning brings us anywhere near the actual thought patterns of Demokritos, it shows how great was the influence of Empedokles on his contemporaries, even those who rejected his theory. If Demokritos saw a virtue in the concept of four elemental colors and four basic humors, and a type of *krasis* (i.e. mixing atomic combinations), he was bound to land in difficulties without the four elements as well. This circumstance was presumably the basis of Theophrastus’ disenchantment with the explanations of Demokritos. At any rate, probably the most compelling ground for seeing the starting point of the latter’s reasoning in the contemporary medical theory of four humors is his use of *χλωρόν* for yellow, for this equivalent comes directly out of Hippocratic writings⁶ and indeed is the preferred usage in that context. Putting this right silences at once much criticism, beginning with Theophrastus (or translations of same), and eliminates sense-distorting translations of testimonia that give the impression that Demokritos was treating *χλωρόν* as the complementary of red. Demokritos was indeed not that naive. And it is to be noted that Aëtius himself did not employ *χλωρόν* but *ώχρον*—both words referring linguistically to various saturations of yellow.⁷ Demokritos did not substitute green for yellow in the four color canon, nor could he have rationally done so. Moreover, complementation of colors was not a factor in Greek color theory in the fifth century (see Illustration 18).

Given our irremediable uncertainty on external grounds about the chronology of many thinkers of the fifth century, one is obliged to seek the logic of the developing intellectual life. Some version of the Pythagorean microcosmic four color system may well have been generally known in the earlier part of the century, as that would accord with the evidence of painting (see Chapter IV, *Panel Painting*, The Classical Period, paragraph 5). On this basis Empedokles could have formulated his theory of four macrocosmic elements, whereupon a perhaps more *technical* medical theory of four humors and their colors could emerge and stimulate Demokritos. Precisely the

formulation of Aëtius (C above) that Demokritos spoke of four varieties of color (διαφοραί can almost be translated as species here) recalls the formulation of the same author that the Pythagoreans spoke of four γένη: families, roots, elements.⁸ And in the larger sense, it would seem that the basic conception of the four elements had to be *in situ* before the atomists could offer a partial replacement for it.

Plato

A quite perceptible difference in time separates the work of the great thinkers of the fifth century and that of Plato. It is just that difference that clarifies the effect of the earlier work on the creation of what we call Classical culture. We have already had occasion to remark on a certain failure of logicity and consequentiality in the thought-structure of Leukippos-Demokritos, specifically on the unresolved juxtaposition of, on the one hand, a physiologically evolved color system that actually corresponds to real life-processes as understood medically at that time, and, on the other hand, of a hard, mechanical conception of “basic building blocks of the universe” (as we might now phrase it) in terms of atoms that are colorless, devoid of qualities and feeling. Indeed, Theophrastus himself (*de sens.* 68) makes this same criticism of inconsequentiality in no uncertain way, using the terms of his day.

The intellectual bias of the atomists was quite at odds with the spiritual convictions of Empedokles and his temporally removed successor, Plato. The latter could, to be sure, appreciate the idea of atoms to the extent that these may presuppose a mathematical order in things, that is, a kind of order in which Plato had the deepest faith. But for Plato, this order was entirely governed by divine force and intentions, while Demokritos seems to have subscribed to a non-sequitur in this respect. First, he took what is basically an agnostic position:

We know nothing about anything really, but Opinion is for all individuals an inflowing (? of the Atoms). (Diels B-7; Freeman, 93)

Yet one must suppose that he shared the basic conviction of Leukippos:

Nothing happens at random; everything happens out of reason and necessity. (Diels B-2; Freeman, 911)

The Platonist would ask, if we can know nothing for certain, how can we know about atoms, and if atoms are not plan-less, where does the plan come from and, above all, why and how can totally empty things produce sensations of qualities through mere combinations of atoms in their structure? Demokritos must have anticipated some of these objections—in a way that would hardly have satisfied Plato (e.g., Diels B-11 on two kinds of knowledge). But the basic difference in orientation is not bridged.

From this introduction we can turn to Platonic ideas on color. For the purposes of this investigation it is most fortunate that Konrad Gaiser (1965) already assembled and commented on the passages in Plato that bear on this. Having referred to that I will simply extract from his work the points that are pertinent to the problems that have been set out in my investigation.

In the matter of the basic unresolvedness of the atomic theory, Gaiser already surmised that Plato was standing on the same spot where Goethe found himself when confronted by the color theory of Newton: that Goethe who, as the defender of a holistic conception of man and world, was aroused to fierce opposition by the methods of a natural science which, in an almost uncanny parallel to Demokritos, divided up the world into a bloodless, abstract mathematical thought-structure of subsensory, indefinable forces on the one hand and, on the other, a subjective world of qualities lacking basically any locus in reality. With this before us, we must call attention to the fact that the Four Elements school of philosophers ought to have been obliged by the logic of their point of view to investigate the macrocosmic nature of the four colors—as Demokritos, to his credit, tried to do—and their attributability to individual elements. Did Plato attempt to follow this logic (for it was his conviction that the Empedoklean conception of a macrocosmos and microcosmos with one interlocking, inseparable nature was valid)? The answer is indeed no, but to understand that—for it is not necessarily equivalent to a denial of the proposition on his part—we must recall that from the beginning the subject of color had always been a physiological question for the Greek natural philosophers (how does the eye receive color impressions?), not a speculative matter (what is the ultimate nature of color, etc.?). For whatever reasons, and not rising to the challenge of Demokritos on this matter(!), Plato simply accepted the tradition, dealt with the problem in relatively short order and did not go beyond physiological considerations. Thus, his discussion of color in the *Timaeus* (68) remains totally noncommittal about the macrocosmic implications of the fire and water that effectuate color sensations in the vision, and these are the only two elements mentioned at all. This is, of course, not to imply that Plato could not have said more if obliged to do so; but he must not have considered it necessary or appropriate. In regard to the mixtures of the four colors that produce other colors, what Plato says may have a reference to the atomists' views: he deliberately refused even to speculate on the mathematical proportions that are involved in this process, for he believed that human intelligence could not (and should not try to) encompass the supersensory part of this process. Again in this respect he was a forerunner of Goethe who hardly used mathematics⁹ and only hinted at the supersensory explanation of color.

If Plato averted his attention from macrocosmic color, Aristotle did so even more. An index that seems reliable enough of the direction color studies veered into is the *Peri Chromaton*, a tract in the Aristotelian stream: one gets no clear definition of what the root-colors (*Peri Chromaton*, 1) are, while black is virtually written off as a color in an almost dismaying pre-emption of the Newtonian view of dark as the absence of light. Thus the breadth of Plato's spiritual horizon became contracted; this is a side of Plato's color views that must still be commented on.

The four traditional colors are retained in the *Timaeus*—almost; that is, black, white and red certainly, but yellow? “Bright” (τὸ λαμπρόν), which apparently breaks the sequence, may perhaps not be so much an intruder as a disguised yellow. For yellow itself is defined by Plato as a mixture of red, white and bright—whereby the resulting yellow arrives at exactly the same point where prismatic yellow stands, i.e., darker than white and lighter than red. Bright must therefore logically be described as “light-

enhancing”, as something that assures yellow its place but presses more toward the light side and thus lends shine and lustre. One is reminded of a primaevial yellow like gold itself, which is traditionally associated with moral, even divine, qualities. In terms of my Illustration 16, Plato seems to be adding transcendent white to noetic red and white to achieve an ennobled human color. Granted that Plato’s colors are not pigmentary mixtures but theoretical conceptions,¹⁰ the color bright is a thoroughgoing symbol of Platonic idealism: the lifting of the human being above his unregenerate level, as this would be symbolized by the unadulterated supersensory yellow.

Aristotle

The general orientation in regard to the four colors of this greatest of Greek scientists has already been touched on. In two places he deals with the nature of colors, their origin and selected physiological problems. These passages: *de sensu*, cap. 3, 439f. (Parva Naturalis) and *de anima*, 418f. are too long to cite or summarize, since they deal only tangentially—but then in some cases tantalizingly—with our concerns. An example of this is *de sensu* 442a (translation W.D. Ross):

Savours and colours, it will be observed, contain respectively about the same number of species. For there are seven species of each, if, as is reasonable, we regard Dun [or Grey] as a variety of Black (for the alternative is that Yellow should be Classed with White, as Rich with Sweet): while [the irreducible colors, viz.,] Crimson, Violet, leek-Green, and deep Blue come between White and Black, and from these all others are derived by mixture.

If this list is cropped, as allowed by Aristotle, to the following seven colors: crimson, violet, green, blue, black, white and yellow, then we have the basic colors of Goethe’s Dark spectrum (assuming that blue and yellow have been combined): (on this spectrum see Chapter III, *The Two Spectra of Goethe’s Color Theory*, diagram). However, the order given by Aristotle and his uncertainty about alternatives discourage any thought that he has direct knowledge of that spectrum. It does, however, show that the iron grip of the four colors on earlier Greek thought (through and including probably Plato) has been broken and a freer concern with the whole range of physical colors was possible. See also the comment on the rainbow (see Chapter III, *The Other Colors*, paragraph 3). Again, in groping for a theory to explain the differences in color, Aristotle (*de sensu* 439b) deals with the idea that they are constituted of varying ratios of black and white in such a way that—if one substituted dark and light for black and white and then introduced his concept of a transparent medium (*de anima*, 418b)—one would be within a stone’s throw of important considerations discovered by Goethe. Yet all these advanced ideas never took on a usable, experimental form, for this could only have been given by the prism. It is likely that they were not understood anyway by Aristotle’s contemporaries; by comparison the writer of the tract *Peri Chromaton* must be classed as naive. The sparks given off by Aristotle’s fertile mind did not set fires until far in the future.

Zeno

H. Diehls, *Doxographi Graeci*, 312 Aetii Plac. I. 15. 6; N. Festi, *Frammenti Degli Stoici Antichi* (Bari 1932) 82 no. 9 with further references.

Ζήνων ὁ Στωικὸς τὰ χρώματα πρώτους εἶναι σχηματισμοὺς τῆς ὕλης·

Zeno, the Stoic philosopher, said that colors constitute the first determinant of (the form of) matter.

This extraordinary statement, out of all context and the only fragment of Zeno on the subject, stands furthermore isolated among the statements about color of any later Greek Philosophers. Yet, it has received very little attention. A. Long and D.N. Kelley, *The Hellenistic Philosophers: Translations of the Principal Sources with Philosophical Commentary* (Cambridge 1987) obviously did not find this passage worth recording, even though it gives a glimpse of something potentially more interesting than the repetitious discussion of color as a secondary quality among authors cited. Perhaps the most extensive comment is that of Clemens Baumken, *Das Problem der Materie in der griechischen Philosophie* (1890) 348, who explains it in the following way: “The Stoics, on the other hand, who see the immediate criterion of matter in something visible to the senses, extensible in three dimensions, naturally look for the essential qualities of things in their sensuously tangible make-up. To these they, along with the Epicureans, attribute objective factuality—and no further investigation required—just as Zeno finds in color the most *primaeval* factor in the formation of matter, which otherwise has (at that stage) no qualities.” In using Zeno’s statement to justify a Stoic definition of matter, Baumken may be not only reading into it much from his own 19th century feeling for materialism but actually quite missing the point, for it could be part of a really insightful philosophy of color not pursued or shared by any of Zeno’s followers; it should be borne in mind that the source of the fragment is Aëtius, who was a physician and hence by definition more likely to have been a four elements humanist than addicted to atomic physics. I believe that the real significance of Zeno’s statement has to be left open.

Conclusions

In the Protoclassical period the Pythagoreans probably gave out a theory of four colors adapted either exclusively, or at least principally, for understanding the medical implications of the four-membered human (microcosmic) organism. This must nevertheless have been general enough to have been of great interest and importance to artists, as reflected in the so-called four color system of ceramics (white-ground category) and the tradition concerning Polygnotos. The significance of the white background can virtually be guessed from the qualities associated with white in Illustration 16 (see my extensive discussion Chapter III, *Preliminary Remarks on the Meaning of White in the Classical Period*, paragraph 5). At any rate, the microcosmic color system could hardly have been arrived at (by the Pythagoreans) without a corresponding reference, at least, to the macrocosmic parallel. In fact, ancient sources imply this and there is no obvious effort to conceal it. It is everywhere implicit in the four color system of medicine and art. Paradoxically, however, in dealing with the Four

Elements theory no philosopher seems to have investigated, or even discussed seriously, the question of a specific assignment of the separate colors to the separate elements, even though this was implicit in the microcosmic system. We will put this down to the fact that such an attribution is not feasible purely on the basis of the polarity principle, (see Chapter II, *Basic Considerations*, paragraph 5) and therefore the problem could not be resolved without resort to knowledge of the Dark Spectrum (see Chapter III, *The Two Spectra of Goethe's Color Theory*, diagram) or its equivalent. The Pythagoreans must have had this equivalent but were presumably unwilling or unable to formulate that knowledge in an intellectually understandable way: for example, they may have operated largely out of what would appear to us as intuition. Beyond the practical medical benefits of the system they must have chosen to be reticent. Reticence to an even greater degree would logically characterize the attitude of the more spiritually inclined philosophers.

The ultimate test of this suggestion is the attempt of Demokritos to explain a relationship among the four colors in a scientific way. Yet he could not do so because his theory of atoms automatically short-circuited the only possible approach to the problem, so that his attempt was mercilessly criticized by Theophrastos. But with a better chance at succeeding in this Empedokles passed up the challenge and the whole matter became submerged under other facets of color. The crux of the scientific problem was that the four color system (black, white, red, yellow) was not really in opposition to the two color system (black and white): they complement each other, as we can see from the perspective of Goethe. But it is abundantly evident from the ancient sources that this was not—and could not have been—grasped on a scientific level without specialized knowledge of a kind that lay far in the future. The result was that the two color system more or less prevailed theoretically and that the Four Color theory led a somewhat precarious, if vital, existence alongside it for a while, and then, probably by the middle of the fourth century B.C., slipped into a non-theoretical zone whence it has continued ever since to exercise a powerful though subliminal influence over western art and culture.

BASIC CONSIDERATIONS

Having decided to pursue the problem proposed in this Chapter, I was obliged to look for some way of considering it from the inside, as it were, rather than with the usual purely spectator consciousness. Only then will the bother of scrutinizing the ancient sources have been worthwhile. If we grant that ancient art itself has cognitive value for us, then it may be possible to recover something of the experience of the artists who actuated that value, for example, in the sense that Goethe¹¹ wrote: “One thing is certain. Ancient artists had just as much understanding of nature and just as sure a grasp of what could be represented and how it must be represented as Homer.... These lofty works of art were produced to form at the same time the most sublime works of Nature—though done by men—according to the laws of Truth and Nature. All that is arbitrary and imaginary crumbles away, leaving only Necessity and God.” In this spirit let us look back at the best documented part of the Greek artistic record: blackfigure and redfigure vase painting.

Here we do encounter firm principles in the use of color—principles that cannot be satisfactorily explained as merely arbitrary or dictated by technical factors. Let us suppose them to have their foundation in a deeply entrenched world view, such as could be generated through a consciousness of the four elements.

Although the canonical four color grouping of black, white, red, and yellow is not documented in ancient literature before the first half of the 5th century, it can easily be noticed that these same four colors, separately, together, or in mixtures giving the so-called earth colors, predominate not merely in Greece but all through early cultures.¹² The Greeks, specifically the Attic ceramic craftsmen, had a special relationship to this “canon” in that they refined their color choice, presumably out of a passionate attachment to it, to a glossy black and orange-red as an aesthetic norm.¹³ Beings and objects in the pictorial frieze (see Figure 10) are shown in black, suggesting the obvious conclusion that this color represents the corporeality, the density, of earth substance. And the frieze itself, be it noted, is reserved in the black density of the pot, also fired earth-substance. In the first part of this study it was established from quite another point of view and in detail that a main concern of the early Greek sculptors as well was to understand and experience the nature of earth-substance.

The orange frieze used in blackfigure work misses maximum contrast value with the black, so why was it chosen? Perhaps a kind of instinctive insight has always led people to refer to red, or reddish hues, as the color of life. For our purposes that is far too general a statement. In the circumstances we are considering—at least if the artists were not irrational—the reddish hue can really only represent air (atmosphere), in which all beings and things are bathed. For example, if we consider animals or men, they unremittingly draw in life force for the blood through breathing air, whereupon the blood maintains both physical and emotional existence. Red, therefore, represents the air on the macrocosmic plane and in the extended microcosmic sense it represents soul life.

We can now take stock. The two opposite fix-points, earth-air, provide a contrast that is more spatial than dynamic, for earth and air are fundamentally contiguous, and in an undisturbed state do not act on one another but simply preside over, as it were, the spheres of below and above, respectively. (Fire and water, on the other hand, are by nature hostile to one another, eliminate themselves when, forced together, they must attack each other). Just as in the relationship of earth and air, the colors black and red have a complementary, not an adversarial, relationship, and it cannot be accidental that as prismatic colors of the Dark spectrum (see Chapter III, The Two Spectra of Goethe’s Color Theory, diagram), black and red are precisely contiguous. Nevertheless, the juxtaposition is decisive: black is heavy, immobile, hence can function as support; red as a chromatic color has also a certain density but, as Goethe already noted, it is the least mobile color, so that without forcing a point we could say that it hovers over black. In this way one can *feel* why the Archaic painters remained so long satisfied with this combination: it gave superb expression to their passionate pursuit of physical reality in a way that no other color as background, e.g., white (see Chapter III, *The Emergence of Redfigure Style*, paragraph 12), could have.

During the Archaic and Protoclassical periods the Ionian philosophers consistently pondered the nature of the elements on the basis of the polarity principle. Similarly the colors black and white were certainly seen as polar opposites, (see Chapter II, *The Ancient Sources*, Pythagoreans, B) like cold and warm; but these colors could not be connected with the actual pair of polar opposites in the elements (fire and water) in view of the factors discussed above. Indeed, apart from black-earth, we shall find that a little leeway must be allowed in assigning colors to elements (even red-air). In any case, at this point fire and water are open to apportionment to white and yellow. According to the criterion of density already established, yellow, visually the stronger of the two colors, will go to water, the denser element, leaving white for fire (warmth) as the most rarified substance of all (just as Empedokles—see Chapter II, *The Ancient Sources*, Empedokles, A—took for granted).

Yellow accordingly is the expression of the principle of fluidity, the functional principle (circulatory system) of the earth planet and all its creatures. Yellow therefore can be called the active color *par excellence*. At a later point it will be seen how closely this purely logically derived conclusion approaches the thinking of the ancient physiologists. White, on the other hand, characterizes the element which is the least physical—which in fact can almost not be experienced except as an invisible connective (warmth) of the other elements. And indeed on the visual plane white is passive, lacking specific expressionality. It does not in any sense importune us but kindly provides without preconditions an empty space for inner freedom. This makes it highly suitable to represent, at the macrocosmic level, the sphere of pure thought, the goal of *nous*; the relative loftiness of this sphere may suggest, but does not compel, a connection to the Godhead. I say not compel because the Godhead is logically prior to and beyond all color. Moreover white can be sullied by the admixture of impure elements, as can pure reason.

Some problems that may arise in connection with the foregoing arguments can be touched on in a preliminary way. One difficulty is the report of Theophrastus that Empedokles considered water (rather than earth) to consist of black, and fire to consist of white. I regard it as unlikely that Empedokles was actually intending to equate the two elements with two colors (see Chapter II, *The Ancient Sources*, Empedokles, H). Krantz¹⁴ interprets that passage in a physiological sense, which may remind us not to be too concerned with rigid equations until a comprehensive system of relating the four colors and four elements on both the macrocosmic and microcosmic levels has been worked out (see below). Another report of Theophrastus that the earlier philosophers—*with the one exception of Empedokles*—considered black and white to be the originating colors might mean that Empedokles substituted other colors in this connection, which seems to me highly unlikely, or that he did not concern himself with a *theory* of colors at all (in the macrocosmic sense). This latter supposition, which I favor, of course negates the other report of Theophrastus (above).

My suggestions for equating elements and colors so far have already uncovered one basic reason why the ancient philosophers did not try to think this problem out fully—at least on the macrocosmic level: whereas the four elements can easily be thought of as two pairs of opposites (earth and air as under and above; fire versus water), this is not the case with the canonical four colors (the origins of which will be considered later).

There is only one absolutely unequivocal pair (black and white) and that pair does not correspond in a fully logical way with either of the two pairs of elements. Without modern knowledge of the spectrum (inclusive especially of Goethe's), dialectical thinking cannot take this problem much further. Thus the lack of a systematic assignment of the four colors to the four elements in theoretical philosophy as handed down can hardly be accidental. There is moreover the circumstance that Pseudo-Aristoteles (*De Coloribus*), so close in time to the great theoretical physicists, deals with this matter in a naive-realistic way, devoid of historical polemicizing.¹⁵ Therefore, what these Greek thinkers—and artists—knew or at least instinctively guessed concerning a correlation of elements and colors can only be put in perspective if we ourselves attempt to think it through to the end with all the arsenal both of dialectical reasoning and modern color knowledge.

THE FOUR ELEMENTS AND THE FOUR COLORS IN THEIR MACROCOSMIC AND MICROCOSMIC RELATIONSHIP

*Till God, or kindlier Nature,
Settled all argument, and separated
Heaven from earth, water from land, our air
From the high stratosphere, a liberation
So things evolved, and out of blind confusion
Found each its place, bound in eternal order.
The force of fire, that weightless element,
Leaped up and claimed the highest place in heaven;
Below it, air; and under them the earth
Sank with its grosser portions; and the water,
Lowest of all, held up, held in, the land.*

—Ovid, *Metamorphoses*, I, 1. 21–31 (translated by Rolfe Humphries)

As a point of departure for attempting a coherent presentation of the vast problem set out in the title of this section I offer in tabular form a summary of the results so far obtained (N.B. Although naturalistic considerations of color are not the criterion here, it may be noted that the sun—the ultimate source of warmth—at midday in a clear sky seems to be glaring white. The naive perception that fire is red ignores the fact that actual heat produced by a fire is colorless whereas the burning gasses (air) are red to yellow):

Element	Processual Designation	Color
Fire	Calefaction (Combustion)	White
Air	Rarefaction	Red
Water	Liquefaction	Yellow
Earth	Condensation (Compression)	Black

It will be seen at once from the processual column that the order of listing is not accidental but from least dense to most dense (following Aristotle, as does Ovid in the passage cited); yet this table presents only one possible condition out of many. For it is a fundamental experience in the study of color that every color is subject to movement through the dynamic processes in the earth's atmosphere. Even the pigment colors are subject to this to some degree, with the possible exception of black. To grasp this I found it necessary to ask, how are the remaining elements affected when, for example, combustion is the dominant process—and then when rarefaction is, etc. One could try to use tables like the one above but in fact, if a pictorialization of the processes should be possible, that would be even better. But pictures, even diagrammatic ones, are subject to the laws of picture-making, and these are seldom articulated. Here it is all the more necessary to do this because we are considering the very basis of human existence and human experience. In view of the importance of this matter I have chosen to present a formal investigation of the theme.

Prolegomena to a Study of the Four Elements Theory and its Relation to the Canonical Four Colors

No comprehensive history of the origin, emergence and effectuality of either of these theories, let alone both in combination, in ancient and later times, has ever, to my knowledge, been attempted (but see the recent important work by G. and H. Boehme, citation included in the opening comments to my bibliography of resources not used in the text). The question as to whether specific colors were in antiquity attached to specific elements (*in the macrocosmic sense*) has been variously evaluated. Although a very few authors have proposed or assumed such actual correspondences, no comprehensive reasoning about the fundamental interrelationships of elements and colors has appeared.

Without prejudice to the possibility that such correspondences actually were accepted in antiquity without being recorded or that such actually do exist whether contemplated in antiquity or not, our first step must be to establish a coherent, logical

visual means of conceptualizing the relationship of at least the four elements among themselves. There is no inherited scheme for this from antiquity, even though, again, one could have existed. Indeed, the possibility of some kind of overall geometric scheme may be suggested by the fact that Plato did visualize each individual element as a geometric figure:

Fire: tetrahedon

Earth: hexahedron

Air: octahedron

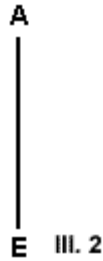
Water: ikosahedron

To these Heaven was added as a fifth—let it be noted—extraterritorial element; its figure was a pentagon dodekahedron.¹⁶ To suggest how to combine all these is beyond my competence. Furthermore, for the purpose of this study, it is essential to invent a “picture” that can also suggest in spatial terms the concept of the miscibility (*krasis*) of the elements, since these were understood by the ancients to be processes¹⁷ whereby a constant metamorphosis of the visual configuration of the world at any moment is actually taking place. The descriptive determination of such momentary states lies within two pairs of opposing conditions: hot-cold and wet-dry. These qualities in effect give the parameters of two of the elements, fire and water, whereby it can be concluded that fire and water have a particular axial quality, a central governing position in the total concept of four.

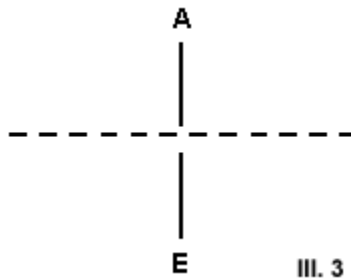
The most obvious and striking aspect of this relationship is, as already suggested, the uncontested polarity of fire and water. The archenemy of fire is water; equally fire opposes water but with much less immediate impact and finality. Fire is quenched by water; water is evaporated (goes into air) by fire. This stronger quality of water may allow it to determine how to pictorialize the relationship. Since the inalienable tendency of water is to seek the horizontal, we may use a horizontal line, whereby the placement of fire and water to left or right is still to be discussed: Liquefaction opposes combustion.

III. 1

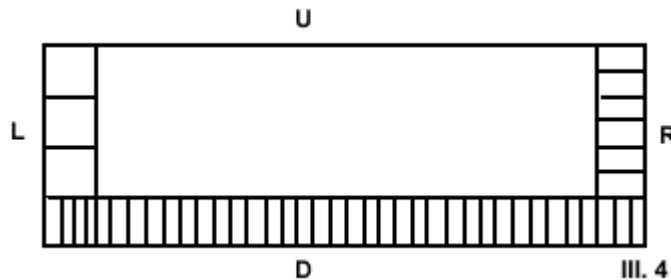
With this given, a second less dramatic but equally inescapable polarity remains: earth and air. Their normal relationship is to be contiguous, with earth below and air above. Their difference in density results in the phenomenon of gravity, which would not be observable without a contrasting medium through which things can fall and, for that matter, rise. If gravity is a force—as science proposes—beyond earth itself, then dialectically an opposing force, levity, must also be postulated.¹⁸ This relationship is logically to be illustrated by a vertical line: condensation opposes rarefaction.



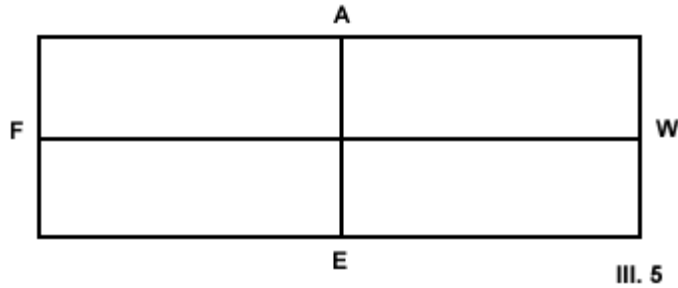
Given the interaction of the four elements observable by the senses, we can now cross the two lines.



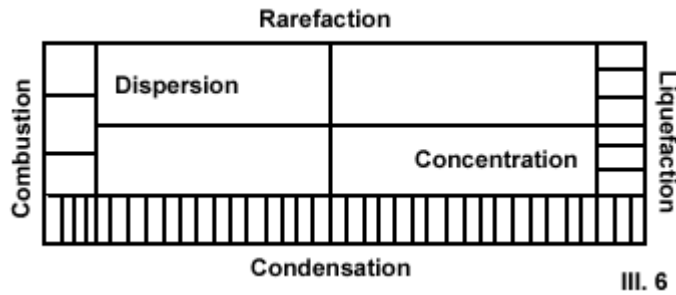
Whereas the positioning of A and E is given by physical characteristics of the two elements, the placement of fire and water involves the relationship of left and right. Therefore the concepts of science and the laws of picture-making, if there be such, must meet and interact. There is no left and right bias in fire and water as such, but there is a fundamental difference between left and right visually. While this is generally recognized as vital by artists and critics alike, it is generally discussed, if at all, using psychological considerations, which plainly are irrelevant here. It was the merit of Vassily Kandinsky,¹⁹ acting on a suggestion of Goethe, to have conceptualized the picture plane as an area—blank or not—that is alive with tensions of weight. Indeed, that plane is an excerpt of each observer’s bodily relationship to the horizontal-vertical conditions of earthly existence. Thus, the horizontal and vertical represent, respectively, earth’s plane from L to R and space from up to down. The visual resistance experienced in a defined rectangular pictorial space is strongest, naturally, below and weakest above. The next strongest resistance (tension) is offered by the right side; this is reduced on the left side but not so much as up and down. Thus, there are four degrees of density (sc. visual density) as represented by the following scheme:



The applicability of Kandinsky’s reasoning to the problem at hand, if any, must be axiomatic, as indeed all geometrical reasoning lies inextricably rooted in the human body/mind condition. We may therefore criticize the suggested scheme as it would appear in the following rectangle.

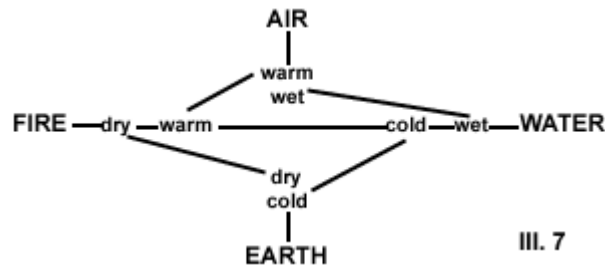


No conflict exists in the vertical plane. The potential conflict is in the horizontal. Although W is correctly placed on the right in relation to A and E, fire can not easily be related to density in the sense of the other three. That is because, in contrast to ancient (and some current esoteric) thought that warmth is a (primeval) substance, present scientific theory sees fire (warmth) as a condition of other substances. In terms of our picture, a resolution of this dilemma may be sought in regarding the elements not as substances but as processes, where there can be no conflict. In this sense we then have the completed diagram as follows:

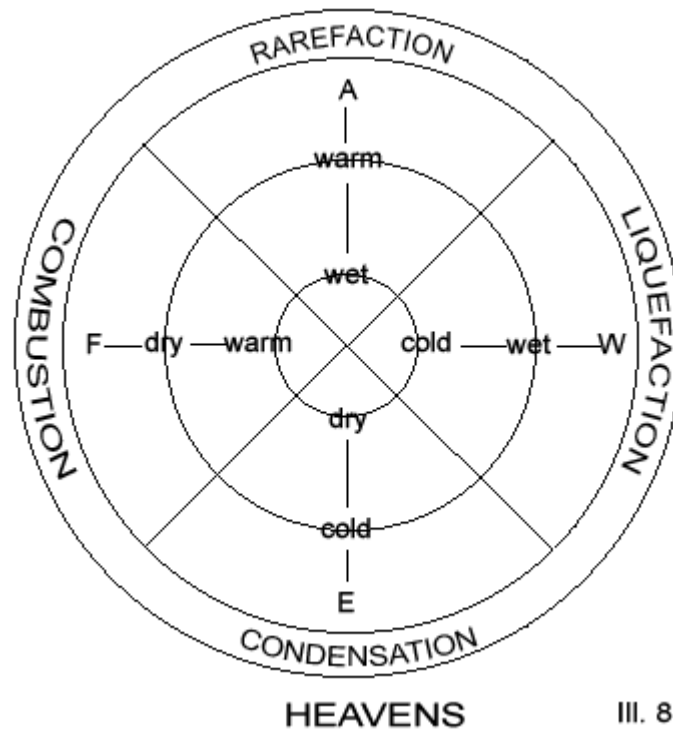


Taking into account again Kandinsky’s criteria and visualizing the results of the four processes in terms of changes of density in weighable and measurable materials of earth existence, combustion is clearly in the right position. Combustion can lighten matter, leaving ashes which are lighter than water or earth but still ultimately heavier than air; and on the other hand it may intensify the process of rarefaction and thus contribute to lightness.

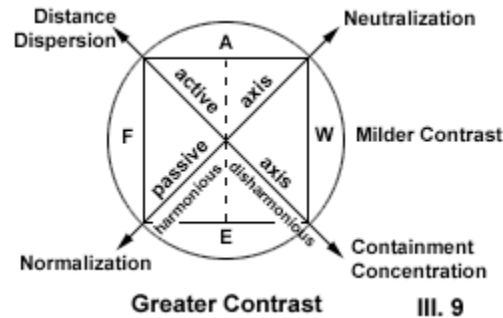
The next problem is to show the opposing pairs of elements in the descriptive sense-analytical terms of early thought. These are described by Empedocles (under A) as hot/cold and wet/dry. The existence of four quadrants allows us to arrange these terms in the sense of equally balancing contrasts;



In this way we have accounted for the nature of the four elements but what of the fifth element? In order to include that in this picture we must find a way of showing that besides the planet earth and its atmosphere, with which we have so far been dealing, there are outside of these the heavens (universe). We can accomplish this by enclosing the above cross in a circle, representing first of all the shape of the planet—if not the arch of the horizon—thus giving an inside and outside, so to speak, and also functioning as a symbol for relationships among equal elements.²⁰ Furthermore, Kandinsky showed how the four arms of the cross function as axes being displaced to the left and right but maintaining the center connection and, in effect, becoming radii of a circular form. Such movement of the arms is particularly meaningful in the circumstances because it literally shows the process of *krasis*, whereby the four elements constantly intermingle as they create and define the quality and quantity of all physicality.

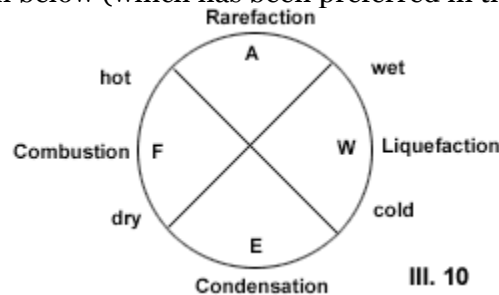


If we now re-instate the picture plane containing (or contained by) the circle, we can see that Kandinsky's characterization of the four quadrants of this plane actually corresponds, to a remarkable degree, to the process of miscibility (cf. e.g., Ills. 9 and 6).



While Kandinsky did not propose that the pictorial framework gives more than symbolical meaning to the qualities of the various quadrants, his considerations nevertheless demonstrate a new degree of sensitivity to the problem of pictorial thinking, without which complicated relationships cannot be prepared for discussion and evaluation in any sphere of knowledge. His apprehension of the pictorial plane as a living entity was deduced exactly from the fact that left and right relationships are not mirrored passively from the observer's point of view. This should be taken into account in all diagrams, for these should correspond to the laws of visual perception. This will become increasingly clear when colors are added to the characterization of the four elements.

N.B. the data about the elements contained in Ill. 8 can also be rendered, and more conveniently, by attaching the information about hot/cold and wet/dry to the vectors, as in the diagram below (which has been preferred in the text).

