



SPECTRUM

Journal of the Colour Society of Australia



Spring/Summer 2006

The Colour Society of Australia and the regional divisions hold regular meetings, with presentations on colour by members and guest speakers covering a broad range of topics such as colour vision and visual perception; computer technology and colour optics; the reproduction of colour in photograph, television, film and the printing industry; colour in the visual arts, architecture, interior design and theatre; pigments and dyes for use in plastics, paper, surface paints and textiles; colour and light measurements; and colour communication.

Spectrum The journal of the Colour Society of Australia contains information about events and developments within the Society and in the international arena, including the text of papers delivered at national and international conferences and divisional meetings. Members are encouraged to submit original information for publication. If forwarding information already published in the media it is usually necessary to obtain permission to republish it. Therefore dates and sources of publication are helpful. We invite your comments and letters with relevant and interesting points of view for potential inclusion in future issues of Spectrum. Longer articles may be edited or serialised for publication.

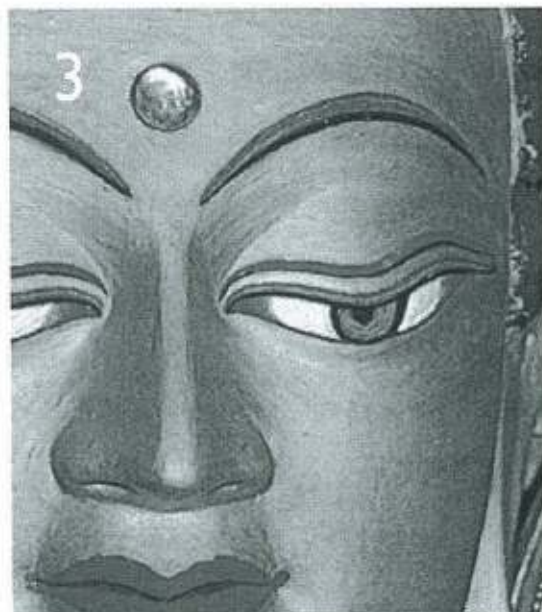
Each division has a specified Spectrum contact; these details are listed with the names and contact details of Divisional Chairs inside this journal.

Spectrum is sent to all individual members and all sustaining members of the Colour Society of Australia and to all member organisations of the International Colour Association. There are member organisations in all parts of the world.

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President's Report



Already it is October and I am writing my second report!

I am loathe to start with an apology but it is appropriate. All of us in the National Executive were hoping to make immediate impacts especially myself on the tasks ahead. However, despite the best of intentions we have been defeated by delays outside of our control and the pressures of working life.

THE POSITIVES

We have now got all the details, passwords and paid for the domain name and hosting of our website. The next step is to move from being under construction to a working one which I will address upon my return from leave in November.

Our new Treasurer is working on the streamlining of our membership database to better record the renewal and payment of membership fees and so create a sounder financial base. This is important as we address the need for finance in order to support the organisation of AIC2009. I must stress here we are not paying for the Congress, we are budgeting for it to be at least cost neutral and trying for modest profit.

I hope you will all agree with me that the last edition of Spectrum was really well presented and a jolly good read. All the credit for this must go to our editor Glenys Thomson who deserves our full support and requires inputs from members in the way of articles, news items, features, indeed anything of interest for consideration.

What we have not done yet is make a start on a membership drive, exploring ways of making the Society attractive to students and younger members and investigating ways of increasing our profile. We will get there, some things take time.

It has been the norm for the Society to hold biennial Conferences hosted by one of the Divisions. The resources needed to host AIC2009, it has been judged, mean that to hold one in 2007 would have put too much strain on the Society as a whole. However not to try and have some kind of get together of members would mean that we would be in danger of ceasing to function as a Society. So, we are exploring the idea of holding in Queensland sometime around September/October 2007 a

"... 2007 sees the Society moving forward apace and engaging more members in the process ..."

"Colour Workshop and Market" over a 3 or 4 day weekend. The bonus of doing this is that we can try out some ideas we are working on for AIC2009.

For those who are not aware, events such as this, properly set up can be fully claimed for on your tax return. It would be our intention to set this up accordingly and so comply with the tax rules.

I met recently from Shenzhen Oceanpower Corporation representatives visiting Melbourne who wished to explore forging close links with our Society. Amongst other things this Corporation operates a Colour Training Centre and also a Research Centre. To look up more about what they do visit their website www.cbcc.com.cn I hope to visit them in Shenzhen during my stop-over in HK on my way to England. I will report further but forging closer links with organisations having colour interests in other countries will help to lift the profile of our Society.

I hope the remainder of 2006 is both happy and prosperous for all and 2007 sees the Society moving forward apace and engaging more members in the process.

»» Derek Grantham

COLOUR

spirituality

» Ruth Marrion

Ruth Marrion is a long time member and supporter of The Colour Society of Australia. Based in Western Australia, this is the paper she presented at the 2005 CSA Conference.

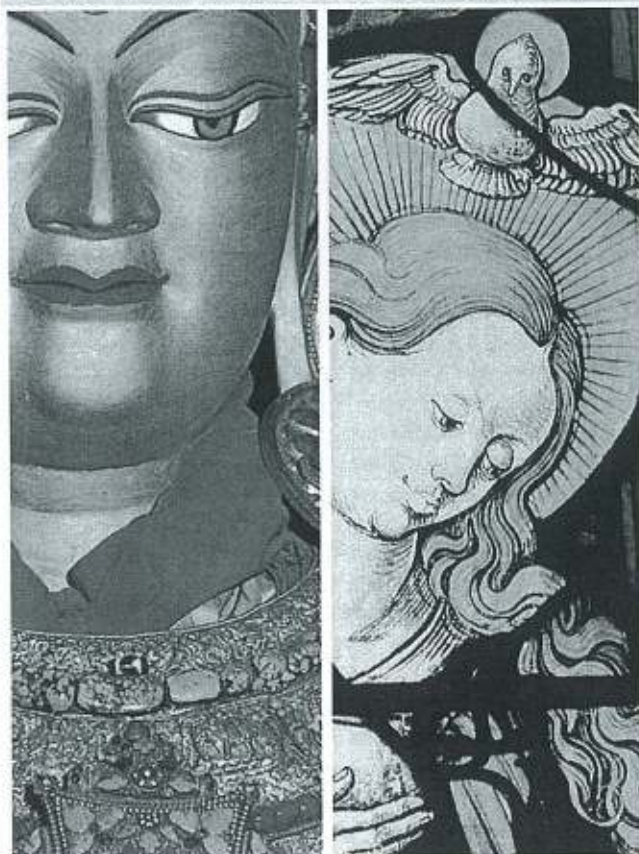
Colour is a phenomenon most of us take for granted and yet it remains intriguing. Is it "out there" or only a byproduct of the way human beings see? It seems that we are designed to receive information about our environment through colour perception so we can respond to it, whether for self preservation and directed activity, or just for pure enjoyment. Colours in light or pigment, alone and in combination, are known to cause emotional responses and so can be used to project powerful non-verbal messages to observers, who in turn receive those messages subconsciously. This process may depend on associations made in early childhood between the colour of objects and the pleasure or pain associated with them. The subconscious nature of colour associations, and the fact that light itself is somewhat mysterious to us, makes colour phenomena the ideal medium for the expression of deeper things about life that are difficult to put into words because they are intuitive and somewhat mysterious.

Social trends

In the 1990s social trend analysts predicted that in the 21st century we would see a huge rise in concern for the conservation of the natural flora and fauna ecosystems of the earth, with recognition that man has not been responsible enough for caring for the planet, and concern for the future across the generations, would bring a new desire to recognise and explore super-natural phenomena and religion. The bumper stickers proclaim "Magic happens" and "Miracles happen". The analysts predicted a growing general search for meaning and direction for life, for peace and stability, and for spiritual understanding. Spiritual knowledge would be perceived as satisfying the need to make better sense of our lives than had been possible through the scientific rationalism of the 20th century.

The respect now given to religions of all civilizations in multi-cultural Australia has made it more acceptable to explore the religions of Asia and our own indigenous people in search of spiritual truth, and to espouse all or some of the ideas encountered, without fear of ridicule. The idea that there is spiritual truth which is different from what our senses discover is thousands of years old. Some definitions will be helpful here.

"... colour phenomena [is] the ideal medium for the expression of deeper things about life ..."



» Colour & Spirituality

Definitions

a) Spirit

The Shorter Oxford English Dictionary (1) defines the word "spirit" as "that which gives life to the physical body and is distinct from the body." Other definitions indicate that the spirit is concerned with higher moral qualities, and religion.

b) Religion

The definitions for the word "religion" in the Shorter Oxford English Dictionary (1) may be summarised as "the recognition by a person that some higher unseen authority has power and control over his destiny, and that that authority is entitled to obedience, reverence, and worship". In Hebrew, the language of the Bible, the word for spirit is "breath". The Creator is described in the Bible as breathing His own breath into the lifeless human He had created, to make him a living soul, with the nature of the Creator animating him.

Human Spirit

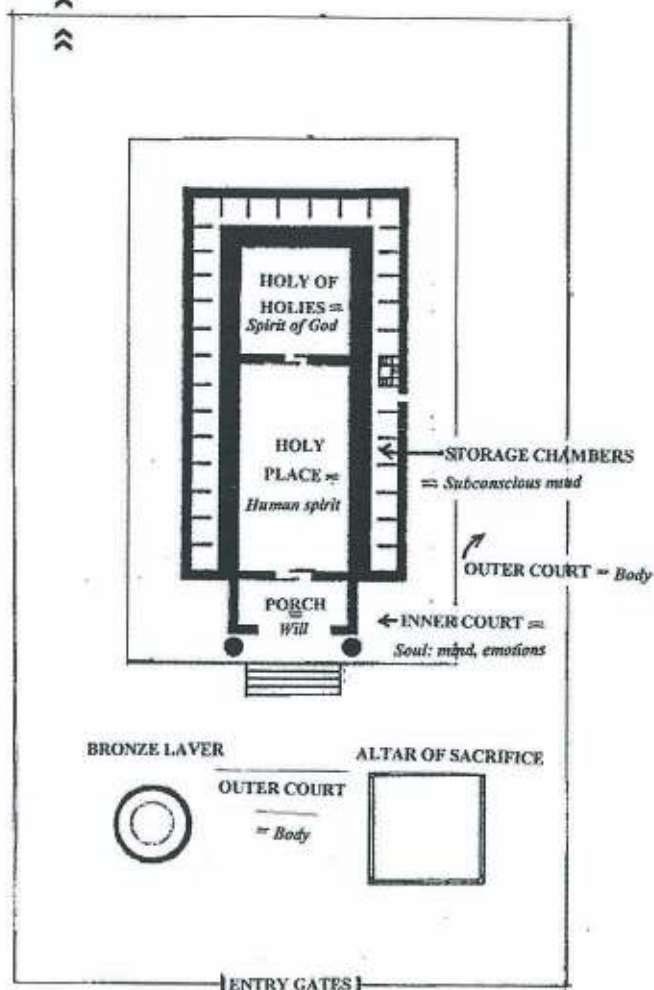
The Bible goes on to depict the human spirit in relation to the rest of the person as a Temple where contact is made with the Creator.

In this architectural model of the human being I have shown the outer court as analogous to our body, the inner court to our soul, which is our mind, and our emotions which we use to communicate with the world around us through the body. The entry porch to the world of the spirit inside us represents our will, but on the outside are storage chambers depicting our subconscious mind. Inside the spiritual temple are two areas, the first representing our human spirit, and far into the interior is a special place reserved for the Creator to live in, for there to be close communication between a person and his Maker in the privacy and intimacy of that place.

The Bible indicates that when a human being decides, using his will, to recognise the Creator as his spiritual father, and invites the Creator to come and dwell with him in that private place, the Creator accepts the invitation and a whole new relationship begins.

