

The Arcane Roots of Colour Psychology, Chromotherapy, and Colour Forecasting

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Abstract: This article explores the genesis of the apparently disparate fields of colour psychology, chromotherapy, and colour forecasting. They came to the fore during the 20th century, and while ostensibly unrelated, their common ancestry lies in the late 18th and 19th centuries. This period witnessed the discovery of such strange forces as magnetism, electricity, X-rays, and radio waves—in addition to odic forces and the colour aura. These were all invisible, mysterious, and to the public and many prominent scientists, equally plausible. This article traces a major influence back to spiritualism and Theosophy: both privileged colour and attributed powerful influences to it. This legacy remains, though not in the scientific domain. © 2013 Wiley Periodicals, Inc. *Col Res Appl*, 40, 99–106, 2015; Published Online 9 December 2013 in Wiley Online Library (wileyonlinelibrary.com). DOI 10.1002/col.21862

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COLOUR AS A SPECIAL DIMENSION

As a construct in both mainstream psychology and the popular press, the very notion of colour psychology poses the question: why colour? Certainly no equivalent “shape psychology,” “texture psychology,” or “line psychology” as such exists, despite notions of symmetry, harmony and proportion that have engaged mathematicians since Pythagoras’ *Harmony of the Spheres*¹ and philosophers since Aristotle;^{2,3} and also classical notions of art and architecture, as evidenced by Polykleitos’ *Kanon* and the *Ten Books of Architecture* by Vitruvius.⁴ More recent efforts to explore the psycho-aesthetic relationship of humans to the visual environment can be seen in work by, for example, Washburn and Crowe⁵ on symmetry, and in the

efforts of architects like Le Corbusier to implement notions of harmony inspired by the golden mean.⁶ Nevertheless, neither “shape,” “line,” nor “texture” combine with the term “psychology” to form a unique construct.

What privileged colour that it should combine with the term psychology? Numerous empirical studies and reviews attest to its establishment in the scientific literature, and within the popular literature it is a staple of home decoration, clothing, and cosmetics. Colour psychology has also been extended into arcane territories whereby personality can be ascertained from it (Lüscher⁷), good health can be enjoyed from it (chromotherapy⁸), and future trends can be discerned within it (colour forecasting agencies⁹). No equivalent exists in other visual domains. There are no shape forecasting agencies, and good health appears not to be enjoyed from shapes, textures, lines or proportions. Colour is unique. What, therefore, are the reasons for the special status of colour?

This article explores the connection between 19th century spiritualism and Theosophy, and early chromo-scientific pursuits, and the extension of their influence into the more recent manifestations of chromotherapy and commercial colour forecasting. While chromotherapy may appear arcane, it is contended that colour forecasting is no less so. Both are predicated upon the belief that a fixed, natural order to colour exists that somehow is lawful in both health generation and consumer choice.

COLOUR ORDER SYSTEMS

Early notions of affective lawfulness accompanied attempts to construct colour order systems. Not content to systematize perceived colour, some sought to discern harmonious relationships within their system. Thus, Munsell, Ostwald and Chevreul prescribed colour relations that are harmonious.^{10–12} In so doing, they assumed that colour combinations are analogous to musical chords, appearing harmonious or not. The most comprehensive attempt at prescribing harmonious relationships between colours

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came, surprisingly, from two mathematicians: Moon and Spencer. Entirely theoretical and devoid of any empirical support, their conjectures were published in three issues of the eminent *Journal of the Optical Society of America* in 1944.^{13–15}

Unfortunately, experimental studies have failed to support the relationships designated by such theorists: simple laws of colour harmony do not stand up to empirical scrutiny,¹⁶ though recent empirical work shows promise.^{17,18} Nevertheless, the underlying concept holds sway within the popular press and public imagination alike, as evidenced by the plethora of magazine articles offering advice on “matching” colours, and by industry’s attempts to provide this. It is perhaps no coincidence that the hue selections of the British Standards Institution’s still current BS5252: *Framework for Colour Co-ordination for Building Purposes* (published in 1978) and derived standards are based upon a consensus of the main theories of colour harmony.¹⁹ As the most comprehensive set of environmental colour standards in any country, the hue relationships were arrived at using the BRS Harmony Selector. Devised at the Building Research Establishment, UK, it enables two, three, four, and five-colour harmonies to be selected. The originator, Gloag, followed in the philosophical tradition “whereby harmony could be deduced, and in his case by recourse to his predecessors’ deductions.”²⁰