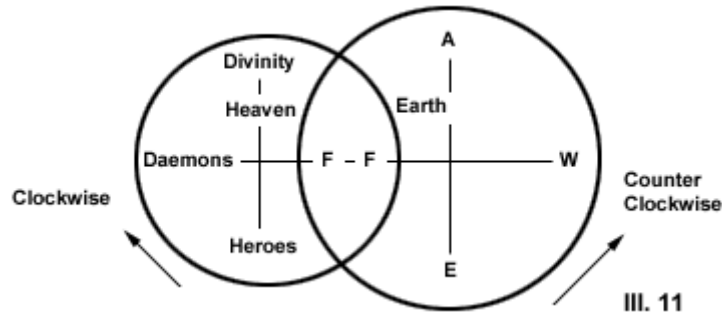


The persistent implication in the method of constructing the picture of the Four Elements theory arrived at in Ills. 8 and 10 above, namely, that this is an irreducible explanation of earthly realities valid for all of humanity, requires a further comment. The elements qua substance require to be thought of as occupying real space: they are in a sense the planet we live on, they are our own body/mind entity. As such they are Being. But they are also synonymous with processes, so that one could just as well speak of the four processes theory—and as such they belong to the realm of time: they are Becoming. There is evidence that the Greeks themselves conceived of this latter idea without, however, living so much in consciousness of the *technical* potentialities of the processes which dominate our minds, but rather in the blessedness of feeling the processes as

earthly projections of realities inherent in higher worlds. Nowhere is this so explicitly put as in a dialogue of Plutarch (*De Defectu Oraculorum*, 10):

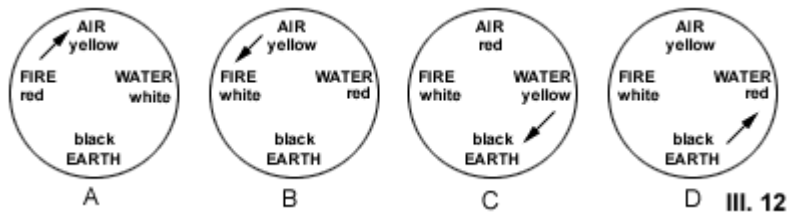
Others (other authors) say, there is a transmutation of bodies as well as of souls; and that, just as we see of [from] the earth is engendered water, of the water air, and of the air fire, the nature of substance still ascending higher, so good spirits always change for the best, being transformed from men into heroes, and from heroes into Daemons; and from Daemons, by degrees and in a long space of time, a few souls being refined and purified come to partake of the nature of the Divinity.²¹

If we consider this passage in microcosmic terms, the reference to men, whose highest earthly member is *nous* (fire), translates into an overlapping of the circle of the four elements by a higher circle of which *nous* is the lowest and, therefore, common member with three stages above it, each of a finer and more (spiritually) rarefied nature: heroes, daemons and the Divine itself. The result of this merger of Heaven as the fifth element and fourfold man is therefore a sevenfold picture in all.



PARADIGMS AND EXPLANATIONS

Having established a structured visual paradigm for the relationship of the four elements among themselves, we can now consider the associated colors when the paradigms are repeated to show the effects of the respective dominant process. Although the impulse to ask how this works arose for me out of the original paradigm itself, the procedure was later found to be quite in the sense of what Empedokles²² himself envisaged: Those elements and forces are to be understood as equally strong and coeval, yet each of them has a different function, each has its own characteristic and *in the rounds of time they take their turn being dominant*.



(A)	(B)	(C)	(D)
Combustion	Rarefaction	Liquefaction	Condensation
Fire: flame, searing heat	Air: medium of warmth and dispersal	Water: medium of constant movement	Earth: solid end-product of series
Air: warmed up atmosphere	Water: medium of distillation	Earth: dissolves	Fire: by-product of friction
Water: steam	Earth: powderized	Fire: extinguished	Air: resists pressure
Earth: coal, ash, slack	Fire: invisible energy (warmth)	Air: becomes heavy	Water: becomes immobile
Function			
Illumination	Animation	Movement	Stability

Fire is the creative principle in (B), (C), (D), hence white; it materializes only in A, hence red (physical).

Air expands in (A), (B), hence yellow and increases its efforts to do so in (D) hence really a deeper yellow; it loses this quality by taking on weight in (C), hence red (immobility).

Water is the least stable in color. In (A) it is white (diminishingly physical). In (B) water signifies (retains) liquidity even in distillation (oxygen) hence red, yet it also becomes gaseous (hydrogen) thus tending toward yellow; in (C) it achieves maximum movement (yellow) and in (D) it tends toward immobility (red).

Earth is always stable to the extent that it remains the darker part in any condition. In principle, yellow is the color of dispersal, black of concentration, red of intensity or arrested movement and white of non-physicality or minimal physicality.

In all cases the colors share the tendency of the elements to mix themselves constantly and must therefore be taken as in constant gradation from one to the other.

It must be emphasized that the foregoing considerations relate to the macrocosmos, that is, more precisely, the universal, external and objective—as it were—basis of physical/physiological processes. Whatever echoes or premonitions of such considerations may be discernible in the ancient literary tradition (probably even including the medical writings) seem to be related to the macrocosmic sphere. However, Goethe's great pioneering work on the psychological and mental/moral aspects of color implicates another dimension to this problem, namely, the microcosmic or individuated realm. Therefore, it would be unconscionable for the modern investigator not to attempt

to understand the implications of elements and colors on the specific level of the human being, whose form and being—physical, physiological, psychological and mental/moral—constantly interact with the macrocosmos.

In structuring the macrocosmic pictures, I employed, as explained above, the hierarchical evolutionary principle of organization: fire, air, water and earth (as solid matter, the finished product of evolution). By contrast, since the psychological and mental/moral effects of interaction can only be realized by an individual consciousness, the microcosmic series is therefore organized according to the biographical principle, wherein the order is exactly reversed: the human being begins with earth (physicality) at birth and rises in the end (ideally) to mental/moral ripeness.



(E) Condensation/compression	(F) Liquefaction	(G) Rarefaction	(H) Combustion
Earth: ground of physicality	Water: agent of assimilation	Air: agent of psychic event	Fire: unseen basis of mind/spirit
Water: stable (e.g., body temperature)	Air: moisture-laden substratum	Fire: instigator; mood	Earth: carburized by consciousness
Air: dispersed actively (breath)	Fire: regulator of movement	Earth: refined physical medium	Water (in the sense of physiological processes): stabilized by pure thought
Fire: energy (potential or actual)	Earth: substratum of excretion	Water: dispersed	Air: emotional forces displaced by thought
Function			
Incarnation	Digestion	Animation	Reflection

Earth is implicit in life processes at all stages providing physicality or its shadow, hence always black.

Water is more subject to movement in (F)-(G), hence yellow but more balanced and stable in (E) and (H), hence red.

Air is more subject to movement in (E) and (H), hence yellow but more stable and dense in (F) and (G), hence red.

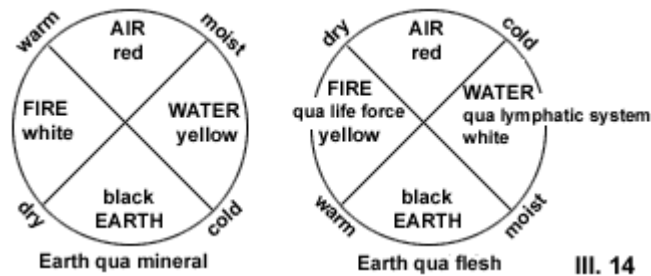
Fire is the invisible presupposition of all processes, hence white throughout.

A comparison of the two sets of figures shows that only the color of earth (matter) remains constant in all cases. Further, only the picture for the dominance of water accords both macrocosmically and microcosmically with the original table that served as the point of departure (see Chapter II, *The Four Elements and the Four Colors*, table) for the study of variations. That original table was obtained from an analysis of the characteristic colors of Archaic ceramics. Yet, quite apart from color altogether, it had appeared from the analysis of sculptural form that Greeks of the Archaic period were at a stage of development that took for its concern the aqueous constitution of man (water-man).

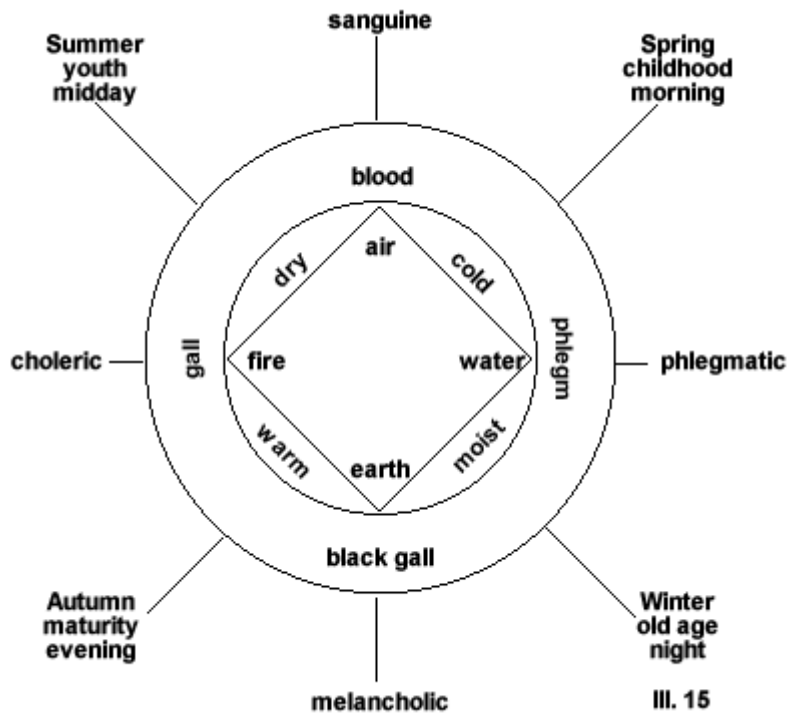
Correspondence of the color series occurs at the earth stage as well as at the water stage of the two systems. Logically this is to be expected, since an individual human being is, as far as physical/ physiological aspects are concerned, identical materially and constitutionally with the surrounding macrocosmic environment. As far as the air stage is concerned, the air-being (soul) corresponds to the color arrangement of the macrocosmic water stage, whereas the individual fire-being (mind) is in accord with the colors of the macrocosmic air stage. This amounts to a chiastic relationship. Tentatively one might argue that individual souls are necessarily limited by a common parameter emotionally, that is, by a certain given range of possible human emotions, whereas individual minds (I-beings) have—theoretically—unlimited freedom to transcend cultural parameters into the sphere of uniquely original creativity. If there is an intelligible pattern in this, it must be stressed that the working out of the tables took place at a comparatively early stage of this study with sole concentration on the separate processual conditions; patterns and implications like those just discussed were not noticed until later.

The various paradigms of Ills. 12–13 show the planet in terms of color, that is, the planet as a four-membered unity with its manifold subordinate, organically living, feeling and even thinking beings, in elemental colors. These tables also go together in the sense of a higher and a lower—though not necessarily oppositional—order. Not as yet taken into account are the functional equalities and oppositions of the separate living beings (microcosms). The very intention to do this brings one to the particular way that philosophy and the rational healing arts of the Greeks were interfaced; for the founders of the latter were, according to the sensitive and sympathetic account of the medical historian, Henry Sigerist,²³ the Pythagoreans, including Empedokles himself—the famous Hippokrates being by this account his successor. In any case, the paucity of the record obscures what contribution these thinkers actually made to the physiological model of the Hippokratean school. On general grounds I am inclined to assume that the

contrapposto-like structure of this scheme as conceived by others from the purely medical standpoint (cf. Illustration 13 with basic macrocosmic figures Illustration 12) makes it indeed a genuine product of the contrapposto principle, and thus an achievement of the High Classical period—that is, a mental model whether visualized as it is here or not.²⁴ Still, the design quality of the resulting inversions (presented in Illustration 14) is so striking and artistic that it could possibly have been symbolized visually in some way. Again, I must stress that the model I justified in Chapter II (see Basic Considerations, paragraphs 2–8) was worked out before I became aware of its virtual existence, together with the same color scheme, in the writings of the Hippokratean corpus and Galen—but there only for a microcosmic purpose and apparently without conscious macrocosmic implication.



By the same token, the method of putting the basic macrocosmic model through four variations was anticipated in theory not only by Empedokles (see Chapter II, *The Ancient Sources*, Empedokles, F) but also by Hippokrates in that he reckoned with a rotating ascendancy of each of his basic substances according to the progression of the four seasons, four ages of man, etc., as visualized by H. Schlepperger²⁵ in a scheme exactly like mine (Ill. 15). I must leave it to the medically cognizant to ring the changes on that theme in a fully dynamic macrocosmic/microcosmic way. Although I do not feel qualified to attempt anything so ambitious, I believe that nothing else could give so vivid a conception of the mixture of the elements and the colors going on all the time as Empedokles proclaimed.



III.

ASPECTS OF ANCIENT AND MODERN UNDERSTANDING OF COLOR

THE EVOLUTIONARY ASPECT OF COLORS

The Four Elements theory can be the starting point for understanding how Greek painting, and for that matter all Greek art, took form. First a generalization: space divides easily into four parts, e.g., the cardinal directions, whereas time lends itself into division by three, e.g., past, present and future. But in the special case of the four elements as primary components of the planetary organism, an evolutionary sequence, that is, a time factor, is implicitly spread out in space. This sequence corresponds to the major stages of cosmic evolution, whether one is thinking on the exoteric level of modern science or on the modern esoteric level of anthroposophy. This latter level is more closely parallel to the thinking of the Greeks.

Just as fire, air, water and earth are notations for four dynamic processes, so they also suggest—in that order—an approximate picture of the origin of the universe, that is, from warmth—even if one insists on this as a kind of primal energy which, by means of a “big bang”, released a tremendous heat—cooling down into gases, condensing into liquids and finally partially solidifying. To this order of events correspond the colors of two phases of the physicality series (Illustration 12 B-D): air and earth, provided one thinks of the color sequence referred to in terms of visual density: white, yellow, red, black. Two directions of thought connect with this observation and must now be pursued. First, has the assignment of the four canonical colors to the four elements any scientific validity in regard to earth origins? Second, what did the Greeks themselves think about the idea of an evolution of the elements?

The first question is complicated and would require specialized scientific knowledge that I do not have (even with this it might not be answerable). Nevertheless, the following circumstance is noteworthy. In the Antikenmuseum in Berlin there is a large wall display of 100 small rectangles, each a sample (Figure 2, Figure 3) of a different kind of marble that occurs within the confines of the Roman Empire, thus

documenting marbles of a relatively large portion of the earth of which the locus of ancient Greek culture is a part.¹ Looking at the display, one can sense how quintessential the four colors are, for with hardly any exception all the samples show white-yellow-red-black alone or in wonderfully patterned mixtures. These fragments from the earth's body retain, as in a pictorial atlas, information about the interweaving mixtures (as in Empedokles' *krasis*) of the four elements during the formation of the present physical earth. Surely the four basic processes express themselves in these colors and even the few exceptions in the display are blackish with a greenish tinge. Black and yellow in certain quantities can result in a dull green. Obviously not everything about the mineral realm needs to be explained in this way but the basic phenomenon remains.

The second question: the speculation of the early Greek philosophers took place amidst unquestioning acceptance of divine guidance of world and man.² Thus, they could hardly have hit upon Darwinian conceptions. In fact, because Presocratic thought had mired itself in the problem of One and Many, Empedokles saw himself obliged to deny the four elements any development at all.³ But that did not stop him from proclaiming a cyclical sequence of processes; if the postulations made so far in this study are valid, this will at the same time implicate also *a progressive dominance of the four colors* assignable to the four processes. And, indeed, a Greek conception of a four-stage development (or at least unfolding) of human consciousness is at the very least as old as Hesiod's Four (Five) Ages. The sequential quality of these was in effect also as far as the individual human being was concerned, who as an organism had to go through the Four Ages of Man. The four-stage idea was particularly developed in the fifth century, as we have seen, and Empedokles' Four Elements theory appears *malgré lui* to be an example of evolutionism with the label "cyclical". Practical work with classifying Greek artistic creativity has, moreover, produced a four-stage framework: the scholarly guild accepts that Greek culture went through four great stages of consciousness: Geometric, Archaic, Classical, Hellenistic. In dealing with the theoretical background of this periodicity (see Introduction, paragraph 10) I discovered that the macrocosmic series is better suited to illuminate the sense of changes in the figural canon (sculpture). The microcosmic series seems better to elucidate the experience of composing scenes in color (including black and white). For the painter must constantly confront the ambiguous non-material tensions of his medium—in contrast to the sculptor who has a definite physical form before his eyes.

Summary: my answers to the two problems posed at the beginning of this chapter are necessarily hypothetical; for the questions derive fully from our modern consciousness which is literally saturated with the idea of evolution in a physical-material sense. So my suggestion that a possible periodicity of colors might be taken into account in studies of the physical evolution of the planet is at worst harmless and at best perhaps useful. It may be noted that sondage photographs from outer space are offered to the public in color.

In regard to the second question: since the concept of physical evolution of our universe and its denizens was not invented, or at least legitimated, until the 19th century, the ancient Greeks could not have had views on this. Nevertheless, in their mythology a spiritual evolution of the universe is implied in stories of Chaos and generations of the

gods—with whom human beings became deeply involved. The final descent of men from that sphere into full earth consciousness after the Age of Heroes has been vividly reimagined by Roberto Calasso. The four elements qua divine beings naturally cannot be excluded from this evolution of consciousness; but it must be emphasized that an intellectual awareness of physical qualities in the elements was only gradually being activated by the Presocratic philosophers, physicality being perhaps more important to some than to others. In any case, since most of them were looking for a single element to explain world-structure—and this had to be in the most theoretical sense as they were not given to observation based on experiment—it would be too much to expect that anything remotely like our ideas of physical evolution could have occurred to them. Only Empedokles put the four elements together in a sequence and he was committed to the concept of their cyclical behavior—as well as of their quasi-divine nature.

COLOR USAGE AND MICROCOSMIC PERIODICITY

The foregoing discussion was intended to illustrate on the basis of a specific concept: evolution, how difficult it is for us to stand back from the current cosmology of a non-rhythmical sequence of physical happenings, so as to empathize with the Greek conception of rhythmically recurring states guided cosmically (by the Four Elements as divinities). In that light let us now examine the attitudes of the vase painters—taking particular note of Attic ones—of the Protogeometric-Geometric age. They seemed to be fascinated with black as an overall coloration, and this in turn pulled them toward a confrontation of dark with light (Figure 4, Figure 5); it is as if they needed to impress upon their consciousness from several sides the density of earth substance. How could they have known that this would be the starting point for an unparalleled development lasting almost a millennium! At any rate their preference for black (just as in Homer there is little consciousness of chromatic colors) is in harmony with the first principal element: earth of the psychological and moral/mental series (Illustration 13 E). When toward the end of this age they took up figural representation, they employed silhouettes (Figure 6) and thus paid attention to the perhaps most irreducible aspect of having a body: the ability, the necessity, to cast a shadow, to cut off light by one's mass. Thus they experienced the mineral realm, the substance of earth, from yet another aspect. This procedure, however groping at times, involved—again inescapably—some consideration of *illuminated* air, which alone makes the shadow-casting figure perceptible to the eye. To represent this, painters were pleased to rely on the basically buff/brown ground color or at times yellow slip which was a consistent part of the long tradition⁴ in their land, and this is in effect the microcosmic color for air *at that stage* (Illustration 13 E). This color is typical for most ceramic schools, continuing into the Archaic period. In the general dark-light contrast that resulted, the contour line, to clarify the “shadow” figure, arose naturally and became a tradition. The interest in figures that began in earnest about 800 B.C. must have hastened the already existing experimentation with dark-light aesthetics.

If “Geometric” style is the beginning of Greek “art”, then one must grant that aesthetic considerations, with selective use of pre-existent traditions, shaped the development.

In the next great time-block, the Archaic period, artists sought to achieve a better understanding of what existed *inside* the contour line, that is, the whole aqueous system of living beings. The need to consider the inner reaches defined by the contours was felt by both sculptors and painters at this time and both began by making incisions on the surface of the figure—Protocorinthian painters thereby inventing the blackfigure style (Figure 7). This device, of course, was not enough in either medium. The sculptor could and did go to in-depth modelling of the shape, whereas painters continued and refined a device already hinted at in some later Geometric painting, namely, the buff or yellow “atmosphere”. Additionally they began filling up the borders to the frieze with disembodied elements of the natural sphere most typical of watery systems, that is, plants and flowers (Figure 8). This gives the inner—one might almost say literally the digestive—source of the liveliness of the figures through “filling ornaments”. Obviously, that conventional expression is rather barren if it only expresses a notion that these artists were obsessed by a need to “fill space”: we can give space here a meaning much more precise (atmosphere) than the abstraction generally meant by that word (perhaps necessarily so) in the modern mind. Some added white on figures or flower motifs at this time provided contrast in a visual enhancement. It is doubtful that the inner force of this color played any part in this usage.

CLARIFICATION OF COLOR RELATIONSHIPS

At this point it will be well to take stock of the color usage described in its relationship to Four Color theory. In the Geometric scenes black as an indication of bodily substance is the dominant color and yellow as an indication of air is the secondary color. While the slip is sometimes literally yellow, as in certain Corinthian examples, it is more generally buff, a combination of yellow with some red. At this stage in the four elements scheme (Illustration 13 E) yellow does stand for air and red for water (thus atmosphere). In the earlier Archaic period this color usage *continues*. However, applying the Empedoklean dictum that each of the four elements rules in turn, we observe in Illustration 13 F that at this stage (the Archaic) air and water have reversed their coloration. Yellow now represents water and red, air. One’s first thought might be: the atmosphere now has more water in it. Perhaps, but the emphasis on water has its own justification, for, as I will show elsewhere, sculptors were emphasizing the aqueous aspects of the body, and vase painters were celebrating the world of flowers. Nevertheless, there is a kind of disparity or incongruity in the situation, for the depiction of air at this stage should emphasize red. It is, therefore, almost uncanny in its implications that, as Attic vase painters set about to achieve dominance over Corinth in pottery export, they actually corrected this disparity. In the words of R.M. Cook,⁵ in Athens “about 580 B.C. the color of the surface deepens from buff to orange and this with the rich black of the paint sets a new standard for Greek potteries.” Moreover, as the artistic pace in the Athenian

Kerameikos quickened, the tendency to go in the direction of red (and so to give full expression to the correct coloration of air in black figure painting) is highlighted by the occasional use of “coral red”, as in the famous Dionysos cup of Exekias.⁶ Yet orange remained the Attic norm, no doubt on the aesthetic premise that anything approaching pure red is too strong in combination with black—and more difficult to “read” in a scene of figures.

THE EMERGENCE OF REDFIGURE STYLE

Toward the end of the Archaic period (circa 525, see Introduction, chronological chart), preparations for the shift to the next major period became tangible—a period in which a real animation of the figure with unheard-of implications would take place. Archaic sculptors had already introduced a very quiet degree of animation through the Archaic smile, a device not available to painters, who were therefore thrown back on refining the technique of incision to an ultimate degree of virtuosity: one learns from the glittering, sparkling patterns imposed on black garments, faces, hair, etc. how worthy and spirited the bearers of these lines are (Figure 9): on an Attic blackfigure amphora in the British Museum which illustrates this mastery of the graving tool we see another use of white paint: a traditional one known in Egyptian painting to indicate the flesh of women, in this case of the Amazon hard pressed by Achilles. Presumably the Egyptians chose this color for naturalistic reasons, in any case also a possible factor here. But I see it more as another decorative use of white as a contrast to the generic black of male figures and parallel to the display of decorative incisions.

By the beginning of the last quarter of the sixth century, the most progressive artists had obviously reached a climax in the expressivity of the blackfigure style. The game of draughts depicted on the Vatican amphora of Exekias (Figure 10) is a virtuoso display by the artist of isometric compositional tensions. Adding to this now the color factor: lustrous black and the less well preserved but still luminous orange, we may experience with some astonishment, perhaps, a reduction of the compositional tension previously ascertained; for the figures now appear to be bathed in comforting warmth. If this is a subjective reaction on my part, it derives from having seen countless scenes showing divine and human beings together—with the underlying implication that a divine order provides the necessities and guidance for life—even amidst the horrors of war. Even more evident is this warmth in the family scene on the opposite side (Figure 11), where private rejoicing is the actual theme. Through a conscious focus on color we can begin to experience more fully—across the centuries—the truly human quality in Late Archaic painting. The precondition for this is the attempt to recover Greek color theory.

The implications of this become even more compelling when we realize that a (perhaps younger) generation of vase painters would not rest on the laurels of a system which, after all, was literally giving way under the weight of new insights about the physical world demanding to be addressed. And so the genius of the Attic school revealed

itself in the simple but drastic device of reversing the reddish and black components of the composition, as if the world were turned inside out (Figure 12a, Figure 12b). And, indeed, so it was; for the whole of the red/orange animation that as atmosphere literally hovered over and pressed against the now overwrought figures was suddenly sucked inside the contours and thereby necessarily expelled the now inadequate blackness to the outside—excreted it, one might almost say. The fundamental condition of the Classical period was set in place: air (red), as basis of the psychic life—as well as water (yellow) as basis of organic life—was now (in mixture) literally inside the human figure and could begin to create the aerated man (breath-man)—and we have moved to Illustration 13G for our orientation. The figure can begin to inhale—a function for sculptors especially to show—and gain an incipient consciousness of being responsible for its own acts. Thus, the immediate preconditions of contrapposto, drama, democracy began to be met. In a single word, there is a kind of deep ensoulment, revealed and co-created by the drama of color usage.

A change of such dimensions cannot, in my opinion, be passed over as an accidental experiment in technique (see also n. 18). The timing also speaks against such a trivializing explanation—though not against its being an experiment. Indeed, the so-called bilingual vases suggest that there was a conscious weighing and comparing of the possibilities and suitability of a new mode of expression—radical in its consequences but extraordinarily conservative in that no immediate outward change in theme or format was involved, as we can ascertain on an amphora in Munich attributed to the Andokides Painter (Figure 12a, Figure 12b). On both sides Herakles lies on a couch and hears the words of his mentor, Athena (whose helmet extends into the border). He holds a wine cup and beside his couch is the traditional table with cakes and napkins. Nevertheless, there are differences in the conception of the two friezes. The blackfigure side is a description of the encounter, with Hermes standing behind the goddess and the prominent figure of a boy ladling wine from a standard jar at the right side of the couch. Above all, the space is literally festooned with branches, leaves and fruit of a grape vine—under which Herakles seems to duck his head. On the redfigure side a strong simplification has taken place. There are now only two figures and the couch appears longer. The vines have been “pruned” so that they serve only as a grace note. Herakles sits up straighter and is so much larger and more prominent that his head now overlaps the border and Athena is correspondingly diminished—and has lost the dominance she had in the blackfigure version. Although elegance persists, the emphasis is on the very moment of encounter between two figures without distractions. Now Herakles occupies center stage and the divine world recedes, as it were.

This enhanced presence of Herakles qua functioning organism allows him to be seen as the immediate ancestor of a generation of attempts by vase painters to explore just that organic aspect of the human being in terms of athletic performance or its equivalent. However, this is primarily a form factor, and discussion of it is best deferred to my study of sculpture. Here I will note only that in early redfigure painting, that is, in the artistic experimentation of the Protoclassical period, a vital role was played by advances in the ability to represent natural form, not least through the enlivening effect of orange-colored athletic figures.

In a certain way the new color situation of the redfigure style clarifies an important relationship. In the macrocosmic series yellow is the color of air (Illustration 12A) surrounding the earth and inhaled by its creatures and hence quite rightly the color of Geometric pictorial friezes. And in the microcosmic series yellow again characterizes air (Illustration 13E), making this color doubly appropriate in these friezes. In the liquefaction stage (corresponding to the Archaic period) of both series (C, F) air is red and, as already noted, red/yellow (orange) surrounds the figures of the developed blackfigure style. But again, in both series, yellow now signifies water—and it is precisely the nature of the human aqueous system that Archaic artists were exploring. Thus, one might conclude that a certain wavering between red and yellow, or better, mixture (*krasis*) of them, would in any case be almost inescapable. When the new pottery style was born about 530/525, this mixture went inside the contours—an improvement logically in that the liquefaction functions of the organism indicated by the yellow component of the mixture were now more properly *within* the confines of the actual body of the figures. But there was a double value in this in that already in this Protoclassical transition, as noted above, the dominant element of the Classical period is being represented by the red component of the mixture (Illustration 13G), so that *physiological* aeration as well as psychic animation are also present within the contours. This is a fortunate revelation of the mighty changes in the (microcosmic) status of the human being that underlie the formation of the Classical period. These changes were of such tremendous import and so decisive for—among other things—the outer behavior of the Greeks that they require recognition on the periodic scale by a special term: Protoclassical.

The role of black throughout the changes discussed above remains to be set forth. Its prime function of representing earth density was, of course, very well fulfilled in the Geometric/Archaic periods, since precisely that function needed to be understood by artists in their efforts to grasp physicality. By the time of the black-red inversion, however, artists had apparently grasped this to their satisfaction, then took it upon themselves to imbue their dense but static figures with psychic sensibility. Representation of the human body obviously gained in plausibility through the color switch, but at the same time the total picture lost visual plausibility, because a pure black could never be the color of the atmosphere—except on a moonless night, which would negate the picture; yet the solution to this lies in the overall impression made by the redfigure scene (Figure 13). The new psychic dynamism of the figures can be understood as the actual source of illumination—that is, self-illumination by its own new-found consciousness—made all the more intense by the surrounding darkness. A darkness, however, that is now meta-physical, that is, present on the vase surface but impossible to justify by any obvious intention of the artist to make the total scene more realistic. The loss of a plausible natural atmosphere in redfigure implicates a loss of the fundamental carrying factor of the Archaic world, for in that atmosphere had appeared the gods and their guidance. The *internalization* of this carrying function on vases pictorializes the new sense of self-responsibility visible in cultural achievements and must have been at once exhilarating (as a release) and disconcerting. The rise of the redfigure style signified

a slow but irresistible dissolution of the Archaic “life style” in favor of new impulses which did not come to a fully viable synthesis until about 480.

It is worth developing these considerations a little further on the basis of an amphora which stands as the centerpiece of the Berlin Painter’s oeuvre (Figure 13). The traditional border above the scene is retained and forms a bridge between the handles, also decorated with leaves. Inconspicuous rays mark the joining of body and base of the vessel. Otherwise the tendency already noted in the Andokides redfigure scene has gathered such momentum that here the figures of Hermes and Dionysos, with a delicate faun between them, float in a sea of blackness. But they are not quite deprived of all support, for they are placed on a narrow border of running spirals truncated to just their stances. Actually they seem to stand on a tiny floating platform. In the whole concept this platform plays a vital role: it is needed to lend credibility to the weight-shifting in the limbs of the two figures, particularly of Hermes, whose heel is raised high above this simulated ground. Without this support the dynamically balanced limbs of the figures—a flurry of arms and heads moving backwards and forwards—could work only as a dream fantasy. But that is precisely what the painter’s efforts are *not* about: he wants to create the maximum effect of flesh and earthly reality in these bodies.

This intention makes the contradiction of terms here all the more inescapable. Black, the foundation of earthly substance—literally matter in the blackfigure style—cannot possibly mean substance here, and so it takes on a character that is not explicable in the old physical terms.⁷ At the least it becomes mysterious and elevated, for by absorbing light (itself a non-physical entity not really definable even by 20th century physicists⁸) it enhances the light-reflecting quality of the figures so that they appear to glow, as it were, in this darkness.

Further thoughts on the mysterious qualities of black will be offered later on the basis of the spectrum; but even at this point certain inferences can be drawn. In this extraordinarily concentrated and self-confident composition the Berlin Painter has created one of the first expressions of what can be called Classical ideality. In using that debatable term for the first time in this study, I define it very sharply. This finished conception of red figures against black has first and foremost a paradoxical quality which opens it to realms of human feeling that resist definitive interpretation; and second, the concentrated composition has a paradigmatic quality, a refinement that would make any effort to change its economy idle. In both these respects it stands as a worthy counterpart to an early fifth century play concentrating on only two characters whose destinies are interlocked in a complicated way, and who, with all their contemporary sensibilities, are placed against a mythological background with its otherworldly implications which it is not amiss to see as metaphysical.

Can we not see in these phenomena a beginning of Classical consciousness of the difference between the literal and the metaphorical⁹—whereby I understand this not in any purely intellectual sense but in a wider spiritual sense?

It should by now be clear that the complex interactions of the four colors and four elements can be *experienced* as dynamic unity, but can be thought about only if the individual strands are disengaged and considered one by one. What, then, is the role of white in the ceramic development? No Greek ceramic center in Archaic times used a

truly white-ground color or slip, even though brownish or yellowish tints occur in a few places “for which reason it is better to speak of light-ground ceramics.”¹⁰ A more detailed examination of that class of ceramic decoration, which in principle did not use the human figure as motif, is not a pressing need in the light of the four elements. However, in Athens exactly at the time the color of atmosphere was forced out of the background of the pictorial frieze, experiments with substituting white in this position did occur. Yet in the Four Elements theory, white is no more possible as representation of air than black. White is *par excellence* the noetic color (with the one exception that in the macrocosmic combustion stage: Ill. 12A, it is assigned to water).

It is important to discuss this proposition in more detail, since the history of Attic ceramics can reveal the actual steps by which white became an important part of the vase painter’s palette. Joan Mertens¹¹ has traced the beginnings of use of a white ground in Athens to Nearchos who ca. 560 introduced a frieze on the lip of a kantharos to set off a tongue pattern. This seems not to have had any issue for another generation when painters, especially Andokides, began to incorporate white into subordinate parts of the decorative scheme. In view of this second start about 530, it is appropriate that Mertens dealt with the subject on the basis of the accentuation of specific features of shapes on which white was used. Continued experimentation of this sort makes it clear that the application of white at first did not rest on a specifically spiritual insight as had the change from black to red figures: it was motivated more by attraction to its shape-enhancing potentiality as it expanded (to cover even the usual pictorial field) than by concern with the psychic effects of its combination with blackfigure human forms.

Thus the prolific workshop of Nikosthenes produced oinochai with standardized floral motifs in black on white backgrounds, filling the main parts of the neck and body. When human or animal figures occur, their mannered style gives them away as “studio props”. This practice spread in the last quarter of the fifth century to various other shapes (kyathoi, skyphoi, etc.) and even to plaques. It is hardly too harsh a judgment to say that all of this constituted a decorative backwater created by those artists who did not want to give up the old blackfigure depiction of the world. A few experiments were made also on the shape perhaps best suited to narrative depiction, the krater (Figure 14), using more ambitious narrative scenes and redfigure ornaments. In such cases the painter had to come to grips with the psychic implications of white as background to shadow-figures and, probably, found the results wanting, for not much came of this. Mertens speaks perceptively of this type of experimentation: “...it makes particularly clear the *unrealness* (emphasis mine) of dark flesh against a light (sc. white) background”.¹² The trouble was not with either color but with the combination of black, which had been canonized as the epitome of physical density in its combination with atmospheric orange, and of white which, however striking as a background, has *no* physical implications: it refers either to the realm of the ego (*nous*, fire) or else signifies emptiness.

