
INTRODUCTION TO BOOK TWO : PAINTING WITH COLOUR

Introductory

The subjects upon which BOOK TWO focuses are:

- **Colour and feeling.**
- **Local colour interactions.**
- **Shadows, shading and highlights.**

Its interest lies in the fact that science is now suggesting new practical insights for artists relating to them all.

The influence of science

History shows that over the centuries artists have benefitted from the findings of scientists. This is just as true with respect to the subjects treated in this book as it is for the subjects that are treated in “BOOK ONE : Painting with Light”.

The artists’ debt has been particularly significant since the middle of the 19th Century when, first, Delacroix and, later, the Impressionists showed interest in various colour-related phenomena reported for the first time by scientists of visual perception. These were revolutionary in their implications because they showed that colour is not a property of surfaces, but something that is made in the head. They included, “induced colour”, “simultaneous colour contrast”, “colour constancy” and new ideas about shadows and shading.

Many years later, after the First World War, these same ideas were to provide the basis of the Bauhaus¹ colour course devised by Johannes Itten which was to become very influential on both art school teaching and the practice of artists during the remainder of the 20th Century. The basic proposals are authoritatively available in the works of Itten and Joseph Albers (both teachers at the Bauhaus) and can be found in a plethora of other books (artistic and scientific) of varying degree of interest and trustworthiness. For this reason, there seems little point in going over this well trodden ground yet again, except as an introduction to the less well known, but well worth knowing perceptual phenomena that are have pride of place in this volume. Amongst these, of particular originality and

¹ An arts and crafts school that operated in Germany from 1919 to 1933, which was famous for its approach to design.

importance are:

- *The treatment of the subject of “viewing conditions”, which can make so much difference to the way we experience colour interactions.*
- *The emphasis on the way that thin lines dramatise contrast effects in exciting and unexpected ways.*

Two other themes of particular originality are the fruit of:

- *The discovery that the eye/brain processing systems classify lightness-contrast effects as colour phenomena (more about this in the “Introduction to the Science” and in the following chapters), with particular reference to the way this neural computational error effects our perception of cast-shadows, lightness graduations and highlights.*
- *The exploration of ways in which the ideas about painting light elaborated in the previous volume, can be used in combination with the ideas presented in this one.*

Since all these issues are either revealed or given added dimensions by recent, ground-breaking, scientific research, it is appropriate to provide a preliminary guide to a number of relevant new understandings, and this will be done will be done in “Second Introduction”. It is particularly worthwhile to do so because most of information to be provided is likely to be unfamiliar to all but specialists in the neurophysiology of visual perception.

SUMMARY OF CONTENTS

Due to the unfamiliarity of so much of the material, it is appropriate to provide a foretaste of the scope of what follows. It is divided into five parts: “Feeling”, “Visual Excitements”, “Shifting Sands of Appearance”, “Shadows and shading as colour” and “Syntheses”.

PART 6 : Feeling

This part considers the role of “feeling” which, in my view, is the most important subject of all in drawing, painting and, indeed, in artistic production of any kind. Unfortunately, it is also the one which is the most elusive in terms of what can be said about it with authority The reason is that how people feel about something depends so much on a combination of their genetic inheritance, their

cultural context and their unique personal history. This state of affairs has both negative and positive implications. On the negative side, it means that generalisations relating to the subject of the feelings are almost certain to be flawed. On the positive side, the emphasis on individual differences tells us that each and every one of us is gifted with opportunities for creativity that are not available to anyone else.

While most of the volumes in this series give priority to drawing and painting from observation, PARTS 7 and 8 of this one switch the emphasis to nonfigurative productions.

PART 7 : Colour Excitements

Here we focus on “local colour interactions”, a subject that has been of special interest to artists for at least 150 years and has been authoritatively dealt with in numerous books. This being the case, some may ask why it needs to be revisited yet again. My answer is that recent scientific findings show that certain well established ideas, however valuable in themselves, can be complemented fruitfully in the light of the findings of recent research.