Our human spirit, then, is the part of us which most needs contact with its divine source. So when our spirit can make its presence felt in moments of quiet separation from our usual activities we become aware of that need as a kind of "emptiness". The drive to fill that need is the basis for religion. When certain

» Solomon's Temple Floor Plan,
according to 1 Kings 6



individuals in history have allowed this drive to intensify, they have separated themselves from normal activities to search for "inner enlightenment" and their experimentation with spiritual awareness in their inner chamber and their experiences there have given them a desire to teach others about a world beyond the human senses. Their experiences have been varied, their cultural and social settings have been different, so the interpretations of the founder/leader/teacher has varied, but as followers gathered to replicate the experience of their leader, so numerous religions have arisen. Buddhism, Hinduism, Islam, Zoroastrianism, B'h'ai are examples of leaders acting on their need for understanding on a spiritual plane which has resulted in spiritual experiences which can then be duplicated by others and a new religion has been

» Colour & Spirituality

founded. These experiences have to be communicated from one follower to the next, and one favoured means of achieving this is through colour in religious artworks. Paintings, tapestries, and symbolic objects express the ideas and emotions contained in the experience through the colours that are used.

Colour in religion

The connection between sight, spiritual insight and colour is clearly shown in the Hebrew language of the Bible. The first sentence in the Book of Genesis reads in English "In the beginning God created the heavens and the earth." However there is a word in this sentence in the Hebrew not translated. It should read in the English "In the beginning God created a-z, the heavens and a-z, the earth." In other words, the first thing created was the Hebrew letter pictographs, the communication system for both realms. It is as though the Creator was writing a play, putting the theme and language in place first. Then He created light, and everything created from then on has colour, with the attributes of hue, brightness and saturation registering on our linear perceptual apparatus.

In the following diagram we see the Hebrew letters for finger. The first letter in Hebrew, aleph, is silent and indicates thought. It also stands for beginning or source, so it stands for the source of light, which is God. The initial letters for light, hue, brightness and saturation in Hebrew (goes from right to left) make up the word for finger: etzba = to indicate, point or identify. To the Hebrew mind light rays which produce colour are the finger of God pointing things out to communicate information to us that we need to know, for example, the red colour of a tomato is an indicator of how good it will be to eat, the redder the better. An unripe tomato is not distinguished easily from the bush, but a red tomato stands out from the background, proclaiming "I'm ready to eat".

Letter of the word etzba (אצבא)	Initial of the word	Type of light
א	אור or "light"	direct light
צ	צבע tzeva "hue"	color:
ב	בהירות behirut "brightness"	reflected light
ע	עצמה otzma "saturation"	

Over the centuries the colours of the spectrum have acquired symbolic meanings which are used in the religious art of each culture to express spiritual ideas. The power of colours, singly or in

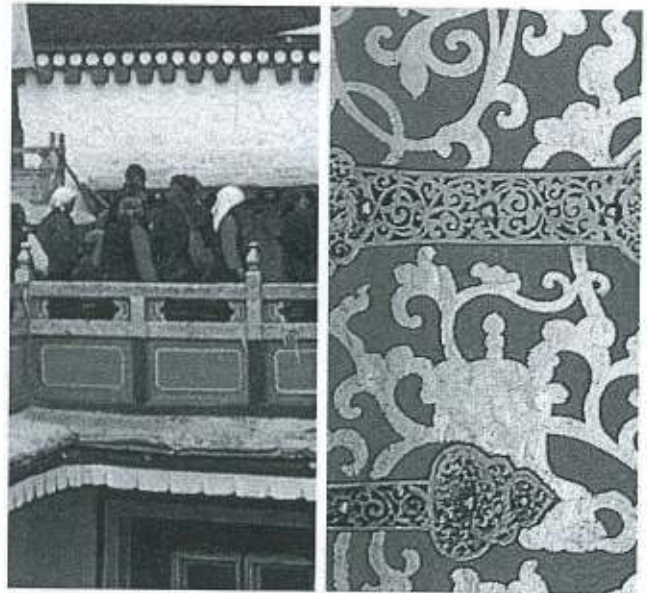


combination, to project particular messages which are understood intuitively or emotionally is the foundation for the use of colours as symbols in religious contexts. This paper is an exploration of how some of the colours of the spectrum are interpreted as spiritual symbols in Buddhism, Islam, Hinduism, Judaism and Christianity, looking for similarities and differences in the interpretations from one religion to the next, and how these may be explained. The diagram (page 6) has been created to show a comparison between the understanding of colour meanings in the different religious traditions, from website articles on the internet. The sites are referenced at the end.

Hinduism

Hinduism is ancient and no one person can be identified as its founder. Dark skinned Indians originated from the Middle East, and the religion may have begun there. There is belief in One Supreme Being but many other gods are given worship through statues of them. The web article "Colors in Hinduism" (2) indicates that one colour dominates Hinduism and that is the colour of the pigment saffron, a yellow orange, because it resembles fire, which is worshipped as a power source. Fire burns impurities, so it symbolises purity, and wearing the colour symbolises enlightenment. Sages moving from ashram to ashram used to carry fire, but it was impractical for long distances so this was replaced by carrying a saffron coloured banner, triangular or forked in shape, which now adorns Hindu and Sikh temples.

In Hinduism, the state of union with the Supreme Being is called Nirvana; to reach this is to be set free from the human condition of suffering, to have no self-centred desires which can be left unfulfilled, to cause grief and sorrow.



» Colour & Spirituality

Colours play an important part of the Hindu religion and culture, with the colours of statues and their clothing representing the qualities of their gods. Yellow was obtained from turmeric, green from leaves, and white from flour.

White has a mix of qualities from all the other colours from which it is made but especially peace, cleanliness and knowledge. The goddess of knowledge is always shown as wearing a white dress. The highest caste, Brahmin priests and sages are represented by white because it represents spiritual rebirth.

Black is associated with night, death and evil, and is considered unattractive. It symbolises the lowest caste, the labourers. The outcastes, the "untouchables" have no colour at all because they are to be ignored.

Red is the colour of joy, passion and energy and is used for happy occasions such as the birth of a child, and in the sari of a bride. Deities who can destroy evil and are protective are represented by red statues. Red is also used to celebrate high achievement. A red dot is applied to the forehead for festive occasions. The second

caste, the warriors, is represented by red.

Yellow is the colour of knowledge and learning, happiness and complete development, so the highest gods of Hinduism are seen as wearing yellow robes.

Green symbolises life, peace and happiness from stability.

Blue as the colour of sky, ocean, rivers and lakes is deemed to have the qualities of manliness, bravery, protectiveness, determination to overcome, and so the major gods have blue bodies.

Buddhism

The name Buddha means Enlightened One. A rich man named Gautama founded Buddhism in northern India in about 500BC. When he was 29 he received four visions, three of suffering people and the last of a holy man who told him to leave his wife and child and seek religious enlightenment in order to avoid suffering. He did so, and experimented with various kinds of self denial and self torture without result, until one day he decided to meditate under a bodhi tree to seek enlightenment. After

	Hinduism	Buddhism	Islam	Judaism	Christianity
White	Peace, rebirth cleanliness knowledge	openness, purity, holiness, long life, cleanliness	good, chastity	holiness, purity through suffering or redemption, approval	holiness, light
Black	night, dark, evil, low caste	darkness, ignorance, hatred, evil	evil, revenge	rejection, disapproval	evil, sin, mourning
Red	joy, passion energy, protection, war	powerful deeds, passion, protection, life force, danger, heat	blood, sacrifice, holy war	blood, sacrifice, man's love for God	blood of Jesus as sacrifice, God's love for man
Yellow	spiritual knowledge, complete development	sunlight, deity, humility, separation from the world	light, purity	deity, fruitfulness, productivity	glory of God, resurrection of Jesus, hope, service
Green	life, stability, peace happiness	youthful vigour, playfulness, action, cleansing from evil spirits	life, peace, prosperity, gaiety	God's provision for his people's needs, his favour	new life, giving, grace of God
Blue	manliness, bravery, protectiveness	eternity, truth, faith, ascension to higher plane	sky, heaven, prayer	sky, heaven, spirit realm, prayer	kingly authority, the spiritual realm, Heaven
	1000BC?	500BC	500AD	1500BC	32AD

» Colour & Spirituality

several hours a breakthrough came, and he received revelation that one can reach a state of complete happiness and freedom from sorrow, called Nirvana, by freeing oneself from all desires and worldly things. He began to preach this in market places and soon had many followers. He organised these followers into religious communities which lived by begging. He taught that there are stages of enlightenment, and cycles of life where people had previous lives and after death would become someone else until Nirvana is achieved. Over the centuries others have added to the doctrine and regulations of Buddhist monastic life.

Buddhism, according to the web article "Color symbolism in Buddhist Art" (3) specialises in presenting the most abstract concepts in visual images in colour, so that the concepts can be intuitively understood. Nirvana, the ultimate spiritual state that an individual can reach through transcendental meditation, is depicted as pure white light. When the individual devotee gets to the transitional stage of transformation before reaching Nirvana his inner self, or spirit, is said to awaken to the complete reservoir of earthly knowledge that is possible, and that is represented in artworks as "the rainbow body" around him, as coloured lines in white, yellow, red, blue and green emanating from his person.

White denotes openness, purity, holiness and cleanliness, as well as being the summation of all learning and knowledge, and longevity. A white elephant is said to be associated with the birth of the Buddha and he is believed to have reincarnated as a white elephant several times.

Black signifies the primordial darkness, hate and ignorance, and the radical element of evil in all its forms.

Red is the colour of powerful rituals and deeds, of passion, protection, and the life force (blood). Negative associations include subjugation, danger and heat.

Yellow is the holiest colour in Buddhism, because it is a relative of Hinduism. It is understood as the closest to sunlight, and the pigment for yellow was from saffron, which was rare and expensive, and reminiscent of the golden metal. Monks were clothed in saffron coloured robes to symbolise their humility and separation from worldly society to live a higher form of existence. Statues of people in meditative poses were gilded in pure gold, because gold is a symbol of the sun.

"... Dark blue has associations with healing and medicine, because its coolness is said to soothe inflammation ..."

Green is the colour of foliage and grasses, and is at the point of balance in the visible spectrum. In Buddhist symbolism green is the colour denoting youthful vigour, playfulness, action and renewal after cleansing from demon spirits.

Blue is considered the coolest, most detached and least material of all hues, and symbolises eternity, truth, faith, spiritual and intellectual life. Light blue is particularly spiritual to a Buddhist because it speaks of limitless heights of ascension.

Dark blue has associations with healing and medicine, because its coolness is said to soothe inflammation.

So to Buddhist devotees most of the colours of the spectrum have significance, though yellow is considered the highest spiritually, followed by light blue.

Islam

Islam's founder, Mohammed, who called himself the final prophet of God, received revelations from an angel during a time of separation in the desert in around 610AD, preached those revelations and founded a religion which draws on the Old Testament laws and history but changes details to show the Arab people as the inheritors of God's promises, by reversing the positions of Abraham's two sons, Ishmael and Isaac.

In the Islamic tradition (see web article "Islamic tradition" in References list) colour is primarily seen from the metaphysical viewpoint.

» Colour & Spirituality

White and black are understood as the duality between light and darkness, symbolising the tension between good and evil.

Green symbolises the whole religion of Islam. In fact "Islam, the colour of Life" is a common expression among Muslims. Islam originated in Saudi Arabia in Arab culture which is based on a nomadic desert lifestyle, where water is scarce and oases surrounded with greenery represent peace, joy, prosperity and gaiety. The happy associations of green link it with every facet of divine reality.

Red is the other colour which dominates in the flags of Islamic countries, which by association with blood means sacrifice of one's life in holy war to bring the peace and joy of Islam to the whole world, if necessary by the sword.

Yellow symbolises light and purity, so the crescent moon, the symbol for Islam, is often yellow against a brilliant blue background for the sky.

Blue speaks of Heaven to a Muslim, so blue is associated with the mosque, the place of prayer.

Judaism

The Patriarch of Judaism, Abraham, grew up among idol-worshippers and decided to seek the Creator instead. His story is found in the first five books in the Bible, and in other Jewish writings which come from oral tradition. The focus in Judaism is not on what man has discovered by his own efforts about the spiritual world, but on what the Creator has chosen to reveal about himself to an honest seeker after truth by establishing an intimate friendship with him. Very significant promises were made by the Creator to Abraham, including one that those who bless him and his offspring would themselves be blessed, and those who cursed him would themselves be cursed. Abraham was shown that a Redeemer would come generations later from Abraham's line who would buy back humanity from slavery to self-centredness by paying the ultimate price of self-sacrifice on their behalf to purchase their freedom to love the Creator instead.