I have already proposed a profound significance in the use of black as background to red figures; contemporary experiments with white as a substitute for a red background to black figures at first yielded no such impressive results. But even painters who confined their efforts to decorative effects contributed something to their age by introducing white at all, for the color eventually was noticed by the progressive artists

who were developing the redfigure style. In a 1972 paper Mertens revealed, on the basis of some fragments attributable to Euphronios, what must be a transitional stage between the decorative style and true white-ground: a blackfigure satyr confronts Dionysos in outline technique with shading in warm hues. In his consciousness Euphronios must have carried the undifferentiated density of blackfigure forms, the breath of life and realistic tonality of redfigure forms and the phantom quality of outline figures against a white background. Even though he and other practitioners of the real white-ground technique continued to use red and yellow of the four color palette, often with delicate washes, the reference to another less physical level of reality is apparent in a subtler, vaguer, emotionally more rarified milieu brought about by the white, and in the (restrained) subject matter and composition of this new genre. The very use of a circular field by the Brygos Painter to depict a delirious Maenad diverts us from physical reality (Figure 15). The tondo of cups became the preferred locale and, often, two figures on an ample background of white seem to be removed from physical space into a realm which I will characterize for the moment as insubstantial. This prepared the way for the classic use of this technique on grave lekythoi. In the second phase of outline cups the use of solid color areas in matte becomes characteristic (Mertens 174), perhaps as a corrective to too much non-physicality in the effect of earlier cups.

The foregoing reconstruction is an attempt to allow the inner nature of colors to speak and, if it is convincing, we are justified in assuming that something similar probably took place in major painting. In the white-ground style the four color system was strengthened virtually to a kind of *contrapposto* unity by the legitimation of white as an equal force in the long term hegemony of black, red and yellow.¹³ This new unity, perhaps around the beginning of the Early Classical period, may also have worked as an incentive to explore other colors. In order to make that statement—as well as my allusion to black on Protoclassical vases as metaphysical and white as indicating an insubstantial realm—understandable, it is necessary to make a considerable detour at this point. For this reason I must defer any discussion of white-ground lekythoi and related phenomena until later.

The diagrams I have used so far as an implementation of a Four Elements/Four Colors theory based on written sources and vase painting (by implication also major painting, as I hope to show) have served relatively well up to this point. But it is impossible to go further without being able to see the four color system itself in a larger framework that can elucidate the nature of that system relative to the other colors. For one is virtually forced to conclude that there was no scientific interest among the Greeks in any but the four colors before the fourth century, and even then—and thereafter—not much. On the other hand artists had been dealing with an extended range of colors, particularly with blue, in a pragmatic way from at least the seventh century. A reason for this situation will be suggested.

Attempts on the part of present day art historians to explain Greek color on the basis of the so-called Newtonian spectrum are subject to the severe limitation of Newtonian thought in general: it is confined to treating color as a purely physical phenomenon. Yet everyone knows that color exists not only in that sphere, but has psychological and even moral dimensions as well.

Having found no help from that quarter I turned to Goethe's work on color. In the end this proved to be not only suggestive of an explanation for the Greek preoccupation with the four colors, but also richly evocative in realms he opened but did not go into. Thus, my results seem to have application not only to the Greek situation but beyond it. I hope to have made the reasons for the detour mentioned above evident to the reader.

THE OTHER COLORS

The point of departure for expanding the four color system is the fact that Goethe rejected Newton's conception of color out of hand and through his own experiments with the prism acquired a quite differently structured understanding of the phenomena of color. The defenders of Newton's conception (which has since become largely a matter of mathematical calculations) against Goethe habitually point to pragmatic achievements in color science—really staggering technical innovations. Thus, in order to master the basics of materialistic color science today one must virtually study mathematics and physics. By the same token, in order to grasp the basics of Goethe's color theory and—with appropriate adjustments, as we shall see—of the ancient Greek color system, one has to get some direct or indirect experience of the prism (this may require some guidance).

Then, just as Goethe intended, one *experiences*, one *sees* the actual coming into being of colors, their *phainetai eon* (φαίνεται ἔων) instead of contemplating thought-pictures of wave lengths. A reverse paradox in this situation is that one can also experience the prismatic phenomena—at one remove—through such technical inventions as color slides and photographs—which would probably not have come into existence without the Newtonian mind-set. I shall take advantage of this by presenting, in a separate section (see Appendix B, *Color Technicalities*), guidance from a friend who has spent years developing just such visual aids and explaining authoritatively what they show. This allows me to proceed in the knowledge that any reader wishing to understand my discussion of the larger aspects of Greek color has the information necessary to do so within the covers of this book.

Up to now we have regarded the Greek sense of color as the basis of a probably coherent theory of color which apparently was never thought out systematically, that is, we have investigated ancient references to four basic colors: black, white, red, yellow in connection with Greek ceramic tradition and with available testimonia. Obviously, in order to do this we have had to deal with the so-called subtractive (fixed) colors, that is, pigments. At this point it is worth emphasizing that the Greeks were necessarily more restricted to those in their color experience than we are. For modern technology has more than accustomed us to the additive color mixtures (called by Goethe *werdend*, incipient), such as are found in movies, television, etc. The Greeks, however, could experience such mixtures virtually only through natural occurrences, particularly the rainbow. E. Keuls¹⁴ calls attention to the fact that Aristotle designated the three "frequencies": green (πράσινον), red (φοινικούν) and violet (άλουργόν) as the main colors

of the rainbow, quite in accordance with the three additive colors of modern color science. Yet I cannot find the slightest indication that the Greeks at any time were familiar with the use of the prism or any other means of studying or even registering spectral phenomena.¹⁵

Despite this, since it was maintained as a truism that the chromatic colors arose through *krasis* (mixture) of black and white, one can suppose that either through some mystery tradition¹⁶—or else quite spontaneously—the Greeks recognized what Goethe established through countless prismatic experiments, namely, that the atmospheric colors arise through the interweaving of light and darkness in certain well-defined circumstances under appropriate conditions. About the same time as the Four Color theory was being given expression more or less consciously (as in the Hippokratean school)—a theory that in the light of prismatic phenomena is quite intelligible and defensible—the formula black + white = color became so deep-rooted in Greek thought that the interchangeability of white with light and black with dark probably seemed obvious (but was not used as a point of departure for reasoning about color problems).¹⁷

If therefore, all that concerned the four color system simply remained below the threshold of conscious theoretical interest, there are even fewer indications that the other side of the prismatic spectrum (of Goethe) embracing black, white, blue, violet was part of any systematic thought procedure, even though again the *implications* of this other side were understood in the practice of painting. We are confronted here with a mystery of the first order; insistent questions arise. How could the Greeks—and for that matter peoples who preceded them—have such a sure understanding of the nature of colors when this is intellectually only possible through knowledge of the prism? And how, in these circumstances, are the origins of the pigment colors, as belonging more specifically to earth substance, to be related to the atmospheric colors as manifestations in the sphere of air?

An answer to the first question is perhaps to some extent inherent in the Greek conception of the Four Ages as this is given in the *Erga* of Hesiod (who, however, distorts this somewhat by inserting an Age of Heroes as a separate entity; that he did so may suggest that he was embroidering in an 8th century manner on an older tradition). The general meaning of the myth seems clear; humanity lived at one time quite intimately with the gods (in a divine order) and was directly guided by them. Gradually, however, the gods gave up this supervision and thus forced humanity to stand on its own feet, regardless of what bitter consequences might ensue for it. Thus, much that had previously been simply handed over by the gods was no longer offered and had to be consciously and laboriously re-acquired. A feeling for the attraction of this view of things can still be found in the Age of Reason; J.G. Herder writes in his *Ideen zur Philosophie der Geschichte* (V. Buch I. Teil, VI.Kap.): “A divine management was certainly operative for the race of men from the time of their first appearance, which was thus launched on its way with the least trouble. But the more human faculties came to be exercised, the less they needed to be subject to this assistance.....”

An important part of the Hesiodic myth is the connection of the Four Ages with four appropriate metals in the following order: gold, silver, bronze, iron. Obviously each metal has a hue. Gold could be described as yellow, though perhaps more accurately

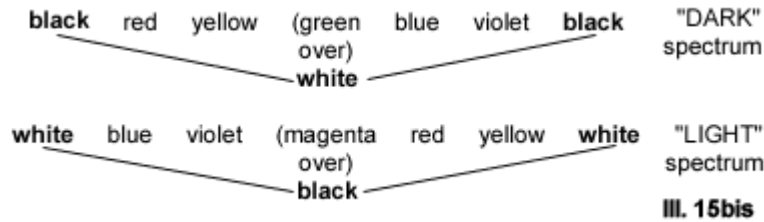
described with Plato's τὸ λαμπρόν, (see Chapter II, *The Ancient Sources*, Plato, paragraph 7). Silver is naturally connected with white,¹⁸ bronze is certainly in the red/brown frequency and iron is black in the *Erga*. Since Hesiod's tale is beyond any doubt a moral one, an earnest conversation with his countrymen, it serves incidentally as a prime example of the way the macrocosmic metals with their colors are interwoven or interfused with microcosmic (psychological and mental/moral) associations. My intention here is to point to an existential quality in the Four Elements/Four Colors theory, not to extract any specific historical content from the myth.

The second question articulated above is on all counts too difficult to discuss in a general way. I have worked out an hypothesis by extending the logic of the laws of optics as I understand them. Since this hypothesis does take account of modern viewpoints as well as of what seems to be inherent in using the Four Elements/Four Color theory as a model, it is unavoidably technical and seems best relegated to the Appendix (see Appendix C, *The Four Elements and the Origin of Fixed Colors*) for readers interested in the scientific implications of the subject.

THE TWO SPECTRA OF GOETHE'S COLOR THEORY

It is at this point incumbent on me to explain in my own words (that is, in addition to those of J.H. Hetzel, see Appendix B, Color Technicalities) how I conceive of the interconnection of the two spectra derivable from Goethe's work, because that interconnection has led me to establish particular values for the various colors according to their connotation as macrocosmic or microcosmic. These values are presented in chart form in Illustration 16.

First of all, strict logic indicates that no prismatic scale, including Newton's, can appear without the cooperation of both light and shadow. In the case of Newton's experiment the wall of the dark chamber around the hole through which he admitted a light ray furnished the darkness necessary to allow the "refracted" colors to appear on the opposite wall. Nevertheless, he deduced from this experiment that colors existed purely in the form of bundles of rays constituting the light. Goethe's first contact with color theory did not happen to take place in the *camera obscura*; in his haste to use a borrowed prism he simply put light rays through the prism onto the white walls of the room he was in. To his surprise—for Newton had said that colors were contained in the light—nothing happened.¹⁹ No color appeared on the wall. Only where he encountered a shadow on the white did it appear. In systematic experiments he then examined how colors appeared when there was more white than black on the surface and vice versa. In this way he discovered a polar reversal in the order of the *same set* of colors that appeared in these two circumstances. Furthermore, he found that by manipulating the prism he could either keep these colors intact or—by approaching the two innermost colors in the series—mix them and create a third, new color: green where dark predominated and magenta where light predominated. These relationships can be visualized in the following way:²⁰



This polarity corresponds quite exactly with the world view of the Greeks, who preferred to deal with polarities in all phenomena. The relation of dark and light as well as the relation of specific colors to each other was on their minds from the first Protogeometric pots to Aristotle's speculations. And it was exactly that portion of Goethe's spectrum corresponding to the popular concept of "earth colors" that most concerned them, particularly so in the earlier periods; whereas the other part of the spectrum with the blue and violet corresponding to the popular concept of "heavenly colors"; increasingly attracted their interest in the later periods.

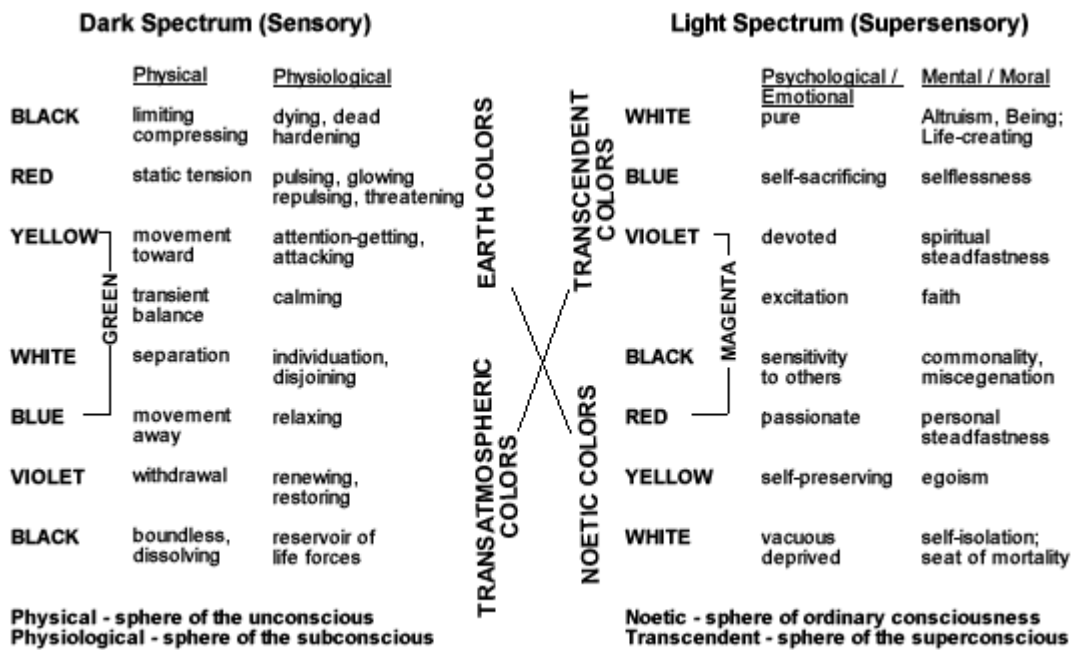
To repeat, for absolute clarity: the famous four colors of the Greeks are in effect one half of the Dark spectrum of Goethe: black, red, yellow, white

The white in this case is the "trench" between the two pairs of colors of the whole spectrum and as such plays an important role. For, although the Greeks at all times freely used yellow and also, when appropriate, the blue poised across from it, they seem seldom to have bridged the white gap between them to mix up a green; in fact, they may have been more interested in mixing black and yellow to produce a dull olive, as in certain ceramic fabrics, and this would have a different expressivity than true green. This downplaying of a radiant green helps to define their relationship to nature. Their subject was first and foremost that part of nature which is the human body and which in its nurture subsumes the green of plants and the oxygen produced by trees; it must not then have seemed necessary constantly to refer to all aspects of the environment literally, as in various other (later) cultures. Nevertheless, since green is a mixed color, not a primary, traces of blue left on stone, particularly on statues, might in some cases be the blue component of an original green (see below), but blue might simply represent a local color.

The nature of black and white *as colors* in the four color system remains elusive. There is no other way the spectrum as a whole can be called up by the prism except that dark (sc. black) and light (sc. white) are played off against one another.²¹ Modern color science, ignoring this, applies the adjective "achromatic" (colorless), which has a proper use in optics, irrationally to black and white. Artists of virtually all periods have wholeheartedly used black and white as colors of the utmost expressivity and, as we have seen, some Greek thinkers regarded them as the only true colors or, more precisely, the original colors (*Urfarben*). The use of black and white as stand-ins for dark and light must lie behind this and by that token Ill. 16 can be read as the relationships of pigmentary colors reflecting, reduced from, the atmospheric colors.

AN ATTEMPT AT A HOLISTIC INTERPRETATION OF COLOR MEANING

My experiences over a number of years in studying the prismatic laws and applying them to the interpretation of works of art of all periods have led me to make a visualization of the relationships I found; this is in the form of the schema given in Ill. 16. My debt to Goethe as a point of departure is fundamental. Yet I have proceeded to derive the fullest consequences of his rather generalized, really incipient, thoughts from the spirit of his work, that is, the insight into polarities, applied here in the most radical fashion. The more uncompromisingly one applies the concept of polarities to colors, the more generously they yield up the nuances of their expressivity, which nevertheless remains inexhaustible. The nature of the case then admits of, even requires, characterizations of color quality by single keywords or phrases. This makes it apparent that Ill. 16 cannot be justified by a long verbal disquisition (although a few features of it will be explained in due course) but rather by use of it in understanding the prismatic experience and by applying it to the (largely non-verbal) appreciation of the choices of artists in the coloration of their works. This in turn implies that artists have always intuitively understood the lawful potencies of macrocosmic/ microcosmic color handed down from earliest times. This occurred normally in terms of conventions individually administered but agglomerated into larger units recognizable as workshops and schools. In effect, many of the concepts offered in Ill. 16 have long been intuitively understood by critics as well as artists; hence the more precise placement of these concepts suggested here could be an incentive to further methodical refinements.



How to Read this Chart:

The characteristics of physical colors are adapted from the concepts of statics and dynamics inherent in the four elements. The characteristics of physiological colors transfer the physical characterizations to the basic organic (vegetative) realm. On the human plane reactions are subconscious but can instantaneously release motor activity as in the case of red and yellow traffic signals (emotions are not necessarily involved). On the supersensory level the order of the colors is reversed and their effect—as a given of nature or acculturation—arises in the personal (soul) sphere. On the mental/moral level one encounters a fluctuating relationship of the personal factor and the social (ego) factor. The latter includes the highest moral concepts traditionally associated with religion and philosophy, hence transcendental.

The color values proposed here, based on the principle of polarity, are representative central concepts. Nuances arise from mixed hues and from (situational) interaction of hues.

At this point at least a few explanatory comments to Ill. 16 are in order. Atmospheric green, induced by manipulation of the prism to combine yellow and blue over white ground is similarly produced in painting by mixing blue and yellow pigments on a white support, as in watercolors. From this fact it can be seen that the invention of oil paints was a distinct step toward materiality, since the white support is not necessary, even though white as a surrounding color has much of the same effect. The preparation of green pigment directly from natural substances, such as minerals (whose color implies an earlier evolutionary process: see Chapter III, *The Evolutionary Aspect of Colors*, paragraphs 2–3) is a further step in this direction. The corresponding color in the Light spectrum is the delicate hue magenta induced by mixing violet and red over a black ground. If one imagines black paper used as the support for mixing violet and red watercolors, the delicacy of magenta can be easily comprehended. Add to this the indication that in their normal state all the colors of the Light spectrum are especially delicate in that they embody non-material qualities.²²

This can perhaps be grasped in the case of the blue and violet of the Light spectrum which I have designated as transcendental colors in contrast to blue and violet of the Dark spectrum which are called transatmospheric; these latter (as atmospheric colors) actually owe their darkness (shadedness) to the backdrop of cosmic darkness against which they are apprehended by our eyes. To put it another way, they conduct the vision from the light-filled earth atmosphere toward the darkness of the surrounding universe. Thus this blue and violet are not so much in the earth's atmosphere as at its very edge, its boundary; it is as if blue were the inner skin and violet the outer skin of that boundary. For this reason they have always been felt as drawing our sight outward and away into the distance. Thus the expression "transatmospheric" is an attempt to do justice in a completely neutral way, with no overtones, to the physical/ physiological phenomenon just described. By the same token the diagonally positioned blue and violet of the Light spectrum, having reference exclusively to the sphere of Being (the moral sphere), do most decidedly have overtones; they are indeed transcendental in that they transcend all other realms known to mankind. Therefore, at one time blue is purely

physical (sensory), at another time it is supersensory, the criterion being how it is positioned in relation to light and dark.

Again I emphasize that *all* the colors of the Dark spectrum are to be understood on the purely physical/physiological level and are therefore highly suited to be grasped in exactly the way that modern color science does grasp them. It is historically inevitable that the Dark spectrum would be discovered by a materialistically oriented science and used as a basis not *only* for defining the sensory nature of color but even of refining that definition in the direction of a sub-sensory (purely mathematical) system of color science. So suitable for this is the Dark spectrum that it has been hailed as the only existing spectrum (to which, of course, Goethe reacted violently) and no lengths have been too laborious to go to in order to defend this assumption.²³ Obviously this is controversial ground and the challengers also have exerted—and do exert—themselves to a corresponding degree. It is also notable that Greek thinkers—even Plato—immersed themselves in exactly the earthiest part: the “earth colors” of the material spectrum, for they did, among other things, lay the basis for a coming western science of the material.

Yet those very same Greeks almost certainly could not have experienced difficulty in conceiving that the colors of the Dark spectrum can become totally (and chiastically) inverted and back-lighted and thereby more delicate. Such colors, in any case, can dialectically have a connection only with mental values (yellow and red as the truest colors of the innermost *nous*) and with spiritual values (blue and violet as belonging to the sphere of the divine). By this reckoning green refers principally to the transience of the physiological sphere, just as it is in fact the color of every blooming landscape. If used metaphorically, it could then refer to transient beauty or to the peacefulness of organic well-being. The other special prismatic color, magenta, has logically to be the link between the noetic and the spiritual spheres, just as green is the link between the materials of earth and the animating forces that descend to nature through the transatmospheric boundary.

On this basis it is not surprising that Goethe considered magenta, which is used here to translate his term *Purpur*, to be the ultimate intensification—*Steigerung*—of red (vermilion); the combination of the highest noetic color, red, with violet, which in low saturation offers a delicate atmosphere of spirituality, creates a bridge from the mental to the divine sphere. But at a price, for this color alone in the light spectrum is not backlighted by white but hovers over black, which holds it down to mortality.

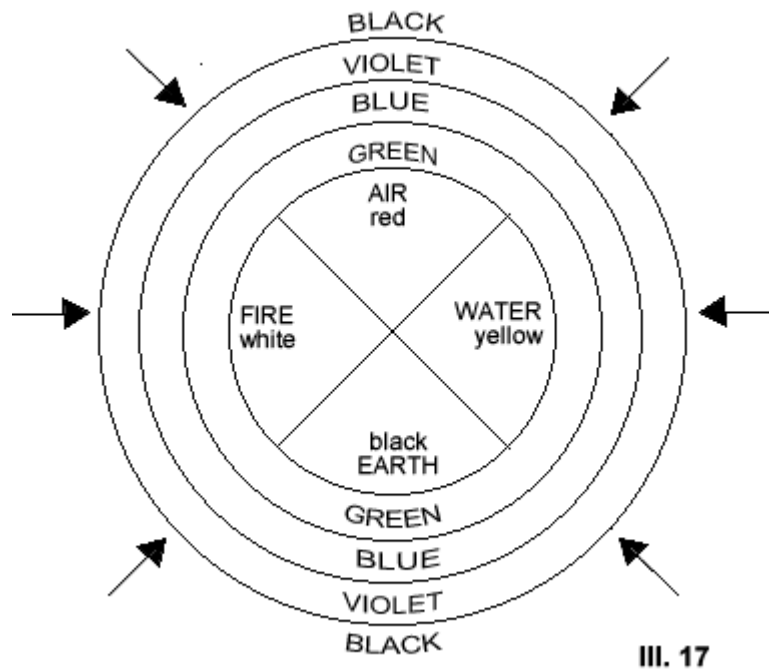
Finally, in order to make the concept of the transcendental quadrant of the spectra comprehensible to the maximum degree, I refer again to the idea that the Greeks probably could have accepted the concept of the colors of their four elements as capable of being chiastically inverted and backlighted, because in fact they used colors in the noetic and also the transcendental sense effectively, when that was appropriate, but without speculation. Their more conscious concern was plainly to grasp intellectually the earth quadrant of the Dark spectrum.

What they achieved in that respect became part of the heritage of a firm, rational conception of human life valued by the Roman intelligentsia, such as Cicero and the Plinys, to mention a few, and which was passed along to become, with or without the blessing of the Church, a powerful factor in the civilizing of northern Europe. It seems

possible to ascribe the earth-bound rationality of Romanesque architecture to this. Yet, when an unprecedented surge of faith swept over Europe in the so called Gothic period, it fell to architects and painters to overcome that earth-bound rationality; they did so by inventing soaring, seemingly weightless architectural forms and, to go with them, stained glass windows. Anyone who has stood in a great Gothic cathedral like Chartres has felt the unique refulgence of its lofty windows—generally dominated by blue, red and violet (on the religious significance of these colors see my discussion in Chapter IV, *Panel Painting and Wall Painting*, The (Late) Archaic Period, paragraphs 5–9) and white. One is seeing pigmentary colors literally backlit by natural light. But is that all there is to it? The total effect is often described as a supreme spiritual experience, even in our jaded century; and the reason is that transatmospheric color is transformed into transcendent color by atmospheric light, which becomes at the same time metastatic divine light. With the chiasmic spectra of Goethe this event can be explicitly described and understood, insofar as human understanding reaches. Without those spectra the experience can easily become lost in an amorphous mysticism.

EXPANDING THE BASIC FOUR COLOR PARADIGM

In order to offer the reader the ultimate intellectual consistency I can muster, I offer below an expanded version of the basic Four Color paradigm to suggest how green, blue and violet could be related to the basic earth colors. In Illustration 12 C or the identical Illustration 13 G, which may be used as the most familiar operative form of the paradigm, the circumferential line marks the separation of all terrestrial phenomena, macrocosmic or microcosmic, from outer space. Obviously this paradigm is a drastic simplification owing to Greek concentration on only the earth color quadrant of the Dark spectrum (Illustration 16). That is, the Greek philosophers were, accurately enough, analyzing the functional (dynamic) processes that take place in the earth's atmosphere but ignoring the visual phenomena that actually result from those processes. This is another way of saying that they ignored the transatmospheric quadrant of the Dark spectrum (Aristotle makes a slight exception to this statement).



III. 17

In order for these facts to be apparent in an expanded version of the paradigm, it must be understood that the circumferential line of the basic paradigm (Ill.12C) separates the earth *plus* its atmosphere from the outer cosmos; in the new version (Ill.17) this same line actually separates the purely mineral earth *from* its atmosphere. The latter now contains the separate realms of the colors green, blue and violet which are visible to us—in what way I will mention shortly. Meanwhile, the *original* four colors are to be thought of as dynamically active under, on and above the earth's ground line and visible where appropriate. The outer circumferential line of Ill. 17 separates the earth *plus* atmosphere from the outer cosmos.

In the new version (Illustration 17) green hugs the surface of the earth, just as does the green mantle of vegetation in reality; the transitory, shifting nature of the latter can be understood through its being a combination of finely moisturized earth represented here by yellow and the cosmic light of the sun (white) penetrating through the blue sky. This circumstance is exactly reflected, as of course it would have to be, in the Dark spectrum. The outermost color, violet, is principally visible in the rainbow, since otherwise it is above the blue.

While this final schema goes beyond Greek theoretical values, it was nevertheless explored and understood to a considerable extent by Greek artists who, at first in advance of the philosophers and by mid-fifth century in tandem with them—and then leaving them behind-, worked pragmatically on into the Hellenistic period (and what I designate as Graeco-Roman painting). By that time they had discovered and used freely many, if not most, of the technical properties of color—apparently at a completely

informal level—which are now discussed routinely in art training and in textbooks on art history. But while such technicalities would apply only to the Dark spectrum (to which Ill. 17 is limited), the insights of the Greek painters reach into the Light spectrum, great art necessarily being a bridge to the divine world and the world of deepest human meaning. That spectrum, being a total inversion of the Dark spectrum, eludes the kind of abstraction which is able to pictorialize the Dark spectrum in a paradigm.

CONCENTRATING ON BLACK AND WHITE

In view of the assumption by the Greeks generally that black and white were the two basic colors and of Goethe's research that confirms this in a certain sense, investigation of this phenomenon from another side is needed. For the rather complicated, polar way in which these colors are related may help explain fifth century painting.

Black and white not only bracket each spectrum—reversed to each other—but also appear at the center of the two spectra again in reverse positions. Having in mind this consistent polarity, if we ascertain that black juxtaposed to red in the Dark spectrum expresses (on the basis of Four Elements physics) the direction of hardening and, physiologically, ultimate death, then, at the other end of the scale, juxtaposed to violet, black will express the direction of dissolution and, physiologically, the region of amorphous life forces whence renewal of organic life can be drawn. I believe the second of these blacks makes the better sense in interpreting the background of redfigure painting. That black which is positioned at the center of the Light spectrum seems more related to the first black circumscribed above: it imposes a basically physical element—the mortality of organic life—as a common unifying factor on all living beings.

By contrast, white in the Light spectrum refers to non-physical realms: in juxtaposition to blue, white points to the transcendental region of divine forces, and in juxtaposition to yellow to the noetic realm, defined as embracing the activities of the inner life of the human being. I have labelled this spectrum supersensory, quite in the spirit of Goethe, although he did not pursue the matter (see Appendix B, *Question 3*, Eastlake translation). I believe that the chiasmic interfacing of these realms with the physical side, as indicated on Ill. 16, can add to an intellectual understanding of the richness and complexity of color experience in human consciousness. Without the prism the Greek experience of this richness and complexity could not be conscious and intellectual but only intuitive and artistic. My research has suggested to me that this intuitive artistic experience of physical and supersensory colors continued through Roman times and became especially acute in the Middle Ages and Early Renaissance, after which it slowly ebbed. Now it can be recovered only by the intellectual route—to which, unfortunately, many obstacles exist in our times.

Turning back to white in the Light spectrum, we see that it can refer either to the realm of intellectual and emotional qualities or to spiritual qualities generally associated with divine beings. The polarity involved here can perhaps be proposed as that between such universal and abstract concepts as omniscience, omnipotence, purity, etc. to

characterize the spiritual side and those self-centered, separative tendencies that are virtually unavoidable in human thinking and feeling—which, in the first instance, take place within individuals (however much these can be influenced from the outside). The white in the central position of the Dark spectrum is closely related to noetic white for it too has a separative function in separating blue and yellow, two totally distinct colors. Furthermore white, as a basically non-material color, can have meaning in the Four Elements/Four Color system—which is rooted in the Dark spectrum—only if one grants the non-materiality of *nous*, as required in the Greek conception. Otherwise nothing is left in this central spot of that spectrum but emptiness. Thus it makes considerable difference to one's experience of green whether one understands it as *krasis* of blue and yellow over white or whether one takes green as a (Newtonian) primary color thus ignoring the white factor, which is thereby relegated to nothingness or emptiness. I must ask the reader to understand that this whole discussion of the single as opposed to the double spectrum is totally relevant to Greek color theory for the simple reason that that theory rests on a conviction of the role of light and dark in the generation of colors—which in turn involves and implies the two spectra even though the Greek philosophers could not pursue the problem that far scientifically for various historical reasons. Nevertheless, the implication of the two spectra is made quite concrete on the artistic side in that vase painters attained the metaphysical black of the opposite pole of the Dark spectrum when they metamorphosed the blackfigure style into the redfigure style, and they reached the noetic side of the supersensory spectrum when they invented white-ground painting.

PRELIMINARY REMARKS ON THE MEANING OF WHITE IN THE CLASSICAL PERIOD

The foregoing discussion makes it possible to offer some thoughts about the introduction of white as a serious component of the vase painter's palette (the connection with major painting will be discussed later). We concluded that white in Archaic vase painting fulfilled largely decorative needs. It was not until the re-evaluation of black at the beginning of the Protoclassical period that a new interest in the potentialities of red and yellow (in mixture) arose.

This more conscious interest in the traditional triad had consequences, the first and foremost being that it began to pull white also into consciousness as a color with more than decorative interest. This motivated some unpromising experiments that thus conditioned a rather gradual emergence of an actual white-ground style—a style that always remained a mere satellite of the ubiquitous redfigure style. On the manner in which this took place we may cite briefly R.M. Cook.²⁴

Their (the redfigure painters') earliest ventures in white-ground work....are in effect red-figure drawings the background of which has not been blacked in; now a distinct manner begins to establish itself.... the sharp clarity of red-figure drawing gradually gives way to

softer effects, as the flush line of dilute paint replaces the strong relief line, even for the outline, and the flat washes of purple, brown, red, and yellow that often cover the drapery take a larger part in the design....by the middle of the fifth century the lekythos has become the usual shape.

Cook proposed that the demand for lekythoi to dedicate at graves led to the demise of the earlier white-ground style and a greater interest in “new and perishable colors and a white friable slip”. The demand for a shape connected specifically with graves and making use of a white setting is actually a rather remarkable phenomenon. The discussion of technique suggests that vase painters only gradually weaned themselves away from the implications of redfigure drawing and thus only slowly became cognizant of the deeper potentiality of a white-figure scene—or even perhaps could not have realized this until their attention became specifically focussed on the subject of death. A study of the themes of the earlier, transitional stage of white-ground representations—which I have barely touched on in connection with the maenad cup of the Brygos painter (Figure 15)—would be interesting but is not strictly necessary to grasp the point being made.

Seen in this light, a classic white ground lekythos of the Achilles Painter depicting a warrior extending his helmet to a woman seated on a klismos (Figure 16) brings us into realms that are less easy to define than redfigure or redfigure-type representations. On the one hand is the rather mysterious circumstance that human beings generally appear to gain a certain dignity from the mere fact of being removed from the realm of the living. Yet here the survivor—as the lady must be in the departure scene—is portrayed as being in the same shadowy realm as the warrior, who, we may suppose, never returned physically: that is, she is shown in exactly the same outline technique against the same white background as the warrior. Both are “outline phantoms” from the physical perspective. To judge from the excellent color plate in John H. Oakley’s 1997 monograph on the painter (in my sketch I have attempted to concentrate attention on approximate color relationships), the lady’s upper garment, which is all she is wearing, is not treated as a real material, for its delicate greyish yellow shade seems to be contrived to appear backlighted by the whiteness of the ground. The same translucent effect characterizes the single garment of the warrior. In sum, the whole scene is completely out of one mold—a mold which can confidently be associated with the noetic quadrant of the supersensory spectrum, which the Achilles Painter has used with flawless logic.

That statement can be tested from another angle. Although the helmet is being proffered, the lady sits calmly with one arm on the chair rail while her left hand rests upon her leg. Contemplating the object, she yet makes no move to react to it, which might seem ungracious of her—if it were a physical helmet. But surely it is merely a thought-form completing the impression that the artist is depicting an insubstantial realm: fire—in its microcosmic form the realm of human consciousness. That consciousness can concern itself with material substance, as in the energy-filled forms of redfigure style; or it can concern itself with the deepest mystery in human experience, death, which is the end, the denial of material substance. The locale for coping with the mystery and pain of the separation brought about by death can logically only be the

realm of the *nous*—human consciousness—of the survivor, just as the Achilles Painter has understood.

His objectivity is so consistent (and persistent) that it actually has a matter-of-fact quality. Therefore I prefer not to bring the word “ideal” into this context. The confrontation is real, but it takes place in the only locale in which the lady can reach her beloved dead. Both figures “inhabit” the same color. That color is thus emphatically noetic white and not transcendental white. Moreover, the black outside the scene, though perhaps conventional enough at this time, cannot have the same significance as in the redfigure style, where it surrounds the figures and gives them their mysterious radiance. Therefore, it can only be the earth black of the Dark spectrum in its implication of physical death as would suit the sense of the scene it surrounds. *In toto* then this vase as a work of art encapsulates a view of life and death which is “realistic” in that it does not search for meaning beyond the phenomenon of death but rests in the painful but also contemplative consciousness of death. To try to characterize it any further might, I fear, obfuscate what the colors objectively tell us. At most I would venture to suggest that it corresponds to the High Classical dialectical balance (*contrapposto*): thus, if this vase suggests pessimism, it then swings over to optimism, but then back to pessimism and so forth. My analysis might tend to support the views of Chr. Clairmont²⁵ in regard to the interpretation of Classical Attic tombstones but that is a large, complicated subject which I leave for others who know more about it to decide.