AN ARCAN E LAWFULNESS: THE VISIONARY EDWIN BABBITT

Originating in an amalgam of new scientific discoveries and spiritual belief coexisting at that time, a unique dimension of colour lawfulness surfaced during the 19th century: colour therapy (chromotherapy). This occurred in an era which also saw the dawn of electricity therapy (electrotherapy or electromagnetic therapy) and magnet therapy (magnetotherapy)—all with potentially curative powers that remain today as alternative therapies.

This period also witnessed the emergence of spiritualism, and in 1882 the foundation of the *Society for Psychical Research* in Britain, with such notable members as two future presidents of the *Royal Society*, and two prime ministers: Gladstone and Balfour. As observed by the historian Knight,²¹ these were perplexing times when not only psychic forces emerged, but also cathode rays (1876), radio waves (1887), and X-rays (1895), in addition to the earlier magnetism and electricity. All were invisible, strange and equally plausible. Later discoveries were even more perplexing: Planck’s *quantum physics* of 1900 and Einstein’s *special relativity* of 1905 introduced still more invisible and powerful forces. Previously, only organized religion and alchemy had occupied such numinous territory, but now it was invaded by a host of enigmatic energies. In hindsight, the distinction between the scientific and the paranormal may be apparent; but at the time it was not. The very existence of the *Society for*

Psychical Research and its distinguished membership provides testimony. This was a time of scientific flux.

Within this milieu, interwoven into emerging spiritualist and, later, Theosophical texts are references to the diagnostic power of colour as revealed by the human aura, and curative measures to correct health imbalances via exposure to colour. The masterwork of this period is undoubtedly Edwin Babbitt’s *The Principles of Light and Colour*.²² Published in 1878, it describes in considerable detail not only which colours alleviate specific illnesses in humans, but also the colours that will generate health in plants. It could unkindly be described as an amalgam of pseudo-science and spiritualism: more generously, it characterises an age in which science and the spiritual intertwine. Babbitt’s undoubtedly influential work established a territory for colour that transcended the mundane. Colour harmony may be of this world: colour healing is not.

In Birren’s edited version of the first edition of *The Principles of Light and Colour*, the *Preface* states that Babbitt’s work uncovered: “the form and constitution of atoms, and their working in connection with ethereal forces to produce effects of heat, cold, electricity, magnetism, chemical action, light, colour, and many effects.” (p. vii) A visionary, his research encompassed natural phenomena, clairvoyance and the so-called ‘odic’ forces, including their manifestation in colour. The latter chapters of his book attest to the power he ascribed to colour; thus, Chapter 6 is entitled *Chromo-Therapeutics*; Chapter 7: *Chromo Culture*; Chapter 8: *Chromo Philosophy*; Chapter 9: *Chromo Dynamics*; Chapter 10: *Chromo Mentalism*. Within *Chromo-Therapeutics* are cures for “lunacy”, rheumatism, pneumonia and baldness, to name but a few. To facilitate the treatments he had devised, he invented the *Chromolume* and the *Chromo Lens* to direct specific colours at affected areas. Having conceived of this interconnectedness between the material and spiritual worlds, and devised equipment to connect them, he observed that: “it seems quite impossible that a thoughtful mind should dispute the correctness of their general features, so absolutely capable are they of being demonstrated by facts.” (p. xviii) In so stating, he displays the modesty of absolute certainty. Babbitt was president of the New York College of Magnetism from 1888 to 1894. *The Principles of Light and Colour* is still in print today, and may be ordered on *Amazon.com*.