In an earlier generation the surface of the earth had been covered with water to drown all living things except the one family who chose to believe they had a relationship with the Creator, and obeyed Him. A promise was made by the Creator that He



would not deal with the self-centredness problem of man by a flood of water again; instead He would use Broken Light, from His own nature, and the rainbow of seven colours appeared. When Abraham's offspring became a nation dedicated to Him, the Creator designed a worship centre for them to use to come close to Him. Certain colours, as threads for weaving or precious stones to be worn by the High Priest, were to feature in the rituals held there: white, black, red, blue, yellow-green, together with gold metal.

- White linen:* Linen must be thrashed out of the flax plant and bleached in the sun before use. White symbolised holiness and purity which is often the result of suffering.
- Scarlet or red threads* represent the colour of blood. The person wanting to come near to his God would bring a substitute, an animal, which was then killed to represent the person dying to his own desires and plans, and choosing instead to put the interests of his Creator before his own. This acting out of the substitute idea was accepted as evidence of the person's faith in God and restoration to closeness with his Creator. So in Judaism red is a symbol of passion for God, for sacrifice to come close to Him, and for love that results in obedience.
- Blue-violet threads* from a dye obtained from a particular snail which died in the process of obtaining the dye. Threads of this colour were woven into garments worn by the High Priest, and also into the woven prayer shawl the head of every household wore when he prayed. It stood for the heavenly realm of the spirit, by association with the sky.
- Yellow-green* represents fruitfulness and productivity, in reference to crops turning ripe.

» Ruth Marrion

e) Black and white stones

The High Priest wore a special garment over his chest which had 12 precious stones attached to it and a pocket behind. It was known as the Breastplate of Judgement; each stone represented one of the twelve tribes, and one of the stones was black and white agate, representing the tribe of Dan, which means "judge". Inside the pocket were four identical pieces of agate, two white and two black. To determine what God's judgement was on any issue, the people were told to ask God a question about it which could be answered by Yes or No. The High Priest then put his hand into the pocket behind the Breastplate and drew out two stones. If two white stones were drawn out God was saying Yes, two black stones He was saying No, and one of each meant He was not answering so the question needed to be thought about more carefully, or He was rejecting the person who was asking for some reason. We can infer from this that white means approval, an open door, while black means disapproval, or a closed door, as a judgement on the wisdom of a proposed course of action.

(f) gold metal represents deity.

Judaism is based on the necessity of showing love for God by obeying His commandments, and the penalties for disobedience are severe. At the beginning of time there were two supernatural trees in the Garden of Eden. The Tree of the Knowledge of Good and Evil represented a way of living based on law not love, and this was not the way of living God wanted for his people, but He had to give them a choice to eat from it or not. Ever since Eve ate the apple mankind has needed laws to keep individuals safe and secure. The stated consequences of disobedience were meant to act as a deterrent to unlawful action. Our Western societies are founded on a system of laws based on this idea. However, the lifestyle to be preferred and life the Creator would bless was one of intimate relationship with Him, which is pictured as continually eating the fruit of the Tree of Life.

Christianity

The price of following the way of law was judgment, with punishment and separation to follow if any law is broken. The Way of Life has no judgement at all – the Creator/Father is able to guide those who willingly stay with Him and follow His instructions in each situation. This Way of Life was lost to mankind when mankind chose the path of law, until the Creator sent the Redeemer He had promised at that turning point (Genesis 3) to take the full punishment for all mankind's

*"... Yellow-green
represents fruitfulness and
productivity, in reference to
crops turning ripe ..."*

disobedience to that law, so that return to the Way of Eternal Life became freely available again.

The followers of Yeshua haMaschiach or Jesus the Christ in Greek/English were first known as followers of The Way, after the Tree of Eternal Life in the Garden of Eden, and it became a stream of Judaism until catastrophe hit the Jewish people.

The colour that was missing from Judaism's story is green, the green of foliage and field crops which are His abundant provision, and grace or unmerited favour, so to Christians green represents the abundant supply of His love and grace. Christians do not deserve God's favour, but He blesses them anyway, because they have taken advantage of the freedom from judgement that He has offered to every human being as a free gift, as long as they allow Him to lead and guide them as father to child. "The Lord is my shepherd, I shall not lack anything..." says the psalmist. The shed blood of Jesus to become the final sacrifice for human disobedience is also a powerful theological understanding and is symbolised by red.

The Christian Church turned away from the equality of believers before God early in its history and leaders became separated as professionals from the rest.

Coloured vestments began to be worn at festivals from the fourth century on and the colours were chosen to reinforce the significance of those festivals. Liturgical churches continue to use those vestments to this day with these accepted meanings, according to the Catholic Encyclopedia (6):

» Colour & Spirituality

White, as the symbol of light, typifies innocence and purity, joy and glory, is used for Trinity Sunday, all the Feasts of Our Lord except those of His Passion, for Feasts of all saints who are not martyrs, for nuptial masses and any services such as baptism of infants which has to do with children.

Black signifies the sorrow of death and the darkness of the tomb, and is used on Good Friday and for offices of the dead.

Red, as the symbol for fire and blood, indicates passionate charity, and the sacrifice of martyrdom, so is used for all Feasts of martyrs and the Passion of Christ, and for fire on Pentecost. From these two uses it is considered the colour of the Church as a whole.

Yellow is an alternative symbol for white light, and is used in lining of vestments to typify the presence of God, by reference to gold metal. Cloth of Gold vestments can be substituted for red, white or green.

Green speaks of life and by extension, Eternal Life, and is used for vestments on every Sunday that is not special from another viewpoint between the major Feasts.

Blue speaks of the sky and so of Heaven, and Kingly authority. It is used for the robes of the Virgin Mary as Queen of Heaven in art and statues. Blue is increasingly being used for Advent to distinguish this season from Lent. Advent refers to the origin of Christ in heaven, for His first and second entrances into history.

Violet denotes repentance before the majesty of God, and is used primarily in Lent leading to the Passion of Jesus.

Conclusion

To return to our table of meanings for colours in the various religions we see clearly that colour meanings are similar in all the religions, often because natural objects like fire, and sky, are given symbolic meanings. The main difference seems to be that the meanings for Hinduism, Buddhism, and Islam are established from the human perspective and good and evil experiences, while Judaism and Christianity have interpreted the meanings as what they tell us about God and our relationship with Him.



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FUTURE COLOUR *trends*

» Jill Stansfield, T.W. Allan Whitfield

Can Future Colour Trends Be Predicted on the Basis of Past Colour Trends?: An Empirical Investigation

This paper was first published in "Color Research & Application", John Wiley & Sons publication, and is reproduced here with permission of the publishers and authors.

A question that has received remarkably little empirical attention is whether colour trends reflect the prevailing sociocultural lifestyle conditions of a society. This is exemplified by such assertions as "the austerity of the War years was accompanied by sombre colours." The presumed existence of order to colour consumption and a causal association between it and sociocultural lifestyle conditions provides the theoretical underpinnings to the work of colour forecasting agencies. The present study investigated this question by examining changes in Australian residential interior colours over the twentieth century. Colour palettes were assembled decade by decade and an analysis was undertaken using the NCS system. The results indicate that the main variation during the century was in the hue dimension. However, variation in each of the NCS colour dimensions was greater in the second half of the century. No evidence was found to support the notion of colour cycles or any tangible order to colour consumption. Although some colour palettes could be partially accounted for by developments in colour/materials technology, such influences were short-lived. The picture that emerges does not support the notion that future colour trends can be predicted on the basis of past colour trends.

INTRODUCTION

Colour forecasting is very much a product of the latter half of the twentieth century. As its title suggests, colour forecasting involves the prediction of future colour trends for particular market segments and particular consumer groups. This is achieved via an appraisal of past colour trends, an assessment of lifestyles associated with these trends, and, on the basis of these, an estimation of likely future colour trends.^{1,2} A number of organizations provide this service. Some are nonprofit companies, although you must subscribe to their services, and the subscriptions

"... The picture that emerges does not support the notion that future colour trends can be predicted on the basis of past colour trends ..."

incur a cost. Examples of these are the Color Marketing Group based in the United States, the Colour Group (UK), Colourways Australia, and the Color Association of the United States. There are also commercial organizations that offer customized colour reports for individual businesses, in addition to general colour trend reports. Examples of these are Peclers Paris (France) and the Jenkins Report (UK). Some organizations originally produced forecasts for the fashion industry and later went into homewares; for example, Peclers Paris and Nigel French Enterprises. In Japan the Nippon Color and Design Research Institute also provides colour forecasts as one of its many services.

Colour forecasting agencies operate on the dual premise that there is an order to past colour consumption and that this order reflects the sociocultural lifestyle conditions prevailing at the time. In other words, the 'mood' or 'Zeitgeist' of a historical period is reflected in the colour palette of that time, and the relationship is causal. Furthermore, an implicit assumption is that those engaged in colour forecasting are capable of discerning this relationship and applying this knowledge to identify future colour trends. The validity of colour forecasting therefore rests or falls on the existence of, first, an order to past colour consumption and, second, if such an order exists, a causal relationship between it and socioeconomic lifestyle conditions.

A number of weaknesses exist in the colour forecasting domain. First, there is little, if any, rigorous and documented

information available on colour consumption for particular market segments and particular products. This is not to suggest that no information exists. On the contrary, some companies monitor the performance of their products and that of their competitors if they are able to. Such monitoring is more likely to occur in certain industry segments (e.g., motor cars and sanitary ware) and less likely in others (e.g., homewares and paint). However, companies necessarily are competitive, and the information that they have is not normally made public. As such, their knowledge of their fragment of their industry remains confidential. Second, there is no empirical evidence that colour consumption is determined, or even influenced, by socioeconomic lifestyle factors. Although it may be argued that there is no evidence to the contrary, nonetheless, the onus of proof lies with those making a positive claim. Third, the validity of colour forecasting predictions has not been subject to empirical verification; in other words, we do not know if the predictions were successful. This is a not insignificant point. Without empirical verification we are unable to know if it works. It is like trying to assess the effectiveness of a particular medical treatment in the absence of hard data from medical trials. Fourth, colour forecasting is theoretically underpinned by the assumption that a causal order exists in the world of aesthetics, and in colour in particular. This assumption is not supported by empirical evidence.³

The present study derives from an investigation that culminated in a higher degree by research thesis in the name of the first author. This article extracts essential elements from this thesis, condensed in a form suitable for journal publication. Full details are available in the thesis.⁴

SURVEY METHODOLOGY

The study attempted to address one crucial question: is there an order to colour consumption? To date this question has not been investigated empirically. There are very good methodological reasons for this neglect. To empirically investigate colour consumption within a given society at a particular time is extremely difficult. Colour, after all, is manifest in a wide range of manufactured products, and consumption will be constrained by availability and cost. Furthermore, to focus on one particular period does not permit comparisons with other periods; as such, changes in colour consumption cannot be identified and therefore order cannot be detected. Despite the clear difficulties, the present study embarked upon this, although within a set of explicit methodological constraints. Its remit was to establish residential interior colour trends within Australia and to identify possible causes. To achieve this it was necessary to decide on a time span and a means of segmenting it, a strategy for sourcing and assembling colours, and a system of colour notation. Finally, socioeconomic lifestyle indicators were needed to enable colour palettes to be "explained."

In considering the time frame, the 20th century seemed a suitable period. It is long enough to have undergone many changes that would reveal patterns of colour consumption. It is also recent enough to provide reasonable access to materials. It was recognized that a shorter time frame of, say, the past 20 years would provide greater access to materials; however, this advantage is offset by the disadvantage of a shorter time scale for patterns to emerge. Also, it was anticipated that the decades containing perhaps the two major events of the 20th century, the two world wars, would reflect these events in their colour palettes. Regarding segmentation, different time periods were considered; for example, 10 years, 15 years, pre to post world wars. Another

alternative was to seek to identify colour trends and then to work the time frame around them. This latter method was discounted, as it does not allow for comparisons in a systematic manner. There also needed to be enough segments to allow patterns to emerge. Decades provided a consistent method of segmenting the century that would result in 10 colour palettes being produced. Although decades may appear as a rather arbitrary choice, it is difficult to identify a more systematic solution.