Quite apart from the work of Classical vase painters in exploring various aspects of the expressivity of black and white—as well as of red (orange)—in combination, far beyond the Archaic level, there is another effect to which they must have contributed. For they were also inescapably involved with the physical side of these colors as dark and light. While philosophers were trying to understand how the eye registers dark and light, artists—no doubt primarily painters of major projects, but who knows how many of these were also, or had been, vase painters—were beginning to be interested in the laws of vision. For, by the end of the fifth century at the latest, they were experimenting with *chiaroscuro*, that is, softening of the forms contained in a lighted space through the introduction of darkening shadows. This was a realization of a more subtle aspect of the opposition of dark and light.

HELLENISTIC PAINTING IN THE LIGHT OF THE CYCLES

The sequence of colors dominating in turn as proposed in the Four Elements/Four Color paradigms has been seen to be expressed in the actual color usage of Greek ceramic painting with scenes in the periods from Geometric through Classical (Illustration 13E–G); in the last mentioned red was dominant and white emerged as an expressive color. However, the possibility of continuing the investigation on this basis disappears in the latter part of the fourth century when redfigure painting expired. It is therefore fortunate that at least the beginning of the next cycle, the fire stage (Illustration 13H), represented by my Protohellenistic period, is well documented in major painting, also with some help

from the coloration of sculpture. These subjects will be treated in detail in the next chapter. It will be shown in my study on sculpture that at this very juncture the development of sculpture as such coincides with this fire stage—though as a re-starting after a completed cycle instead of as the culmination of a cycle. Although in painting the High and Late Hellenistic periods are poorly documented, what must have been achieved in them can be gathered from the “Graeco-Roman” paintings of Late Republican and Early Imperial times. A number of these paintings also will be analyzed in more or less detail in the next chapter in order to round out an impression of the great achievements of Greek painting in the Hellenistic period.

In view of the disparate nature of that evidence I wish to try to pull together here some theoretical factors that may help in understanding in what way white as the dominant fire color, and black—drawing the whole cycle to a close as secondary color—are represented in the Hellenistic period. At that stage the consciousness of self which had emerged in the Classical period, but under the strong constraint of “contrapposto thinking”, was gradually given over to the necessity either of self-regulation (of the *nous*)—or none at all. The effective disappearance of the *polis* as a significant political phenomenon no doubt explains much, but certainly not all of this change of orientation. The soul-calm which we seem to encounter in Classical works of art disappears: often evident in sculpture and architecture, it must also have existed in major painting, some impression of which I will attempt to reconstruct in the following chapter. Something of this sentiment seems to me to inhere in the following statement of I. Scheibler:²⁶

One will not go wrong in regarding four color painting of the fifth and fourth centuries as the most consistent demonstration of the transposing into color and onto a surface of a particular form of intentionality. Not until the succeeding centuries that are more concerned with atmospheric illusionism than tangible physicality do green and blue play a larger role.

Nevertheless, of course, tangible physicality did not lose its importance in the Hellenistic period (see further discussion Chapter IV, *Panel Painting and Wall Painting: Italy*, Conclusions, paragraph 2) or actually in all of antiquity, whatever variants it took, nor did the four colors ever cease to play the dominant role wherever realistic figural representation was the principal concern of art—in ancient *or* modern times.

Finally it cannot be accidental that the Hellenistic period produced probably the most *practical* applications of fire in the realm of technology (e.g., the lighthouse of Alexandria) as well as the discovery of the curved surface of the earth and the central position of the sun (fire as the fruition of *nous*).

Parallel to this went a renewed consideration of the use of black and white as background of pictorial representation, re-playing the Protoclassical experience at a higher level. To the extent that the four elements system raises an expectation for white to be the characteristic color of the Hellenistic period, that particular color is not “obliged” to appear physically in all possible contexts (although it frequently does²⁷)—as was the case with the dominant colors in the previous periods. The subtlety involved in grasping the color sense of the final period is perhaps evident in the discussion of white by a connoisseur²⁸ of ancient painting:

For the ancient painters, white must have been the equivalent of light, without which no system of chiaroscuro would be possible; so it became a necessary part of the painter's equipment.

To make that statement even clearer, I should like to add that the whole Hellenistic orientation to the problem of light sources could not have arisen without a previous direct consciousness of dark, that is, black. That implies that there were two significant stages in the process of understanding white: first, in the Classical period, white on the grave lekythoi (running parallel with black-ground redfigure painting) signified the illumination of the inner consciousness, but hardly any farther than the borders of the soul, as it were, in the fullest sense of the emotional life. Second, however, if I may repeat for emphasis what was said earlier (see Chapter III, *Preliminary Remarks on the Meaning of White in the Classical Period*, paragraph 7)—the tender beginnings of chiaroscuro in the Late Classical period portended the deepening of that experience in the direction of coming to terms *intellectually* with the physical laws of vision, in other words, with the struggle of light with the darkness; but there were limitations, at least in ceramic painting. A redfigure representation could have shown internal modelling but could never have cast a shadow on the black surrounding it. This stricture no doubt applies also to white-ground style.

An eventual surfacing of this struggle seems predictable from the universal assumption of the Classical philosophers that chromatic color arises out of varying combinations of black and white (see Chapter II, *The Ancient Sources*, Conclusions, paragraph 2). But on the level of what we call illusionistic art this struggle was not engaged until that stage of moral/mental maturation we know as the Hellenistic Age—and then not nearly so systematically as in the modern era. And on the highest level of all, the philosophical, this battle seems not to have been joined before Neoplatonism, by which time ancient painters had become interested in other matters.

The final results of this investigation of the coloration of Greek art: vase painting in as far as this is based on representation of figures; and wall painting (including some Pompeian) in the light of the Four Elements/Four Colors theory can be summarized in the following schematic way:

Period	Element	Dominant Color	Subdominant Color
Geometric	Earth	Black	Yellow
Archaic	Water	Yellow	Red
Classical	Air	Red	White
Hellenistic	Fire	White	Black

In concluding this chapter and leading over to major painting it will not be inappropriate to recall one of the most sophisticated results of the Four Color tradition, the Alexander Mosaic (Figure 17) reflecting a painting of the Protohellenistic period (see also Appendix A, *Mosaics*, paragraph 1). For this is truly not thinkable without the patient and consistent work of many generations of vase painters in exploring the expressive possibilities of this particular combination of colors. In the mosaic the brilliantly highlighted portraits of Alexander and Dareios lead one to think of other famous portraits. Only in the band around the headdress of Nefertiti (*EWA* 12, fig. 489) did the Egyptian artist go beyond the four color palette. What is most extraordinary is the blending of those colors to produce a skin hue which is slightly swarthy but indescribably radiant, as can be fully experienced only *in corpore*. In a portrait of this quality and sophistication, I should hesitate to think that the black was introduced only to do justice to a racial quality; it must also be physical black representing the material body, and hence predictor of mortality.²⁹ While the latter suggestion may in this case be somewhat speculative, it can hardly be so if applied to—far down the centuries—the self-portrait of Rembrandt in the Hague (*EWA* 11, fig. 456) for the concept of *memento mori* was built into his era and perhaps particularly so in the consciousness of this artist.

IV.

GREEK ARTISTS AND THEIR COLORS (APART FROM CERAMICS)

GENERAL CONSIDERATIONS

The larger history of concepts embedded in the Four Elements/Four Colors theory, as worked out in this study, seems capable of illuminating a kind of inner driving force throughout the drama of Greek spirituality. To be sure, the well-preserved ceramic tradition alone provided the visual framework for this (at a level not concerned with the great variations in artistic quality characteristic of the category—in modern terms we might say at the existential level of the artisan process). But ceramics, of course, is not the whole story of color. Textiles, statues, paintings, architecture all exhibited color and we must try to take this into account, even though in many cases the color is largely gone. Obviously it is not easy to make judgments about faded bits of color. Since, moreover, these categories sometimes exhibit a more varied range of colors than ceramics, one must go into the whole question of prismatic phenomena along the lines already suggested in order to seek the exact meaning in the use of a particular color.

It must first of all be kept in mind that figural representation on ceramics as a category of objects useful for daily life, trade or for funerary purposes brings us as close as we can get to the life-style of the ordinary Greeks. But the color *sense* found in this category extends right into the loftier categories enumerated above, especially those made of terracotta; and that is not surprising since the similarity of the basic materials suggests similar handling. It was particularly when artists turned to more expensive materials like stone that they chose to add other colors, especially blue, to the basic four. But material alone cannot have been a final determinant.

I am not tempted to explain this situation by the notion sometimes heard that blue is somehow just a substitute for black. In the first place, both these colors could be used simultaneously on the same relief, and already at an early stage, as on the terracotta slab with Gorgo from the temple at Syracuse (Figure 18).¹ The figure itself is depicted in the four color range but the background is blue. Instead of showing air in red/yellow in

the neutral sense of surrounding atmosphere (of earthly beings), the artist has apparently resorted to blue as the color of the divine abode of the gods, the heights of Mt. Olympus, for example, for the Gorgo is now entangled in their sphere. Her hair and accoutrements could still be conceived of as physical (black).

The second consideration is that black, which together with white produced all color in the universal Greek view, and hence necessarily blue as well, absolutely cannot be an identical twin of blue. The evidence is indisputable: the Greeks *could* see blue (*pace* Gladstone) and when they used blue they meant blue. The only valid question can be, which blue did they intend, that of the Dark spectrum or that of the Light spectrum? In the relief just discussed I have opted for the latter, fully understanding that in this very usage the germ of the former was planted and would be nourished by any demythologizing tendencies in Greek thought (but I believe very slowly). This is a problem to be addressed gradually without the interfusion of either materialistic or romantic proclivities from our own age. Again, in regard to the four traditional colors, we shall have to consider the possibility that artists experienced the meaning (effect) of each color in an intensified way when it was applied to parts of statues and temples of the gods. With all these intimidating problems in mind I shall undertake a description and tentative interpretation of some individual works and make some larger generalizations about categories.

Excursus on Literary Evidence

It has long been an accepted scholarly enterprise to investigate the occurrence of color terms in Greek and Latin authors in order to deduce the significance of these terms from the context. Already in 1927 Karl Meyer put together references to *leuks* in cultic practices and established that, starting with Homer, that word could be used equally for light itself as “shining” or “brilliant” and for physical or physiological qualities as “white”, for example, women’s arms or milk. A fusion of the word “white” with the moral sphere implied in light to give “pure” or “innocent” was then established, this being especially obvious in Early Christian practice. Essentially his study stands in a tradition of using written references to supply the data for religious, sociological or anthropological conclusions; the dividing line between this and the psychology of color can be fluid, as in Ingrid Riedel’s 1983 study.

In any case, since there is in that stream little concern with how the Greeks may have experienced their use of colors, it is evident that my approach to ancient color problems is altogether different. Yet it was, to a certain degree, anticipated insofar as Heinke Stulz included a section on color theory and its relations to the visual remains of Greek art in her study of the color red in early Greece (see Chapter II, *Prologue*, In Particular, paragraphs 1–10). It is appropriate, therefore, to refer to this again before presenting my interpretations of specific works of art. Her book is symptomatically a welcome contribution to ancient studies and, within the rather narrow framework she set for herself, is well worked out. She concentrates on one specific color suggested by the two terms *porphyreos* and *phoinix*, by which one understands, respectively, a lighter and a darker shade of red (Liddell and Scott), with the *phoinix* ranging from crimson to

purple. To what extent one should match these terms from early Greek literature with actual colors visible to us on Greek artifacts is open to question. We simply cannot know whether an early Greek painter would have attempted to match terms known in poetry to standard colors in his paint-box; the question is even less answerable in relation to sculptors, on whose work only traces of color (if any) now remain. I prefer greater caution here than does apparently Stulz.

Another limitation to the reasoning of Stulz centers around the fact that she did not (this is not a criticism but a statement of fact) consider the physics of Greek color theory, which lead over to its metaphysics, but based her conclusions on the physiological aspect, which is, indeed, as we have seen, a prominent factor in Greek philosophy. Nevertheless, it is only on the basis of a full study of Four Elements/Four Colors philosophy that we can find the diachronic factor involved (as opposed to her largely synchronic approach).

That observation elicits a question: how does the rather frequent reference to red from Homer to the Protoclassical poets relate to my chart (see Chapter III, *Hellenistic Painting in the Light of the Cycles*, chart following paragraph 8), which shows for the Geometric period black as the dominant and yellow as the subdominant colors and for the Archaic period yellow as dominant and red as subdominant? While the explanation for an apparent discrepancy here lies in the complexity of the overall development of color sensitivity, which I have already laid out in detail, some further comments may be useful at this point. Obviously, Greek authors were not constrained by any ordinances on color usage; they chose whatever color terms suited their purposes. Yet, even though they were not painting a picture with a brush, they had to understand on some level what color did suit their purpose. Thus, the adjectives I suggested for red in the physiological column of Ill. 16 and their metamorphosis, as it were, in the psychological and noetic columns, fully explain why that color is suited to an imagination of the raw vitality of the epic world. These adjectives are, for example, in Stulz' description of the effect of Agamemnon's cloak as he harangued his troops at the ships (see her pp. 100–104), the real driving force of that effect.

Other questions follow that finding. First, where did Homer get the two color words for red being considered, as they have Near Eastern connotations, especially *phoinix*? Whether these are to explained as surviving from the Aegean Bronze Age or as newly introduced from the East in the later Geometric period, the fact remains that they seem to convey in the epic meanings that coincide with a precisely structured ancient color theory, as I have shown and as any reader can verify by studying Stulz' analysis of the Agamemnon episode cited above in conjunction with my Ill. 16. A certain timeless quality uniting us across the ages to Homer is inherent in this: we can *understand* his use of red.

Let us return now to the problem of the dominance of red. Is it really so dominant? Stulz herself points out that its use was “secondary in Homer to that of *weiss-glaenzend*.” I would argue that this situation in Homer does not justify her conclusion from it, namely, that red is second most important to white in the color scale (on Plato's discussion of these colors in quite another context see Chapter II, *The Ancient Sources*, Plato, paragraph 7). What Stulz has found is a literary coincidence, not confirmation of a

(not completely understood) variant of Empedoklean theory excogitated some centuries later. It is one thing to use a comprehensive color theory to understand Greek literature; it is another to adduce those authors as sources of technical information. Indeed, my final impression from reading Stulz' study is of a light-filled consciousness of white and red as the mood of the early centuries. I believe that this impression has its subconscious cause in the Newtonian view of light that ultimately taboos the subject of death in modern consciousness (see Introduction, paragraph 3). Homer leaves us the opposite impression: woe, death and destruction, punctuated by (often ill-fated) heroism.

The final question to be asked is: what is the relation of color to literary conventions? Homer's red and purple were, as pointed out by Stulz, picked up by lyric poets, much later of course, and used increasingly in a metaphorical and technical way and, I would add, a conventional way. The metaphorical tendency was already prefigured by Homer himself in the term "wine dark" sea. From that point on, indeed, we are dealing with literary convention, not immediate color experience. Hence if there are any echoes of such conventions in vase painting, as Stulz assumes, they are surely to be seen as would be any other epic convention and they would have only the most tenuous connection to any direct color experience on the part of the painters as soon as the convention was established. My feeling is that there is too much speculation in this assumption (by Stulz) and that it is safer to assume that red, purple, white or yellow touches added to the Four Color basis of Archaic vase painting were simply decorative enhancements called forth by the color sense of the artists (although the use of these touches, usually in specific places such as the flank of felines, quickly created a convention of another sort). In stone sculpture, beginning so much later than Homer, the case could be different, although there is very little reliable color to consult. At least with the flowering of sculpture in the later 6th century in great temples and cult statues, sculptors must have been as aware of the basic meaning of colors as the great painters of this period. I particularly want to stress this point because our very first instance of panel painting, discussed below, was created in the crucial second half of the 6th century.

My final conclusion, then, from the foregoing reasoning, is that, however precious literary references to color are, an integrated, holistic theory of the Four Elements/Four Colors philosophy is a more exact and trustworthy guide to interpreting the significance of real colors in materials preserved from antiquity. This is especially so because the origins and ancient connotations of color terms can never be known to us fully, while the precise aspect of a color term intended by one poet may be transformed into something else by a later poet, as Stulz has shown. And we do not necessarily always have both the early and the late reference. Actual colors in works of art before our eyes constitute objective evidence, and a consistent system of understanding color meaning reduces, even though it cannot entirely eliminate, speculation.

PANEL PAINTING AND WALL PAINTING: MAINLAND GREECE

The (Late) Archaic Period

It seems appropriate to begin with painting of a type that could not, merely through the material of the support, lend itself to the system of “earth colors”. The earliest known representative of this sort is the now famous wooden panel from Pitsa, which informs us about the time just before the dawn of the Proto-classical period and is securely identified as the depiction of a sacrificial ceremony.

Designated as Pinax A (out of four similar ones) the panel has been fully described by A.K. Orlandos², so that we can proceed to an interpretation of the colors (Figure 19). The figures of the procession were painted on a ground said to be white, although this indication does not seem to be entirely certain³. However, on the assumption that it is white, and correctly dated, this would be the earliest known instance of polychrome figures isolated—hence, coloristically enhanced—against a white, “spaceless” background. Did the artist also have a sense of the meaning of this color on the transcendental plane? Was there already a tradition of religious scenes against white on panels?

The blue and violet of the altar make sense only in the context of the Light spectrum as a sign of piety toward the gods, in the manner of the altar cloths of Christian churches, whereas the black of the altar itself appropriately refers to the physical density of the structure. Again, it is obvious that the worshippers are wearing clothing appropriate to the festive occasion; thus the transcendent blue of meditation and the red of human dignity define the garments, just as in the Madonna icons of the Quattrocento. But the white skin of the ladies and the red skin of the boy appeal as pure conventions, inherited ultimately from Egypt, so perhaps also the consistently black hair—all of this derivable from the Dark spectrum. The brown portions of the scene are presumably explained by loss of the gesso surface (the skirts of two of the women have miraculously escaped this dissolution).

Since the foregoing color analysis is novel, I shall summarize it more systematically and then attempt a broader interpretation of the results.

Black: altar—physical (Earth)

White: background—neutral or mental/moral (Transcendental) skin—physiological (Earth) Sheep—physical (Earth) gray to suggest wool?

Red: skin—physiological (Earth) garments—mental/moral (Noetic)

Violet: object on altar (also pitcher?)—mental/moral (Transcendental)

Blue: rim of altar—mental/moral (Transcendental) garments—mental/moral (Transcendental)

This characterization of the purpose of the colors speaks to us across the ages about a basic intentionality of the artist: he was circumscribed in choice of colors by the necessity to satisfy an experience in the life of the soul, whether one thinks of this in reference to him personally or to those in his community who might see or use the object he created. On this basis I shall attempt to fit his color choices into the ecclesiastical usage of the Western world. I regard this as an exercise in historical realism and, in common with other classicists such as Karl Meyer (see his p. 112), an appropriate method of interpretation.

The predominance of red and blue in Early Renaissance religious painting (and even earlier) is given and, of course, it carried over in principle even into such later areas as French secular painting of the 18th century in aestheticizing attenuation. In the forthrightness of his color usage the artist of Pinax A is perhaps most comparable to Giotto and the pioneers of oil painting. The rationale for the red-blue combination in both cases can only be an intensely felt perception of the interweaving of human action (or potentiality) at its highest level with divine omnipresence, as expressed by red and blue respectively. The extension of this coloration beyond figures to architectural settings, as in Domenico Veneziano's "Madonna and Child with Saints", ca. 1445 (Figure 19 bis), demonstrates that the entire consciousness of the artist was absorbed into a psycho-religious vision.

What are the historical differences between Veneziano's scene and that of the pinax? Although in the latter the same color combination is present (and related color symbolism carries over to part of the altar), the total effect is quite different. Its white background separates the figures impersonally and that objectifies their presence. Again, in the Christian tradition Mary wears a red garment next to her body, obviously to show her humanity, but is usually enveloped in a large—even massive—blue cloak signifying her intimate connection with the spiritual world. In the pinax, the priestly ministrants wear blue next to the body and are enveloped in a large red cloak. Logically, the blue in this case denotes the impersonal sanctity of the servant of the deity; indeed, no personal qualities are given in the representation in contrast to most representations of Mary. Correspondingly the enveloping noetic garment provides the dignity which the priestly status has at all times enjoyed along with social recognition. The child acolytes wear either red, perhaps to indicate that they are from the lay sphere, or blue, which might show that they are already destined for a life of service to the deity. A more grudging interpretation might suggest that their colors are distributed only to satisfy a rhythmic sense.

It cannot escape notice that the largest figure in the scene, now headless, is indeed completely enwrapped in a blue himation, thus paralleling some representations of Mary (e.g., that of Rogier van der Wieden's *Descent from the Cross*, although there the head is enveloped in a white cloth). This differentiation from the other figures on the pinax is so precise that it must be the determinant of the entire scene, that is, showing that the large figure is the goddess herself or her statue. Stulz has pointed out (her p.119) that in the epic and epic tradition purple (red) is never worn by gods and women but only by highly placed men. Yet by the end of the 6th century our document shows that the female ministrants of a goddess do wear red (our artist clearly differentiates red and

violet). And in the Protoclassical period Pindar has minor goddesses, at least, the Horai, wearing red cloaks. Stulz' explanation for this as a literary conceit (her pp. 138/39) connected with the vital forces of spring renewal could be correct; if so, Pindar has focused on the physiological implications of red, whereby the older mental/moral associations would still trail along. Nevertheless, it is exactly on the comparison of Pindar's cloaks and those of Pinax A that the limitations of literary color interpretations are evident. On the pinax we have color *combinations*, hence color context; in the ode we are not told the color of the chitons the Horai must have been wearing under their cloaks; indeed, the color reference is far too vague and poetic to support any more precise translation than "red-clad". Thus, we lack vital details. Their importance can be demonstrated again by looking ahead briefly to Chapter V on sculpture.

In sculpture there is little evidence from traces of color preserved on early statues that can help with specific problems of deities' garments. In the case of the Berlin Goddess it has been suggested that there was some patternization in red and blue (with yellow) on the chiton. However, to utilize this information one would need to know the extent and arrangement of these colors, which is manifestly impossible. By the Protoclassical period the Athena of the west pediment of the Aigina temple is credited with a red chiton together with a blue helmet. This amounts to an inversion of the Renaissance iconography of the Virgin. For Athena, who by her nature is entitled to wear transcendental blue on her body, instead wears noetic red and in so doing conveys the new, essentially Classical intimacy of the gods with human beings; in this case Athena deliberately adopts a human attribute. This is also in keeping with a physiological undercurrent in Greek culture at that time (established in Chapter III in the analysis of redfigure painting). The red of Athena's garment responds on the psychological plane to the excitement of the battle being depicted. This new complexity in the consciousness of color expressivity goes beyond the Archaic stage and helps justify my term Protoclassical for the years 525–480.

All in all, the coloring of this panel affords us a precious glimpse into a more reverential side of early Greek life than that generally conveyed by the more earthy scenes and colors of ceramic painting, although even Pinax A can surely be only a pale reflection of the powerful impression sacral architecture with its color system must have given.

The Classical Period

Apart from the Pitsa wooden fragments no original Greek panel or wall painting has been preserved until the very beginning of the Protohellenistic age. There are, to be sure, many wall paintings in Etruscan tombs which reflect something of Greek style, but it is the style of Greek vases and utensils. Etruscan colors need to be treated separately and also, to be consistent, those of wall paintings influenced by them in graves from the region of Paestum.⁴ At an equal distance from our theme are the fragments of wall paintings of the late sixth century B.C. found in Gordion and Kizibel.⁵ Though apparently strongly influenced by Greek style, these deserve a separate treatment that would

investigate possible influence on the color system by non-Greek commission-givers and local tradition.

Thus we are left with no original major paintings (fresco or panel) of the Greek mainland in the Protoclassical and Classical periods, that is, until the end, or near the end, of the Classical period. Nevertheless, there is a considerable corpus of ancient passages dealing with just these missing paintings and I will consider them below. That is one aspect of the problem; the other is that in the last generation excavations have brought to light an unexpected bounty of actual fresco paintings and stelai in northern Greece which, given the high status of their commission-givers, must reflect the best that the art of Greece could offer. Since these paintings date from the Proto-Hellenistic (or very latest Classical) and very early Early Hellenistic, they must at least reflect the results that major painting achieved in the just preceding era. There is also something to be gleaned from the coloration of a few mosaics and sarcophagi. Since all of this has been analyzed many times from an art historical viewpoint, my remarks will largely concern questions of color choice and technique.

To begin with the ancient passages. Numbers in parentheses refer to pages in J.J. Pollitt's compilation *The Art of Greece 1400–31 B.C. Sources and Documents* (Englewood, N.J. 1965).

Cicero (221) avers that Polygnotos (Early Classical), Zeuxis and Timanthes (fourth century) and other painters used no more than four colors. It is quite understandable that many scholars—working from a Newtonian view of color⁶—have proposed a contradiction in the inclusion of Polygnotos in this category, especially since Pliny (228) specifically lists Apelles, Aetion, Melanthios and Nichomachos, all much later than Polygnotos, as masters of the four color school. Note, however, that Pliny's intention is to explain why paintings of the artists in this list fetch high prices—that is, because of the unexcelled quality of their works. He is not concerned with artists who may also have used this technique but failed to produce “immortal” works. Moreover, Pliny, like Quintilian (219), might have regarded Early Classical painters as rather primitive anyway, whereas Cicero had a more catholic taste.

I see no reason to reject the evidence of Cicero.⁷ In fact, every detail in the literary tradition speaks for the dominance of the traditional four colors in major painting from Polygnotos onward. In the ancient passages (apart from the two just discussed) I have counted six casual references to black, two references to yellow, one to white and one each to purple (perhaps as an enhancement of red) and to a color between blue and black. No others! On this latter combination I shall comment directly; but one sees clearly in these raw data what stood out in the consciousness of the commentators. As to blue (combined with black—a blue-gray being a frequent color on white-ground leythoi) it has mystified astute critics of Greek color that blue was excluded from the canon of colors; I trust that my connecting of the four colors individually with the four elements may dispel that mystification. Of course, blue could be and was used where appropriate, but it could not form part of the point of departure for artistic conceptions in the Protoclassical and Classical periods. The artistic elite of those times, when Pythagorean influence was so strong, could hardly have avoided the task of clarifying the dynamic and chiasmic balance of the four colors—just as was being done for the understanding of the

four elements—and Cicero has given us the clue that the fame of Polygnotos rested on his ability to make a contribution to this task.

Furthermore, there is another factor to be considered. In my review of the origins of four color painting on ceramics I reported on the opinion of Mertens that Euphronios was the essential innovator. As that innovator has the deserved reputation of being a great artist, he must surely share the credit with Polygnotos for the four color synthesis, whether as follower or leader. It is ironical that Irma Wehgartner, who has given us a careful account of the mechanics of the emergence of this technique in terms of shop practices, found it necessary specifically to deny any connection with four color major painting.⁸ How can we visualize the *colors*—if not the whole style—of Polygnotan works as being much different from that of the very best four color cups? A broader, freer technique might have been encouraged by the sheer size of his composition (*if* they were very large and true frescoes)—perhaps reflected in the ongoing fortunes of white-ground ceramics—and there is no doubt that he tested the expressivity of other colors. Pausanias (101), in a rare departure, mentions specifically that the skin of the demon Eurynomos in the Knidian Lesche was between blue and black like that of flies “which are always hovering over meat” (not necessarily an original observation of that writer). There could be no better example of the use of local color—that of flies—to suggest *ethos*. This significant variation from the normal color of human flesh in no way disturbs what must have been the general impression of the painting as being of the four color variety, any more than attributes given to a statue would disturb its classification as contrapposto.

The Use of White and Yellow by Polygnotos

In my investigation of the realities behind the four color palette I have relied heavily on ceramic practice in Attica. This yielded abundant evidence for the colors black and red—insofar as red in this context is not generally pure but mitigated by yellow—and also white. Yellow *per se* remained more elusive.⁹

In general, the implications of these colors seemed best explained in the Archaic period as mainly physical and physiological, even though it is not easy for us, as modern critics, to shut out the many psychological, noetic and metaphysical overtones which, it seems, did not consciously come into play until the “Protoclassical Revolution” of values. At that point, it starts to be possible to sort out some of those values. Moreover, it has proved possible through analysis of sculptural coloration (see Chapter V, *Archaic and Protoclassical Periods*, paragraphs 2–3) to recognize the quite opposite situation of blue: this has metaphysical implications in the Archaic period and perhaps began, in the Protoclassical period, to accrue to these a very limited transatmospheric significance and, in the Classical period, some value as a local color.

Polygnotos must have overlapped the Protoclassical period in his beginnings and would have been, by osmosis if nothing else, a party to all this. As an early Classical sculptor and painter (along with Mikon) he would have been imbued with the principle of dynamic ponderation (see Chapter III, *The Emergence of Redfigure Style*, paragraph 8). Furthermore ancient sources comment specifically on his relation to yellow and blue-gray. The fact that he would have been contemporary with the remarkable trans-

formation of white from a physical to a noetic color in white-ground painting gives a clue for approaching a decisive question which, to my knowledge, has never been posed: what was the background color of Polygnotos' paintings (which are thought to have been movable wooden panels)?¹⁰

First, what about walls (or panels) in the Archaic period? There are at least two possibilities. If white was used—for which I know no direct evidence from mainland Greece (excluding the somewhat ambiguous Pitsa panel: see Chapter IV, *Panel Painting and Wall Painting: Mainland Greece*, The (Late) Archaic Period, paragraph 2)—it may have been in the physical sense of the Dark spectrum, like black, red and yellow, providing what we might think of as a neutral (empty) setting. This would explain why it took Euphronios a while to discover that outline figures make sense on a white background—in fact to discover that white is a real noetic color (see below for closer definition) capable of meaning something in combination with the active colors. Or the Archaic painters may, not knowing the noetic quality, have sensed the super-high transcendent quality of white in the Light spectrum (Illustration 16) just as they did with blue. In this case one might postulate that Nikosthenes “discovered” the physical “decorative” value of white, that this was re-discovered a generation later and was considered a novelty of limited interest until a great painter like Euphronios—in tune with the noetic awakening of the Protoclassical Revolution—gave it a new and more suitable role in a dynamic balance with the usual three colors.

At this point a closer definition of the quality of the white background in white-ground painting is called for. Whether white emerged from the Archaic period as a physical or a transcendent color, I believe that in the Protoclassical and Classical setting and right on into the Protohellenistic tomb paintings, it is non-atmospheric, knows no horizon or spatial depth and thus serves as the color of pure human self-consciousness in which the figures are bathed. Since the color itself implies light, shading on the figures is not totally illogical, even without a specific light-source. Because of the self-consciousness of the figures the effect of the color is, on the whole, uplifting, ennobling and thus suitable to harmonize the grief of bereavement rather than to intensify it as black would, for figures in a funerary context against a black ground would seem to be held fast by the implication of earth density.¹¹ By the same token white would be ideal for working out the emotional quality of *ethos*. It would be literally astounding if Polygnotos did not avail himself of this tool. The saturation of the other colors could be infinitely varied against white to express nuances of emotion. Moreover, when four color *contrapposto* is enriched by a color from the other side of the spectrum for a special effect, the white background could isolate it dramatically, as may have been the case of the blue-gray Polygnotos used for the skin of the demon Eurynomos (see Chapter IV, *Panel Painting and Wall Painting: Mainland Greece*, The Classical Period, paragraph 6). Had the artist put this against any other color, distracting problems of color harmony might have arisen.

We are told by Pausanias (Pollitt, 102) that in the same section of the Lesche the companions of Odysseus are carrying black rams. This again supports the suggestion that the background was white. Further on in the same scene Pausanias implies that the poplars and reeds of a grove are black—since that color apparently enabled him to

recognize the grove as that of Persephone. In all this there are indications of hills; it is generally thought that the famous Niobid vase in the Louvre reflects the technique by which Polygnotos conveyed the impression of uneven terrain, that is, by irregular contour lines with no horizon. If we picture the other figures mentioned by Pausanias as showing some orange, brown, yellow, etc. plus solid black accents like the rams and the trees we can begin to sense what the paintings of Polygnotos were like. I suspect that the human figures were in outline with solid colors for accoutrements because solid flesh color together with descriptive colors would have produced a more realistic or even showy effect than would have been appropriate to the theme of an Underworld scene with shadowy figures.

There is another aspect of the problem. We know from Pliny (Pollitt, 228) that Polygnotos and Mikon paid particular attention to yellow. For what could they have used it? Possibly and probably for local colors. But the Alexander mosaic gives us a clue that should not be overlooked. In the macrocosmic series (Illustration 12 B) yellow corresponds to the element air and conveys (invisible) energy. This is precisely what the artist of the mosaic gives us (see my description in Appendix A, *Mosaics*, paragraph 1). By the late fourth century a tremendous subtlety in hues had obviously been achieved but while we cannot expect the same thing from Polygnotos and Mikon, they may have understood that yellow can convey both a physical quality (energy-charged air) and a noetic quality (egotism), both highly appropriate for battle scenes. This raises the question, was a horizon line ever specifically shown? A white background, as in the Knidian Lesche excludes this. Indeed, the problem may always have been avoided—as it was in the mosaic where the picture space is totally filled with human and animal corporeality so that the horizon has to be imagined somewhere back of the action. The Alexander mosaic gives us a breakthrough into the viewer's space, not a foray into pictorial depth, while the Niobid scene for all its stacked contour lines remains flattened in a lateral plan. As yellow expands *towards* us, it is really more likely that Polygnotos used this quality in a very elementary kind of color harmony in which only the spatial depth of a "pictorial ledge" corresponding to the physical ledge of fifth century pediments and reliefs is judiciously maintained. This would be one aspect of what I mean by four color contrapposto (in this context *counterpoint* might be more precise).

I conclude, therefore, that Polygnotos and Mikon—and, of course, many others—found white backgrounds to be a satisfactory device both for the physical emptiness of white and for its powerful noetic connotations. If there was any use of blue in its purely transatmospheric quality, I suspect that it was used only when foreground objects obscured the true horizon line and reduced the physical sky to a mere appendage to the scene. The conditions for this are ideal only in a neutral scene in which the blue can add a touch of peaceful recession after contemplation of the foreground. Obviously this circumstance might be met by buildings massed together as in stage sets. An example of this in later times, conceivably but perhaps not likely with precedents of the kind I am hypothesizing as early as the beginnings of true *skenographia* (Agatharchos), is given by the cubiculum of the Villa Boscoreale (see Chapter IV, *Panel Painting and Wall Painting: Italy*, Color Analyses, Boscoreale, paragraph 2).

Some Aspects of the Use of Blue

Apart from the foregoing suggestions we have only the course of white-ground ceramics to give us some—no doubt very rough—idea of what in major painting must have been an increasingly subtle understanding of the technical possibilities of the Dark spectrum along with a more intimate adjustment of the four colors to those of the Light spectrum in scenes in which transcendent values were more or less in play.