THE ORIGINS OF CHROMOTHERAPY

While the origin of chromotherapy appears to lie with Babbitt, his own roots can be found in the works of other figures of influence from the 19th century. Of singular influence was General Augustus Pleasonton, who conducted numerous studies of colour and published them in 1876. His excessively titled book, *The Influence of the Blue Ray of the Sunlight and of the Blue Color of the Sky, in Developing Animal and Vegetable Life; in*

Arresting Disease and in Restoring Health in Acute and Chronic Disorders to Human and Domestic Animals,²³ immediately preceded the publication of Babbitt's book in 1878. Pleasonton was cited repeatedly by Babbitt as his major source of supportive evidence, and thus could legitimately be credited as the originator of chromotherapy.

Another prominent influence, Baron Karl von Reichenbach (chemist, metallurgist and member of the prestigious Prussian Academy of Sciences) had already made significant contributions to industrial chemistry when he turned his attention in 1839 to what we would now regard as the paranormal.²⁴ Influenced by Franz Anton Mesmer (mesmerism) and the notion that electrical forces impinge upon human consciousness, von Reichenbach came to believe that all materials exhibit an electromagnetic life force which he termed the "odic force." Inevitably, perhaps, it was linked with the newly discovered electricity. It may be an oversimplification to see the odic force as the sole progenitor of modern conceptions of the "aura," in part because the concept had already existed in Asian religions for centuries, e.g., the Vedantic notion of the physical body, psycho-spiritual "subtle body" and causal body being composed of five *kosas*, or sheaths.²⁵ Legitimacy for this bioenergetic force at the hands of such a major scientific figure as von Reichenbach, however, may have lent credibility to the existence of the aura as a scientific concept worthy of attention. Such notables as the founder of Theosophy Helena Petrovna Blavatsky²⁶ and even Adolf Hitler, who purportedly spoke of the power of the odic force²⁷ to his head of SA Otto Wagner, took advantage of von Reichenbach's research to further their own ends.

Babbitt mechanistically describes a metaphysical association between colours and health, yet he does not clearly articulate why this might be so. In his 1902 work *Man Visible and Invisible*, Charles Leadbeater, a leading Theosophist, appears to bridge this gap by describing the energy field termed the human aura, and the meaning of "various shades of colour" accessible to a clairvoyant.²⁸ For example:

Black. - Thick black clouds in the astral body mark the presence of hatred and malice. When a person unhappily gives way to a fit of passionate anger, the terrible thought-forms of hate may generally be seen floating in his aura like coils of heavy, poisonous smoke.

And,

Greenish-brown, lit up by deep red or scarlet flashes, denotes jealousy, and in the case of the ordinary man there is nearly always a good deal of this color present when he is what is called "in love". (p 81)

The aura, according to Leadbeater, is not the emission of a unitary colour, but rather a luminescent amalgam of many emanating from and surrounding the body, in which

certain specific colours predominate. Coloured plates in his book illustrate the chromatic complexity of auras, bestowing an apparent authenticity to his descriptions.

Having deciphered the aura, Leadbeater goes further. In *The Chakras* he attempts to associate the aura's emanations with the Vedantic notion of the chakras, energy vortices animating and radiating from the physical body.²⁹ In so doing he grounds his interpretation of the aura in that ancient belief system, one particularly favoured by Theosophists, notably Annie Besant.^{30,31} Leadbeater's system ascribes colours to these energy centres which, while questionable, strengthened the associations between colour order, physical and psychospiritual health. His efforts proved influential: coloured chakras and coloured aura connotations remain associated with Western notions of the chakras and aura to this day.³² As testament to this, *Man Visible and Invisible* and *The Chakras* are both still in print.

The spread of the concept of the aura into the public imagination was driven by its pervasive adoption by proponents of spiritualism and Theosophy. Major figures in the Theosophy movement, including Rudolf Steiner, Helena (Madame) Blavatsky and Annie Besant embraced this other-worldly dimension of colour. A book of Steiner's lectures on colour of 1920 is simply entitled *Colour*,³³ while Besant and Leadbeater jointly authored a book, *Thought-forms*, that included colour as a major component.³⁴

It is important to note that these precursors to what would later become chromotherapy have not been consigned to history. On the contrary, spiritualism is alive and well, and as an organized religion with its own divisions, is present in cities throughout the world (that will permit its free expression). Theosophy, superseded by a breakaway movement (led by Rudolph Steiner) called Anthroposophy in the early 20th century,³⁵ flourishes in its most public expression through Steiner Schools, found in cities around the world.