To establish colour palettes it was necessary to source a variety of materials on interior colours from each decade. These included paint charts, store catalogues, brochures, magazines, fabric samples, floor coverings, furniture, wallpaper, accessories, and publications that illustrated the colours in interior use. Of the latter, four books devoted to this subject proved invaluable.⁵⁻⁸ The Historic Houses Trust of New South Wales was extremely useful, as it maintains a fairly comprehensive record of a wide range of interior products. The Powerhouse Museum in Sydney also has many records, as do both the John and Phyllis Murphy Collection and the Francis Burke Collection at the Royal Melbourne Institute of Technology. Interviews were conducted with people who were involved in the interior colour industry and a number of homes were visited that were in original condition. Company records were also accessed. An indicative list of sources is given as an appendix: the complete list is available in Stansfield.⁹

When going through the above sources the predominant colours (i.e., the colours most typical of the decade) were visually matched to available colour samples. The latter were normally samples from the Dulux Master Palette Colour Register, because it provides an extensive range of approximately 10,000 samples. Where a match was not available, a colour sample was found from another source. Having assembled palettes using this method, the samples were visually notated using the Natural Colour System (NCS). Although the Dulux Master Palette Colour Register provides a much larger colour range than the NCS, the latter is an internationally recognized colour order system. Also, it is structured to provide dimensions of colour that would assist in the analysis.

To permit a balanced visual comparison of the colour palettes, a standard number of 20 colours was selected as representative of each decade. Selection of the 20 colours per decade inevitably was based on personal estimation of their frequency of occurrence. There were limitations with this method, but given the availability and location of source material there was no alternative to the procedure followed.

SURVEY PARAMETERS

In undertaking research of this nature, the parameters of the survey must be acknowledged.

Accuracy of the Colours

As the colours were selected from a variety of sources, it is inevitable that some provide no accurate representations of the original colours. For example, paint charts discolour over time and fabrics tend to fade. The printing quality in magazines and brochures varies dramatically, particularly in the 1950s and 1960s when colour printing was first introduced. The coloured illustrations used in many of the books and catalogues earlier in the century were hand-painted and therefore were an interpretation of the source colour by an artist. In addition, on-site sourcing necessitated visual matching.

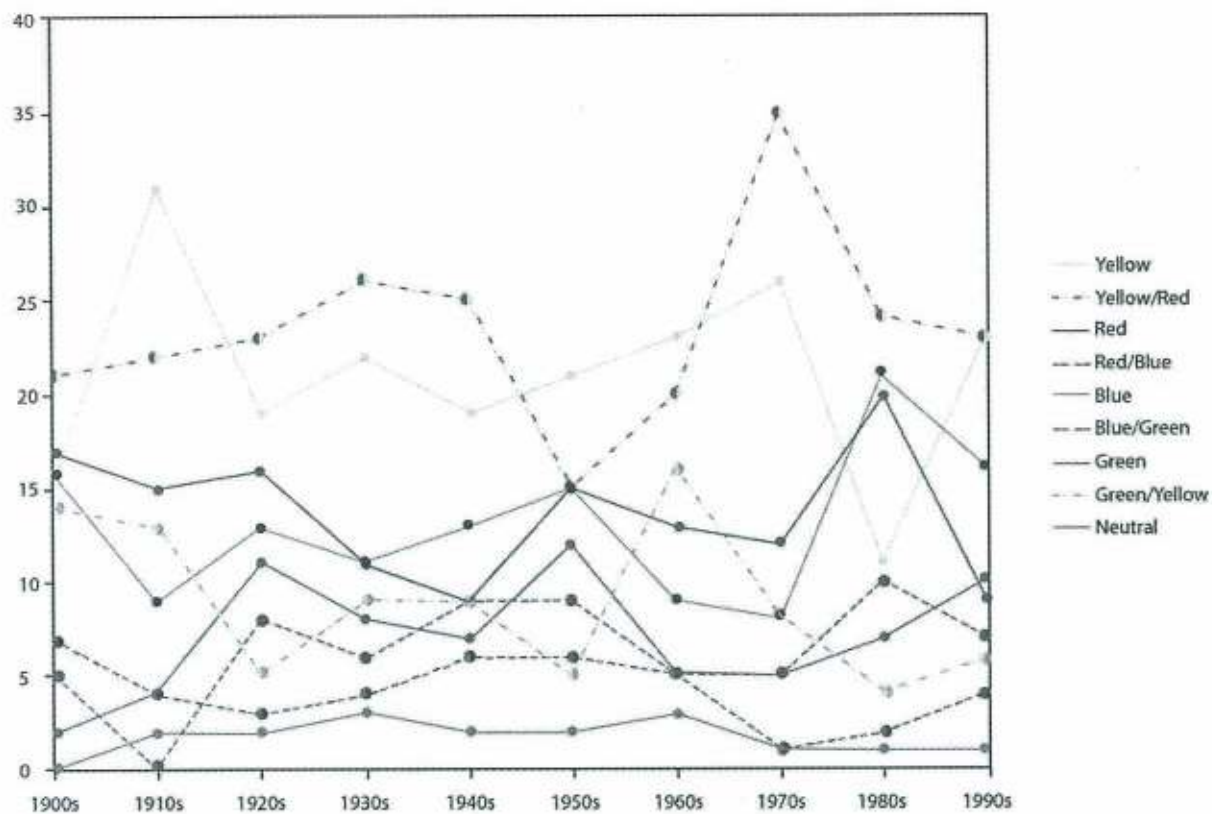


FIG. 1. NCS hue categories as a percentage of each decade's colour palette.

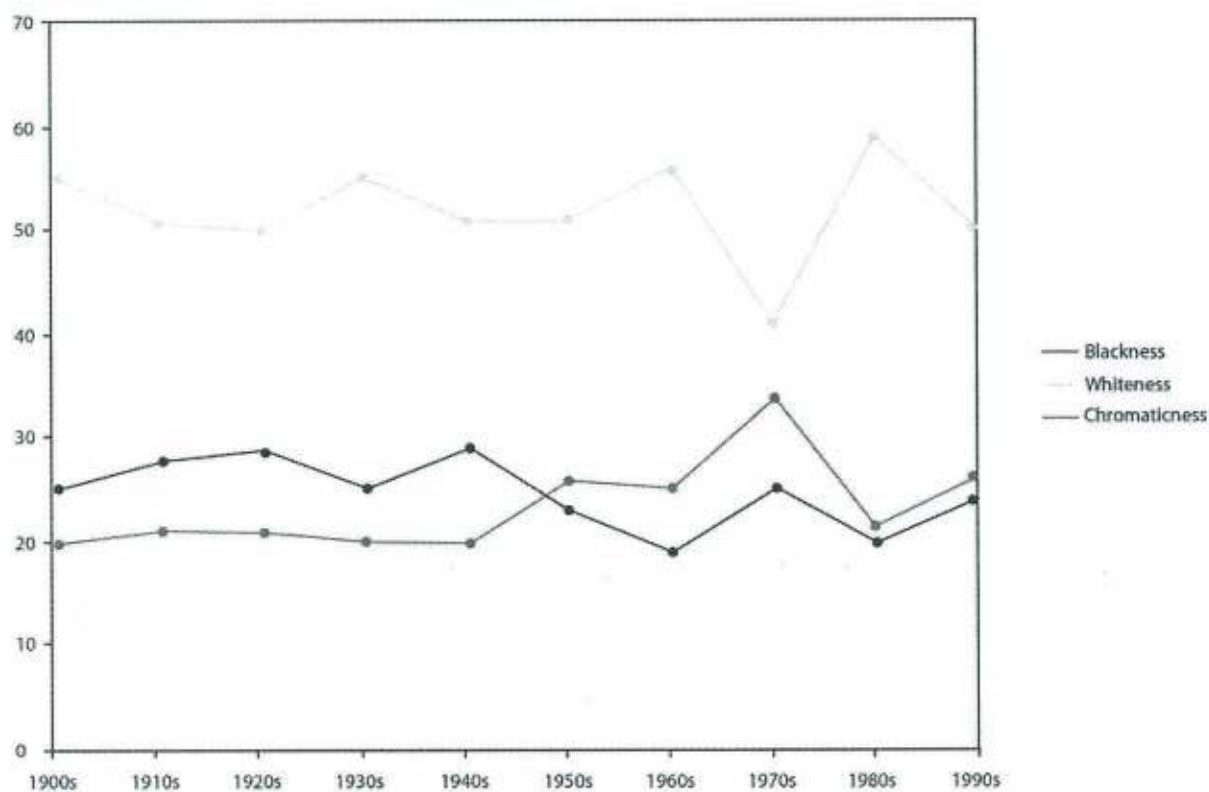


FIG. 2. Mean level of NCS blackness, whiteness, and chromaticness of each decade's colour palette.

Availability of Material

Material was scarce from the early decades of the century. No coloured photographs were available, although some catalogues existed with colour samples and coloured illustrations. For these decades, company records proved useful, as did such sources as the Historic Houses Trust of New South Wales and the Powerhouse Museum, Sydney.

Choice of Colours

As products and colour schemes often comprise more than one colour, the actual colours selected for the palettes were the important colours in the interior scheme. Similarly, where the predominant colour was accompanied by an accent colour and that accent colour was representative of the period—such as orange accents in the 1930s—both were included in the palette. Inevitably, these decisions reflected personal judgement.

Geographic Limitations

Most of the research was conducted in Melbourne and Sydney. As many of the products covered in the study were distributed across Australia, regional differences may have occurred. Because of the small population of Australia relative to its geographic size, companies have tended to distribute the same products throughout the country. Ascertaining any regional variation in colour consumption is outside the scope of this study.

The study therefore was conducted within specific methodological constraints. Acknowledging these constraints, the study has the advantage of explicit parameters. No previous attempt has been made to systematically chart colour usage over a significant timescale.

RESULTS AND DISCUSSION

Colour Changes over the Century

Figures 1 and 2 provide an overview of NCS hue, blackness, whiteness, and chromaticness distributions over the century. In discussing the results, hue categories are taken as the point of departure, given that there was more variation in hue over the century than in the other colour dimensions. The nuance of a colour—that is, its NCS blackness, whiteness and chromaticness—is taken into account when discussing hue. Below is an outline of the main changes that occurred during the 10 decades. (The percentages are rounded to the nearest whole number.)

1. Yellow (G75Y-Y24R)

Yellows were most popular in the 1910s, consisting of 31% of the decade's palette, and least popular in the 1980s, consisting of 11% of this decade's palette; however, the average chromaticness was almost identical in these two decades. The 1970s revealed the second largest use of yellows in the 20th century at 26%, and chromaticness was the highest for the century at 34%. Although the average blackness for the 1970s corresponded to the century's average, the whiteness was the lowest for the century, indicating little occurrence of pastel colours. Blackness was higher in the 1910s, and remained above average until the 1950s. In the remainder of the century, yellows remained between 16 and 23% in usage.

2. Yellow/Red (Y25R-Y74R)

The use of yellow/reds was fairly constant (between 20 and 26%) except for two decades, the 1950s, where they declined to 15%, and the 1970s, where they were by far the most popular hues, with 35% usage. Chromaticness was high in the 1950s,



but highest by far in the 1970s. In the 1950s both blackness and whiteness were slightly below average, in contrast with the very low whiteness of the 1970s.

It is notable that the yellows and yellow/reds always comprised more than one-third of the hues used in each decade—the minimum was 35% in the 1980s and the maximum was 54% in the 1910s. With few exceptions, these hue categories were the most frequently used during the twentieth century.