A symptom of the last-mentioned factor can be seen in the use of blue on a white-ground lekythos of the later fifth century (Figure 20).¹² This color appears on a fillet tied somewhat diagonally to a grave stele before which is seated a youth with reddish brown hair. The blue continues at a sharp angle downward over the youth's shoulder. It is not clear to me whether this represents a loose end of the fillet or part of a garment (a cape thrown over the shoulder) but probably the latter, in which case its color has been attracted into that of the fillet—which after all has some connection with ritual. This connection is supported by the blue-gray paint on the pediment of the stele. There is a slight suggestion of torsion in the actual forms discussed plus a single color uniting two spheres (the religious one of fillet and the utilitarian one of cape, the color of which was perhaps chosen here more to unify the design than to represent what was customarily worn). Some generations later another illustration of this type of interaction occurs in the decoration of a tomb in Kazanlak.¹³

A male figure in a festive procession (Figure 21) holds in his hands a blue cloth; the same color is discreetly repeated in the design of the border of the frieze, but otherwise all the colors of the whole painting derive from the four color palette (in my sketch I have concentrated on the approximate color relationships). The blue of the cloth gives such a liberating effect in the psychosomatic sense—that is, as a means of releasing concern with the earthly world into a higher one—that to call it an accidental local color would do the artist an injustice, especially in view of the delicate rhythmical repetition in the frieze of the somewhat dramatic splash of blue on the cloth. The intimacy of this use of one transcendent color in a four-color environment cannot be grasped in words, but only felt in response to the artist's inspiration.¹⁴

From the white-ground repertory, however, I cannot cite an illustration of the former of the above suggested Classical developments (subtler understanding of the technical possibilities of the four color system). At least in major painting there must have been developments leading up to the subtler understanding that has been demonstrated by V.J. Bruno in relation to the same frieze at Kazanlak. Watercolors rendered by him based on close study of the originals show that blue shadowing was introduced in order to enhance the naturalistic effect of *figures otherwise painted only from the four color palette* (Figure 22). In this instance of illusionism it becomes clear that the eyes of Greek artists were opened in the Hellenistic period *at the latest* to the purely optical subtleties of the Dark spectrum, that is, of the physical colors, in the same sense, if not to the same extent, as this occurred in French Impressionism. In the service of illusionism black could on occasion be used alone for shadows as well as in combination with blue, as in European painting. Not until this stage of highly conscious shadowing technique where the optical rather than the psychic quality of blue is

addressed can one speak of an identical function of blue and black. And at this late point such functional identity has no theoretical (philosophical) significance for the four color doctrine.

The Protohellenistic and Early Hellenistic Periods

The Art Historical Setting

After this glance ahead to the third century, I return to deal in detail with the final achievements of Greek Classical painting *qua* four color painting on the basis of the elaborately decorated tombs found in Eretria and northern Greece. These display for us the *culmination*—and no doubt the turning point—of the tradition of Classical fresco painting. Furthermore, various stelai found in the region of Volos are surely little different in the theory of color they demonstrate than contemporary Greek panel painting (though that must have had a wider range). All this gives substance to Pollitt's assumption¹⁵ that the four color painters mentioned by Pliny were at a sophisticated stage of development. It is now understandable that it was not only the glamour of the personality and achievements of Alexander but also the high technical achievement of Protohellenistic painting that caused the later commentators to look back on it as the ultimate two-dimensional standard, much as in our era the High Renaissance has occupied that position. Of course, in ancient times, the palm for sculpture was accorded to the High Classical artist. Indeed, it was the very dominance of sculpture as the great medium of artistic expression—conservative as its development was—that gives us assurance that Classical painting as well never strayed from contrapposto of the four colors any more than sculpture strayed from contrapposto of the four limbs. It is worth noting that Polygnotos and Mikon were reported on the one hand to have been sculptors as well as painters (Pollitt 105) and on the other hand to have been the first to institute “the practice of painting with yellow ochre, using only that which comes from Attica” (Pollitt 228). At least in ceramics yellow had nearly always been used to bring red to shades of orange before it found some direct use in Four Color painting. The minimum that we can take from the information about Polygnotos and Mikon is that they were concerned to give yellow its full due in the contrapposto equation of major painting (see Chapter IV, *Panel Painting and Wall Painting: Mainland Greece, The Classical Period, The Use of White and Yellow by Polygnotos*, paragraph 6).

The first consideration in dealing with the Protohellenistic/Early Hellenistic tomb paintings is that the painted facades occur on a variety of architecture and to that extent follow the conventions of that medium. Thus, there are white backgrounds throughout. How far does one go, then, in giving special value beyond that of an architectural convention to the white of marble or limestone building materials? Parts of those materials were painted over with other colors to achieve a desired symbolical and visual effect and parts were left white, so white is part of a meaningful synthesis.

When the Greeks began to build temples in stone and decorate them with colors, a religious sensibility of the Light spectrum, particularly in the case of blue, must have inspired the choice of colors. Here we come face to face with the facts of world evolution: why does the hue of so much fine building material, especially in the Mediterranean, lie

in the white range? Nothing compelled the Greeks to use it, but on an existential level, once they did, a powerful transcendental implication inhered in their structures (which, incidentally, has remained alive in the western architectural tradition—not least through the example of the Romans). I shall therefore make no additional reference to this in continuing the discussion (but this does not preclude reference to the noetic understanding of this color that came about in the Classical period).

The Coloristic Complexity of the Lefkadia Facade

The designer of the Lefkadia facade¹⁶ (Figure 23) played very freely with the rules of architectural orders to achieve his coloristic purposes. The low, plain pediment is separated from the architrave by a kind of high attic with half-columns and filled interstices with the result that the viewer's gaze is drawn first and held to a highly dramatic frieze about center height of the building: battling figures rendered in shades of tan with carmine accents move fluidly within a tangle of close encounters (unfortunately the center is missing) against a black background. This continues the black background frieze of the Erechtheion and suggests that the Protoclassical ceramic innovation of warm-hued figures on black background had a deep hold in the Greek psyche; it became a particular style in later Hellenistic painting (see Chapter IV, *Panel Painting and Wall Painting: Italy*, Introductory Observations, paragraph 8 and see *Conclusions*, paragraph 3). Moreover, it seems that some blue touches on garments were modified by a mixture of white for a pastel effect. All these factors, including the scale in relation to the panel figures below, remove the frieze from the realm of real happenings to a world of imagination and potentials—yet with no strong mythic or mythological force, especially in the strong contrast with exactly that feature of traditional Greek iconography offered by the sculpturesque monochrome figures of the metopes.

But that contrast pales beside the contrast of both these elements together with the four spacious inhabited panels below created by cutting off the horizontal courses of the solid wall between the Doric columns. The flowing, then retarded movement above comes to a complete halt when the descending gaze confronts four solid, quiet figures, differentiated among themselves in costume and pose but uniformly simple, dignified and in relative repose in their isolation. The sense of worth they lend to the program as a whole is reinforced by red accents at the lower edge of the panels—accents picked up by the lower border of the attic and ubiquitously framing the pediment. These accents, together with the predominantly red and brown hues of the panel and frieze figures, secure the frontal plane against the recessive tendencies of the abundant blue decoration of the architrave and pediment. This is spatial checkmate, perhaps comparable to the equivocal and shallow spatial orientation of the Demosthenes. There is something of this, perhaps not so consciously done, in the figure of Hermes, (Figure 24) with his carmine tunic placing him firmly on the surface and the blue cloak over his shoulder relating to the triglyphs.

Thus in the creation of dynamic overall color contrast—superimposed, as it were, on the Four Color painting of the figural areas—there seems to be a will to experiment with color relationships for their own sake, quite apart from the deeper traditional

significance of the individual colors that is taken for granted—for instance, the value of the white background in reference to the Underworld, which is particularly evident in the panels devoted to the deceased and his pendant Rhadamanthos, the former having just departed from life and still in dress of vibrant color while the latter as a shadowy denizen of Hades is rendered in suitably paler colors (in this respect, compare my remarks on the Nekyia of Polygnotus. Chapter IV, *Panel Painting and Wall Painting: Mainland Greece, The Classical Period, The Use of White and Yellow* by Polygnotos, paragraph 5)

The foregoing considerations of color and form have led me to find an early third century date (my Early Hellenistic) for Lefkadia, as proposed by the excavator, very plausible.¹⁷ Moreover, the figure of a dead warrior in the “Bella Tumulus” at Vergina, dated by its excavator¹⁸ to the later third century, is rather comparable to the deceased at Lefkadia: likewise isolated in space—though not through architecture—and similarly flamboyant with a huge red cape draped around center-body. Yet the principal garments in blue and white are suitably colored for passage to the underworld. The total effect of the three almost “free floating” Bella Tumulus figures is calculated understatement, while that of the Lefkadia facade is overstatement, virtually *Effekthascherei*, hence two possible poles of the increasingly self-conscious quality of Greek art as this began to develop in the early and ongoing Hellenistic period.

The Still Conservative Cast of Beginning Protohellenistic

What I mean specifically can perhaps be better understood by considering how this self-conscious quality differs from what is earlier but yet not much distant in time. I shall undertake to elucidate this by comparing the facades of Lefkadia and “Philip’s Tomb” at Vergina. The scale of this latter *royal* tomb (Figure 25) seems modest, restrained, simple. Yet the large frieze—the sole figural decoration—must have seemed to contemporaries a bold, even a reckless, display of luxury perhaps beyond what had spurred Attic sumptuary laws, especially since the quality of the design requires that an absolutely top-flight artist had been employed, and also since the result would not have been safe to leave for posterity to wonder at but would need to be covered up and given over to the elements. Such romantic extravagance, from the Classical point of view, corresponds to the whole career and subsequent legend of Alexander which dominated the Protohellenistic period. Here we can see it beginning and this to me confirms the excavator’s conviction that the tomb is to be dated in the decade 340 to 330 B.C. It is beyond my reach to analyze the magnificent hunt scene as a painting—in effect a world masterpiece, I believe—especially in its poor condition. For my purposes, I am content to accept the excavator’s judgment that “we may confidently say that the whole range of color was almost entirely built around warm tones—orange, brown, reddish brown and violet purple. The background is white, flecked with muted hues of red or sometimes gray.”¹⁹ I wonder only—if it is not effrontery to judge by the color photographs—whether the “muted hues of red” do not actually go strongly toward the yellow side. I mentioned elsewhere (see Appendix A, *Mosaics*, paragraph 1) the light yellow background of the Alexander mosaic and—given the strong connection with that work proposed by the excavator, both in color choice and figural stances—it is significant that the painter of the

fresco was not satisfied with leaving the sky dead white (as might have been the Classical convention) but was extending the psychological power of color also to the atmosphere. There is a distinctly high horizon line defined by mountain peaks but between these and the figures and dark trees constituting the foreground there is no middle ground. A few details in blue or even green are local color touches in keeping with the coloration of sarcophagi (see Chapter V, Classical Period (and Protohellenistic), paragraph 2). The excavator's statement that "the tree behind the lion seems to have had dark green foliage" recalls the black poplars of Polygnotos (see Chapter IV, *Panel Painting and Wall Painting: Mainland Greece*, The Classical Period, The Use of White and Yellow by Polygnotos, paragraph 6) It is entirely plausible that in the course of time painters would "bend" the four color canon toward local coloration for elements of composition which were not quite of primary importance but not really incidental either.

The Fluid Boundary Between Late Classical and Protohellenistic

Granted that we have reasonably secure and sufficiently representative examples of color composition for the Early Hellenistic and Protohellenistic periods, is it possible to go back further in time in such a way as to see these examples in a longer perspective? Fortunately it is *if* we accept the excavator's date for the Tomb of Persephone (Figure 26) at Vergina.²⁰ His estimate of 350/340 B.C. would mean that a structure with no facade at all (entrance from the roof?) and with fresco showing the rape of Persephone would fall *just* within what I have for other reasons called the Late Classical period. Yet despite such proximity in time, the difference in the design between the Royal Tomb and the Persephone tomb (both at Vergina) is so great that we might want to put it down to the outlook of two more or less contemporary artists, each of whom is, as Andronicos points out, of the highest calibre in his own way. A very mature artist and a younger artist? In any case—and this seems irrefutable—the Persephone tomb does correspond in various ways to what we might expect of more Classical orientation. First of all, the very idea of a built tomb with an expensive frieze inside is unclassical enough by mainland Greek standards. But at least the designer did not go so far as to impose on it a showy, simulated architectural facade. That breach of good taste would come later.

Again, inside the tomb the frieze at least gives a straightforward, self-contained depiction of a myth, loosely spread over several walls, against a totally white background with only the most minimal indication of terrain under a few of the figures, and is executed closely and narrowly within the four color range. Indeed, the color effect is still one of simplicity and even purity—qualities we might easily have associated with the works of Polygnotos and Mikon (in a more linear mode). The facial expressions of the frieze seem outwardly impassive and inwardly involved in an intense soul experience, recalling the maenad of Skopas. Andronicos²¹ called attention to the quite different, outstreaming expression of the Vergina Alexander head, although for the purposes of establishing contact with the Pluto-Persephone expressions the Dareios face of the Alexander mosaic would give us the best Protohellenistic versus Classical comparison. Yet we can leapfrog here to an even more instructive comparison: the head of Pluto with that of the Lefkadia Rhadamanthos—via the detailed sketch of V. Bruno.²² In the former

(Figure 27), not only the outwardly unfocussed eyes complement the interior terror of Persephone's expression, but the (by our standards) wildly romantic, flowing hair of the two figures melts in a unity of soft transitions within an almost monochrome range of red-brown with poolings of darker brown.

By contrast, in the Rhadamanthos portrayal (Figure 28), short, quick, nervous brush strokes build up the form on a red-brown substratum liberally laced with yellow and gray. Yet for all the impression of free, loose brush work this gives, the definition of form is much tighter than in the Pluto; one might almost say that it has a cramped quality by comparison. And the brooding, but clearly focussed gaze may be thought of as streaming right across the whole facade to reach the newly arrived inhabitant of the tomb. This kind of "unified disruption" could hardly be in greater contrast to the "harmonious tension" of the Pluto-Persephone heads. We find ourselves at the point where the Hellenistic world of our historical imagination has begun, leaving Classical values as a distant and receding vision; for example, although the four color palette still rules—as indeed also in the still later Bella Tumulus figures—the quality of light shimmering on the surface of the Rhadamanthos announces a new will to probe more deeply into the nature of human receptivity to color stimuli. Put in another way, attempts to understand the physical-physiological laws of color begin. Yet it would be well to use caution at this point in making comparisons with modern trends and Bruno seems to me right in his assessment that the style of the Rhadamanthos, while in some degree painterly in relation to earlier (and some continuing) trends, hardly equals the level of what Wölfflin would call *malerisch*. And indeed the Greeks were still learning very basic color principles.

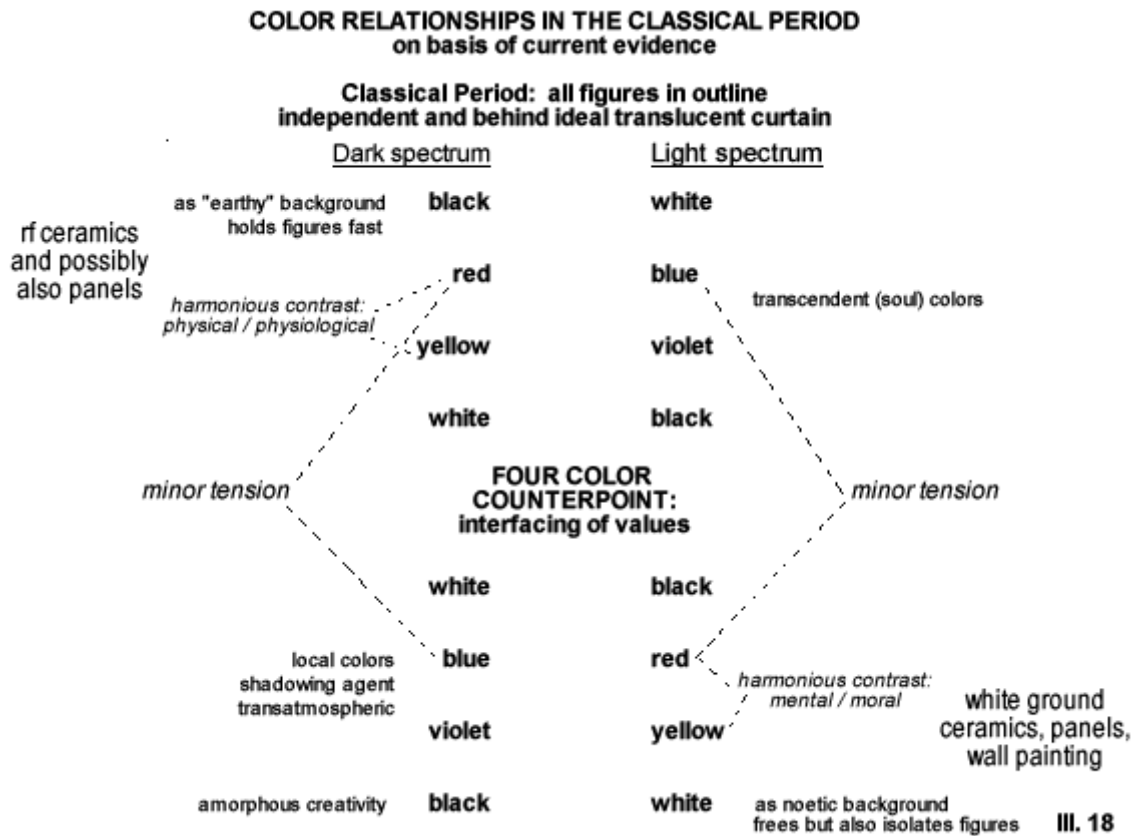
Another metamorphosed continuity between Late Classical and Early Hellenistic can be found in this context. I have already interpreted the red and blue of the garment of Hermes at Lefkadia (Figure 24) in the sense of color dynamics, but of course there is more to it. The red expresses noetic dignity, lent to the gods on occasion as we know from sculpture (see Chapter V, *Archaic and Protoclassical Periods*, paragraph 3), while the blue has to be transcendent in this context. The designer of the Tomb of Persephone had long ago carried through this symbolism in the most eminent sense by making the lowest zone of the wall red below a zone of blue as a background to griffins—profound symbols of the soul world—to support the white background of the mythological representation (Figure 26). This combination of colors of the Light spectrum constitutes a fundamental expression of the Greek view of macrocosmic/microcosmic reality. In fact, the universality of this combination, at least in the western consciousness, is demonstrated in its frequent use in flags of countries purporting to respect individual values.

The numerous fragmentary grave stelai found at Vergina and dated by the excavator to a range from Late Classical to Early Hellenistic suffered considerably from soil exposure and may not add a great deal to our theme, to judge by samples published in color. One of these²³ described by the excavator as the "most beautiful of the painted stelai", seems to have a range of color similar to but more limited than the Hunt fresco; yet it is interesting that the pediment in this case has a floral pattern reserved on blue ground while the architectural border is red. Another stele shows a painted red fillet

(instead of the blue usual on white ground *leythoi*); red also predominates in the pediment, reinforcing the dignity of the deceased. V.J. Bruno ²⁴ has sketched out the color aspects of a number of third century stelai from Pagasae and western Macedonia as far as reconstructible. There is a range of warm hues modified in some cases to a cool brown, presumably by the admixture of blue; Bruno discusses the loose flowing style in relation to the literary tradition. The stele of Hediste has been described as having “besides pure color—such as reds, yellow and blacks—mixed colors.... for instance violet (for the wall and pillars)”.²⁵ The extension of violet to such general architectural features as walls and pillars signals a devaluation of the kind of color meaning we have so far encountered and the beginning of a new attitude to colors with implications for the future of Greek painting to which I shall turn shortly.

Summary

The primary motivation of this book was not to try to determine what Cicero and Pliny meant by four color painting (unfortunately we shall never know exactly what they meant or whence they took the notion). Although my research has, I trust, thrown some new light on that problem, my own use of the term arises not from them but from the realities of actually preserved works by the Greeks from all periods. There is in these adequate evidence that some painters—of pottery, walls and perhaps sculpture—took satisfaction, at least sometimes, from using or combining all the four hues—and only those—on the warm side of the Dark spectrum. However, I favor including more than that in the use of the term: actually it should carry the sense of “Four Elements painting”. This would cover the numerous instances when painters selected two or three from the four, as in blackfigure vase painting, but also when they added to two, three or all four of the colors a subordinate amount of blue (or violet) when content called for reference to the fifth element, *viz.*, the world of the gods or even, in due course, reference to the threshold of that world (transatmospheric colors of the Dark spectrum) or to the warm colors of the Light spectrum. As a quite practical matter, instead of attempting to explain all this once more in a more condensed form, I offer here a diagrammatic explanation, keyed to the interpretive diagram (Illustration 17) based on Goethe’s color theory.



Notes to illustration 18:

Green (a mixed color) hardly emerges as separate from blue.

Red and yellow together may contrast but are still harmonious.

Blue and red together always produce some degree of spatial or emotional tension.

Massing of buildings (on stage sets) may have preceded massing of figures.

Transatmospheric blue sky conceivable in stage sets from about 400 but unlikely.

PROTOHELLENISTIC PERIOD: New or changed features. Massing of figures to facilitate effect of horizon/sky. Exploitation of four color counterpoint to achieve intricate psychological effects. Forward views imply break in translucent curtain.

HELLENISTIC PERIOD: Conscious color stasis through tension between red and blue. Experimentation with complementary colors (major tension). Architectural isolation of figures behind translucent curtain.

PANEL PAINTING AND WALL PAINTING: ITALY

Introductory observations on Hellenistic and Graeco-Roman Painting

It has proved possible to characterize, in a limited way, color practices in the third century on the basis of actual monuments as: continuity of four color orientation and an interest in recreating optical effects of lighted surfaces (skin, garments, etc.) by particular techniques. However, we may assume that much more information about painting practices would be available if we had more monuments. In looking at this question, it is surely significant that we are dealing with a sequel to what seems to emerge from the written sources as the “High Renaissance” phase of ancient painting—the last third of the fourth century—when there were also great sculptors such as Lysippos and Leochares. The Alexander sarcophagus merged these media to create shadowed, sculptural effects that are also enhanced by color. In Protohellenistic painting (Vergina Hunt and—by extension—the Alexander mosaic) there are colored skies—as opposed to the white background of the sarcophagus—as if to match by means of color the sheer physical dynamism of the sculptured figures. Yet white backgrounds were not permanently displaced from painting: They continue in the Hellenistic period at Bella Tumulus (Vergina) and at Lefkadia (tomb facade) where they facilitate a heightened psychic effect.

After the Protohellenistic period there are, in effect, no more ancient literary sources to give us guidance (in my opinion the vexed subject of austere and florid colors falls outside the theme I am pursuing²⁶ or at least I have found no basis to speculate about it). Perhaps more once existed, but the silence is eloquent. In any case, it is clear that the vitality of four color painting as an irresistibly forward rolling evolution flagged. Painters were confronted with the choice of repeating what had already been done—even to the extent of becoming a copyist—or else of seeking out new paths. Just as retardataire art is not likely to bring fame to its practitioners, neither is that art which breaks too radically with old ways, especially when this is done in settings far from the “classic centers”. If these were the circumstances, it is understandable that no particular critical appraisals resulted (except to admire the art of earlier periods, as perhaps in the case of commentators like Pliny, Cicero and Vitruvius). I should like to approach the achievements of the more adventurous group of painters mentioned above, which we can know only from the frescoes of Italy in any quantity, with some reasoning about the spectra, and then compare that to the colors actually in the frescoes.

Let us revert to Goethe’s discovery of the two spectra and the fact that the Greeks seem to have been using color in a manner consistent with the sense of those spectra. The question then arises, to what further knowledge of color principles did Goethe progress—knowledge of the sort that arises consequentially out of a holistic view of the world? From his physiological experiments Goethe gained a knowledge of color complementarities that led him to create eventually the universally valid color wheel by which the primary and secondary colors—terms that have a meaning only in this context—can be systematically understood.

Autopsy of paintings on or from Italian soil made it clear to me that in the Hellenistic period Greek—or Graeco-Roman—painters trod this same path, but important similarities and differences have to be noted. It is particularly important to notice that the Greek Classical approach to color was overwhelmingly physiological and there is no evidence I know of that any change to this took place later. It was thus in a certain sense likely that painters in that tradition would eventually make at least some of the discoveries of Goethe. However, he had the advantage of using the prism and they did not. On that basis alone I cannot postulate any serious scientific thought on the subject in ancient times, nor is there the slightest evidence for it. Aristotle went about as far as is possible without the prism and—as in so many other matters—progress stopped there; indeed, to judge by the *Peri Chromaton*, it rapidly deconstructed to virtually an anecdotal level, having nothing in common with Goethe's *Farbenlehre* but the name.

In these circumstances it would be too speculative to suggest exactly how the discoveries in question took place or when. The only given would seem to be this: in true Greek fashion painters had to exhaust the potentialities of four color painting (as sculptors had exhausted the theme of contrapposto) before turning seriously to something else. Existing evidence suggests that that point was reached some time in the third century: the stele of Hediste at least is one small sign that really serious experimentation with color for its own sake, temporarily ignoring meaning(?), took place then. By “exhausting the potentialities of four color painting” I mean turning away from the harmonious effects achievable with *krasis* of the “plus” colors (Goethe's term): red and yellow with black and white, to contrasting them quite consciously with the “minus” colors: blue and violet also with white and black in the sense of spatial tension (as in the Lefkadia facade) or direct complementation (as in the Hediste stele) to a gradual experimentation, presumably by sheer trial and error, with the optical harmonies and tensions inherent in the complete circle of primary and secondary colors as we know them. This would be the technical side of the matter. But in actual compositions with themes the subtleties of meaning inherent in the Dark and Light spectra cannot have been far away from the consciousness of really good painters. In any case, I have found that an amazingly high degree of sophistication in both respects often exists in Late Republican and Early Imperial painting.

It is well known, of course, that there is no way to make an infallible division of the elements of this painting into what is purely Greek and what is the contribution of Roman artists and patrons. Certainly the Greek tradition supplied the impetus, just as the French tradition supplied the impetus for Impressionism—with a not inconsiderable contribution by American artists and collectors. From the second century B.C. onwards the situation in ancient painting may well have been somewhat similar. Certainly even at Delos—and how much more so in Italy!—at the very least the intentions of non-Greek commission-givers must have played a significant role. Thus, while the various monuments of Italian painting can usually be dated and a certain change of “style” detected, we are probably dealing largely with changing fashions in an elite society that was both highly motivated politically and culturally pluralistic. This makes it really difficult to speak of an evolution of color sensibility in the same way that this can be found in the earlier periods. For this reason I prefer to leave that question open and

concentrate on getting a sense of the range of coloristic possibilities from the late second century B.C. to the first century A.D. Nor do I concern myself in general with the question of whether any particular painting is a copy of another one.²⁷ Such a question may be legitimate but I tend to agree with recent commentators who are skeptical that much can be achieved in that direction.²⁸ Above all, *I am not offering another art historical commentary* on the paintings, as that has already been done for generations and with particular thoroughness and acumen recently. Of course, I hope that my color analyses may supplement those interpretations already in existence or at least inspire others to pursue the color problem in a fuller way than has hitherto been attempted.

A further comment seems appropriate in regard to my suggestion that white is the dominant color and black the subdominant color of the Hellenistic period (see Chapter III, *Hellenistic Painting in the Light of the Cycles*, chart following paragraph 8). This can be justified philosophically by the consideration that white is the color of fire/*nous*, the principle which found its fullest and most free expression in this period. It can be justified coloristically by the consideration that only in this period did Greek (sc. Graeco-Roman) painters enlarge their horizon to include full and meaningful experimentation with the “minus” side of the Dark spectrum and—along with this—to include much more consciously than before the same range of colors in the Light spectrum. This latter is, of course, framed by white (Illustration 17) with transcendent overtones. It may or may not be significant that this overlaps with the victorious advance of salvation religions in the Mediterranean world which left earlier Greek values to be continued as far as possible in crassly rationalistic philosophies like Cynicism, Epicureanism and Stoicism.

But above all, this placement of white is justified by the great interest in the mystery of light itself as a factor in painting. This becomes particularly evident in a technical sense in a much more sophisticated use of black as a background foil, as in the so-called garlanded frieze. Against this background was placed a composition of illusionistically conceived, self-illuminated figures. Undoubtedly it is the striking effect of this juxtaposition that induced V.J. Bruno²⁹ to speak of the realm of the fabulous shrouded in a timeless atmosphere. In these circumstances it is clear that Hellenistic artists had learned to exploit the possibilities of the “minus” black of the Dark spectrum, going past the constrictive physical density of the “plus” black to the realm of mysterious creativity and boundlessness. A similar great conscious liberation of the artistic imagination occurred again in European Baroque painting.

By way of leading on to some representative color analyses, my conception of the historical position of Graeco-Roman painting is here summarized. I have suggested that there were *grosso modo* two categories: that of the experimental painters (progressive in terms of color usage) and that of the more traditional painters who favored copies or else adaptations (as, perhaps in Figure 29 and Figure 30) of earlier paintings that adhered to the principles of Four Color painting. These two schools are easily discernible in their extreme form, for example, in the Aldobrandini Wedding and the Alexander Mosaic, respectively (the latter being presumably a copy of a copy). Although many paintings may seem to be a mixture of these values, a propensity to one tendency or the other can usually be recognized. I do not hesitate to compare these tendencies, in fact, to the

situation in Hellenistic sculpture (without claiming that the chronology is the same): the Neo-Attic school clung to Classical values, whereas the experimental school, best represented by Pergamene sculptors, pursued new and striking effects overall but especially in free-standing figures.

To facilitate understanding of the technical aspects of color in these two tendencies and to indicate exactly how far the painters went in their manipulation of principles that were apparently never conceptualized, I offer a discussion of those principles in Appendix A. It is intended for readers who wish to know how I arrived at the color analyses.

Finally, I wish to make it clear that these analyses of works I have been able to study personally are presented solely for the purpose of rounding out the *implications* of the Greek experience of color. They may suggest a direction for future studies in the art of the Roman world, where they belong historically—and in that sense exceed the theme of this book.

Color Analyses of Selected Graeco-Roman Wall Painting

The order of presentation follows the chronological succession suggested by Karl Schefold.³⁰

Second Style

Boscoreale (Metropolitan Museum of Art, New York)³¹

Cubiculum

The buildings are, if not nearly white, painted in warm, light colors; light brown, cream, light rose. Marble columns are a fairly well saturated reddish purple and the same color is picked up in marble framing panels of the dado (surrounding greenish blue indeterminate scenes). Carmine red appears on walls enclosing the gate. Over the scene is a considerable extent of light blue sky lending strength to the illusion of being out of doors. There is no strong impression of fading of colors except in the green of foliage on sides of and behind central garden walls, green being perhaps the least stable color in ancient painting. The remainder of the dado is in the brown to cream range.

Although the technique of this room is not classifiable as Four Color painting because of the extensive blue sky, there is nevertheless a strong impression of that tradition in the total effect, since a harmony of warm colors throughout the scene and dado appears to have been a goal in the planning of the decor. An obvious source for this, in theory at least, is fourth century stage sets which would probably have had a similar coloration but without contrasting sky. If this supposition is correct it still does not imply that the designer of the room necessarily meant the scene to be interpreted literally as a stage set.

Garlanded Wall

A huge thick garland of dark and light green leaves and assorted fruits dominates plain cream-brown panels. These greens have remained stable in general. A simulated marble

cornice above the panels consists of blocks of the same color as the panels alternating with saturated blue panels below several strings of narrow ornaments such as dentils.

Figural Walls

In striking figural scenes very large and ample female forms in flowing cream to white garments are seated before a red background—plain or with indeterminate representations—while another figure with shield stands. The red background, being very strong, has called forth its complementary green in the undergarments of the women, on chairs and in other details. This red-green opposition dominates the aesthetics of the entire figured wall. In the garlanded panel the greens were a suitable local color and there are no disturbing contrasts but in the figural scenes the artist has deliberately invoked the dramatic, tension-producing quality of red as combined with green to draw the viewer into the destinies of the persons represented.

Odyssey Landscapes (Vatican Museum)³².

I–II: yellow, shading into brown, predominates and is contrasted with light blue for sky, water and shadows (Figure 31). The yellow-blue dichotomy yields a classic description of mythical (ideal) earth and its surrounding sphere of the gods in Goethe's sense that the two basic colors are yellow (on the plus side) and blue (on the minus side: *Farbenlehre*, 696). The same effect is heightened thematically in III–IV where water and earth are shown more extensively. In IV particularly the blue sky is reddened slightly at the horizon; this touch suggests nature observation. Further, red as enhancement of yellow combined with the blue sky characterizes this blue as more transatmospheric than transcendent, though the latter quality is immanent in the entire frieze as a transposition of poetry. V: again there are colored shadows (Circe's portal reddish, the portico bluish) which go as far as very dark blue (though not black or if black not extensive). VII–VIII naturally have the deepest shadows, and the absence of black gives the scenes a certain lightness, increased in mood by the lack of logical treatment of shadows. The framing of the entire series is by pilasters of darkest purple with a strong three-dimensional effect.

Aldobrandini Wedding (Vatican Museum)³³.

Although the light seems to be coming from the R throughout the scene, this is more to be deduced from the shadows than from any impression of a brightly lighted space (Figure 32).

Since a supposed shadow to the R of the extreme R figure has been used as major argument³⁴ in discussing the composition, it is necessary to digress briefly on the subject of shadows. On the whole, Roman painters, following Greek precedent, were content to indicate contrasts between lighted and shaded areas within the contours of the object so affected.³⁵ However, a few painters went beyond this to indicate a cast shadow of sorts in the form of streaks *on the ground* below human figures or as darkness pooling under a low object. In the AW the lifted foot of the lady leaning on a pillar casts a short, almost symbolic shadow like a wedge to the R, not picked up—it simply ends abruptly, and the matron casts an even shorter shadow to the R at the level of the hem of her dress. One

can say that in principle ancient artists did not understand, or at least pursue, the phenomenon of shapes repeating themselves in distorted form as shadows on neighboring surfaces.³⁶ Thus von Blanckenhagen's claim that a tiny shape at the R of the AW is a shadow cast by another figure excluded from a larger composition is exceedingly controversial, not least because the shape is pointing the wrong way to have come from a distant figure (like the leaning lady) and, if from under a closer figure (like the matron), some part of that figure would certainly appear with it. Furthermore, it would take an eccentric—if not irrational—copyist to show a blob connected with a figure he was deliberately excluding from his “copy” of another composition. What von Blanckenhagen is referring to may be part of a general discoloration in that section of the frieze, for by his own admission there is no evidence that the AW was not complete as found. Since he also admits that the somewhat cut-off figure to the L of the AW is not significant proof of truncation of something else, we are free to regard the scene as an original composition with its own meaning, even though—like many of the great European paintings—“quotations” from works of other artists may have been taken into it. In fact, von Blanckenhagen correctly stresses that the AW is a powerful compositional unity, but he is committed to the conviction that no artist of the Augustan period could have been the originator of it and therefore demands that we seek a Greek master behind it.

A formal unity is given the painting by the long stretch of light blue sky and the prominent dark blue marbled border. The long wall is violet L and white R (short stretches): it divides up the groups of figures according to their activity without disturbing the unity of the composition and above all assures the transcendental nature of the whole scene. The effect of open depth is achieved to a modest extent on the R by the progression violet-white carrying the viewer to the green-blue background. In this connection the foreground position of the L group and the more distant placement of the Muses should be noticed. More or less in the center of this progression is the main group.