Belief in the aura and the information and power it transmits, in combination with such esoteric practices as magnetotherapy, chromotherapy, reflexology, and spiritual healing, remains as a powerful reminder of the schism that occurred in 19th century Europe and North America between paranormal and scientific explanation—and of the flux that accompanied new and unexpected energies.

SCIENTIFIC PSYCHOLOGY, THE COLOUR VISION CONTROVERSY, AND GLADSTONE'S EVOLUTIONARY CONTROVERSY

Babbitt's lineage to the 20th century is clouded, and disreputable examples come to the fore. In the USA a Colonel Ghadiali marketed an apparatus derived from Babbitt's *Chromolume* called the *Spectro-Chrome*, with alleged curative powers. Ghadiali's creation joined a throng of curative colour therapy devices, such as the *Alpine Sun*, and the *Hellion and Chromoclast Lamps*.³⁶

His qualifications should have aroused suspicion—MSC, MD, ME, DC, PhD, LLD, ND, DoPT, DFS, DHT, DMT, DST. He was imprisoned for 3 years for fraud.

Certainly, the practice of chromotherapy is a direct descendent of Babbitt's work, as is Leadbeater's notion of an aura "representing" a person's being (thereby linking persona to colour). The idea that colour exerts influence on behavior is implicit here. Exemplifying this are the notions that red excites while blue calms, and that red is warm. The latter, if literally true, could reduce energy expenditure in buildings; and, in fact, has been investigated with that in mind. However, results proved inconclusive.^{37,38} Via such associations, the exploration of colour's extrinsic and intrinsic effects came to warrant investigation as a phenomenon distinct from other visual attributes.³⁹ And for this reason it has occupied a special place within experimental aesthetics, the branch of Fechnerian psychology that employs scientific method.

Within this scientific tradition, an early 20th century pursuit was the investigation of a natural order to colour preference. Studies were carried out that attempted to establish whether agreement existed: if it did, then this would support the nativist position and, by implication, the lawfulness of colour.^{40–43} It will be helpful to consider this lawfulness in the wider historical context of then recent advances in the understanding of colour vision and also its presumed evolution, before examining its development in tandem with emerging theories of a more esoteric nature.

William Gladstone, the classical scholar and Prime Minister of Great Britain, seeded a late 19th century controversy with the claim that the evolution of colour vision could be detected in Homer's confusion of the colours of natural objects and, presumably, the failure of his Greek compatriots to notice this. Gladstone surmised that the ancient Greeks must have been colour vision deficient⁴⁴ or, as he puts it: "the organ of colour and its impressions were but partially developed among the Greeks of the heroic age."⁴⁵ While not expressly subscribing to Bishop Ussher's renowned calculation of Creation occurring in 4004 B.C., as Hickerson observes,⁴⁶ Gladstone was operating in such a time-scale whereby evidence of sensory evolution would be plausible. Geiger, surveying a range of ancient texts from various civilizations, supplemented this with the notion that humans had evolved from the recent past through stages of colour recognition.⁴⁷ And Magnus extended this to then current day members of races who displayed similar deficiencies.⁴⁴ Colour vision became an albeit dubious instrument for detecting the stage of evolution of a given race. Numerous studies were conducted on various nationalities to determine how they organized colours.^{48,49} Effectively, did they categorize colours into the equivalents of red, green, yellow, and blue? This debate was resolved mid-way through the 20th century when Berlin and Kay published their seminal text: *Basic Colour Terms*.⁴⁸ Essentially, it was not colour vision that differed, but rather the lexicon of colour terms used: they also determined that a natural order

did exist in colour term acquisition by societies. This obvious interpretation, divorcing colour language acquisition from colour perception, had been courteously expressed by a Mr. William Pole in two letters to *Nature* as early as 1878⁵⁰—including a dissection of Gladstone's questionable interpretation of certain ancient Greek terms. These were either overlooked or discounted.