3. Red (Y75R-R24B)

Reds were most popular in the 1900s (19%) and 1980s (20%), which coincided in both cases with relatively low chromaticness and blackness. This indicates that pinks rather than strong reds were popular. This was especially obvious in the 1980s when the average whiteness was 60%, the highest by far for the century. Reds were least popular in the 1940s and the 1990s. The remainder of the decades recorded between 12 and 16% usage of reds.

4. Red/Blue (R25B-R74B)

This hue category was not as popular as the previous three, though it showed more variation across decades. Red/blue was not evident in the 1910s, whereas the 1980s showed the greatest use at 10%. Pastel variations of red/blue were popular during the 1980s. The other decades fall into two blocks: those between 7 and 9% (i.e.,

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the 1920s, 1940s, 1950s, 1980s and 1990s) and those between 5 and 6% (i.e., the 1900s, 1930s, 1960s and 1970s).

5. Blue (R75B-B24G)

Blues again reflect the dramatic differences between the 1970s (8%) and the 1980s (21%). Chromaticness was reversed, with the 1980s recording 21% against 34% for the 1970s, the latter registering the highest usage for the century. Blues were relatively low in usage in the 1910s and the 1960s at 9%, though they were moderately popular in the 1900s (16%), the 1950s (15%), and the 1990s (16%). Except for the highest and the lowest, all of the other decades reveal average usage of between 9 and 16%. The levels of whiteness and blackness for these decades give additional information on the blues; for instance, it is apparent that the 1980s, with a high degree of whiteness, indicates pastel blues.

6. Blue/Green (B25G-B74G)

This hue category has not been popular (1-7%), but there is some variation. Blue/green was most widely used in the 1900s (7%) and was moderately popular in the 1940s (6%) and the 1950s (6%). Chromaticness was similar in the 1900s and 1940s, but higher in the 1950s. The other difference between these decades was in blackness, which was lower in the 1950s and higher in the 1940s.

7. Green (B75G-G24Y)

Green has been more popular than blue/greens, but not as popular as the yellows, yellow/reds, and reds. Greens reveal fluctuating popularity ranging from 2% in the 1900s to 12% in the 1950s. The green decades were the 1920s (11%), the 1950s (12%), and the 1990s (10%). The 1950s and 1990s reveal a similar level of average whiteness and blackness; however, the 1920s had the highest blackness for the century. Chromaticness varied most during the decades when green was least popular; for example, Chromaticness in the 1900s was 20%, whereas in the 1970s it was 34%.

8. Green/Yellow (G25Y-G74Y)

This hue category shows high variation ranging from 4% in the 1980s to 16% in the 1960s. Apart from the 1980s, the other low decades were the 1920s (5%) and the 1950s (5%), whereas the 1990s were 6%. The 1900s (14%) and 1910s (13%) reveal a high use of green/yellows, although the Chromaticness in these decades was low in comparison to the 1960s. The 1960s had the lowest average blackness of the century (19%).

9. Black/White/Grey (N)

This last category is difficult to interpret, in that it consists of the colours designated by N, the neutral axis of the NCS colour space. It is the most inaccurate, as often there was no source colour documentation of blacks and whites, although they were often referred to in the accompanying written material. For example, blacks are not included in the 1900s chart, although Black Japan was used extensively on floors. The number of recorded blacks, whites and greys was relatively small and perhaps does not reflect the actual occurrence. Black may have appeared on many occasions, but was only recorded once. It also does not show the quantity of the colour used. For instance, in the 1920s and 1930s, many of the ceilings were white with dark, almost black, stained timber on joinery and floors, but this is not reflected in the colour palettes.

Patterns of Colour Use

The results show a greater variation in colour over the second half of the century. This was probably because of both advances in technology that increased the range of coloured products available and to the dawn of the "age of consumerism" that resulted in an increasingly fashion-conscious market for interior products. Changes in chromaticness support this interpretation, with very little variation occurring in the first half of the 20th century and more variation in the second half of the century.

The main changes in colour during the twentieth century are in hue. These changes occur frequently throughout the century, so that although advances in technology increased the availability of highly chromatic colours, there are other factors at work. An interesting observation concerns the development of new yellow bases for paints in the 1970s.¹⁰ During the 1970s, the chromaticness increased to an all-time high, with hues of high chromaticness such as yellow and yellow/red being very popular. These high chromaticness hues were still available in the 1980s, and yet their popularity decreased dramatically, especially the yellows, which fell to an all-time low. It is notable also that a new blue base for paints was introduced during the 1980s,¹¹ which could have encouraged the use of blue/greys, blue/greens, and blues. The result of 21% for blues in the 1980s was the highest for the century. The 1980s also showed an increase in reds, red/blues, and blues, together with a decrease in both chromaticness and blackness, and an increase in whiteness. In other words, pastel pinks, blues, and lilacs appeared, in contrast to the clear

bright primaries of the 1970s. It is difficult to account for this shift in terms of technology.

Although there were variations in hue in the first half of the century, the greatest changes occurred in the second half of the century. This was particularly obvious in the yellow/red category, where little variation is apparent until the 1950s, when a dramatic increase occurs. It is interesting also that the three most popular hue categories during the century were yellow, yellow/red, and blue. However, these hue categories exhibited more variation during the second half of the century.

The hue changes are particularly obvious when nuance is taken into account. Chromaticness, in particular, was fairly consistent for the first five decades and then varied considerably during the last five decades. Both blackness and whiteness also varied more during the second half of the century. In combination, the result is a far greater change in colour palettes during the latter part of the century. However, the most interesting feature of the colour data, and the main change over the decades, is in the dimension of hue.

The colour data were examined for evidence of pattern or cycle to the changing colour palettes. It is almost folklore that colours go in cycles; however, there was no indication in this study that colours reappeared at regular intervals. Oberascher¹² in his study entitled "Cyclic Recurrence of Collective Color Preferences" claims that purple is fashionable every 7 years. The validity of this claim is questionable in the light of the present study. Also, Oberascher documented only 20 years of limited data. A 20-year study is too short to establish a convincing argument for a 7-year repetition of colours.

The results for hue, blackness, whiteness, and chromaticness were examined closely in an attempt to find any reoccurring pattern. As described earlier, there have been definite changes in each of these dimensions, with some decades recording significantly higher or lower levels than others. The different hue sections were considered individually; however, no hue pattern is discernible. The same applies to the nuance of the colours. There is very little variation in blackness, whiteness, and chromaticness during the first half of the century. It is only after the 1950s that there are any significant variations across decades. The results of the present study therefore provide no support for a systematic pattern to colour use.

Causal Factors

In addition to examining changes in colours, attention was given to their possible causes. A number of social indicators were considered in an attempt to relate social change with changes in colour palettes. These included disposable income, technology, the role of women, home building, and home ownership.

Technological developments were investigated to assess their influence. The availability of new bases, as indicated earlier, appears to have encouraged the use of certain colours; for example, the popularity of yellows and reds in the 1970s and blues in the 1980s. However, such technological changes do not fully explain the colour palettes for these decades. For instance, the popularity of so-called "heritage colours" in the 1980s could not be attributed to the introduction of new pigments and dyes. There were advances in technology that directly influenced the availability of certain colours; however, these advances did not influence colour consistently over a sustained period of time.

Social changes, such as the role of women, may have influenced colour choice during the century. During the first part of the century, the decoration of interiors could be considered primarily a woman's domain. With the advent of the women's movement and, with it, increased equality and the sharing of roles later in the century, men probably had a greater role in interior decoration. There was also a growth in single households, with the breakdown of the family unit resulting in changes in the profile of interior decision makers. In the 1970s, when men's influence in interiors could be anticipated, colours such as bright yellow, orange, lime green, red, and brown were popular. This could be interpreted as representing more masculine colour choices as distinct from the presumed feminine colours, such as pink. One could speculate that pink was popular in the 1950s, when there was a move to get women back into domestic duties after World War II; however, pink was also popular during the 1980s when women were entering the workforce in increasing numbers. There is no apparent association between the changing role of women and colour palettes.

An attempted association also is made between women's fashion colours and interior colours,¹ the underlying notion being that fashion colours influence interior colours. Some decorators have even sought to ensure that interior colours would complement their client's colouring and wardrobe. Advice was given from the 1940s onward on choosing colours to suit the homeowner's colouring and/or personality. From the results of the present research there is no indication that fashion leads furnishings in colour. If there is an association, the 1990s would have been the era of black interiors in Melbourne, where black was the predominant colour in apparel! There are probably some links between the moods and tastes of the time and the availability of pigments and materials; however, the differing lifestyles and use of fashion versus interior products probably results in different consumer decisions for each.

Architectural changes in some cases have a direct bearing on the use of colour. For example, in the 1940s the recognition of the difference in aspect between the Northern and Southern Hemispheres resulted in a reevaluation of the use of colour in Australia. Previously, warm colours were recommended in north-facing rooms and cool colours in south-facing rooms, in line with British Northern Hemisphere guidelines. This guideline was then brought into question, together with the actual colours used. Designers such as Frances Burke and Margaret Lord developed colour palettes specifically for the Australian home. Another example is the development of an architectural style more suited to the Australian environment.¹³ This used larger windows and more interaction with the outdoors and again resulted in a reevaluation of the use of colour. For example, curtains in Australia provided larger blocks of colours, and therefore colours could be overpowering if not carefully considered. Strongly coloured curtains on smaller European windows could be used as an effective highlight.

The age of consumerism that emerged in the 1950s encouraged homeowners to redecorate on a more regular basis. Marketing became an important activity for companies that invested in researching their target markets and promoting products to clients. It was in their companies' interests to have changing trends in interior decor, as it required people to upgrade their homes. Changing fashions in interior colours were encouraged by marketing departments to maximize sales. The result of this was rapid change and the growing importance of colour in interior products.

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An important factor during the second half of the century was the increase in the rate of change, and the acceptance of change facilitated by improved communications and the age of consumerism. Advertising and marketing became more sophisticated, influencing consumer choice and encouraging change. This appears to be reflected in the more dramatic changes in colour occurring during this period. The media was probably the major influence in changing colour palettes and played an important role in the marketing of colour. Consumers appear to lack confidence in choosing colour and consequently look for guidance. Even though the ideal of individuality and self-expression is promoted, the reality is a large degree of conformity. The availability of books, magazines, brochures, and expert advice increased dramatically during the second half of the century. Such articles and books provided extensive advice on using colour. This probably contributed significantly to the rate of colour change during this period.

The only economic association appears to be the large growth in disposable income that occurred after World War II and the increasing degree of change in colour palettes during that time. The increase in affluence enabled consumers to indulge more in aesthetics rather than just the functional aspects of the home. This probably resulted in a desire to change for the sake of fashion—a want rather than a need.

In the data examined, no specific determinant of colour use is apparent: rather, the colour changes are most likely the result of a combination of factors. To achieve changes in colours, the colours first have to be available, and then they have to be marketed and the consumer has to accept the colour and to be in a position to change. As such, technology provides availability, marketing communicates and promotes the colours, the social context determines acceptability, and the economy determines affordability. The problem then is how to quantify these influences to determine if and what impact they have had on colour choice. To unravel this would be extremely difficult.

Colour Forecasting

People tend to look for rules in colour choice and to search for some rationale to account for colour trends. Consequently, the opportunity exists for colour forecasters to provide guidance. A number of people working as colour forecasters have built up years of experience in this process. Some acknowledge the

“... This study investigated the popularity of residential interior colours in Australia during the 20th century and the possible causes of changing colour palettes ...”

vagaries of colour forecasting. For example, Verloot states, “Color forecasting is not an exact science, and like so many areas involving aesthetics, beauty, and design, color fits into an elusive category. There are no hard and fast rules that apply to how to color forecast, but there are certainly proven track records that show successful methods of the process.”¹⁴ The proven track records she alludes to presumably indicate the forecasters’ success at predicting the future popularity of their selected colours. But where is the evidence? The evidence seems to consist of anecdotal observations rather than documentation of colour palettes related to past predictions.