On the R is the group of three figures now identified as Vesta and two divine musicians. The subtlety of the color composition is most interesting here, for the Muses are appropriately garbed in purple and (blue?) white, respectively—fully transcendental colors. Vesta, however, wears a yellow costume with an extraordinary feature: a strip of white shows beneath the waist overfold. This is hardly to be explained realistically. The white connects her to the musicians as a supersensory threesome assisting at the wedding and—on the other hand—connects her with the white costume of the bride and the white over-cloak of the important woman on the L heating water. In these the white, though worn by human beings, transcends the noetic level through the presence of Venus and must have the implication of godlike purity, chastity, about to be (lawfully and necessarily) reduced to an earthly condition. This condition is represented by the older woman, the matron, whose undergarment, in yellow, indicates that earthly condition, while the white cloak represents symbolically—for the purpose of this ceremony—the state the bride is in and the matron herself once was also in. In Vesta, of course, the undergarment showing is white, her true permanent state of divine purity, while the outer dress in yellow represents her sympathetic participation in such earthly affairs as nuptials. That is, it has the advantage of referring to her function as the

guardian of the hearth, the center of earthly life, which she is, in fact, here attending to. Again, moreover, her yellow echoes the concentration of yellow on the L, in the underdress of the white cloaked woman and the dress of a humble attendant in the background, no doubt also to be interpreted as an earth color. Color rhythm meshes perfectly then with meaning. Not to be overlooked is the elegant casualness of Vesta's dress, which exposes much of her back heroically, just as Venus and her attendant display heroic nudity. Even the kerchief on Vesta's head is a casual touch, as she attends to her "kitchen duties".

But there is yet another coloristic subtlety. In typical Late Hellenistic fashion, the purple of the central muse's garment can be said to have called forth the complementary color, yellow, in Vesta and this effect is actually continued in the loosely worn cloak of the seated man, and particularly in his purple headdress with a yellow fillet. Thus he too is drawn into the transcendental sphere on his L (in which the background blue can be included owing to its proximity to the muses). Thus he can be seen either as divine (Hymenaeus, Dionysos) or as human in the grip of divine inspiration. The alert, attentive position of his head gives the impression that he is more concerned with what is being whispered to the bride than with her person. This impression is strengthened by the repetition, albeit in much less saturated form, of the color of his cloak on the garment of the high being (Venus) who is instructing the bride. Thus surrounded, the white clothing of the bride refers unmistakably to divine inspiration.

Reflecting the bride's dress is the white cloak of the main figure on the L, as noted. Besides her undergarment, also the cloth under the basin is yellow. The strongest indication of an earthly quality in the center is the alternation of yellow and deep, luxuriant blue on the wedding bed, with a folded yellow cloth on top of a yellow undermattress. The coloration of these purely physical objects points to the Dark spectrum and restores the impression of an earthly wedding after all, which now seems strengthened by the realistic anatomy and sensual flesh color of the "bridegroom". Nevertheless, there is more than enough indication that the transcendental aspects of coming nuptials constitute the real theme of the painting. The use of colors allows us to identify all the figures on the L, with the possible exception of the woman leaning on a column, along with the bride as earthly. The leaning woman shares divine nudity with Venus, which is probably decisive, but her garment is the same sensuous blue as the bed cover; I see this as "poetic license" required for color balance. All the other figures on the R are divine, except that there is ambivalence in the depiction of the seated man. The colors say more likely divine, but the purple here could conceivably refer to very high position in the worldly hierarchy—in the sense that aristocratic Romans of that time had themselves portrayed with the bodies of gods and their own heads.

Much of the content, then, of this lovely painting is expressed in terms of color harmony; in its cosmic extensivity this harmony united beauty and (narrative) meaning. It would indeed be difficult not to recognize in this most unusual frieze a Greek brilliance in the feeling for expressive color just as in the (oft noted) feeling for Greek sculptural form. But the former quality is paid so little attention that most discussions of the work begin and end in analysis of various parts of the composition which are assumed to be lifted from specific Greek prototypes and fitted together. In this

way the very real creative achievement of this Augustan painter as a colorist is not apprehended. Who was he? Here we have one of the most beautiful paintings of the first truly classicistic age from an aristocratic residence of the capital of the world—a Raphael-like situation, but Raphael's counterpart—like the corresponding sculptural genius of the Prima Porta portrait—remains in impenetrable obscurity. At any rate, how this painter felt about coloration is *at least* as significant as how he dealt with earlier sculpture (in or out of painting)—and for connoisseurship I think more important. If the figure types are eclectic, then it is impossible that the overall color pattern could have been taken from such varied sources. Out of late Hellenistic color principles this painter seems to have created in a personal way a harmonious unity out of what his commissioner required him to excogitate and bring together from suitable compositional sources. Only on this basis can one comprehend the greatness of this painting which can be compared unhesitatingly with masterpieces of the Renaissance, as demonstrated by the procession of great painters of later ages who sought out this creation of an ancient colleague to study and copy. In order to bring out the spiritual quality of this Augustan master, and with him the whole ancient vantage point in painting, I shall discuss one of the many later imitations of his work:

Galleria Doria Pamphili: anonima copia S. VXI delle Nozze di Aldobrandini. Già attribuita à Nicolas Poussin.³⁷ The painter opened the picture with a high sky, eliminated the border and replaced it with a very broad, brownish black strip (Figure 33). He used highly saturated colors and introduced gray to black shadows. The blue-purple-white unity of the central group disappears totally: both seated women seem to be dressed in white while the standing woman is given a grayish blue/green garment matching the bedclothes, on which a great, dirty yellow cloth has been laid (the painting may need cleaning but it does not appear to). The L wall matches the garment of the standing woman, the R wall is slightly reddish while the floor of the foreground is a highly saturated violet. The seated man seems to be resting in semi-darkness.

In contrast to the almost joyful lightness of the ancient painting—lacking as it does a real atmosphere—here the chiaroscuro atmosphere is all-important and enfolds the figures so that deep pools of shadow arise—so that, for example, the wall becomes essentially one with the figures instead of standing back from them. The ancient figures, especially the standing woman, were near to the border of the frieze and the others stood well back from it. The later figures have all been retired in a single unit to mid-ground and behind them the expanse and many colors of the sky create further depth. The dark wide strip underneath the scene has a rather mysterious quality.

Thus the later painter had no interest in carrying over the colored shadows of his predecessor but turned the scene entirely around in accordance with the principles of chiaroscuro. It is not his greater consequentiality in dealing with shadows that creates the salient difference, but his whole concept of how color and space go together. The ancient painter operated with fixed (*gewordene*) prismatic colors, which literally still had in them much of the old self-illumination (*Eigenlicht*), and—as expected in the Hellenistic age—made much use of white and less of black. The later painter by contrast was extremely conscious of the origination of colors from the reciprocal effect of dark and light, so that he created self-generating (*werdende*, incipient) colors with much use

of black. Against this new stage of development of the *nous* (I-principle), the ancient sense of neutrality toward (evolving) time stands out clearly. For the later painter, *Le Nozze di Aldobrandini* could at most represent something vaguely symbolical (just as for us still), yet he looked back yearningly to the old, seemingly objective norms and forms of beauty and awoke aesthetically in seeing them.

Casa della Farnesina (Terme Museum, Rome)³⁸.

Cubicola E 16: the very delicate figures are clothed in golden yellow, lilac, green and blue/green. Shadowing of folds follows the same principles as those noted on Pompeian frescoes (see Appendix A, *Observations on the Technique of Paintings and Mosaics*, Complementary Colors, paragraph 3), above all the use of dark violet on lighter grounds. The difference of this shadowing method from the basic red of architectural parts is clear, unequivocal and not to be overlooked: violet was intended (in the scenes), not dark red. Cubicola B: the background of the wall is dark red with light green architectural details (figments). Below, black oblongs and small yellow pictures. The enframed center picture has delicate figures on a white ground. Thus, the contrast red and blue/green is a basic sign of the times in Rome also. Nevertheless, the use of colors can be extraordinarily complicated in the Casa della Farnesina and a fuller treatment would be desirable: blue, for instance, appears in both high and low saturation on the same wall. The painting and stucco work from this house are of very high quality but not necessarily superior to the best in Pompeii.

Third Style

Boscotrecase (Metropolitan Museum, New York)

Mythological Panels

Andromache and Perseus: in this painting a bluish green or greenish blue hue, varying in the proportion of the two, creates the mood and satisfies the substance of the story, whereby it is not clear where (or whether) earth, sky and sea have their separate spheres. For all seems to be blended together in a seamless unity even though the color gradations are numerous. This masterly blending of the transatmospheric and transcendental implications of the minus color scale creates a dreamy, surreal realm of “color poetry” suitable to an “inwardized” appreciation of the myth. The effect is made particularly lovely by the fact that the greenish component of the background has called forth a mauve (to mauve-brown) hue for the garments, rocky cliff and other features. All this makes for a vague, fantastical atmosphere barely impinged on by the (realistic) skin color of the human figures. *Polyphemos and Galatea*: the style and coloration of this are the same as those of the foregoing. However, there is a more focal concentration of human figures at lower center of the panel and these, owing to the relatively large area of exposed flesh in warm shades, tend to dispel to some extent the magically removed quality noted in the *Andromache* panel.

Black-Background Panels

In quite a different key the surreal mode is continued in a number of vertically oriented black panels with small delicate motifs of buildings or figures. The phenomenon of self-illumination manifests strongly here exactly because the black background absorbs or stops the presumed light source, which in any case is not felt to be very powerful. Thus, from even a short distance away, the representations give the effect of not yet (or no longer) physical light-globules floating in the inscrutable blackness of becoming and passing.

Conclusions

Probably the most important aspect of the autopsy of ancient color usage reported here concerns the definition of ideas about light-dark. The natural tendency in modern times is to use gray and black straight (or as a shading medium for chromatic colors) for atmospheric shadows or darkened atmosphere. This is, however, virtually unknown in preserved frescoes and could only be assumed, if at all, indirectly on the basis of a few mosaics (as in Figure 34) which may be copies of paintings. In the latter, even the most advanced attempts at atmospheric effects, as in the sacral landscapes (Figure 36) and night scenes,³⁹ the effect is mostly achieved through the skilled use of complementary contrasts in various saturations or shades. I take it that this is precisely what Pliny the Elder was referring to when he wrote: “in the course of time the art differentiated itself and discovered light and shades, *with the alternating contrast of colors heightening the effect of one and then the other* (emphasis mine).”⁴⁰

The deeper reason for this could lie in the fact that the ancients at all times experienced more powerfully the corporeal presence⁴¹ of what was represented than the physical space in which the representation was contained—with corresponding unawareness of the manifold implications of that space which are second nature to us. In this sense, the practice of light-dark resembles that of ancient perspective: it was not thought through to the final consequences.

The use of variously saturated chromatic colors or mixed colors to show the more illuminated and less illuminated surfaces of an object (animate or not) in atmospheric space seems to have been the normal Late Hellenistic practice. In fact, however, the self-illuminating quality of earlier colors was still deeply fixed in artists’ consciousness and hindered any consistent progress toward rational chiaroscuro. In effect, the ancient painter paid more attention to light in its basic aspects than to the space that contains objects. Indirect but powerful evidence of this is given in the words of Pliny the Elder as he continues his thoughts in the passage cited above:

Afterwards *splendor* was finally added, which is something different from “light”. Those qualities which exist between these (light and *splendor*) and shades is called *tonos* (“tension”), while the joining together and transition of colors is called *harmoge*.

We have already had occasion to refer to a certain parallelism in the nature of shadow-giving between the Pompeian and the Impressionist painters: in both cases light was more important than space.⁴² Although other conditions are quite heterogenous in the

two cases, in both the result was a tendency to avoid black for shadows. In neither case is that tendency mere chance or arbitrariness, but rather the expression of a spiritual crisis in the respective eras, for in both cases black had been a vital component of the preceding artistic scene (in different ways, of course: see *Chapter IV, Panel Painting and Wall Painting: Italy*, Introductory Observations, paragraph 8).

V.

OBSERVATIONS ON THE COLORATION OF SCULPTURE

INTRODUCTION

It would be very productive for our understanding of the way the ancient Greeks thought about color if we could see their sculpture (and architecture) in something like the condition in which the creators of these entrusted their products to the world. For certainly there was much color on them, of which now we find generally only the most minimal traces—if that. Even colored photographs of sculpture tell us little in this respect except the color of the stone. In general, these traces are so little noticeable that they hardly intrude on our consciousness when we speak about the works. Art historians virtually confine themselves to form analysis—as also in my parallel study of sculpture.¹ A vital part of the reality that was is simply lost. This is not to imply that researchers have ignored the problem. On the contrary much thought has gone into it. But the apparently insuperable difficulties inherent in the problem make firm reconstructions of Greek art in full color seem risky and, in any case, such reconstructions would probably seem bizarre to our neoclassicizing eyes! It was therefore never my intention to attempt new investigations of ancient artifacts in order to glean a few more details about their color. It suffices me to offer a few observations on the general trend of color usage in Greek sculpture in the light of the four element and four color systems, using as a basis the careful investigations of Patrik Reuterswård's *Studien zur Polychromie der Plastik*² (references thereto cited as R plus page number). Naturally, the following, necessarily provisional, observations would not be feasible without some guidelines gained from the foregoing study of color in Greek painting.

ARCHAIC AND PROTOCLASSICAL PERIODS

Non-architectural Figures

From the very beginning of the kouros type in stone, traces of red, especially in the coiffure, indicate the use of color; in the case of female statues red also occurs on the garment (Berlin goddess). In many cases the possibility that this red was an undercoat or at least part of another color must be weighed. For the Berlin goddess yellow is postulated for the hair. It seems that gradually the plain white of the marble, as in the case of the Protoclassical korai, came to be appreciated as a part of color harmony (R43), a conclusion that is supported by the role that white otherwise played in this period (see Chapter III, *The Emergence of Redfigure Style*, paragraph 13). Traces of black have been detected in the parts of these statues that simulate embroidery.

Thus, it appears that the usual four colors were represented—and even quite common, although not necessarily in combination—in sixth century Athens. In addition a few other colors occur (much less frequently), in particular blue and even a little green (in which case it must sometimes be questioned whether a blue or a green was intended). At any rate there is far less green, so that in general we have to do with a palette of the four colors plus blue. And again in individual figures blue is usually not conspicuous. In the contemporary pinax from Pitsa (see Chapter IV, *Panel Painting and Wall Painting: Mainland Greece*, The (Late) Archaic Period) we could ascertain a transcendent quality in the use of blue in garments on the basis of the context and the presence of violet. The korai statues were presumably dedicated to Athena, which would make blue a suitable color; but it is also possible that the costume of the korai figures reflects to some extent courtly conventions.

Architectural Sculpture

It should not be surprising that in this context the use of blue, particularly for hair and beards, is common (Zeus, Herakles, Bluebeard of the poros pediment, Giants of the Acropolis Museum 370, 631: R 66). This sculpture was created (in theory) to honor the gods in or on their temples. In this sense, the four elements are expanded coloristically to include the fifth, divine element, the color of which is blue. The application of transcendent blue, often together with red—which may be noetic as in the case of the costume of the pinax priestess—even to architectural details like water spouts, palmettes (and possibly other accented points: R 76) is an appropriate sign of the age. In the case of figures the preference for blue is not confined to the hair as such (where its use elicited from Reuterswärd, 77 the suggestion “Zeichen männlicher Kraft”, which is *at best* a secondary or derivative meaning), but applies to the whole head region, as in the blue helmet of Athena on both Aigina pediments, where the reference to divine, guiding intelligence (“cool” in the heat of battle) is inescapable. It is the red garment of Athena—red as the supreme noetic color—which refers to the strength and bravery which *human* warriors must have when inspired by the gods. At the latest from this point onward red had this mediating role, whether it appeared on clothes or artifacts of a military nature; thus, on the warriors of the same pediments: blue helmets (intelligence by osmosis) and

blue and red shields. This is another, important reason why red was *the* Classical color (see Chapter III, *Hellenistic Painting in the Light of the Cycles*, chart following paragraph 8).

At this point it is appropriate to offer an independent comment on the color of the Athena Parthenos of Phidias—insofar as this can be surmised—since that statue along with the Zeus of the same sculptor functioned as the quintessence of Greek religious sensibility. According to the evidence assembled by Neda Leipen (*Athena Parthenos*, a 1978 study to serve as a basis for a model reconstruction at the Royal Ontario Museum in Toronto), painting of certain facial features (but not much more) is documented by literary and archaeological evidence. Presumably this statue was indeed a dazzling chryselephantine composition; yet the actual colors of gold and ivory can not have been the point of departure for the depiction of the goddess, who in the three-dimensional representations was characterized by transcendent blue and noetic red. The colors of this particular statue then simply conformed to the nature of physical substances that have ever been used as the ideal enhancement of divine-royal status. The mimetic relation of gold to the sun as the source of all light and energy in the solar system is a truism; its hue is thus related to, but vastly transcends, yellow as the nearest spectral color, which at most has noetic implications. Ivory, for all its desirable rarity, has to be classified in the same way. Thus an exceptionally limiting noetic quality can not be “thought away” from the glory of the Athena Parthenos. Indeed, the very choice of these materials tells us—or rather confirms what history tells us—that a certain fateful element of self-indulgent, self-satisfied egotism had insinuated itself into the Athenian culture-makers as beneficiaries of the politics of the Delian League.

Thus from yet another angle we ascertain that the most brilliant hour of Athenian cultural hegemony was marred by the emplacement of a cancerous cell that would keep on growing. The dark side of the possession of physical wealth in overabundance—an affront to the ideal of moderation and balance—soon brought on sordid and disastrous consequences for the commission-giving city and even for the sculptor of this statue.

Reliefs

I shall comment first on Reuterswärd’s conviction that *grave* reliefs of the “Ripe Archaic” (my Protoclassical) period had, or could have, a red background—with a certain continuation into the Classical period. For the interpretation of red in this position (e.g., on the Aristion stele) one could refer to the traditional practice in ceramics of red as representing the physical element air (under certain conditions; I include here reddish hues). The interlocking of the four elements and four color systems always implies a wider potential for interpretation than ceramics alone, as evidenced in the realm of physiology (see Chapter II, *The Ancient Sources*, Hippocratic Writings, A, paragraph 1). To this problem must be added Reuterswärd’s observation that blue *became* usual as a background for *votive* reliefs, sometimes temple reliefs and similar (e.g., the Treasury of the Siphnians; R37). This usage, possibly somewhat later than the one just discussed, in any case places us squarely before the issue of ambiguity. If it is replacing a reddish hue, as seems likely, it may be a substitute for physical air. Yet in the consciousness of the

Protoclassical age the transcendent quality of blue still echoed very strongly, as we have just seen in regard to the pediment figures. So obviously blue would still harmonize with the sacral quality of votive reliefs and temples. But it is also how the sky (where the gods live) *looks* to the human sight. This could have been the fulcrum point at which the physicality of the color blue started to be realized. Nevertheless, the actual evidence from the sphere of painting makes it unwise to assume that transatmospheric blue significantly broke into the prevailing bias toward a four color world until after—perhaps well after—the Classical era.

CLASSICAL PERIOD (AND PROTOHELLENISTIC)

Original, non-architectural figures in stone are almost completely lacking to us, so that effectively one is forced to depend on architectural sculpture for evidence and even this is, to a great extent, in fragmentary condition. The Apollo of Olympia West had a “kräftig rotes” garment (R41), thus recalling the Athena of the Aphaia temple. Like the Olympia metopes, those of the Parthenon also had a blue background, which also appears on the Frieze of the Theseion (R52). In this period a study of the free-standing sculpture of various pediments and other monuments allows the conclusion that sculptors were willing to depend on the painting in of certain details, such as parts of footwear, in lieu of fashioning every part three-dimensionally. The same economy of effort can be inferred on many reliefs of the fourth century from prominent empty stretches in the composition in which logically representations should be found; if originally present these have faded completely out of existence. It seems therefore that illusionistically simulated reality was preferred over tangible three-dimensional copies of it. To the extent that this movement toward color affected the sculpture of the High Classical Reaction and Late Classical style, it fed the constantly deepening desire to “interiorize”, to seek the soul-in-self, expressed also in a different way by the self-absorption of torsional figures.

In the color usage of the fourth century the psychic attitude just referred to took the following course. Just as in wall-painting white or light was increasingly valued, so also in three-dimensional figures and relief. In the former, Reuterswärd (R83) points to the fact that the bare flesh of figures on the Alexander sarcophagus is not red but only slightly tinted (“leicht getönt”). In the latter category, colored backgrounds were sometimes abolished altogether (R66), as on the Mourning Women sarcophagus, the figures of which have the usual colors of that period: yellow and red shades, around which are clustered minor touches of violet, cobalt blue, rose, brown and green. The effects of colored figures against a white background are even more variegated on the Alexander sarcophagus. On the well-known Negro jockey relief in Athens National Museum the coloration is less marked and the greater part of the surface is left white.

It is clear that the development of earlier Greek sculpture sketched in terms of color by Reuterswärd had much in common with the course of color practice in contemporary painting. In the later Classical period and especially in the Hellenistic epoch the striving in Greek culture toward noetic self-sufficiency, exemplified *par*

excellence by Aristotle and his followers, is expressed in both media by a greater, more purposeful use of white. Most indicative is that the earlier concern for a physical, four-color representation of the atmosphere is in the end given up in favor of a mental abstraction, for white in elemental terms is not ever the color of air, but is habitually the color of warmth (either physical or mental energy). It is then the mental energy of the later figures that overwhelms and dominates the physical setting in which they exist. Visually, the atmosphere became a void. At least by Late Hellenistic times a naturalistic coloration of the atmosphere (blue) is represented, along with other colors, in painting but I am not aware that it was ever used in sculptural relief.

HELLENISTIC PERIOD

A kind of continuation of Reuterswärd's work now exists in a 1984 dissertation by Konstantin Yfantidis.³ This author does not, like the former, emphasize neutral backgrounds, but quite incidentally balances the situation by noting that there was what we may designate as a parallel, conservative stream that retained the earlier practice of blue, and also alternately red and yellow striped, backgrounds in certain reliefs. Yfantidis' concern is rather with the actual colors applied to three-dimensional figures: the preference for delicate, pastel-like tints attested by the Alexander sarcophagus became a general Hellenistic aesthetic principle. Thus, the tinting of terracotta figurines (Figure 37) and of life-size stone sculpture was "identical".

Because pastel colors are obtained by the admixture of white, the sculptural world adds its testimony, already established on the basis of a philosophy of the elements (see Chapter III, *Hellenistic Painting in the Light of the Cycles*, chart following paragraph 8), that it was the destiny of the last phase of Greek culture to come to terms with the phenomenon white, a factor that still fascinates philosophers in the twentieth century.⁴ Yfantidis also calls attention to a concomitant phenomenon in this phase, the spreading use of gilding. In this connection, it is useful to recall that for Plato yellow is white plus red plus the shining (see Chapter II, *The Ancient Sources*, Plato, paragraph 7). Yellow and red are noetic colors, white is both noetic and transcendental (Illustration 17). The shining must have been, in Plato's intentionality, metaphysical adrenalin so that he was elevating yellow, as it were, to the status of gold. In this sense, the human tendency to gild statues of gods, kings and heroes is understandable as admiration for an (often only ideal) model of purified egohood. The latter is underlined by the frequent association of gilding with white, for instance in the pastel colors and white backgrounds of Hellenistic art or equally well in the white and gilt walls of Rococo palaces. Obviously, the temptation to allow true egohood to degenerate into egotism can be overwhelming. The example of Baroque and Rococo monarchs is obvious enough and the extension of gilding to private portraits in the Late Hellenistic period, on which Yfantidis reports, would seem to be a less baneful example of the same weakness.

APPENDIX A.

OBSERVATIONS ON THE TECHNIQUE OF PAINTINGS AND MOSAICS¹

Painting

Background Color

Background color of panels and friezes except for landscape with visible sky. The following hues were employed:

- White
- Light yellow (buff)
- Light yellow/red (orange): apparently continued from the identical color of simulated marble on the plinth.
- Red (cinnabar; orange/red): very common, combined with blue/green details.
- Black: less usual than red.
- Blue-green: usual for night scenes but can occur also in a quite unsaturated state to appear neutrally as a kind of gray-green, as for example with the Three Graces (inv. 9231 and 9236=S.340), where this color represents nature (hills and flowers in a vague form without picked-out details, especially successful in 9231).

Complementary Colors

In addition to the more or less conventional background colors listed above, another principle comes into play (although it is not always clearly followed), by which other colors can take over the background. That principle is the optical phenomenon of the laws of complementaries as illustrated in successive contrast (see Appendix B, *How Do Newton and Goethe Compare...*).

If one follows the suggestion implicit in this study that the earlier Greek artists experienced their own earthly existence through a strictly circumscribed (hence guided, imposed) use of the Dark spectrum, then it may seem that in the later phases of their culture Greek artists (and doubtless some of other nationalities, such as Romans) felt a

certain release and expanded their horizon on the basis of self-motivated discoveries of the laws of color relationships, and, moreover, that they became more conscious of pitting the values of the Dark and Light spectra against one another. In this view the Four Color doctrine as well as the Four Elements theory could be understood as divinely inspired intellectual and moral instruction (it is difficult to believe that Empedokles or Plato would have taken exception to that formulation). On the other hand, the free manipulation of complementary colors indicates a beginning of experimentation, of self-instruction. In other words, the contrasts to be discussed below must have been sought first of all for the sake of new and striking visual effects; for once artists left the safe ground of the “warm” colors, that is, red and yellow of the Dark spectrum (Illustration 16), they would have had to fall back on their own culturally implanted instinct for polaric reciprocities (Empedokles’ Love-Hate). Note that Goethe specifically called red and yellow “plus” colors (his paragraph 794 of Didactic Section) and called blue and violet “minus” colors (his paragraph 777). But once they gained the new ground, basic aspects of the deeper meaning inherent in the relations of the two spectra must have glimmered in their consciousness—sometimes quite vividly, as I have noticed. Yet I cannot suppose that any theoretical genius of that age went on to produce the basic color-wheel, as Goethe did for the modern age. Just as in the case of the laws of perspective, the laws of color seem to have been grasped as a somewhat inchoate glimpse of things-to-come.

Thus we find frequently the approximate complementation of blue/green (or green/blue) and cinnabar (or other slight variations in the red range) e.g., *Menade dormiente* (inv. 112283=S.355) or *Dionisio affare ad Arianna* (inv. 9286=S.342), both Casa del Citarista. A second contrast is given by the use of violet for shadowing yellow clothing (violet can also be used purely in terms of color value: lighter for the garment, darker for the folds). Moreover, the two complementaries just mentioned can occur in the same painting, so that the color combination violet and green arises by proximity—and then occurs in its own right as a cherished feature. Blue (i.e., dark blue) is also used for the folds of green garments. From all this emerges the series yellow, green, blue and violet as particularly suited to garments; they occur as pure hues with or without shadowing and, doubtless rather consciously, in an aestheticizing sense (some are very beautiful). Despite this, I believe that—on the whole—usage is generally in keeping with the prismatic polarities worked out in Illustration 16. Green=violet: *Perseo e Andromeda* (inv. 8996=S.333); *Amore di Ares e Afrodite* (inv. 112282=S.355). Green=violet and purple: *Eros tra Paride ed Elena* (inv.114320=S.355) Casa dell ‘Amore Sfortunata. Yellow=violet: charming yellow/gold garment of Andromeda against light blue/green background, contrasted with dark violet garment of Perseus (inv. 8998=S.333) Casa dei Dioscuri. *Citareda, Stabiae* (inv. 9623=not in Schefold): two figures with yellow garments, one with green garment, main figure wears white; background (wall with pilasters) is lilac. Yellow/gold=blue/green: *Teseo uccidore del Minotauro* (inv. 9043=S.355) (Figure 29). The color harmony and its effect have a striking similarity to Raphael’s *Galatea*. Was that painting influenced by ancient colors?

Aspects of Red

Although violet is by far the most usual color for shadows, in at least one case red/brown is used for this purpose. Its effect is disappointingly monotonous in comparison with the wonderfully enlivening quality of violet on the color of flesh. Cinnabar as pure drawing line (on marble) also occurs with rather the effect of Renaissance sepia drawing. Of highest quality in this category is *La Lotta dei Centauri* (inv. 9560=S.350), reminiscent of the best Renaissance work; not far behind is *Le Giachotore di Astralogo*.

Four Color Painting

Above all one thinks of *Teseo Liberatore* (Figure 30), *Arcadia* and *Chiron e Achille*. Yet in all these, green does occur (resp., behind the boy, on rocks—gray-green—and on the ground). It seems, therefore, that from a certain time onward the law of complementaries exacted homage of some sort. That point was marked by discovery of the transatmospheric colors via green as the real bridge between the warm and cool colors (link to upper half of Illustration 15 bis); but green itself seems to have been the last of the colors to be taken notice of. I refer here, of course, to the conscious use of the transatmospheric colors blue and violet to shade flesh representation (in lieu of brown or black). Yet an argument can be made that violet with flesh also has a transcendent connotation; to what extent may the artists have been aware of this? To what extent, in other words, may we assume that by enhancing the physical presence of a figure coloristically the painter was also aware of a supersensory value of his colors? In her study of hero-figures, especially Theseus, who was also a king (and thus representative of the divine world), I. Scheibler² seems to touch on this problem:

In all the pictures a rich, dark skin color, dark red garments and rather crisp modelling make the figures of the heroes stand out more corporeally from the general composition than do the other figures.

Further she attempts to connect the color of the heroes' cloak with Tyrian purple, in order to heighten the value of the color for the iconography of heroes.³ Is this going too far? At any rate, she does not sufficiently consider a possible double intention of the artist in using a single color nor the nuances of red and violet in the Light spectrum. For red is also an aristocratic color: *Dionisio tra Apollo e Venere* (inv. 9449=S.346), where Apollo wears a cloak of brilliant red. On the other hand, the *Medea* of the *Casa dei Dioscuri* (inv. 8917=S.331) is dressed in violet: is this ironic (meant tragically) or is there in this case a sense that even this color can belong to the purely physical scale, making Medea starkly, almost defenselessly unprotected and deserted? For certainly the very theme prohibits dismissing her striking dress as conventional local color.

In sum, then, I find it inevitable to assume that—even in Four Color painting—in the colors selected for narration a certain sense, instinctive or otherwise, of the transcendent or noetic value of those colors is implied. For example, the gold/yellow garment of *Andromeda* (Figure 29) announces the tender frailty of the emerging I-consciousness being threatened by animalistic forces and being rescued by divinely inspired bravery (*Perseus* wears violet). Green seems in most cases to be applied to

subordinate or explicitly earthbound types. (Dark) blue is appropriate for female divinities (Venus: inv. 9449 mentioned above, and in that very scene Apollo has a blue/green aura equipped with sunrays! The dovetailing of the two spectra could hardly be better demonstrated).

Mosaics

The “Alexander Mosaic”⁴ (Naples National Museum of Archaeology) covers an entire wall like a Baroque painting (Figure 17). The individual tesserae are incredibly small and fine. Black and also a consistently medium gray are used for shadows. But also a medium red and a highly saturated dark red are used for the same purpose, so that it is not possible to postulate a consistent system. Problems arise from this. Did the original painting behind the mosaic have these two types of shadows? And were its shadows really dark red and not violet, as otherwise usual in Pompeian painting? The air in the mosaic is a light, actually very light, leather-yellow, distinctly differentiated from the white of the Persian king’s shirt (undershirt). On the whole the coloration can be described as restrained, severe and thoughtful, all of which is perhaps archaistically heroic. The light background allows the colors to emerge clearly without shining. The question of light source is not easy to resolve because one cannot get the necessary standoff in the space where the mosaic is exhibited.

Chiaroscuro: only in mosaics does this seem to have occurred (occasionally) in the sense of a certain probing in the direction of darkening the air, or part of it. Two examples are of interest at Naples among the many that adhere more or less faithfully to the rules of wall painting. One⁵ is a riverscape which begins at the base with a broad black stripe, then rises in the general pattern of a grill of expanding green stripes (darker and lighter and filled with green and dark brown). Above all this are fish, water fowl and birds of prey clutching fish; the total effect coloristically is rather like that of a 19th century (A.D.) painting, though harsher and more abstract and with surrealistic elements. Unnumbered:⁶ this well-known scene with actors, garlands, etc., in an architectural setting (Figure 34) not only has black for shadows but also a dark atmosphere enveloping the figures quite in the sense of European painting. Especially striking are the darkened legs of the actor and the space under a chair. The treatment of the dark is sufficiently skillful as to suggest a school of mosaicists who experimented with light-dark.

Two mosaics in Rome are also germane to the discussion. A later mosaic in the Terme Museum (Figure 35)⁷ reproduces the same alternating dark and light stripes in a riverscape as in Naples (above). The dark portions of the scene in this case are dark blue, although black is used for outlining figures or for setting accents (but not for shadows). Vatican Museum: a mosaic “dall Aventino”⁸ with animals of various sorts and exotic plants is a landscape of excellent quality. Although colored shadows are generally found, black is sometimes used for shadows in darker portions of the picture. As at least a partial explanation for this phenomenon, it may be recalled that most mosaics simply reflect the four color system, and that black in all cases played an important role in borders and outlines (there is, of course, a category of purely black and white mosaics).

Thus the mosaicist was pulled in two directions. The painting he was copying doubtless had colored shadows; but in his own medium he automatically used much black. The pull could also work in another manner. In many mosaics (e.g., in the Terme Museum) the mosaicist was plainly following the four color system in general but was pulled by the power of the complementary principle followed by his painter colleagues to let his normal reds call up green to be used in a subordinate role (see Chapter IV, *Panel Painting and Wall Painting: Italy*, Color Analyses, Boscoreale, paragraph 4).

APPENDIX B.

COLOR TECHNICALITIES

An Introduction to Goethe's Theory of Color for Non-specialists as a Conversation with Hans-Georg Hetzel, (formerly) Technical Research Photographer, University of Freiburg-i-B, Germany.

What are the so-called spectral colors in terms of Newton and in terms of Goethe?

For Newton the spectral colors are those that he produced in his first experiment in a camera obscura in the following way: he admitted a light ray through a small hole in the shutters allowing it to pass through a prism held in front of the hole, whereby he refracted ("broke") the colors on the white wall opposite the hole. These colors constituted his famous color spectrum. On the basis of his observations and reflections about this, Newton came to the conclusion that these colors must have been contained in the light and refracted into various lengths by the prism. On this basis a scientific theory came to be built up.

Goethe, however, came to a different conclusion. He discovered that he could produce colors by focussing the prism (in an open space) on black and white edges. Colors appeared along the edges in accordance with the deflection caused by the material of the prism: dark before the light always results in yellow-red color boundaries (Figure 38) and light before the dark always results in the blue-violet color boundaries (Figure 40). These effects, according to Goethe, are the fundamental principles governing the genesis of all color (including what Newton saw). Additionally when Goethe caused, in the first instance just mentioned, the opposing borders to be narrowed over the white space between them (by manipulating the prism), the yellow and the blue poles combined to produce green (Figure 39). In the second instance, he narrowed the red and the violet poles over the black space and produced what he referred to as pure red (or *Purpur*—not our ordinary purple): Figure 41. This is sometimes referred to as magenta.

Given the results of Goethe's experiments involving the producing of colors, how did he react to Newton's assumption that all colors are contained in light?

In thinking over the phenomena, Goethe reached the conclusion that colors arise on the boundaries of light and dark (whenever and however these occur). The prism itself, through its distortion and deflection of the light ray, produces the necessary turbidity (*Trübe*). Goethe's view thereby differed fundamentally from Newton's assumption that the colors which are supposed to exist in light are refracted into differing lengths. For Goethe considered all surfaces that he viewed through the prism as displaced and distorted; to put it another way, the dark-light and light-dark parts of the surface are shoved over and into one another through the levering action of the glass on the light: in the first case yellow/red arises, in the second blue/violet. It must be emphasized that in the experiment the prism furnished the turbidity, through leverage and distortion, without which on the borders between dark-light and light-dark colors can never arise. Without turbidity there are no colors. This is made clear in Figure 42.