While the Gladstone-inspired controversy reflected a failure to distinguish between colour vision and colour language, a more pervasive 19th century dispute reflected a difference in perspectives. Colour is a property of surfaces and illuminants in the external world: it is also a property of human perceptions—or percepts.⁵¹ The former aligns to physics, the behaviour of light, and the reflection-absorption properties of surfaces: the latter aligns to psychology, and the performance of the visual system. While Newton⁵² typifies the former position with a focus upon decomposing light, Goethe⁵³ typifies the latter via his observations on perceptual phenomena. This difference in perspectives underpins the late 19th century dispute over three or four primary receptors for colour vision that pitted Young-Helmholtz's trichromatic theory against Hering's opponent process theory.^{54,55} In the tradition of Newton, the former determined that mixing three light sources—red, green, and blue (indigo)—achieved a full colour gamut. In the tradition of Goethe, Hering observed that two pairs of opposing hues—red/green and yellow/blue—have a unique psychological status. There cannot be a reddish green nor a yellowish blue. As a foundation for colour vision both theories are plausible, yet in conflict. At the time, colour vision was seen as a retinal event. Only in the 1950s was it found to be a staged process in which retinal impulses (Young-Helmholtz) are reclassified at mid-brain centers, the lateral geniculate nuclei (Hering), and then travel to the visual cortex where an enlarged set of receptors prevail.^{56,57}

The conflict remains in the everyday idea of three or four primary colours, further confounded by the existence of additive primaries (light) and subtractive primaries (paint). Perhaps the most recent manifestation of this conflict of perspectives arose in an attempt by the International Organization for Standardization (Technical Committee 187) in the 1980s to arrive at an international standard for colour notation. This pitted the Goethe-Hering based Natural Colour System⁵⁸ against more Newtonian systems. The outcome was inconclusive, and the Technical Committee was disbanded.

This digression away from the question of a natural order to colour preference seeks to position colour preference within the then rich domains of enquiry with colour as a privileged visual attribute. Shape, line, texture and form were not keys—despite receiving considerable attention.^{1–6,41,59} To return to colour preference, Eysenck's meta-analysis of 1941 compiling previous research indicated that there was a natural order, with blue as the most preferred colour and yellow the least.⁴⁰ This lawfulness, though apparently convincing, was undermined, again just after the turn of the mid century. Its demise came about

on three fronts. The earliest, by McElroy in 1952, found that non-westernized aborigines in Arnhem Land, Australia, did not replicate Eysenck's natural order of colour preference.⁶⁰ The second came from studies that employed a systematic sampling of colours covering the three dimensions of hue, lightness and saturation (or, to use the Munsell nomenclature, *hue*, *value* and *chroma*).^{61,62} It emerged that a yellow of the "right" lightness and saturation was preferred over a blue of the "wrong" lightness and saturation. In other words, colour requires a tri-dimensional specification, absent in studies before 1950. Finally, in completely unrelated yet laborious studies by Sivik in Sweden and Inui in Japan, the former demonstrated that preference for colours applied to building exteriors ran diametrically opposite to Eysenck's natural order, and Inui found the same for building interiors.^{63,64} A natural order was thus brought into question.

The studies conducted by Sivik and Inui represent high points in the history of the empirical investigation into colour preference. Sivik employed standard experimental method whereby colours were judged per se as colour chips and then superimposed onto simulated building exteriors. In a statistically rigorous examination, comparisons of responses to colours per se and in situ were conducted. Inui took the unusual step of visiting locations where people had painted their walls, and identified the colours using the Munsell system. Because neither published in illustrious journals, their findings have not received the regard they deserve. Sivik, in particular, in an age when university league tables and international comparisons were unknown, simply published in three issues of the journal of his host university, the *Göteborg Psychological Review*. Despite this modest shortcoming, his is undoubtedly one of the most rigorous empirical studies in the history of colour psychology; and a precursor to the recent and systematic work by Palmer and Schloss of the *Berkeley Color Project*, and Ou and Luo.^{17,18,65,66} Along with Sivik, they attend to the tridimensional specification of colour under controlled conditions, employ a systematic sampling of colour space, and use multivariate statistical procedures. While the latter condition was not available to earlier researchers, the first two were, but largely ignored. Thus, Eysenck in his influential publication⁴⁰ of 1941 used in Experiment 1 "ten Ostwald coloured papers...red, green, violet, orange, yellow, all fully saturated; green, red, and orange tints; and a yellow shade." (p 386). "12 Ss were asked to rank the colours in order of preference." (p 387). Methodologically, this leaves much to be desired.