There appears to be no clear pattern to changing colour trends: the influences and possible causes of colour change are far too complex. Many of the colour prediction agencies referred to in the introduction look at lifestyle, social and economic change in relation to colour trends. Although these agencies may provide the opportunity for those involved in the selection and marketing of colours to exchange ideas, rationalize decisions and develop future colour palettes, there appears to be no evidence to support the predictive validity of their colour decisions. In the absence of evidence to the contrary, colour forecasting appears to be a matter of rationalizing decisions based on past experience, observation, and intuition. This is not suggesting that no individuals exist who have skills in colour selection. However, if colour forecasting is to achieve credibility, there needs to be a more analytical approach



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to the process. Predictions need to be matched against hard data for actual colour consumption.

CONCLUSION

This study investigated the popularity of residential interior colours in Australia during the 20th century and the possible causes of changing colour palettes. The study found that although there were distinct changes in the use of domestic interior colours during the 20th century, there was no apparent pattern to these changes, nor was there evidence of specific sociocultural lifestyle causes in the incidence of colour choices. These results therefore challenge the foundation of colour forecasting, namely that there is order to past colour consumption and that this order reflects the sociocultural lifestyle conditions prevailing at the time.

In providing such a challenge, this article hopes to open up the area to greater empirical scrutiny. Although the methodology employed has limitations, it has the distinct advantage of being explicit. It has strengths and it has weaknesses, but it is immeasurably stronger than the anecdotal evidence that characterizes this domain. The challenge is to devise more effective methodologies to tease out what underlies colour consumption. This is not an easy field to investigate—as acknowledged. But it is amenable to scientific scrutiny, as the present article demonstrates. To the best of the authors' knowledge, this is the first such attempt at an investigation that specifies its methodological parameters and seeks a dispassionate outcome.

Finally, and on the point of a "dispassionate outcome," it should be stated that the underlying intention of this research was not to bring into question those principles underpinning colour prediction. On the contrary, the first author is an active member of the colour consultancy/prediction field of many years standing, who sought to provide empirical verification of such principles. The first author gathered the data and undertook the analysis with this in mind. In other words, this was not an unsympathetic study. However, the results do not permit a sympathetic interpretation.

APPENDIX

Magazines: 'Australian Decorator and Painter', 'Australian Home Beautiful', 'Australian Painter and Decorator', 'Australian House and Garden', 'Australian Home Builder', 'Australian Women's Weekly',

'Vogue Living', 'Australian Home Journal', 'The Home', 'The Home Annual', 'Art and Design', 'Furnishing', 'Interior Designs'.

Trade Journals: Domestic Textiles and Wallcoverings Trade Journal, Australasian Window Furnishings, Australasian Floor News, Australasian Interiors, Australian Furnishing Trade Journal, Furniture and Furnishings Trade, Furniture Trades Review Journal.

Colour Cards and Catalogues: Hall's washable distemper colour cards; Maples carpets catalog; Shand Kydd, Pears, Maples, Patersons, and Richmond furniture catalogues; Jennings' wallpaper and wallcoverings catalogue; Keystona paint charts; Borthwick's household enamel colour charts; Waring and Gillow carpets; Bebarfalds home bureau catalogue; Grace Bothers furniture and Brother's furnishings illustrations; Newton's Paints; Berger's paint colour scheme brochure; Laminex colour samples and catalogue; Marimekko fabric samples

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LIGHT BOOTHS, an *essential* in colour management

By David C. Albrecht, Advanced Color Technologies, writing for GTI Graphic Technology, Inc./ Newburgh, NY. Reproduced with permission. Previously published *Paint & Coatings Industry*, January 2006, Vol 22(1) pp 64-68

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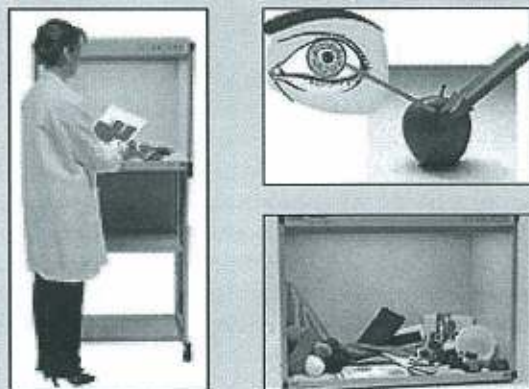
Because the eye adapts so well to the various white light sources, it does not take into account the color reflectivity differences of the various objects we see. When it comes to color matching, this can be a very big problem.

Color is an ever-present measure of quality, even in a subliminal sense. Whether it be automobiles, food, appliances, toys, etc. we perceive quality by the color of the product and how well the colors cover and match. If an automobile is repaired after an accident, do we first judge the quality of the repair job by the structure of the new part or its metal composition, or do we judge it by how well the color of the fender was matched to the door and hood? Unless the fit is horrible, the vast majority of people will judge the color first.

Too often in color, the lighting environment is taken for granted. We see a light source as "white" and are not concerned with its actual spectral output. If it appears white, it is white and therefore will render colors properly. Or so many people think. In actuality what we call "white light" can have heavy biases toward the red, yellow, green or blue portions of the spectrum. Unless viewed in conjunction with each other, we perceive all of them as "white light." But the human eye integrates the information too easily, and therein lies our problem. Because the eye adapts so well to the various white light sources, it does not take into account the color reflectivity differences of the various objects we see. When it comes to color matching, this can be a very big problem.

Seeing Color

To see color we need an observer, an object and light. If the light is a true white light source, all the primary colors (red, green and blue) are reflected back as the sample dictates. We see an apple as red because it absorbs all colors but red, which is reflected to our eye. Yellow objects reflect both red and green, white objects reflect all colors, while black reflects no light (not to be confused with the gloss of a sample, which reflects a specular or mirror image of the light source). Unfortunately, the light we use to view an object has a large effect on how we see it. Taking a common "white light" source, such as a 100-watt tungsten light bulb, and viewing different shades of dark blue, we find it very difficult to judge small color differences. The tungsten lamp produces very little blue energy, as can be seen by the spectral curve of a typical tungsten lamp. Blue starts about 400 nm, green is about 500 nm and red starts at about 600 nm.



If there is very little blue light coming from the light source, then there is very little blue light for the sample to reflect. The only thing worse would be to match two colors in complete darkness. You may find that the chances of a good color match are about the same!

Similar problems occur with various other light sources. The ability for a light source to render color well is rated on the Color Rendering Index, or CRI. A CRI of 100 is perfect, a CRI of 20 is very bad for evaluating color. Industry specifies a CRI of 90 or better for color evaluation applications. For color matching, another, more-stringent system is used to rate light sources.

If a light source has such a bias toward one color or another, why do we see white light? To live in a world of changing colors, the human visual system has adapted itself over thousands of years. We can see a piece of fruit in the yellowish light of early morning sun or at midday when the quality of light is bluer, and still see a red apple. Even though colors shift under these different light sources, we can still see objects we need to see. But until recently, in an evolutionary sense, we have not had to actually match colors. And between then and now, we have become far more critical of color. Not only do we want the color to match between two painted parts, but also between fabrics, plastics, paint, etc. and under all light sources. And therein lies our biggest problem — it is called metamerism.

Metamerism is very well known in the world of color. Two samples, say one plastic, the other painted, may match in color under a specific light source, such as daylight for instance. But when another light source is used, incandescent for instance, the samples no longer match. The effect can be insignificant, or it can be dramatic. One thing is for certain, if the samples are of two different types, or the color is achieved using different dyes or pigments, there will be metamerism to some degree.

With this information now placed in front of us, it is easy to see why we need multiple-source lighting systems to properly view color. They allow us to determine metamerism and to confidently evaluate samples for color and color match under various light sources. So why aren't more people using them? Although used quite a bit, why do so many companies avoid the small expense of a lighting system? No company would think of going into business today without purchasing a computer. Why would a color-related company even think of trying to communicate color-related issues without first specifying the light sources the evaluations were or should be performed under?

Finding The Best Solution

'Penny wise and pound foolish' is an old English expression that still holds true today. Or could it be that the use and benefits of a visual color-matching system or light booth are just not fully understood? Perhaps both. The first is easy to refute. Most people look at the products they see for visual color matching and come away with the idea that there is only one source for them and that source sells an expensive product. In actuality there are many sources for light booths, and they come in various sizes and prices. The key is to know what you need. And the industry provides that information for us, if we know where to look.

Industries have banded together, legally, for many years to come up with standardized product attributes. For instance, instead of buying tires for your Buick from GM alone, you can buy tires from virtually any manufacturer that makes tires because of standards. Tires are manufactured to specific size requirements. The rim type, size, height and width of a tire have all been standardized so tires from various manufacturers can fit a common or standardized rim. And the designations for these sizes have also been standardized so you can buy a tire from XYZ tire and from ABC tire, with the size and fit to the rim being the same.

Color technologies have also been standardized. The standard, ASTM D 1729-96 specifies the light sources to be used and minimum requirements for the daylight source to allow for effective color matching. The standard CIE/ISO 10526 describes standardized light sources. Table 1 contains a brief summary of the ASTM standard.

The important aspect to consider when looking for a quality light booth is whether it meets the specifications in the standard. Even if light booths of different technologies are used, if they meet the standards, the evaluation of samples within the booth will be the same. If the standards are met, then the differences in the light booths will only be the conveniences and features included with the specific light booth.

One of the more important specifications is the CIE Publication 51 rating of the daylight source. This is more stringent than the CRI system and quantifies the mismatch resulting when samples that are a match under the standard CIE daylight illuminant are viewed under the illumination of the test source. A "BC" rating or better is required for critical color matching and represents less

than 1/2 Delta E difference in the visible spectrum and less than 1 Delta E in the UV spectrum, for all of the eight metameric pairs (5 for the visible and 3 for the UV portions of the spectrum). The first letter of the rating indicates how well the source performs in relation to the visible spectrum and the second letter, how well the source performs relative to the ultraviolet or UV spectrum. Natural daylight has UV energy that affects how we see samples with optical whitening or brightening agents.

If the light booth meets the specifications, and there are a number that do, then the idea that light booths are expensive can be put to rest. Light booths that meet the specifications indicated above range in price from around \$550 for the least expensive (and the smallest) to over \$4,500 for the most expensive (but not the largest). It all depends on your needs and the size of the materials you are working with.

Color samples for paints, plastics and textiles such as let-down chips or spray out tests and other similar industry test samples are generally small, less than 3 inches square. For these applications, a small light booth, about 18 inches wide, will be the most practical solution for viewing color properly. This sized light booth will easily fit on a desk or credenza and be convenient for everyday use. They work as well in an office environment as they do in a lab. Controls on such booths are generally simple, using basic switches. Larger booths, up to 60 inches wide (152 cm) can include automatic sequencing systems to allow the user to pre-program a sequence of light sources. This helps to increase the efficiency and effectiveness of the visual color matching process or evaluation.

For even larger areas, most manufacturers offer their lighting systems as individual luminaires. These are suspended over a work surface. Although having the same features as the fixture on a booth, this option has the added benefit of allowing a company to create large custom viewing environments or rooms. Some systems can even link a controller luminaire to a series of satellite luminaires, allowing one controller to switch the lamps on all the luminaires. Using the luminaire approach does require the user to create their own standard surround condition. Walls and viewing surfaces must all be of the proper color, a neutral gray, commonly designated as "Munsell N7". Although it would seem that getting the right shade of paint would be easy, to get a truly neutral color gray, having no metameric effects, is not easy. Generally it cannot simply be found at the local paint store. One source for the paint is GTI Graphic Technology, of Newburgh, NY. The company can supply paint in the required Munsell N7 shade, in quart and gallon containers. It also sells complete light booth systems in various sizes.

Light Booth Maintenance

A light booth for color-matching and evaluation applications needs to be maintained differently from the conventional general lighting fixtures we find in the home or office. There are two basic attributes that need to be maintained — light intensity and color quality output. Maintenance does not have to be expensive, but it depends on the system you have. Systems that use older filter technology are the most expensive to maintain. These use high-intensity filament-type lamps and special glass filters, which change over time, actually becoming denser or bluer. To maintain proper color quality, the filters must be changed periodically. A filter set can cost over \$700, and then the booth needs to be calibrated afterward to make certain it is within the original specifications. The cost of such a calibration, with filters and relamping other sources, can be well over \$2,000. If filters are not needed, then you can subtract this expense. Calibrations usually need to be performed yearly to meet ISO 9000 conformance.