Since Goethe could not accept Newton's view that colors are contained in light, and made their appearance dependent on particular conditions, where did he propose that colors are before they manifest?

Goethe referred to this matter in only one passage, but there at any rate rather forthrightly. In the section concerning the psychological and mental/moral effects of color he wrote (*Farbenlehre*, B919; B920 continues the sense of this): When the distinction of yellow and blue is duly comprehended, and especially the augmentation into red, by means of which the opposite qualities tend towards each other and become united in a third; then, certainly, an especially mysterious interpretation will suggest itself, since a spiritual meaning may be connected with these facts; and when we find the two separate principles producing green on the one hand and red in their intenser state, we can hardly refrain from thinking in the first case on the earthly, in the last on the heavenly, generation of the Elohim. But we shall do better not to expose ourselves, in conclusion, to the suspicion of enthusiasm; since, if our doctrine of colours finds favour, applications and allusions, allegorical, symbolical, and mystical, will not fail to be made, in conformity with the spirit of the age. (Eastlake translation)

What is the relation of Newton and Goethe respectively to the interpretation of color?

Newton and his successors have investigated and researched light exclusively in order to make use of the energy contained in it. The so-called magenta spectrum (*Purpusspektrum*)—in terms of this study Light spectrum—as complementary pole to the well-known and much used green (Dark) spectrum remains outside the consciousness of current science and technology, since it is inexplicable by their concepts. Although Newton and many of his adherents had (have) some religious sensibilities, they do not

take these into account in their researches and are therefore unable to enter into the psychological and mental/moral aspects of the colors. Goethe investigated color from the standpoint not only of its physical and physiological but also of its psychological and mental/moral aspects, the latter—as we have just seen—in only an indicative way.

In scientific contexts we hear of spectral colors and pigmentary colors. How do the two differ in the Newtonian view and the Goethean view?

Spectral colors arise, according to Newton and Goethe, on the basis of refraction and displacement, respectively (see above). Pigment 5 are called chemical colors by Goethe. Basically the two categories of color are the same in both systems.

How do the atmospheric colors arise according to Goethe, who does not work with refraction of light rays?

Goethe's color theory gives us to understand that at sunset the atmospheric mist, becoming denser near the earth's surface, is to be regarded as darkness before the setting sunlight. Accordingly, the colors red and yellow manifest—conforming to the general rule that dark before light produces red/yellow (Figure 43). Conversely, blue arises when the sun shines obliquely through the illuminated atmosphere before the darkness of the universe—again conforming to the rule that light before dark produces blue/violet (Figure 44).

Is there a concept of additive and subtractive color mixtures in Goethe's system?

Goethe did not know these concepts nor can they be used in his system. He speaks only of a luminous and a toned-down mixture of colors. In the so-called additive color mixtures three (or two) colored lights are projected over one another. These combine to register a white color or neutralize one another partially or wholly. The massive luminosity on the point at which the two or three colors come together fades off to be seen as mere brightness (white) (Figure 45).

In the case of the subtractive color mixture only one light source is used. Each colored filter applied to it combines with the already existing color and is neutralized wholly or partially to gray by the next filter applied to it. Thus translucence is progressively reduced (Figure 46).

How do Newton and Goethe compare in regard to the conception of a color circle?

Newtonian physics works with a linear scheme, that is, with ends which do not meet. Yet, it must not be overlooked that various modern technical processes, particularly photography and color-printing, must use Goethe's color circle. Goethe stated that he did not develop his color circle on the basis of the opposing, complementary spectra (hence, theoretically) but rather on the basis of the physiological colors, the after-image

phenomenon, i.e., successive contrasts (hence, entirely by direct human experience). The after-image is achieved by staring for 10–15 seconds at a particular color, for example magenta. When the gaze has then been turned to a neutral light spot, the after-image sets in as the impression of the complementary color, in this case green. Putting together successively the various colors and their complements obtained in this way (Figure 47), Goethe obtained the well-known complete color wheel (Figure 48). Goethe, however, *also* used light blue and light yellow as two basic polar colors which, mixed together, yield green. But if one exposes yellow successively to augmentation—that is, saturates it—orange and then red arise by degrees. Polarically to these colors, the corresponding colors of the other half of the spectrum arise, that is, to light yellow the violet, to orange the blue and to red the blue-green. When, in the final phase, the colors violet and red are mixed,* the highest of all colors, magenta, results. This color contains, according to Goethe, partly *actu* and partly *potentia*, all the other colors (B793, *Farbenlehre*). The validity of Goethe’s color circle enjoys general acceptance. [*I believe this point can only be understood in terms of the supersensory spectrum. J.L.B.]

What is a colored shadow and what is its meaning?

The colored shadow results from a particular lighting arrangement of an object, whereby the shadow of a monocolored light remains without direct illumination but is brightened to the status of a half shadow indirectly through another neutral light source, or even from a clear neutral reflecting light-shield. Therewith the complementary color to the light source illuminating the object appears in the main shadow. This colored shadow is called in physiology a simultaneous contrast, that is, a color arising in the eye. When Goethe discovered the phenomenon (12.12.1777) he described it as an objective color (that is, arising outside the eye), but shortly thereafter changed his mind. However, three years before his death, in a conversation with Eckermann he admitted that the color of this phenomenon must after all be objective.

The colors of the colored shadow represent invariably and with exactitude the complementary color of the color illuminating the shadowed object. In terms of the doctrine of macrocosm and microcosm recognized by the Greeks and by Goethe, the microcosm is involved in the after-image and the macrocosm is involved in the colored shadow. (See an article by Hetzel: “Der farbige Schatten” in *Optometrie* 4 (1987) 177–179).

APPENDIX C.

THE FOUR ELEMENTS AND THE ORIGINS OF FIXED COLORS:

AN ATTEMPT TO JUSTIFY AN ANCIENT PHYSICS OF LIGHT-DARK IN RELATION TO COLOR (BY J.L. BENSON).

Characterization of the most advanced state of *krasis* with the elements progressively dominant: In earth: fire, air and water *solidified* In water: earth, air and fire *liquefied* In air: water, earth and fire *rarefied* In fire: earth, water and air *burned*

AXIOM I

Light comes from an extraterrestrial source and illuminates each of the states of *krasis*. Comment: this corresponds to normal human perception that light itself is invisible but *reveals* a colored world.

AXIOM II

In reaching any of these states the light itself becomes subject to the appropriate functionalities of the four elements themselves, that is, to warming, aeration, liquefaction and condensation. This constitutes the fate of light in the terrestrial milieu.

AXIOM III

Light illuminates *inter alia* the pigmentary colors black and white. Both of these have full earth character: opaqueness. Yet the opacity of black is harmonious with the non-material darkness of outer space, while the intensification of light by white is harmonious with the dynamic activity of light itself (as an illuminant). Hence, pigmentary black and white in their color-referrent polarity (color sphere) symbolize the color-precipitating activity of light in contact with darkness as this can be experienced in boundary observation with a prism.

On the basis of the foregoing reasoning, it is possible to postulate that the color properties which were summed up by Newton as the definition of light belong instead to the elemental world. By this reversal of standpoint we leave light undefined as to its composition but clearly defined in a functional sense: it is purely and solely an

illuminant of the utmost sensitivity as it absorbs and reflects the functionalities of the four elements.

Light could then be, as supposed by Goethe, indivisible. Since it has been found to have a speed of movement incommensurable with terrestrial circumstances and is therefore measurable only in a non-physical medium: (abstract) time, the historically consistent microcosmic perception of light as metaphysical is justified. By the same token, the persistent microcosmic reaction to (pigmentary) black and white as having religious-moral significance in a symbolic sense is justified. One may recall Aristotle's statement that "light is the entelechy of the Transparent" (*de anima* 418b, 419a).

The first possibility for a rational explanation of color in objects is given by this postulate. As an inevitable result of the conjunction of light and the four elements, the stability of color varies greatly. In the least physical of the elements color is the most volatile, apparently created and vanishing on the spot. In the most physical of the elements it is obviously a persistent quality (fixed color). While the impression of color may be continuously recreated for the viewer in varying nuances depending on changing circumstances, the rational mind knows that the basic color remains, even in the absence of light, just as the basic shape of the object remains when it is not seen or touched. Just as the origin of other perceptible qualities has to be sought in the history of the earth and cosmos, so that of fixed color: it is the agglutinative result of perhaps innumerable confrontations of light and *krasis*—states of the elements in which color has been woven into the earth phenomenon in the same way as other perceptible qualities.

Comment: the usual explanation that the cause of color in objects is the absorption and reflectance of wave-lengths by the surface equally requires—*if thought through to the end*—the color determining property to reside in the object. For the selectivity of the surface in respect to these two processes is, in ordinary circumstances, constant. It would, therefore, be necessary to postulate that the particular selectivity of a particular surface is objectively fixed within the total nature of that surface (or its interior) and hence is a permanent quality as much as shape, weight or any other measurable feature. This would be a corollary of the isomeric phenomenon. It is, therefore, a non-sequitur to claim that color exists only in the perception in the sense that it is different from any other objective property of matter.

It is a short step from this to the concept that absorption and reflectance refer to (but do not necessarily exhaust) the lawful processual relationships of the earth (opaque) element to the other three elements at the second of their being illuminated (i.e., precipitated) by the light. Other processual relationships among the same elements are perhaps precipitated ("illuminated") by the darkness (i.e., infra-red and ultra-violet).

AXIOM IV

There is no white in the atmosphere corresponding to pigmentary white. But light reveals its illuminating power in the atmosphere and may therefore be called the prototype of white. Complete atmospheric darkness may in the same sense be called the prototype of pigmentary black.

Comment: atmospheric black can be said to exist, as in an underground cavern or in a darkroom. To define this simply as the absence of light is to ignore the difference between a blind and a sighted person, for the latter of whom this is a visual experience. Such a definition would be true but irrelevant, just as it would be true but irrelevant to define light as the absence of darkness. The opposite of true atmospheric black is not atmospheric white but full daylight, which is colorless. Artificially produced atmospheric light—insofar as it approaches the quality of daylight—is also colorless. Light and Dark are therefore best described as simply the two polar conditions of our atmosphere, both of which exist.

AXIOM V

Given the principle of *krasis*, the symptoms of any elemental process involved in a synthesis can be pried out of it by appropriate means.

Example: if reduction to particles is typical of earth as element when it is subjected to drying, the action of particles (rays) should be detectable in pigmentary colors. By the same token, if wave action is typical of earth as an element when subjected to moisture, wave lengths should be detectable in pigmentary colors. Warmth should also be detectable in various syntheses, etc. Moreover, it is obvious that detectable functionalities of several syntheses which are considered together must impinge on one another, e.g., a fixed color object illuminated in atmospheric light.

SELECT BIBLIOGRAPHY: (USED IN THE TEXT)

Abbreviations follow those currently in use in American Journal of Archaeology.

- Andronicos, M.** (1989) *Vergina The Royal Tombs and the Ancient City*. Athens.
- Boardman, J.** (1974) *Athenian Black Figure Vases*. New York.
- Bollack, J.** (1969) *Empédocle III Les Origines*. Paris.
- Bouma, P.J.** (1947) *Physical Aspects of Colour An Introduction to the Scientific Study of Colour Stimuli and Colour Sensations*. Eindhoven.
- Bruno, V.J.** (1977) *Form and Color in Greek Painting*. New York.
- Bruno, V.J.** (1988) *Hellenistic Painting Technique: The Evidence of the Delos Fragments*. Leiden.
- Burkert, W.** (1985) *Greek Religion*. Cambridge, Massachusetts.
- Burnet, J.** (1930) *Early Greek Philosophy*. London.
- Buschor, E.** (1980) *On the Meaning of Greek Statues*. Amherst.
- Carpenter, R.** (1959) *The Aesthetic Basis of Greek Art in the Fifth and Fourth Centuries B.C.* Bloomington.
- Clairmont, C.** (1993) *Classical Tombstones Vol I*. Akanthus Verlag.
- Cook, R.M.** (1960) *Greek Painted Pottery*. Cambridge and Chicago.
- Cornford, F.M.** (1937) *Plato's Cosmology The Timaeus of Plato*. Translated with a Running Commentary London.
- Diels, H.** (1964) *Die Fragmente der Vorsokratiker Vol. I*. Berlin.
- Dodds, E.R.** (1951) *The Greeks and the Irrational*. Berkeley.
- Dürbeck, H.** (1977) *Zur Charakteristik der griechischen Farbenbezeichnungen*. Bonn. *Encyclopedia of World Art Vols I-17*. McGraw-Hill. (1960–1987).
- Farrington, B.** (1959) *Greek Science*. Penguin.
- Frankfort, H.** (1954) *The Art and Architecture of the Ancient Orient*. Penguin.
- Gaiser, K.** "Platons Farbenlehre," *Synusia Festschrift für Wolfgang Schadewaldt*. 173–222 Pfullingen.
- Helbig, W.** (1969) *Führer durch die öffentlichen Sammlungen klassischer Altertümer in Rom, III*. Tübingen.
- Hiebel, F.** (1953) *Die Botschaft von Hellas*. Bern.
- Kantorowicz, G.** (1992) *The Inner Nature of Greek Art*. Translated by **J. L. Benson** New Rochelle, New York.
- Kelber, W.** (1958) *Die Logoslehre von Heraklit bis Origenes*. Stuttgart.
- Keuls, E.** (1978) *Plato and Greek Painting*. Leiden.
- Kirk, G.S.** (1974) *The Nature of Greek Myths*. Penguin.
- Kranz, W.** (1912) "Die ältesten Farbenlehren der Griechen," *Hermes*. 47, 126–140.

- Maiuri, A.** (1953) *Roman Painting*. Skira.
- Maiuri, B.** (1953) *Museo Nazionale di Napoli*. Novara.
- Mertens, J.** (1972) "White Ground and Euphronios," *Harvard Studies in Classical Philology*, 271–282.
- Mertens, J.** (1977) *Attic White Ground The Development in Shapes Other than Lekythoi*. Garner Series.
- Meyer, K.** (1921) *Die Bedeutung der weissen Farbe im Kultus der Griechen und Römer*. (Diss. Freiburg—i-B 1927).
- O'Brien, D.** (1969) *Empedokles' Cosmic Cycle*. Cambridge.
- Ott, G. & Proskauer, H.** (1980) *Johann Wolfgang Goethe Farbenlehre*. (3 vols. with introduction and commentaries of Rudolf Steiner) Stuttgart.
- Petsas, P.** (1965) *Ho Taphos ton Lefkadion*. Athens.
- Pollitt, J.J.** (1965) *The Art of Greece 1400–30 B.C.*. Englewood Cliffs, NJ.
- Pollitt, J.J.** (1972) *Art and Experience in Classical Greece*. Cambridge.
- Reuterswärd, P.** (1960) *Studien zur Polychromie der Plastik: Griechenland und Rom*. Stockholm.
- Richter, G.** (1969) *A Handbook of Greek Art*. New York.
- Ridgway, B.** (1977) *The Archaic Style in Greek Sculpture*. Princeton.
- Riedel, I.** (1983) *Farben in Religion Gesellschaft Kunst und Psychotherapie*. Stuttgart.
- Robertson, M.** (1975) *A History of Greek Art*. Cambridge.
- Samboursky, S.** (1987) *The Physical World of the Greeks*. Princeton.
- Sepper, D.C.** (1988) *Goethe contra Newton Polemics and the Project for a New Science of Color*. Cambridge.
- Schefold, K.** (1952) *Pompejanische Wandmalerei*. Basle.
- Schefold, K.** (1959) *Griechische Kunst als religiöses Phänomen*. Hamburg.
- Scheibler, I.** (1974) "Die Vier Farben der griechischen Malerei," *Antike Kunst*. 17, 92–102.
- Scheibler, I.** (1978) "Zum Koloritstil der griechischen Malerei," *Pantheon*. 36, 299–307.
- Sigerist, H.** (1961) *A History of Medicine II*. Oxford.
- Smith, W.S.** (1958) *The Art and Architecture of Ancient Egypt*. Penguin.
- Stulz, H.** (1990) *Die Farbe Purpur im frühen Griechentum*. Stuttgart.
- Tuchman, M. (ed)** (1986) *The Spiritual in Art: Abstract Painting 1896–1985*. Abbeville.
- von Graeve, V. & Preusser, F.** (1981) "Zur Technik griechischer Malerei auf Marmor," *JdI*. 96, 120–156.
- Wehgartner, I.** (1981) *Attisch Weissgründige Keramik*. Mainz.
- West, M.L.** (1971) *Early Greek Philosophy and the Orient*. Oxford.

- Wright, M.R.** (1981) *Empedokles The Extant Fragments*. New Haven.
- Zajonc, A.** (1993) *Catching the Light: The Entwined History of Light and Mind*. New York.
- Zhirkova, L.** (1973) *Das Grabmal von Kazanlak*. Recklinghausen.

SELECT BIBLIOGRAPHY: (NOT USED IN TEXT)

GENERAL COMMENTS

In regard to the history and interpretation of color in both its technical and aesthetic aspects, I consulted a large amount of material from the German sphere preserved in the library of the University of Freiburg. Besides what appears in my text, some of this is listed in the bibliography of Stulz or in her text—as on her p. 37—or else below.

Finally, when I wrote in Chapter I (see Chapter I, The Four Elements, paragraph 4) that the Four Elements theory could still be profitably taken into account by the scientific establishment, I was aware that the four “aggregate states” of matter recognized in modern physics closely parallel the dynamic aspect of the Four Elements theory. But I meant this more in the sense of a conscious outlook—a viewpoint which in fact has just been advocated in a book by Georg Kniebe: *Die Vier Elemente: Moderne Erfahrungen in einer alten Wirklichkeit* (Stuttgart 1993). That the concept of the four elements is indeed of current general interest is indicated by the recent study: Gernot und Hartmut Böhme, *Feuer, Wasser, Luft, Erde: Eine Kulturgeschichte der Elemente* (Munich 1996).

TOPICAL LISTINGS

Color in the Ancient World

- Rowe, Christopher** (1972) “Conceptions of Colour and Colour Symbolism in the Ancient World,” *Eranos*. 41 327–364.
- Griesshammer, H.** (1983) “Die Farbe in der Frühgeschichte und in den frühen Kulturen,” in *Farbe-Material Zeichen Symbol*. Berlin. 18–25.
- Kees, H.** (1953) *Farbensymbolik in ägyptischen religiösen Texten, Nachrichten der Akademie der Wissenschaften*. Göttingen.
- Reuterswärd, Patrick** (1958) *Studien zue Polychromie der Plastick, I: Aegypten Erwägungen über die ursprünglichen Farbenerscheinung*. Stockholm.
- Morenz, Siegfried** (1962) “Von der Rolle der Farben im alten Aegypten,” *Palette*. 11 3–9.

- Morenz, Siegfried** (1978) "Die Farben des Materiels im aegyptischen Kunstschaffen," *Palette*. 39 19–27.
- Veckerstedt, Edmond** (1888) *Geschichte der griechischen Farbenlehre*. Paderborn.
- Platnauer, M.** (1921) "Greek Colour Perception," *CQ*. 15 153–162.
- Jucker, H.** (1950) *Vom Verhältnis der Römer zur bildenden Kunst der Griechen*. Frankfurt-a-M. 141–146.
- Osbourne, H.** (1968) "Colour Concepts of the Ancient Greeks," *British Journal of Aesthetics*. 8 269–283.

The Role of Light in Art

- Schöne, W.** (1954) *Ueber das Licht in der Malerei*. Berlin.
- Reimendahl, E.** (1961) *Licht und Farbe*. Berlin.
- Rainer-Schmid, H.** (1975) *Lux incorporata Studien z. Kunstgeschichte, V.* Hildesheim—New York.

Art Historical Analysis

- Von den Bercken, E.** (1930) "Forschungen über die Geschichte der Farbe in der Malerei," *Forschungen und Fortschritte*. 6 262.
- Chorus, H.** (1933) *Gesetzmässigkeiten der Farbgebung in der ottonischen Buchmalerei*. Bonn.
- Tikanen, J.** (1933) *Studien über die Farbgebung in der mittelalterlichen Buchmalerei*. Helsingfors.
- Manz, H.** (1933) Die Farbgebung in der italienischen Malerei des Protobarock und Manierismus (Diss.) München.
- Hetzer, T.** (1935, 1948) *Titian Geschichte seiner Farben*. Frankfurt-a-M.
- Haeberlein, F.** (1939) "Grundzüge der nachantiken Farben-Ikonographie," *Röm. Jrbh, für Kunstgesch.*. 3 75–126.
- Jantzen, H.** (1951) "Ueber Prinzipien der Farbgebung in der Malerei," in *Ueber den gotischen Kirchenraum und andere Aufsätze* Berlin.
- Schmidt-Clausen, K.** (1955) "Die liturgischen Farben," in *Grundfragen evangelischer Paramentile* Kassel.
- Dittmann, J.** (1957) Die Farbe bei Grünewaldt (Diss.) München.
- Sedlmayr, H.** (1958) "Farben," *Festschrift für Ludwig Conrad-Martius*. Munich. 323–330.
- Sedlmayr, H.** (1964) "Bemerkungen zur Inkarnatfarbe bei Rubens," *Hefte des Kunsthist. Sem. der Univ. München*. 9–10 43–54.
- Imdahl, M.** (1966) "Die Rolle der Farbe in der neueren französischen Malerei," *Immanente Aesthetik-Aesthetische Reflexion Poetik u. Hermeneutik*. Munich.

- Roosen-Runge, H.** (1967) *Farbgebung und Technik frühmittelalterlicher Buchmalerei*. Berlin.
- Vriesen, G. and Imdahl, M.** (1967) *Robert Delaunay—Licht und Farbe*. Cologne.
- Rupprecht, B.** (1971) "Farbe, Licht und Dunkel bei Hans Holbein d. Ae.," *Jhrb. d. Staatl. Samml. Kunst in Baden-Württemberg*. 7 57–76.
- Dittman, L.** (1983) "Grundzüge der Farbgestaltung in der europäischen Malerei," in *Farbe—Materiel Zeichen Symbol*. Berlin. 104–113.

Psychology of Color

- Allesch, V.** (1924) "Die aesthetische Erscheinungsweise der Farben," *Zs. f. psych. Forschung*. 6 215–281.
- Arnheim, R.** *Kunst und Sehen Eine Psychologie des schöpferischen Auges* Berlin (1978) : *Art and Visual Perception* 1974.
- Birren, F.** (1978) *Color and Human Response*. Van Nostrand.

General Scientific Color Theory

- Conrad-Martius, H.** "Farben," in *Jhrb. f. Phil. u. phän. Forschung* (Erganzbd. Festschrift f. Ed. Husserl) Halle 1929 339–370.
- Katz, D.** (1930) *Der Aufbau der Farbwelt Inst. f. Psych. u. Physiol. der Sinnesorgane Erganzbd. 7*. Leipzig.
- Katz, D.** (1935) *The World of Colour*. London.
- Halbertsma, K.** (1949) *A History of the Theory of Color*. Amsterdam.
- Itten, J.** (1962) *Kunst der Farben*. Ravensburg. (also appeared as *The Art of Color*, New York, 1961).
- Evans, R.** (1974) *The Perception of Color*. New York.
- Kuppers, H.** (1979) *Das Grundgesetz der Farbenlehre*. Cologne.
- Ott, G. & Proskauer, H.** (1979) *Das Rätsel der farbigen Schatten*. Basel.
- Helbing, J.** (1983) *Welt, Farbe und Mensch*. Stuttgart.

Color Theories by or for Specific Artists or Art Products and Conceptions

- Gage, J.** (1981) "A Locus Classicus of Color Theory: The Fortunes of Apelles," *J. Warb.* 44 1–26. (Note "The Problem of Mixture" pp. 6–9.)
- Runge, P. O.** (1959) *Die Farbkugel und andere Schriften zur Farbenlehre*. Stuttgart. (Runge worked on his theories of art in the first decade of the 19th century.)
- Chevreul, M.** (1839) *De la Loi du Contraste Simultané des Couleurs*. (Cf. English translation by F. Birren 1967.)
- Signac, P.** (1899) *D'Eugène Delacrois au Néo-impresionisme*. Paris.

Kandinsky, W. (1912) *Ueber das Geistige in der Kunst*. Munich.

Bühler, H.A. (1930) *Das innere Gesetz der Farbe Eine Künstlerische Farbenlehre*.
Berlin. (Treats among other things colors assigned to the zodiac.)

Albers, J. (1973) *Wechselbeziehungen der Farbe (Translated as Interactions of Color)*.
Starnberg.

Note: many artists of the 20th century have advocated or illustrated idiosyncratic conceptions of color relationships, e.g., Robert and Sonja Delaunay and Paul Klee.

NOTES

CHAPTER I

1. A clear overview of this situation is found in J. Burnet 1930. For example p. 39: “All we can really be said to know of (Thales) comes from Herodotus.”
2. Commentators sometimes consciously take account of this, e.g., B. Farrington, 1961, 41, 55.
3. On the dates of Empedokles see M.R. Wright 1981, 3–6. Wright estimates the working period as 470’s to 430’s.
4. In this same sense their contemporary Sophokles presided over the perfecting of tragedy as the ultimate display of human affective life. This evaluation of the importance and universality of the work of Empedokles is not automatically given by his critics but I share it with S. Toulon and J. Goodfield, *The Architecture of Matter* (New York 1962) 53–54. B. Farrington 1961, 58–59 also accorded a great significance to Empedokles, particularly for his demonstration of the “corporeality of viewless air”. Farrington’s discussion of this is almost panegyric; it is, of course, quite true that that insight of the philosopher pointed far into the future and is one of the most modern of Greek scientific ideas. G.E.R. Lloyd 1970(1), 39–42 evaluated the Four Elements theory in the light of the modern conception of elements. S. Sambursky 1987, 17–20, lays particular emphasis on Empedokles’ discovery that “light propagates through space and requires time to do so”—another insight confirmed by modern science. Although academic critics show appreciation of this or that feature of the work of Empedokles, no one to my knowledge has treated him as a consummate artist of ideas which can literally be visualized in a picture—as I shall try to demonstrate in this study—as well as understood in a poem. In this respect he is *the* High Classical philosopher just as Plato is *the* Late Classical philosopher.

5. For a summary of the problem see M.L. West 1971, 115–170.
6. G.S. Kirk 1974, Ch. 12.
7. R. Carpenter 1959, Ch. IV.
8. This is defended specifically by Kirk 1974, 299–300. Herakleitos' use of Logos is interpreted by many writers as a spiritual symptom, not least by those who speak of an esoteric tradition, e.g., Wilhelm Kelber in 1958, *passim* (Stuttgart) but denied by West, 1971, 124. The arguments of Karl Schefold (1959) are directed specifically to a pervading sense of the divine in all Greek life and nowhere more specifically, on the basis of ornament, than on his p. 27. He is one of the few commentators to refer to developments in European culture since 1800 as skewing the contemporary view on this. Equally concerned with a primary engagement of Greek thought with suprapersonal forces is Friedrich Hiebel, (1953). Some commentators deal with this problem more in terms of the overriding concern of mid-century psychiatry which, absorbed with the human experience of anxiety, works with the dichotomy of rational and irrational: so E.R. Dodds (1951); J.J. Pollitt (1972, 3–8) on Order and Chaos.
9. These terms derive from Ernst Buschor, 1980, 6–9.
10. Cf. “Hot and Cold, Dry and Wet in Early Greek Thought” by G. E. R. Lloyd in *Studies in Pre-Socratic Philosophy* Vol. I, The Beginnings of Philosophy, ed. David J. Farley and R. E. Allen (New York 1970) 255–280, esp. 267–269 on possible origins of the Four Elements theory.
11. Cf. Herakleitos Frag. 126: “cold things grow hot, hot is cooled, wet is dried, dry becomes wet”; Aristotle, *de gen. et cor.* B, ii,iii.
12. The abbreviated description of the piece by Henri Frankfort, 1954, 10, masks the totality of the conception. Earth, as the hard, lifeless mineral realm it appears to us, can hardly have been in the consciousness of this early epoch, for earth was felt to belong to the gods along with everything else, to be a part of them, as it were—hence more spiritual than physical in our sense. Even the earliest Greek philosophers who speculated on the four elements still had an awareness of the divine nature of each element. If we demand logical placement of earth in the composition of the Warka vase, we can find it only minimally in the consideration that the life-giving water of Mesopotamia in the lowest frieze flows on top of the earth element—not in a void. What the composition really pictures is the absorption of the artist in divine being, while the earth conditions that support life are present more as ancillaries. The spiritual approach of the Near Eastern artists to the depiction of mineral, plant, animal and man was thoroughly discussed by Walter Andrae in “Der Alte Orient” in *Handbuch der Archäologie* hrsg. v.W. Otto, Munich 1939, 754–780. M.L. West 1971, 31–41 discusses the so-called “five elements” and “three elements” recognized in early Iran and India. As all these served religious purposes rather than conceptual thinking a rigid consistency in number is not to be expected. The Egyptian fourfold schema of (physical body), KA, BA, and Akh (W.S.

Smith 1958, 9) perhaps more readily constitutes a doctrinal conception anterior to, but very similar to, the Greek version of the four members (see below).

13. Precisely the same evaluation is given by W. Burkert 1985, 318. Cf. also M.W. Wright 1981, 76.

14. Buschor 1980, 18–20 and G. Kantorowicz 1992, 17–18.

15. F.M. Cornford 1937, 6.

16. Peter Heusser, *Der Schweizer Arzt und Philosoph Ignaz Paul Vital Troxler (1780–1866): Seine Philosophie, Anthropologie und Medizintheorie* (Basel & Stuttgart 1984). Successor to Troxler is Friedrich Husemann, psychiatrist, who used Steiner's concept of a four-organ system in demonstrating the inner dynamics of the four elements in bodily-psychic functions as a basis for therapy: *Das Bild des Menschen als Grundlage der Heilkunst* Vol I (1940). Cf. also Ekkehard Meffert, *Carl Gustav Carus: Sein Leben, seine Anschauung von der Erde* (Stuttgart 1986). Carus is an important and creative 19th century thinker who viewed the earth as a living organism.

17. *Der Aufbau der Realen Welt : Grundriss der allgemeinen Kategorienlehre* 3. ed. (Berlin 1964) 173–183 (Kap. 20). Hartmann is the academic philosopher who most closely approached my viewpoint. His paper “Die Anfänge des Schichtungsgedankens in der alten Philosophie” in *Kleinere Schriften* II (Berlin 1957) 164–191 not only gives a perceptive account of the relation of Plato and Aristotle to the idea of four members of the human being but also explains why modern philosophy (sc. also psychology and anthropology) is largely unaware of these members *as a system* (that is, an explanation of human reality): This situation has, of course, arisen from the following circumstance. The historian of philosophy can recognize in his array of materials from texts *only* those insights that he has himself already worked out in the sense of a systematic philosophy. The nineteenth century interpreters and compilers who created the modern view of Aristotle lacked the sustained ability to do this—and most particularly in regard to the question of ontology, which plays a fundamental role in any evaluation of ancient thought. (translated by J.L. Benson) That statement, written in 1943, was followed by an expression of hope that improvement in this critical matter was on the way. Certainly, in Hartmann's case, there is no doubt that the power of the four-member system was felt (see Ch. I, n.16). Hartmann does not give a detailed history of the concept but does treat that aspect casually.

18. Besides Steiner's books and voluminous published lectures an enormous and ever-growing secondary literature exists dealing with, among other things, research on the various physical and life sciences. His work is often tangential to the traditional “Panpsychic” stream (see Tuchman, 187ff.) but eludes exact classification. It is of some interest that the concept of the etheric body, which in Steiner's view regulates the rhythmic processes of an organism, has been paralleled non-conceptually in recent years in medical parlance by the “biological clock”.

19. The general framework of the macrocosmic-microcosmic view of Hellenism historically has to be based on Plato and Aristotle, that is, at the most developed stage of the Four Elements philosophy. Whether or not one takes a teleological view of the development itself does not in any way exclude the importance of unstable and even contentious attitudes towards aspects of it at various times, any more than it excludes powerful background guidance on the part of the Pythagoreans. I do not consider it my task here to trace the history of the concept of soul both because this has been done by others and because it is in effect not essential to the large picture I am trying to sketch out in this study.

20. A measure of the difficulty is the temptation felt by some commentators to treat ancient philosophical-scientific matters in a somewhat mechanical way. An example of this is the claim made by B. Farrington 1961, 143 that existence of the economic class structure in Athens that Plato wanted to improve by organizing society into rulers, police and workers *gave* him the idea of dividing the soul into reason, spirit and appetites. Further: "As with Plato, the master-and-slave relation provides the basic pattern for his (Aristotle's) thought in *every* sphere (emphasis mine)": Ibid, 145. Again he ascribes the specific originality of the Ionian thinkers to the fact that they applied "to all major phenomena of nature modes of thought derived from their control of technique": Ibid, 135. A one-sided viewpoint thus obscures what might otherwise be useful observations.

21. See, e.g., Arthur Zajonc, 1993, 301–302.

22. The precise nature and urgency of this crisis have been recently defined by Brian Appleyard, *Understanding the Present: Science and the Soul of Man* (Doubleday 1993) passim.

CHAPTER II

1. See J.J. Pollitt 1965, 221 and 228.

2. Kranz 1912, 138–139 (where the rest of the passage referred to is given in Greek). Kranz virtually admits in the last paragraph of p. 128 that Empedokles could not have meant this.

3. *Farbenlehre Hist. Teil Naturwissen. Schriften I. Teil* (Artemis Verlag Zurich 1949) 254 (*Geschichte der Farbenlehre*).

4. Cf. W. Burkert 1985, 298 on Orphics and Pythagoreans; also p.318 on the religiously inclined nature of Empedokles; A. Mele in "La Storia (Crotone)" *Att. dal ventitresimo Consegno di Studi sulla Magna Grecia* (Taranto 1984) 23 n. 79. On the question of Pythagorean tendencies in the Platonic Academy (perhaps the source of the information provided by Aetius) see K. Gaiser 1965, 214 n. 71.

5. G.M. Stratton, *Theophrastus and the Greek Physiological Psychology before Aristotle* (London 1917): *de sensibus* 73–82 (text and translation, 132 f.).
6. H. Dürbeck 1977, 113.
7. Dürbeck 1977, 57. Even Theophrastus, 82—or is it his translator?—falls into the error of questioning whether Demokritos was opposing “green” (πράσινον) to red. But the question would be equally valid if Theophrastus meant yellow, since it is a question of the structure of the color.
8. For reference see note 3.
9. P.J. Bouma 1947, 205 explains that the “colour properties” of an observer can be defined through measurement with equal accuracy on the basis of either Newton’s “spectral” colors or of Goethe’s border colors, but that in the first mentioned case the process is by far easier because, among other things, negative quantities do not have to be taken into consideration. Goethe, and also Plato, would surely have replied that convenience is a poor criterion for truth and that it would be better to sacrifice that and proceed more slowly, in order to avoid missing or distorting a part of reality.
10. Or should be interpreted, at least, in the spirit of dialectics, to use the terminology of Gaiser, 183. Dürbeck, 63 gives the result of his philological investigation of *lambron* as: “*zeigt an allen Stellen mehr Ethos als wirklich fassbare Bedeutung. Ein hohes Wortethos ist auch ein Noem, allerdings ein solches, das sich oft genug, wie hier, nicht genau fassen lässt.*” With this gesture Plato may have wanted to make clear, at least to his own poetic sensibility, that colors—which the Greeks normally treated in a very objective way—do also have a mental/moral aspect, just as Goethe felt that this aspect was a vital part of color reality.
11. *Goethes Werke* Herausgegeben im Auftrage der Grossherzogin Sophia von Sachsen (Weimar 1906) Erste Abteilung Vol. 32, 97, 19ff.
12. One need only examine the artifacts in any ethnographical museum to establish this visually. As an example for many, I cite here a tradition related by a Maya descendant, Giacondi Belli (Belize) in an article entitled “Journey to the Lost City of the Jaguar” published in *Nature Conservancy* 44 (1994) 14 : “I look up and see the ceiba tree. A sacred tree for the Mayas. In their cosmogony, the world was thought to be a square, flat surface, suspended between 13 successive heavens and nine underworlds, each of them ruled by a god. On the geographic center of the Earth, a great ceiba tree grew, while four smaller trees stood on its four corners. Each corner had a separate color: white for the North, yellow for the South, red for the East, black for the West. “
13. The hue of Attic soil is sometimes supposed to be the reason (i.e., sheer convenience), but nothing *compels* artisans to accept unchanged what is at hand, and concealing ground color as Attic potters long did—is a common phenomenon in ceramics: cf, for example, the blue ceramics of the New Kingdom in Egypt. Further discussion of this see Note 4, Chapter III.
14. W. Kranz 1912, 128 n 4.