I first learnt about colour-contrast effects in the late 1960s as a result of participating in a colour course provided by my art school. Our tutor was the artist Michael Kidner² and his approach was based on ideas coming from the Bauhaus and their transposition for his English students by Harry Thubron, a highly respected teacher under whom Michael had studied. I was later to learn that almost all the Bauhaus theory had its origins in the early 19th century observations of scientists. Of key importance were those of Goethe and Chevreul relating to various manifestations of “induced colour” including “simultaneous colour-contrast” and “simultaneous lightness-contrast”. At the core of what Michael taught us was that the visual excitements generated by colour juxtapositions are at their peak if lightness-contrast is eliminated. Accordingly, he had little to say about lightness-contrast effects. This is why, despite their enormous importance for artists, these are not dealt with in PART 7. Instead they are reserved for PART 9 which deals with chiaroscuro, shadows, shading and highlights.

Michael also taught us that figuration interferes with the colour-induced experiences about which he was teaching us. However, this does not mean that colour-contrast effects do not occur in figurative painting or that they cannot

² For more on this important 20th century artist see Chapter 7 in “Fresh Perspectives on Creativity”.

create visual excitements in them. Far from it, as is evident from the sayings, writings and the works of numerous representational artists since the time of the early Modernist Painters and later ones such as Bonnard and Matisse.

PART 8 : *Shifting Sands of Appearance*

Here we turn to less familiar issues. To this day I feel that I was particularly lucky with my colour course tutor and the way he taught his subject. However, his approach raised at least as many questions as it answered. One of the main justifications for the existence of this book is that I was later to have the opportunity of researching all of these, both as an artist and as a scientist.³ In the process I was able to find illuminating answers for all of them, and was lured by them to venture into regions of the new territories which they opened up. Of particular fascination was the hitherto largely neglected subject of how of viewing conditions influence our experience of colour dynamics.

Amongst the new avenues of exploration, the one nearest to my own heart concerns how ideas relating to the perception of pictorial space and light of the kind found in “Painting with Light” can be used to enhance the experience provided by local colour interactions. Exploring these has constituted a central theme of my own life as an artist and provides one of the two underpinning themes of this section of my book.

My attempt to explain why I became so fascinated by this subject starts with the question whether it is possible to perceive regions of body-colour in paintings without any significant interference from information provided by the reflected-light which indicates the physical presence of the picture surface?⁴ This issue is a fundamental one for artists because the presence or absence of competition between perceptions of the actual physical surfaces of paintings and regions of pigment-colour painted on them can have profound effects on the experience provided. Of particular significance is the issue of whether the regions of pigment-colours in paintings are seen as part of the picture-surface or as being liberated from it.⁵ As we shall see, when they are given their freedom, just about every colour-contrast excitement gains an extra dimension.

As with the phenomena described in PART 7, the ones described in PART 8

3 Most importantly during my time at the *University of Stirling*, first as Cottrell Memorial Fellow and then as a Senior Research Fellow in the Department of Psychology.

4 See “*Second Introduction*”

5 For more on this see “*Painting with Light*”.

are best presented in the context of abstract paintings. However, the issues that they raise are ones which apply to all painting and figurative artists will find that they are very well worth keeping in mind.

PART 9 : Shadows, shading and highlights as colour

As already indicated, the discussion of “shadows and shading and highlights”, entails a switch from “colour-contrast” effects to “lightness-contrast” ones. The explanation why this essentially achromatic phenomenon is included in a book called “Painting with Colour” lies in the discovery that our eye/brain processing systems are structured in such a way that they regularly make an important classification error: one that transforms the nature of our perception of shadows, shading and highlights.