» Light Booths Essential

On the other side of the cost spectrum there are light booths that use modern fluorescent technology. Fluorescent lamps have come a long way since they were first introduced over 60 years ago. Full-spectrum lamps are now available that offer cool and efficient light output, consistent color quality and require much less maintenance than their filter technology counter parts. The cost to relamp is generally less than \$300 for the largest booths. Certified relamp kits, which include all the lamps within a booth and a Certificate of Conformance, are also offered by manufacturers such as GTI Graphic Technology, Inc., for only \$100 more.

Other than relamping and calibration, booth maintenance includes making certain the reflectors are cleaned of dust and dirt that can accumulate over time. For some environments, where there is a great deal of dust in the environment (e.g., powder coating operations, paper making, printing press and textiles manufacturing operations) may require more frequent cleaning of the fixtures to ensure proper light and color output.

Communication is Key

Now with the two most common myths of standardized lighting put to rest, why companies still don't obtain and use a light booth is a mystery. Those that do finally install one find the experience liberating. When combined with the use of a light booth at their supplier or customer, the experience is almost enlightening. Where before supplier and customer would argue over what each was seeing, now they are able to specify a light source under which to view the sample and make their decisions accordingly. They can communicate far more effectively than they were able to in the past. Just having one booth in a company will help people understand what their supplier or customer is seeing. But like any tool, it must be used, and used properly. The higher the position of the person evaluating the sample, it seems, the less they feel they need a light booth. They are experienced, or are just too busy. But if truly experienced, they would know that experience cannot compensate for the physics of reflected light. You cannot make quality judgments on something you cannot see! As for too busy, are they too busy to make the product over? Too busy to save the expense of a wrong decision?

There are many excuses for not using a light booth, or not using one properly. But if used regularly and used properly, each time a color decision needs to be made, the light booth will end up

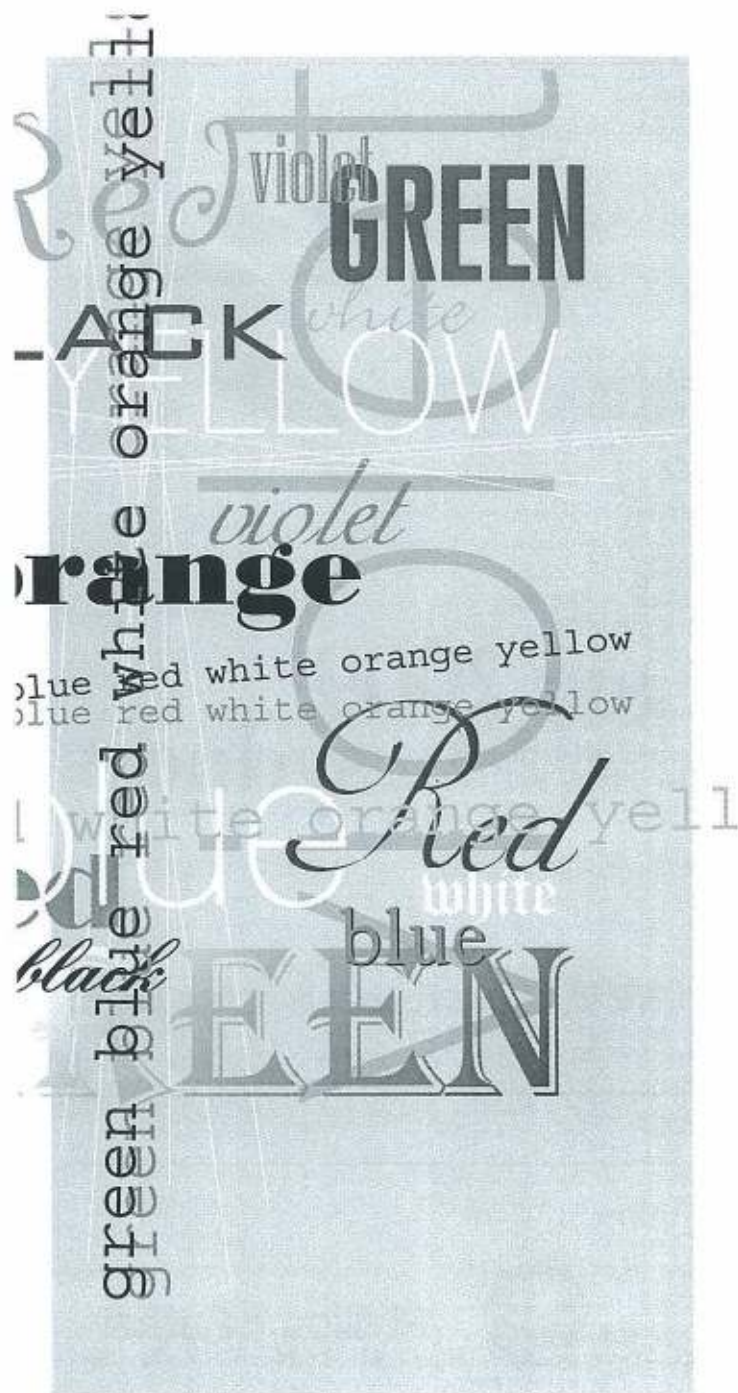
paying for itself, many times over. Users that stop making the excuses and stop using the light booth only "when necessary" will benefit greatly from applying this discipline. And they will feel better for it. It's like the old joke, "Why do I keep hitting my head against the wall? Because it feels so good when I stop!"

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2. "Various Light Sources and Their Use in Color Matching Applications". www.gtilite.com/gti-technote-archive.htm.

For further information, contact David C. Albrecht, Advanced Color Technologies, dave@measurecolor.com.

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14th CENTURY EXAMPLE OF THE *four unique hues*

*This article was first published in the journal
"Color Research & Application" and is
reproduced here with permission.*

» Ralph Pridmore

Ralph Pridmore is or has been a civil engineer, color designer, and artist in paint and leaded glass, and has researched colour and colour vision part-time since 1975. He has published some 30 articles in international scientific journals or international conference proceedings (including some in press for 2007).

The following article by Ralph Pridmore is reprinted from *Color Research and Application*, Volume 31, pages 364-365 (2006). This short article concerns the theory of unique hues, published by Ewald Hering in 1878. It is now universally accepted, and is an important part, a basis, of colour theory. To describe it in brief, the concept is that all the hundreds of discriminable hues of the hue circle (that is, the entire cycle of hues from, say, blue, through cyan [ie, aqua or turquoise], green, yellow, orange, scarlet, red, crimson, magenta, purple, violet, back to blue again) can be described by four "unique" hues and their mixtures. The four unique hues are Blue, Green, Yellow, and Red. Only these hues are unique, or unitary, that is, each unique hue is independent of the other three unique hues. Thus, unique blue is neither reddish nor greenish; it is simply and purely blue. Unique green is neither bluish nor yellowish (to me, unique green is rather rare in nature, with most greens being distinctly bluish or yellowish). Unique yellow is neither greenish nor reddish (note that yellows, particularly the reddish ones, when darkened or mixed with black become the hue known as "brown"). And finally, unique red is neither yellowish (eg, scarlet) nor bluish (eg, crimson).

The unique hues vary amongst individuals, and even between the two eyes of an individual. What appears as unique blue to me may be a slightly reddish-blue to you. Other hues consist of mixed unique hues. Eg, the purples may be described as bluish-red, equally blue-red, reddish-blue, etc. Orange may be described as yellow-red. (Note that "orange" cannot be a unique hue because it clearly consists of red and yellow.) Cyan is bluish-green, blue-green, or greenish-blue, etc. Unique hues are now a generally accepted concept. For example, they are the basis of the Natural Colour System widely used in the Scandinavian and other European countries, in which all the hues are described in terms of four hues and their mixtures.

Unique hues are also called the psychological primary colours. Here it is worth mentioning the difference between the psychological primaries and the so-called subtractive colour-mixture primaries. The two were once thought to be the same, that is, that a colour-mixture primary (say red) was also a psychologically pure red (ie,

*"... The significance of
this glass is that it was
designed and constructed
in the 14th century
and represents the four
unique hues ..."*

unique red in modern parlance.) However, it has been proved in science and commerce over at least one hundred years that magenta is a better (and brighter) colour-mixture primary than red. The modern colour-mixture primaries in art and commercial printing are Yellow, Magenta, and Cyan; you can see these three colour patches printed in the margin of a newspaper using coloured advertisements or photographs. There have been arguments, usually from painters, that green is not a unique hue but a mixture of blue and yellow. Painters have traditionally used yellow, red, and blue as colour-mixture primaries, thus mixing green from blue and yellow. Hence painters can find it difficult to perceive green as a unique hue. But any unique hue can be mixed from the two adjoining hues; eg, red can be mixed from magenta and yellow. Similarly, yellow light (but not paint) can be mixed from red and green lights (red and green pigments mix brown, or dark yellow, which is why yellow must be a colour-mixture primary).

In summary, unique hues are an important part of understanding colour and its principles. Though the concept was first published and demonstrated by Hering in 1878, the concept was not popularly accepted in science until the 1950s. Hence it is surprising to find the idea of four unique hues apparently existed in Arabic art over 600 years ago, as shown by the following article reprinted from *Color Research and Application*. However, the Arabs in those times led the world in art, mathematics, and science,

with Europe later learning those skills directly through the Arab presence in Spain (eg, Arabic clear glass in Cordoba, Spain, in the 9th century) or indirectly through Egypt and thence Greece.

It is generally thought that Ewald Hering (19th century), or possibly Leonardo da Vinci (16th century), first recognised the concept of four unique hues (blue, green, yellow, red). However, in the Alhambra palaces, Granada, Spain, in a room roped off from tourist traffic, is a stained glass window featuring the four unique hues, built around 1370.

During a visit to the Alhambra palaces in Granada, Spain, a day before the AIC 05 conference in May 2005, I noticed the stained glass window in the ceiling of the Mirador de Lindaraja ("Mirador" means a lookout, and "Lindaraja" is corrupted Arabic for "the eyes of the house of Aixa." Aixa was apparently the wife of the Sultan of Granada).¹⁻¹ The Mirador is a small room off the Hall of the Two Sisters (beside the famous Courtyard of the Lions), overlooking the Garden of Lindaraja, all built by Sultan Muhammad V ruler of Granada, 1354-1391.^{1,2} Once a throne room, the Mirador's magnificent ceramic tiles and stained glass are original.^{1,2} The coloured glass, held in an intricate wooden frame, is shown in Ref. 1 (p. 127), although in small scale. The glass, damaged by a gunpowder explosion in Granada city in 1590 and never repaired,^{1,2} comprises repetitive patterns of four colors only, clearly the unique hues blue, green, yellow, and red. Because the Mirador has long been roped off from tourists due to the risk of falling glass, it is difficult to see the glass ceiling without dropping to one's hands and knees. This may explain why no one seems to have previously reported this historic example of the unique hues. Museum officials would not let me enter the Mirador to photos but a museum-authorized professional photographer, who happened to be working nearby, took photos of the glass for me (see Fig. 1).

The significance of this glass is that it was designed and constructed in the 14th century and represents the four unique hues. It thus predates Hering's theory of four unique hues³ dated 1878 (by some 500 years) and Leonardo da Vinci's color theory notes⁴ of about 1510, in which he treats colour as four main hues, blue, green, yellow, and red: his notes are sometimes claimed to be the first known recognition of the four unique hues.⁵ Hence, the Mirador's stained glass, made about 1370 by an unknown artist for the Muslim Arab monarch Muhammad V, seems to represent the earliest evidence of recognition of four unique hues. Certainly this glass is a rare and concrete example (rather than theoretical or conceptual) of the unique hues in early art and architecture. The Muslims are reputed to have invented clear glass making in the 9th century, evidenced in Istanbul and Cordoba, and created the first high-quality stained glass windows in the 11th century.²

I first observed the Mirador's glass in late afternoon and in mid-afternoon on a second visit, and on both occasions it was partly in strong light and partly in shade (Fig. 1). The saturation of the colors was high, as is typical of stained glass. I was unable to measure the wavelengths of transmitted light from the glass, but from previous data on the wavelengths of my own unique hues.⁶ I estimate the glasses' wavelengths to be 460-470 nm (blue), 505-510 nm (green), 580 nm (yellow), and 493-495 nm (red). Four observers (one naive and three practiced observers including myself) perceived the glass colours as unique or very close to unique hues. The wavelengths of unique hues vary between individual observers.^{1,7} The ambient daylight presumably approximated illuminant D65. One of the four observers (Peter McGinley, CIE Australia) perceived some of the yellow glass as slightly redder (say about 580 nm) than his own individual unique yellow. Another observer (myself) perceived some of the blue glass as slightly

redder (say about 465 nm) than his own unique blue. These slight differences from our individual uniques were one or two just-noticeable differences and may be due to the original artist's individual unique hues, to discoloration, to hue shifts due to different luminances of incident light, or to the normal slight hue shifts across a sheet of handmade coloured glass.