DEPRIVILEGING COLOUR WITHIN SCIENTIFIC PSYCHOLOGY

In the 1960s and early 1970s, scientific attention in empirical aesthetics was diverted away from colour to the more fundamental question of explaining aesthetics. Major problems of colour vision had been resolved, as had the question of its role as an evolutionary marker,

and also the problematic existence of a natural order to colour preference. A shift took place in which colour played no role. Emerging during this period was Berlyne's psychobiological theory of aesthetics—later termed the *collative-motivational model*—that focused upon what he termed "collative properties" of stimuli—complexity, novelty and incongruity.^{67,68} As probably the most comprehensive empirically-based theory of aesthetics to emerge from psychology, this attracted considerable research attention, and became the dominant forum for research in this field. Notably, Berlyne's theory had nothing to say about colour. Its dominance was compromised during the 1980s with the emergence of a conflicting theory—later termed the *categorical-motivation model*^{69,70}—and subsequently by other explanatory theories, including the *processing fluency model*⁷¹ and *appraisal theory*.⁷² Remarkably, none of the above theories privilege colour. In fact, none even include colour as a significant variable. After its stellar status as the key visual attribute in aesthetics during the first half of the 20th century, interest in colour waned. Though not in the popular press nor in alternative therapies; and certainly not in the business domain. Perhaps due to Babbitt's powerful advocacy, combined with prevailing spiritual beliefs encouraged by Leadbeater's work, its presence remains in forms that are now excluded from previously respectable scientific research. Thus, chromotherapy remains, as do divinations of personality based on colour choices, and also commercial colour forecasting agencies that foretell tomorrow's colour preferences, mainly for clothing and household apparel.

PROBING THE ARCAINE: COLOUR FORECASTING AGENCIES

The final expression of colour lawfulness considered here is far removed from the world of odic colours and the spiritual. On the contrary, this is the world of modern business practice: it is the world of colour forecasting agencies. These produce reports on the colours for particular product categories that should be acceptable to the public in the next year or two. Companies pay for these forecasts because experience dictates that if the colour of their product is wrong, then the public will not purchase their product. Given the alarming uncertainties of predicting future colour trends, companies subscribe in order to reduce uncertainty. This is most challenging in product sectors where colour is critical. An example is the sanitary ware (bathroom) industry where manufacturers produce a very limited range of colours. From their sales figures they know which colours have receded in popularity, but which colours should they replace them with? If they get the new colours wrong, then retailers will not be happy: after all, it is difficult to hide failed bathrooms under the counter. The financial investment is considerable.

Colour forecasting agencies work on the assumption that there is a natural order to consumers' colour

preferences that may reflect the *zeitgeist*; thus for example, the *war years were accompanied by sombre colours*.⁷³ Furthermore, apparently there is a cyclical pattern to colour preference, though why this should be so has never been satisfactorily explained.⁷⁴ As with more arcane divinations, a requisite ability on the part of those who predict colour trends appears to be “sensitivity” to colour and its association with lifestyles, public aspirations, the “mood” of the period, and past colour trends. These are somehow mentally amalgamated into a composite that leads the predictor to select specific colours. A major problem with this field is that the success or otherwise of such predictions is not available for scrutiny. It is not even clear if their success is monitored: it appears sufficient that predictions simply be made. In other fields, predictions must be verified: the treatment for a particular disease must be verified as being effective; but not for colour. Both chromotherapy and colour forecasting share a common antipathy to verification. In this sense, they appear to share the same modest certainty of Babbitt, and with the support of popular acceptance and business investment, they have somewhat effortlessly reunited the separation between science and the paranormal.