The history of painting provides plenty of evidence that artists have had problems with representing shadows. According to the physics of the situation, these familiar parts of our everyday visual world are due to the abrupt change in the intensity of reflected-light that occurs at their borders. On the face of it, this indisputably correct analysis would seem to indicate that cast shadows should be dealt with in the volume on “Painting with Light”. The explanation as to why they have been reserved for this volume on “Painting with Colour” will be more fully presented in the “Introduction to the Science”, which tells us of discoveries in the fields of neurophysiology and computer modelling. One of these is that visual-system that enables us to see body-colour is tricked into an incorrect classification of the sudden changes in intensity of light at the borders of shadows. Instead of seeing them in terms of transitions between different intensities of light, the eye/brain perceives them as junctions between regions of different body-colour. For similar reasons, the same visual-system is tricked into classifying as manifestations of body-colour both highlights and the gradations that we see as shading. The implications for artists of this neural system computing error are many and fascinating.

And what can we say about the actual appearance of this illusory body-colour? The answer to this question is that, since shadows are due to a sudden diminution in the intensity of all the wavelengths of the light being reflected from the surface within their boundaries, they will be perceived as tending towards a low-reflectance, monochromatic colour. In practice this means that it will seem to us that the colour of the surface upon which they fall has been flooded with achromatic “dark grey” or “black”. Significantly, in the process of creating this

artificial body-colour, the eye/brain ensures that the shadows will always be perceived as considerably darker in relation to the surrounding colours than readings from a light meter would indicate. As we shall see later, the consequences with respect to attempts to analyse and represent whole-field lightness relations could hardly be more challenging for artists.

However, the eye/brain is not completely deceived for there are always residual gradations of reflected light that it computes as surface-reflections⁶ and this is used by it to give the shadows a sense of lying on a solid surface. We do not see any part of this residual reflected-light as chromatic and only see colours in shadows in special circumstance which will be listed later. The fact of this invisibility explains why it took so long for artists to get round to representing the residual reflected-light using complex colours containing complementaries.

Unfortunately, even to this day, there remain many confusion with respect to the subject of colour in shadow, which are at least partly a consequence of the widespread dissemination of misleading (often just plain wrong) information. It is high time to sort these out since the combination of being tricked into seeing shadows as regions of dark grey or black body-colour and of not being aware of the residual reflected-light has not only caused artists no end of trouble over the centuries but also continues to do so. Fortunately, the knowledge presented in these pages transforms the situation for the better.

PART 10 : Syntheses

This final part of “Painting with Colour” consists of three chapters. The first of these (Chapter 28) provides a syntheses of ideas put forward in “Painting with Light” and “Painting with Colour”, the two books of which this volume is made.

*Chapter 29 starts with an introductory section on **recognition** and the implications of the fact that the eye/brain routinely recognises things that are actually different as being the same. It shows the connection between this remarkable capacity and the “**constancies of appearance**” that are such an important part of our visual experience. It also explains, not only why they cause so much trouble to artists when drawing or painting from observation, but also, their part in creating the gulf which exists between literal and experiential accuracy.*

Chapter 30 provides a series of exercises that will help readers explore

6 For full explanation see “What Scientists can Learn from Artist”, Chapter 14.

some the ideas presented not only in the volumes on painting but also those on drawing.

The final chapter returns to theory and provides a synthesis of ideas from both this volume “Painting with Light and colour” and its companion, “Drawing on Both sides of the Brain”.

Postscript

In both the volumes of this series much use is made of personal history, but none more so than in PART 7 and PART 8 of this one. As indicated above, the explanation lies partly in the way that the teaching that I received during my Bauhaus-based Art School colour course led to a number of questions that I could not answer at the time, but which I had the opportunity to explore later both as an artist and as a scientist. It also lies in my personal quest to unify the strikingly different and seemingly incompatible approaches to colour coming from my two most influential teachers, Marian Bohusz-Szyszko and Michael Kidner. Since it was this two pronged personal journey of discovery that led to the unearthing of the wide spectrum of new or now obscure knowledge that is presented in this volume, autobiography seemed the best route to explaining a large proportion of them.