15. *Aristotle Minor Works* (Loeb Class. Library) Cambridge, Massachusetts 1955 Vol. 1 Translated by W.S. Hett: *Aristotelous peri Xhromon* (from the Peripatetic School, of unknown authorship: Theophrastus? Strato?) *passim*.
16. Plato, *Timaeus*, 55A. A detailed discussion of the relationships among all these shapes is to be found in Plutarch's "Why the Oracles Cease to Give Answers" (*De defectu oraculorum*) 32–34 in *Plutarch's Essays and Miscellanies* edited by W.W. Grodam (Boston 1906) Vol. IV.
17. This conclusion arises inevitably from a fragment of Empedokles himself: see under his testimonia A and, of course, the elegant disquisition on qualities by Plato (*Timaeus*, 49).
18. Ernst Lehrs, *Mensch und Materie* (Frankfurt-a-M 1966) Goetheanismus Ch. VII.
19. *Punkt und Linie zu Fläche*, 1926 (*Point and Line to Plane* Dover, 115 f.)
20. J. Pawlick, *Praxis der Farbe* (Cologne 1981) 214.
21. See translation reference in n. 16.
22. Hermann Diels 1964, B17, 27–29; B26, 1–2.

Historians of ancient philosophy traditionally interpret the cyclic aspect of Empedokles' philosophy as an alternating dominance of love and strife, i.e., of "forces." Undoubtedly that had high priority in the thought of the ancients. Yet this approach neglects a possible similar significance in the other term of the Empedoklean statement quoted here: dominance of the (four) elements in rotation. Coming to this problem from the direction of color, I found it necessary to conceive a way of doing justice to the processual quality of the elements (a Greek concept though not usually mentioned) and to the differentiation between macrocosm and microcosm (also implicit in ancient thought). Obviously I do not claim that Empedokles or anyone else actually systematized his philosophy in my conceptual terms; yet certain conclusions from them concerning colors and Hippocratic medicine, if not more, are implicit in fifth century culture and all the more in the pragmatic achievements of Hellenistic engineering and chemistry.

Thus there are now two parallel interpretive streams: that of the traditional scholarly analysis of cycles, e.g., D. O'Brien's *Empedokles' Cosmic Cycle* or in B. Inwood, *The Poem of Empedocles* (Toronto 1982)46–52—in which there is no mention of any of the factors I have just brought up; and the one I am developing here out of analysis of art and from diverse clues in previous scholarship. In stressing processual quality I do not exclude the operation of love and strife—indeed that has to be the essential mover of the rotation of the elements to dominance. That is not, however, to say that I can offer any definitive suggestions about the technique of its operation—any more than can O'Brien and those he reports on, who do not agree on how or even whether love and strife operate in turn. In any case the two interpretive streams under discussion seem to me to express complementation rather than contradiction and to demonstrate again the richness of fabric of any creative moment in world history, going beyond the ability of human consciousness to exhaust.

In the foregoing sense it can be pointed out that my demonstration of triadic stages in the rotation of the elements in Greek sculpture opens the way to a new hypothesis. Empedokles' mention of a "double tale" (*dip'l'ereo*): the coming together and growing apart of roots, can hardly exclude a middle phase in which the process starts to reverse itself, comes to a balance and then starts on the opposite course. Logically this is more plausible than the assumption of a single abrupt and dramatic turning point whereby things are completely turned around. It could therefore be supposed that the thinking stage is dominated by the creativity of strife (in reaction against an old order) and that in the feeling stage the new creation is then gradually harmonized by the increased activity of love so that in the final (willing) stage, all things desire each other in the now refined conditions of the cycle in progress. In due course the cycle begins over again. In this way, the *simultaneous* rotation of the elements *and* love and strife can be accounted for.

N.B. I follow Diels-Kranz and Freeman in the interpretation and translation of the passage under discussion. However, if one is going to doubt that Empedokles was referring to elements as well as forces—as does H. Lambrides, *Empedocles A Philosophical Investigation* (University, Alabama 1976) 67–69—then it must be counterclaimed that the whole thrust of the section (fr. 17) in which it occurs would leave no sense in these lines without elements but could if necessary be understood without forces.

23. Sigerist 1961, 101–106.

24. According to the astute arguments of W. Müri in "Melancholische und schwarze Galle": *Antike Medizin* (ed. N. Flashar, Darmstadt 1971, 165–191: excerpted from *Mus. Helv.* 10, 1953 21–38, 49) the systematic differentiation between black and yellow gall first turns up in "On the Nature of the Human Being", which he dates to about 400 (cf. W.H. Jones in the Loeb edition of this with the date of 440–400). Müri rightly calls attention to the mental agility of the Greeks in recognizing such subtle distinctions as four instead of three seasons and keeping "psychological" apart from "mental". Yet it is surely a modern preconception to propose some systematic compulsion toward fourfold division. Who was forcing whom to do this? I prefer to assume that Hippokrates—if not Empedokles himself—had absorbed the artistic model of contrapposto, perhaps in stages as it was being worked out, and simply applied that to his own concerns. Just when the results were written down cannot, of course, be known but the detailed structure of the scheme rather suggests the spirit of the High Classical Reaction (see Introduction, chart following paragraph 10). Another problem is whether the statement in the Hippocratic work *On Diet* which A. Krug (*Heilkunst und Heilkult: Medizin der Antike*, Munich 1985, 21–38, 49) takes to be evidence of an alternative system, represents the refusal of the author of that work to relinquish the old macrocosmic system in favor of new ideas, given that the definitions of the elements fire and water in *On Diet* remain unchanged (see Chapter II, *The Ancient Sources*, Hippocratic Writings, B).

25. "Antike und Mittelalter" in *Historische Anthropologie* Bd. I Krankheit, Heilkunst, Heilung (Freiburg 1978) 257.

CHAPTER III

1. Harold Mielsch, *Buntmarmore aus Rom im Antikenmuseum Berlin* (Staatliche Museen Preussischer Kulturbesitz 1985) pls. 1–24.
2. A maverick account preserved by Diodoros has been cited by B. Farrington 1961, 82–85 as an early example of dialectical reasoning (in the Marxist sense). If this account is not based on a sophistic spoof—perhaps the most likely explanation—there is in any case too little known about its context and date to evaluate it as an exception to the general trend of ancient culture.
3. Jean Bollack 1969: 1, 73.
4. On this tradition see my remarks in *Bamboula at Kourion* (Philadelphia 1972) 119f. The olive green variety of earlier clay survived perhaps most tenaciously, although not in great quantities, in the Corinthian ceramic stream. As a color, olive green is, or can be, a mixture of black and yellow.
5. Cook 1960, 251.
6. J. Boardman 1974, 57.
7. The change in meaning of black is made all the more obvious by the continued use of the traditional blackfigure style at the same time. See J. Boardman 1974, 113.
8. See A. Zajonc 1993, 292–329.
9. Cf. G.E.R. Lloyd 1990, 14–38 on this development. He seems to think of it exclusively, or at least largely, as an intellectual process.
10. Irma Wehgartner, 1983, 3. On an interesting episode of Early Archaic vase painting see S. Morris, *The Black and White Style Athens and Aigina in the Orientalizing Period* (New Haven 1985) 27, where a connection between white and light can be inferred.
11. Mertens 1977 (throughout).
12. Mertens 1977, 106.
13. For this reason it is sometimes called in scholarly writings “the so-called four color painting” (Wehgartner, 78). From this we can draw two conclusions. First, the unhappy experimentation with white backgrounds for black figures probably awakened the insight that white is the representative color of noetic consciousness, while this step in turn—given the holistic tendencies of Greek thought—entailed reflection on how the other three colors are related to white. It is apparent from the seignorial position of *nous* in the macrocosmic hierarchy (*Seinshierarchie* as opposed to *Daseinshierarchie*—the microcosmic series) that such a maturation of thought could only be set in motion by a real attempt to use white. Secondly, the appearance of this quadripartite synthesis, fluid though it may have been, toward the end of the Protoclassical period is probably the first complete statement of the *principle* of contrapposto and created purely out of artistic intuition. This would therefore not only considerably precede Polykleitos and

Empedokles but even be somewhat earlier than the first provisional version of contrapposto—in terms of dynamic ponderation—in sculpture that we know of (assuming the Kritios Boy to be datable to about 480).

14. Keuls 1978, 69–70 ad Aristotle, *Meteorologika*, 374b, 31–34.

15. The word *prisma* is used by Euklid (II Deff. 13) in connection with its geometric shape: cf. PW s.v. Euklides, 1018. Hellenistic Greeks were at least interested in the refraction of light as it affected katoptrics (*Hdbh d. Altertumwiss.* V, 1,2 I: L. Herberg, *Geschichte der Mathematik und Naturwissenschaften im Alterthum: IV Optik*, 73–79). It is my understanding that there is at least one natural means of access to the spectral phenomenon, *viz.*, quartz crystals. However these are said to produce *double* bands of each color at the border of the light ray—a perhaps confusing impression (cf. Rudolf Rykart, *Quartz-Monographie*, OH-Verlag Thun 1989 : I have not personally been able to consult this publication).

16. I am thinking of temple geometry as this is recovered by Tons Brunés, *The Secrets of Ancient Geometry and Its Use* (Copenhagen 1967).

17. Goethe concerned himself with this problem in *Beiträge zur Chromatik*, Par. 29: "...thus pure white is a representative of light, pure black a representative of darkness". Rudolf Steiner, in editing this (Kurschner edition, Weimar) commented: "white then in Goethe's view is only the representative of light, whereas Newtonian optics claims it as light itself. But at most one could say that white is a condition of matter under the influence of unadulterated light, or that white appears as matter that resists light by its opacity. " This is obviously a, if not *the*, central problem in color studies and has been thought about extensively by philosophers such as Wittgenstein as well. It therefore seems pertinent to quote a rather long passage from an exceedingly astute commentator whose work is hardly known in the English speaking world, and perhaps only marginally to German art historians: E. Strauss, *Koloritgeschichtliche Untersuchungen zur Malerei seit Giotto* (Deutscher Kunstverlag 1972) 125 (my translation):

Through this process there is a firming up of those elements of color which are supported by a system of linear structuring, foremost among them being those that most purely represent the phenomena light and shade, colorless as these are. That only black and white are capable of doing this has, of course, always been understood and accepted, and yet the whole long route to complete autonomy of picture colors had to be traversed before this article of knowledge could finally be accepted in the practice of artists. Not even Otto Philipp Runge—who in his color theory gave more room than any other artist-theoretician before him to reflections on the manifestations of light and dark and the problems these present to the painter—succeeded in consistently incorporating into his own painting his own pregnant observations about the two "polar colors". Nevertheless, he came to the remarkable realization that white and black are to be considered "figures" of light and dark. Through this important insight color acquires a form-quality: the "etheric essence" of light and darkness first of all takes on a definite reproducible shape.

On this point Runge's ideas come very close to Klee's evaluation of white and black as the primary components of chiaroscuro in painting. For to Klee's way of thinking what consists of white is simply the light itself, whether this is applied pigment or simply part of the surface color of the picture support itself. By the same token pure black stands for pure darkness.

This materialization of darkness through the deepest, most absolutely scaled color quality signifies at the same time a decidedly upward valuation of darkness as a picture element. It also contains a basic innovation. By identifying darkness with pure black, Klee gives the former the same color status as that which light gets through being represented by white—and makes it, through this opposition, for the first time tangible to the senses. He creates a balance between these two potencies which could not exist so long as the conception of the natural primacy of light as the only animating force had uncontested validity also in regard to pictorial light. But “what may be true in Nature, the dominant activity of the white pole, must not seduce the painter to a one-sided view.” In fact, Klee goes so far in this relativizing of light and pure white as its equivalent as to deny it even in its isolated state any automatic power of its own. It can perhaps acquire this in its “interaction with opposites.” Painting thereby does not reckon *only* with a light-energy set against a specified darkness, but just as much with a black energy set against a specified light, and so with two forces that work in opposite directions.

18. Cf. the title of J. Boardman's article, “Silver is White” *RevArch* 1987, 279–295.

19. However much Goethe's expectation in this case was an (understandable) misunderstanding of Newton's *crucis experimentum*, it also harbored intuitively an inevitable criticism of Newton's legacy in its capacity as an absolute model for the world view that swept all before it. That legacy starts from the premise that the phenomena of nature can be understood as mathematical abstractions which in turn can be used to manipulate said phenomena quite arbitrarily to serve human convenience. Curiously, this premise is not inapplicable to the way that Newton himself silenced his contemporary critics: Hook, Huygen, Marcotte, etc., more through his great authority and clever politicking than through honest consideration of their doubts. The problematical nature of this whole side of modern science troubled Goethe more than any other factor of the culture of his time. Despite the fact that he hardly made a breach in the impregnable fortress that was Newtonian science at that time, the problems he aired have never ceased to exercise theoreticians of science (e.g., Helmholtz and Heisenberg). A number of studies have appeared recently in the Anglo-Saxon world which attempt in an unprejudiced way to do justice to Goethe's concerns: J.P.S. Uberoi, *The Other Mind of Europe: Goethe as a Scientist* (Delhi 1984) ; Frederick Amrine, ed. *Goethe and the Sciences: a Reappraisal* Boston Studies in the Philosophy of Science, no. 97 (1987) ; and D.L. Sepper, *Goethe Contra Newton Polemics and the Project for a New Science of Color* (Cambridge University Press 1988). Particularly the last mentioned sets out trenchantly the ramifications of the controversy not only for the science of Goethe's time but also of our own age. He concludes that Goethe's conception of the scientific method represents an ideal which—despite his inability to gain a hearing for it—has in

many ways been validated in the 20th century through sheer necessity. Thus “we have seen that rejecting Goethe’s science as the imaginings of a poet is false; perhaps it is not fanciful to suggest that as poet Goethe recognized with unmatched clarity the role of language in science, its symbolic and inalienably metaphoric character” (192).

20. This scheme is based on that in Ott & Proskauer I 1980, 327.

My terms, “Dark spectrum” and “Light spectrum” do not appear there, although Goethe is said by John Salter (see Rudolf Steiner, *Colour*, p. 78) to have used the terms in a reverse sense (no exact reference is given); Goethe did not use them generally nor has anyone else, so far as I can determine. Rather, the two spectra, if given any description at all, have been called the Newton-Goethe spectra. The purpose of my terms is to go beyond that purely theoretical controversy and suggest the actual dark background against which the light coming through the prism produces the “physical” colors, and the actual light background against which light through the prism produces the “metaphysical” colors.

21. The rainbow is a special problem. Individual atmospheric colors arise according to the polaric rule: dark before light makes red, while light before dark makes blue, interfacing with such physical factors as rain drops and dust. But the position of white at the center of the Dark spectrum seems to me not to be taken sufficiently into account in explanations of various phenomena.

22. One could try to formulate it in this way: although the prism can make these colors physically visible, they are by virtue of their inverse relationship to light-dark more hovering over than entering into physicality.

23. In the experience of H.G. Hetzel (see Appendix B) many scientists condemn the physical theories of Goethe without having investigated them, that is, on hearsay. More fair-minded scientists, such as R.M. Boynton (*Human color Vision*, Rineholt, 1979, 22) and P.J. Bouma 1947, 204), recognize that a holistic interpretation of reality such as that of Goethe would naturally produce a quite different understanding of color than Newton’s.

24. Cook 1960, 178.

25. Clairmont 1993, Chapter III A–D.

26. Scheibler 1974, 99.

27. The background color of Hellenistic wall painting is usually white or gray-white: cf. V.J. Bruno 1977, figs. 6–13; idem 1988, *passim*. Now white no longer conveys only a contemplative attitude toward death but stands for human consciousness on a broader basis.

28. Bruno 1977, 58–59.

29. Antiquity had already touched on this question. “The Aristotelian *Problemata xxxviii*”, 8 (967b) in *The Works of Aristotle* Vol. VII, tr. by E.S. Forster (Oxford 1929) asks: “Why do men become darker complexioned as they become older? Is it because

anything which decays becomes blacker, except mildew? And old age and decay are the same thing. Further, since the blood when it dries up becomes blacker, it is only likely that the older men are the darker they are; for it is the blood which naturally gives color to our bodies.”

CHAPTER IV

1. On the possible functions of this slab see Ridgway 1977, 193 note 8.
2. *EAA* VI, 201–4; also reproduced by W. Biers, *The Archaeology of Greece* color fig. 7 and by M. Andronicos, M. Chatzidakis and V. Karageorghis, *The Greek Museums* (Athens 1975) 69 fig. 48.
3. Orlandos refers to this as “interamente bianco (ora leggermente ingiallito) ottenuto con gesso”. Yet he describes the central panel of an altar as “di colore giallastro”, although in the colored reproduction there is no difference whatsoever with the background color. Is therefore the overall yellowish tint the last remains of a yellow surface coat, a phenomenon met with in sculpture? However, a pure yellow to represent air does not seem likely at this stage. Orlandos does not mention a background for the contemporary pinakes B–C (perhaps because of their poor condition). But in the case of D, which he specifically dates to the end of the sixth or beginning of the fifth century, he describes the background as white.
4. Cf. *EAA* Supplemento (1970) s.v. Paestum; recently on this *Dialoghi di Archeologia* terza serie 5 (1987) No. 2: 113–123 (L. Cerchiai, “Sulle Tombe del Taffatore e della Caccia e Pesca”).
5. *AJA* 60 (1956) 256 Pl. 86 figs. 20–21; *AJA* 74 (1970) 251–253 Pls. 59–61.
6. The assumptions implicit in Newtonian color theory are so pervasive and unquestioned that it may perhaps seem that something similar to them ought to have existed in antiquity to which the four color palette would form a curious exception!
7. Bruno 1977, 66 came, in my opinion, to the correct conclusion: that there is no contradiction and that, in fact, Greek painters from the beginning of the fifth to the end of the fourth centuries all painted essentially with four colors, though obviously not without advancing in their consciousness to the possibilities of combining them with other colors. After that, however, I cannot follow his arguments to the end. The four color palette of Polygnotos can only have been black, white, red and yellow as in early white-ground painting.
8. Wehgartner 1981, 18. Comparisons of Polygnotos’ supposed figure style with Archaic paintings outside Greece have no cogency. We do not know the scale of his frescoes and there is in any case no way to determine what his aesthetic preferences in regard to outline figures may have been. But if we assume use of a white background, at least in

part, then there were psychological reasons for using, at least to some extent, outline figures, just as in ceramics (see Chapter III, The Emergence of Redfigure Style, paragraph 15).

9. The use of pure red and yellow as decorative accents—for example as encircling bands or on tongues—was of course known in Archaic pottery. I noted instances of this in *CVA USA 29 Philadelphia 2*, p. 43. So-called purple enhancements on Corinthian animals and other figures represent, in my opinion, simply a strengthened red.

10. Bruno 1977, 107.

11. A reference to black in connection with grief (not specifically connected with death) in a way reminiscent of Mediterranean cultures of today is given by Lucian: Pollitt 1965, 165.

12. Color reproduction in R. Brilliant's *The Art of the Greeks* (1972) 237.

13. Bruno 1977, Fig. 11; L. Zhivkova 1971, pl. 33.

14. In the vase painting of the third century from Lipari and Centuripe one finds similar, if less exalted, examples of the use of blue (and white) that have at least a poetic quality—even if transcendence is not certainly intended. See P.P. Kahane, *Ancient and Classical Art* (2000 Years of World Art, I, 1967) 161–62 ; M. Robertson, *Greek Painting* (Skira 1959) 173–174.

15. Pollitt 1965, 228.

16. Petsas 1966, Plate 1 followed by plates with details in color.

17. Petsas 1966, 181.

18. Andronicos 1989, 37.

19. Andronicos 1989, 114.

20. Andronicos 1989, 224. My hesitancy about accepting this date as definitive stems from the absence of original works positively datable to the Late Classical period for comparison. Thus, despite very strong theoretical connections to that period, it seems better for the present to leave the question open.

21. Andronicos 1989, 115.

22. Andronicos 1989, fig. 52 and Bruno 1977, pl. 8.

23. Andronicos 1989, 85 fig. 45.

24. Bruno 1977, figs. 1–5.

25. G. Richter 1969, 278–79; for a color reproduction see *JdI* 96 (1981) 141 fig. 1. The violet of the walls contrasts with an immediately juxtaposed yellow pillow. Other instances of this complementarity are not so clear in the color reproductions of other stelai published here but V. von Graeve and F. Preusser 1981, 152 point out exact parallels in details of shading on painted reliefs.

26. A. Rouveret, *Historie et Imaginaire de la Peinture Ancienne Ve siècle av. J.-C.-Ier siècle ap. J.-C.* (Rome 1989) Series: BEFAR 274, p. 258 accepts the explanation of *colores floridi et austeri* as being a reference to the ability of certain colors to reflect or to absorb light. Apparently she connects this with the invention of the technique of showing light and shadows in painting (Apelles). This hypothesis, while not unreasonable, retains an element of speculation in the absence of any panel paintings of the period in question. More ingeniously, she tries to rescue the modern concept of three primary colors by allowing black (in the four color system) to have included a form of very dark blue (*tryginum*, p. 260)—much as did Bruno. From my point of view this is an exercise in futility.

27. That Greek artists did to some extent occupy themselves in making copies of existing painting is actually documented in one case (Pollitt 1965, 170) and there is, of course, the famous instance of the Alexander mosaic. Thus, there is a built-in likelihood that quite similar, if not exact, coloration was involved especially if four color painting in the strictest sense characterized a famous original, for one could not change this much without changing the character of the painting. On the other hand, in perhaps many other cases, the temptation to “modernize” the coloration must have been strong. An exact parallel to this is the current debate over whether to re-issue classic black and white films in technicolor. And who is to say that later artists did not sometimes “adapt” the composition of an older painting and alter its color scheme in quite arbitrary fashion, making of it a separate work of art, (as in the case of statues)? A modern parallel for this would be the many versions of a tropical lagoon scene inspired by a lithograph of “Morning in the Tropics” by Frederick Church (Walters Art Gallery, Baltimore). Hardly any of these could be called a true copy (probably most were not intended to be) and some of them are quite stunning new compositions in their own right. One could wonder also whether there were black and white sketches of famous artists’ works in circulation among later artists so that something like the recreation of prints and engravings in European painting with entirely new colors took place. In short, the question of “copies”, especially in regard to color, brings one into a morass of unresolved and unresolvable problems.

28. For instance, M. Andronicos 1989, 117 writes “Historians of Greek painting have regularly sought help from Greek vase paintings from earlier periods (the fifth century B.C.) and for later periods (fourth-second centuries B.C.) in Roman works which ‘are inspired by’, ‘imitate’ or ‘copy’ Greek originals. I am afraid that in both the first and second cases the help afforded by these pictorial sources—valuable in all other respects—have usually proved misleading”. Martin Robertson (1975, 574–577) has squarely faced this vexed question of how copies could have been made at all, let alone how faithful the copyist wanted to be, and arrived at a skeptical position paralleling my own on the subject.

29. Bruno 1985, 18. In his further exposition (e.g., in Ch. V) of the effects of light figures on dark backgrounds in the late period, Bruno speculates that the principle descends from the Classical architectural use of Eleusinian marble as a background for lighter

relief figures. Certainly subsequent generations must have seen it or at least heard of this, but immediate inspiration may have come over other routes, such as mosaics or vase-painting, as Bruno realizes. His comparison of the wall paintings with modern surrealism is intriguing but we simply cannot know how valid the analogy is. He asks: “Is there any reason to believe that the emotions of the subconscious *as we experience them in dreams* were any different for those living in classical antiquity than they are today? (p. 62; emphasis mine). Can we equate our post-Freudian consciousness with an age two thousand years ago when there was no conception of the subconscious?”

30. Schefold 1952, 176.

31. The study by Roger Ling, *Roman Painting* (Cambridge Press 1991) laudably and consistently pays attention to the fact that all paintings are colored; what I offer here is nevertheless more complete and detailed and, of course, takes account of the Goethean spectra. On the Boscoreale figural scenes: Ling, 104–106; Boscotrecase: Ling, 114.

32. B. Nogara, *Le Nozze Aldobrandini e i Paesaggi con scene dell'Odisea e le altre Pitture murale antiche conservata nella Biblioteca Vaticana e nei Musei Pontifici* (Milan 1917) ; Helbig 1969, 353–60. Color reproductions: EEA V, facing 818; A Maiuri, 1953, 33. These give scenes I-II; b & w reproductions of various scenes ubiquitous in the literature; EWA VII, pl 180: scene VIII in color.

33. Nogara (see note 32) reproduces in both b & w and color but the latter does not do justice to white and yellow. Better color reproductions in Maiuri 1953, 24, 30. In general I follow the interpretation suggested by B. Andreae, “*Igni et Aqua Accipi: zur aldobrandinischen Hochzeit*” in *Römische Quartalschrift* 57 (1962) 3–16). (See also Helbig, III, 360–66). The reasons for this will become apparent in my further discussion. In my interpretation of the color choices in the AW I depend on the suggestions for meaning worked out in Illustration 16. It will be seen that the terms given there can be no more than directional signals in approaching any specific painting. The case of yellow is particularly interesting here, since that color is rather insistently connected with the bridal “condition” in Roman testimonia, e.g., Pliny, NH XXI.46: *Lutei video honorem antiquissimum, in nuptialibus flammeis totum feminia concessum* (I understand that yellow was the earliest color to be highly esteemed and was granted as an exclusive privilege to women for their bridal veils). There are indeed yellow veils in other Roman bridal representations and Laetitia LaFollette, to whom I am indebted for these references and translations, believes she has seen traces on the Aldobrandini veil. In any case, the use of yellow in connection with the bride in general—if it is as ancient as it seems to be—is deeply connected with the philosophy of the four colors. Varro Ling. V.61 says *Igitur causa nascendi duplex: ignis et aqua. Ideo ea nuptiis in limine adhibentur, quod coniungitur hic, et mas ignis...aqua femina...* (Therefore the conditions of procreation are two: fire and water. Thus these are used at the threshold in weddings, because there is union here, and the fire is male...and the water is the female...). In the most dynamic cosmic sense fire is red (Illustration 12 A) and, since Egyptian beginnings, the color of the male is red, presumably thus pointing to pure activity. White normally designates the opposite state, pure passivity, and is so used for the female: in the same

paradigm water is white. But in the strict sense of liquefaction (Illustration 12 C, and throughout the microcosmic series: Illustration 13 E-H) water is yellow. This does full justice to the role of the liquid element in the processes of the generation of physical beings.

34. P.H. von Blanckenhagen and Beatrice Green, "The Aldobrandini Wedding Reconsidered" *RM* 82 (1975) 85–98. Other considerations brought forward here also lack cogency. The slab on which the youth is seated is compared to a "bench-like stone placed exactly like the slab on which the young man of the AW is sprawling." But a narrow bench is not a low wide slab and moreover it is placed *many feet* distant from the bed in what is obviously a closed-off room. The *female* figures on the bench are seated primly and normally. The value of this comparison eludes me. Von Blanckenhagen laboriously reconstructs a lost painting of the wedding of Alexander and Roxane which he admits is in no way comparable to the AW but then proceeds to invent the composition of another lost painting which is claimed to be reproduced in the AW. Surely this is the kind of speculation which Andronicos (n. 28) warned against. Another factor which makes me suspicious of a total prototype for the AW is the blue background. There is so far no evidence whatsoever that figures were placed *in toto* against transatmospheric blue in the fourth and third centuries B.C. My impression is that this is not likely to have occurred until the Late Hellenistic period (in Alexandria?) with the creation of landscapes with scaled down figures, horizon and sky (e.g., the *Odyssey Landscapes*). In any case the coloration of the AW in no way agrees with the four color style which was predominant in the Protohellenistic and Early Hellenistic periods. Finally, even if we granted all the identifications of the figures proposed by the authors, it seems highly unlikely that, in the moral atmosphere of the Augustan period, a wedding picture of a Hellenistic prince would have been used without a specific Roman application—and von Blanckenhagen does admit in the end that Curtius' interpretation "may not have been entirely wrong."

35. Moreover, architectural parts of wall decoration are usually shadowless, that is, do not throw shadows, although shadows can appear on them (e.g., façade in the Casa dei Misteri where the two outer columns and the plinths have illogically placed heraldic shadows: illustrated in color in *Palette* 13, 1953, fig. 5 in "Die Wahl der Farben in der antiken Kunst" by K. Schefold).

36. There was an incipient, though quite unsteady, interest in this in a few still lifes (cf. A. Maiuri 1953, 135 and B. Maiuri 1957, 131) and in some of the theatrical mosaics (e.g., tambourine player of Dioskourides: EEA III opp. 120 and EWA VII p. 166—both in color).

37. T.H. Fokker, *Catalogo Sommario della Galleria Doria Pamphili* (Rome 1959) 12: Poussin, oil on canvas 1.41 x 2.42m.; Giorgio Torselli, *La Galleria Doria Pamphili* (Rome 1969) fig. 385 b & w illustration (Poussin).

38. General description of room: K. Schefold, 1952, 67–71; detail of scene with figures on white background; EAA VI, facing 214; another detail in color: girl decanting perfume (A. Maiuri 1953, 29).

39. Sacral landscape (*paesaggio a fondo nero*): A Maiuri 1953, 122 in color; B. Maiuri 1957, 105–107; detail also in color. Night scene: A. Maiuri 1953, 75 in color.

40. J.J. Pollitt 1965, 228.

41. In connection with the third century painted stele of Hediste K. Schefold writes (“Die hellenistische Blütezeit der Malerei” in *Sitzber. Bay. Ak. Wiss.* 1985 Heft 2, 10): “Although there is depth in space, it in no way dominates the figure; on the contrary, all pictorial elements, even indications of body perspective, are subordinated to the plasticity of the forms. Greek art understood space as something that existed between three dimensional forms, not as a concept in itself, as in Roman and later European art”. This conclusion, based on form analysis alone, approximates my own conclusion.

42. On the tendency of some impressionists to believe that the human eye properly recorded the world as a flat picture (via the optical theories of Hermann von Helmholtz) see H. Honour and J. Fleming, *The Visual Arts: A History* (Prentice-Hall 1982) 523 and notice also the attraction of Japanese art for these artists.

CHAPTER V

1. A casual survey of books on Greek Sculpture of the last half century which have indices (only about half of them) revealed that color was often not mentioned at all and at best received only the briefest of mention—usually to the effect that it was used for contrast between figures and background or between figure and attire. J. Boardman, *The Sculptures of the Parthenon* (Austin 1985) 34 assumes that flesh parts were left in plain white marble while costume and accoutrements were painted. This view was also expressed in regard to later works by M. Bieber, *Sculpture of the Hellenistic Age* (New York 1961) 20. On this question in general and on *ganosis* see Reuterswärd, 67 and especially V. von Graeve and F. Preusser (1981), 152–53. The Renaissance and Neoclassical tradition of unpainted flesh in sculpture may account for our general lack of enthusiasm in visualizing color there, as illustrated by the fate of the so-called “Tainted Venus” in the Walker Art Gallery, Liverpool, by John Gibson (1799–1866). Commissioned by the Preston family and exhibited in 1862, it scandalized a number of critics who felt that—despite its classical pose—it had been made by the color to look like a naked English woman. In late 20th century superrealistic sculpture, faithful imitation of flesh color has become a commonplace but, of course, the figures so treated are devoid of Classical pretensions.

2. Reuterswärd 1960; this is still the basic comprehensive study on this subject but an unpublished Columbia University dissertation by P. Dimitriou, “The Polychromy of

Greek Sculpture: to the Beginning of the Hellenistic Period” should be noted. There is no lack of interest in pursuing special problems connected with color, as in the research of von Graeve and Preusser 1981 on the techniques used in painting on marble; or as in the research on painted inscriptions on the Siphnian Treasury by V. Brinkmann, “Die aufgemalten Namenbeischriften am Nord—und Ostfries des Siphnierschatzhauses” (*BCH* 109, 1985, 77–109). In other types of research color is touched on incidentally, as in “Birds, Maniskoi, and Head Attributes in Archaic Greece” by B.S. Ridgway in *AJA* 94 (1990) 594 : comments on color occur in connection with types of headdress on statues.

3. *Die Polychromie der hellenistischen Plastik* ; mimeographed dissertation, Mainz 1964.
4. L. Wittgenstein, *Remarks on Colour*, ed. by G.E.M. Anscombe (Oxford n.d.) 1–8 passim, 15 and occasionally elsewhere; on this see Jonathan Westphal, *Boston Studies in the Philosophy of the Sciences*, no. 97 (Dordrecht 1987) 19–340.

APPENDIX A

1. Based largely on holdings of the Naples Archaeological Museum. Next to each inventory number mentioned I have placed a corresponding numeration in Karl Schefold’s *Die Wände Pompejis: Topographisches Verzeichnis der Bildmotive* (Berlin 1957) or an equivalent notation if available.
2. Scheibler 1978, 302.
3. Ibid, 303.
4. A Maiuri 1953, 69 color; B. Maiuri 1957, 80–81 with color detail.
5. My field notes list this as 9987 which must be erroneous but letters to the museum have not resolved the difficulty. An excerpt in color from a marine mosaic in the Naples National Museum—not further identified in any way by the author—clearly shows the system of alternating black and green lines to indicate water: S. Rossi: *Mosaics A Survey of their History and Technique* (Praeger 1970) fig. 7.
6. E. Pfuhl, *Malerei und Zeichnung der Griechen* (Munich 1923) fig. 686: “Einübung eines Satyrchors”; illustrated in color in *Mosaici e Mosaicisti nell’Antichità*, opp. p. 12 (listed as Estratto dalla Enciclopedia dell’Arte Antica, Rome 1967 but this figure is not in the article on mosaics in the EAA).
7. Helbig 1969, 332–33, dated there mid-third c. A.D. This mosaic, which shows a spacious terrain with animals and buildings, is of particular interest because of the large amounts of green in it. This documents the growing awareness of an urban-oriented civilization of the actual colors of rural nature and it prepared for the widespread popularity of green in Early Byzantine mosaics for symbolical purposes (e.g., San Apollinare in Classe).

8. B. Nogara, *I Mosaici Antichi Conservati nei Palazzi Pontifici del Vaticano* (Milan 1910) pl. VIII. I am informed by Dr. F. Buranelli that this mosaic is not under the jurisdiction of the Vatican and Gregorian Museums and has not been given an inventory number.