Apart from one study,⁹ almost no empirical attention has been given to the theoretical underpinning of colour forecasting. Stansfield and Whitfield hypothesized that if there is an order to colour consumption, then it would be discernable during the time periods of major events such as the two world wars. Conducted in Australia, their study charted colour palettes that were popular during each decade of the 20th century. Using the NCS system to systematically chart colours, they found no pattern other than an increase in more saturated colours during the second half of the century, which coincided with advances in colour technology.⁷⁴ The most interesting features of the study are a sheer absence of order, and no evidence of the cyclical.

CONFUSING LIGHT WITH COLOUR

The special status of colour within the visual domain shows no sign of abating. It entered the mainstream medical field in 1958 via the accidental discovery that a vial of blood left on a windowsill in full sunlight resulted in a reduced level of serum-bilirubin (a symptom of jaundice).⁷⁵ From this, trials were conducted of lamps with different spectral energy distributions: “blue light,” “green light,” etc. A review of the often conflicting results by Ennever identifies the importance of the “light intensity.”⁷⁶ Similarly, in a meta-analysis of the effect of phototherapy on mood disorders, the results provided cautious support; however, this was for “bright light.”⁷⁷ Clearly, clinicians are looking for effective treatments; but the descriptors used—“blue light,” “green light,” “white light,” etc.—leave much to be desired. Also, horticultural trials have coloured polyethylene surface mulches

with different enamel paints and compared yields.⁷⁸ Again, the descriptors are problematic.

Both illustrate a recurrent problem with colour. It exists as a sensation—a phenomenological percept—and as a property of surfaces and illuminants. It can be measured using a human observer, and also via instruments devoid of a human observer; i.e. colorimetry. Furthermore, it exists in various modes such as surface, illuminant, matte, gloss, and even fluorescent. And it is described linguistically by a wide range of serviceable but imprecise colour terms. The propensity for confusion is considerable. Thus, the effectiveness of light in reducing levels of serum-bilirubin may have little to do with the phenomenological appearance of the source—“blue” or “green light”—but rather the inclusion of specific components of spectral energy distribution. Similarly, the effect on horticultural yields exerted by coloured polyethylene surfaces may be due to specific reflected components of the spectral energy distribution. Adding to this confusion, different spectral energy distributions can result in the same phenomenological percept. Effectively, two colours perceived as identical under one illuminant can have different energy distributions; but these same two colours will appear different under another illuminant, and hence the industrial colour matching problem of metamerism. As with the above medical and horticultural studies, the originators of chromotherapy, Pleasonton and Babbitt, interpret their studies of the effects of coloured glass as if a unitary descriptor, “blue” or “green,” will suffice. Early 20th century studies of colour preference and colour harmony fare similarly.

The Helmholtz-Herring three/four primaries controversy illustrates the conflict over differing perspectives. Helmholtz, in the Newtonian tradition, focuses upon the capacity of three light sources to generate a colour gamut; Herring, in the phenomenological tradition from Goethe, regards the status of four unique colour percepts as important. The Gladstone-inspired controversy over the evolution of colour vision further illustrates this propensity for confusion, in this case between the actual percept and the colour term used to describe it.

CONCLUSION

This article does not suggest that those who initiated such arcane practices as chromotherapy and even colour prediction were motivated by deceit; and similarly those who gave rise to the three-four primaries debate and the evolutionary controversy. Rather, each engaged with an apparently simple yet deceptively complex phenomenon. As a property of objects and illuminants in the external world, as an internal percept, as a colorimetric measurement, and as a linguistic lexicon of fairly simple colour terms, colour is ripe for misrepresentation. A contention of this article is that no other visual attribute shares such diverse representations. Its transcendence as a spiritual marker by both Theosophy and spiritualism further enhanced its special status. The determination of harmonious proportion

has a long, albeit linear heritage. Study into shape, line, and texture hardly competes. For this reason there are no *proportion-shape-line-texture* prediction agencies, and chromotherapy is not challenged by *proportion-shape-line-texture* therapies. Colour remains special and, given its rich and complex heritage, is likely to remain so.

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