In Fig. 2, I have attempted a color reconstruction of a corner section of the ceiling glass. Each corner section is the same pattern but reversed or mirror-imaged as appropriate and probably, but not certainly, the same colours. For example, the top left section of Fig. 1 has some red glass where the top right section has blue glass, but this may be from attempted repair post-1590, by replacing pieces of fallen glass without a prior record of the colour pattern.

It would be interesting if my present report were followed up by another, perhaps by Spanish scientist(s) and including the transmittance dominant wavelengths of the coloured glass, in order to corroborate that the colours fall well within the four wavelength ranges normal for unique hues.⁷

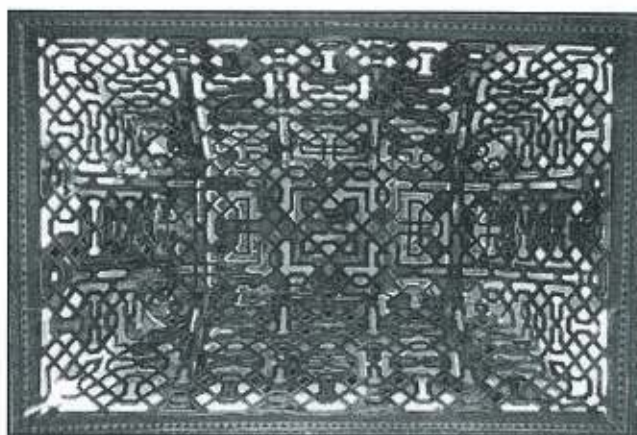


FIG. 1 Stained glass window in the ceiling of the Mirador de Lindaraja, in the Nazrid palaces, the Alhambra, Granada, Spain. The color design uses only four glass colors: the unique hues blue, green, yellow, and red. Where glass is missing, the brown timber ceiling may be seen. (Color reproduction in this photo is not necessarily accurate.) Photograph by Michael Gross, Williams College, USA, 7 May 2005.

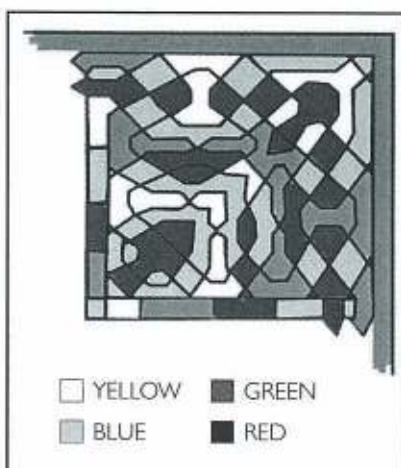


FIG. 2 Attempted reconstruction of the colors of a corner section (the top right corner of Fig. 1) within the brown wooden frame.

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• • DIVISION • •

Reports

» New South Wales

NSW Division meetings have been held monthly and continue to be well attended.

Our programme this year has included a variety of site visits which have generated an enthusiastic response.

In comparison to presentations, site visits enable members to be more interactive in the proceedings, and in addition are informative and enjoyable providing positive feedback.

Our first meeting of the year was in the showroom and factory of one of Sydney's art suppliers and framers to the design profession.

Representing many high profile artists, we had the opportunity to talk with Conchita Carambano who discussed her philosophy towards her work and how the colour palette evolves. Members were issued with white cotton gloves and could touch, pick up and view the works. They also participated in a brief demonstration of framing one piece of work in various ways.

In April, "Colours of the Lombok Reef" was quite an amazing evening with stunningly beautiful underwater photos of life downunder. Dr. Kevin Hellestrand, a keen underwater photographer, discussed the effect of movement by the waves on colours below the surface. There was much discussion with the presenter following the meeting.

Signature Prints in May on a Saturday morning, had budding textile printers from the Society, printing wallpapers! Sole

agents for Florence Broadhurst's designs Helen and David Lennie, are passionate about the successful business they have built up. Florence Broadhurst's biography had just been released and the author Helen O'Neill talked about Florence's colourful life. We sat on small stools covered in Broadhurst designs and listened intently to flamboyant tales of a dynamic and exotic woman who in the 1970's was designing, manufacturing and exporting sensational wallpapers to designers in Australia and overseas.

The June meeting at Studio 342 was another opportunity to interact with six extremely talented artists. Light, colour, design and creativity are constantly being reinvented by an object installation artist, a tailor/dressmaker, a textile designer, sculptor and two painters with highly contrasting styles. The studio was in an old "heritage" building and we moved around as each person outlined how they approached their work. What was most interesting, was that they did this work part time and did not have to compromise their pursuit, unlike most members primarily involved in the design profession, who compromise their work much of the time to suit a client!

We look forward to our first meeting this month in a series on colour in the natural and built environment, which will be followed up with a workshop later in the year. This will enable members to apply the information in a practical and useful way and understand how a colour language develops.

MEMBERSHIP

Whilst we are receiving good support from members we are still struggling to



Reports

build up the numbers significantly. The tertiary institutions are a prime target where students are young and enthusiastic and graduating students who are enthusiastic about their careers. There are currently 71 financial members in the NSW Division.

STYLING

DESIGN, BALANCE & SPONTANEITY WORKSHOP BY BABETTE HAYES

What is that magic, that special something that is felt and hard to define in words? What makes a space work? What makes a design feel "right".

Australia's first stylist, Babette Hayes, is recognized for her ground breaking work in magazine styling and commitment to raising standards of interior finishes and furnishings. She generously gave her time to members of the NSW Division of the Colour Society, running an all day workshop to explore how we respond to images, spaces and colour.

Commencing with a brief meditation session followed by words of inspiration "The mind is like a parachute ... it works best when it is opened", the group responded to a number of images - a soaring eagle, late afternoon with dappled sunlight filtered by autumn leaves, morning mist over a lake, a sunset and numerous others. Each participant responded to an image and described memories or reactions they had to it. How differently people experienced the images!

A similar exercise was carried out with interior images and a scenario evolved where participants became the client, describing what "feeling" they wanted for their home... "We don't see the world as it is, we see it the way we are".

Babette demonstrated some of the many "moods" she styled for photography for Belle, House & Garden and Domain showing their individuality, attention to detail and successful outcome. She discussed why certain themes were selected and the whys and wherefores of the choice of items for wall colour, floor finishes, fabric, accessories, layout and placement of furniture and art work.

It was a fun day with the exercises, a lot was learnt and we left inspired with a better understanding of why things worked and our parachutes were opened.

» Western Australia

In my March report I mentioned that our first meeting for 2006 was held on Wednesday, March 1st at Kidogo Arthouse on the Fremantle foreshore. Our AGM was held at that meeting and all current officers were re-elected to the positions they held in 2005 and some new committee members were added. I omitted to mention who was elected to those positions so, although a little late, here they are:

Chair: Tony Marrion

Vice-Chair: Annie Hoar

Secretary: Ruth Marrion

Treasurer: Barry Maund

Web Master: Marnee Rinaldi was not present and later resigned from the position. Mike Dixon later indicated that he would be willing to take on the task.

Committee: Branka Fantela, Lyn Ware and Ema Denby were also invited to become Committee members.

On Saturday 5th March we held a "Salad Day Workshop" at the beach house home of Suzanne Stroebe, Yanchep Lagoon, north of Perth. Members each contributed a raw food salad, as multi-coloured as possible, and we all partook of each other's vibrant creation. At the same time we learned about Suzanne's raw food diet and its benefits.

We had scheduled our April Technical Meeting for Wednesday April 5th when Trudi Pollard, a well known Perth textile artist, was to tell us about her technique of dyeing fabrics using extracts from the natural vegetation in the hills behind Perth. Unfortunately Trudi was slightly injured in a traffic accident that day so her talk was postponed until Wednesday May 3rd, by which time she had fully recovered. Her talk, titled the Earth Treasure Project, was so enthusiastically received she offered to host a workshop in her hills home where she could show us how she actually goes

• DIVISION •

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about dyeing her fabrics from extracts boiled out of leaves and wood. This became the next event for our division.

On the afternoon of Sunday 11th June we converged on Trudi Pollard's house and spent the time in a hands-on session observing and using her fabric-dyeing techniques and admiring her "wearable art" pieces.

Instead of a July Technical Meeting we held a "Weekend Away" at New Norcia, a Spanish town and monastery founded by Spanish Oblate missionaries in the 19th Century, about 60 km north of Perth. There we studied the colours of the buildings in their natural setting, and also participated as subjects in a study of legibility in graphic design being conducted by Paul Green-Armytage.

Our August Technical Meeting, held on Thursday 3rd, was addressed by Dr Adolf Deppe, a psychologist currently working with prisoners in Bunbury Regional Prison. His topic was about his use of colour in healing emotional states such as aggression and depression under the general heading of "Colour and Mind". Last September he had given a paper at the National Conference in Fremantle and in this address he expanded on what he had spoken about then.

Our September Technical Meeting was given on Wednesday 13th when our guest speaker was artist Andrew Carter. He described his life's journey from a design course in which he studied industrial design (and was taught to draw) to stage set design and set lighting, to working on big events (Melbourne and Manchester Commonwealth Games) to his present

"... use of colour in healing emotional states such as aggression and depression ..."

occupation as a freelance painter in Fremantle. The key to his success has been to sketch quickly, in his journal, ideas and concepts as they happen, so they are remembered for later development and discussion.

In October we plan a forum on Legibility in Graphic Design with several contributors from the Graphic Design industry.

» Tony Marrion

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Reports

» South Australia

Latest activities in 2006 have included:

COLOUR IN OPALS

Presenter: Jack Townsend

Opal is the most fascinating of all gemstones. The scintillating colours are produced by a complex interaction of optical effects with only a minor influence of pigmentation. Jack will unlock the secrets of the opal in a comprehensive yet easy to understand presentation. From formation to finished product, sedimentation to scintillation, Jack will lead you on a wonderful journey. Jack may also hint at some of the secrets of colouration in other gemstones.

COLOUR AND SPIDERS

Presenter: Mike Gemmell

Spiders tend to be seasonal. When people come out of their winter hibernation and start spring cleaning and gardening they tend to find creatures that have always been there but have probably gone unnoticed. When these spiders and other creatures emerge they are often thought to be a new species, and some people get most upset when Mike identifies them and they find that they cannot name their new species after themselves.

COLOUR IN THE BUILT ENVIRONMENT - DECORATIVE CONCRETE'S CONTRIBUTION

Presenter: Derek J Grantham

We are all accustomed to colour in our lives, the old black and white world is largely consigned to history. In everything we do we try to gain attention and one of the most successful methods is by instant recognition. A powerful tool for this is colour. In construction it used to be

said that concrete is grey and goes hard. Not any more. Concrete can now be coloured in a variety of ways to give the architect, designer, planner and all others involved in the built environment a way of creating something that is colourful, vital and enhances the visual appearance.

I enjoy working with colour and the challenge of creating the pigments that are needed to achieve some of the results I will show in the presentation. I look forward to sharing my enthusiasm for the challenge of creating coloured concrete and the many facets that it has.

» Ken Pidgeon

» Tasmania

The 2005-2006 year has not been a really successful one for the Tasmanian Division. Therefore this report is somewhat sketchy. Efforts to increase membership have not produced any improvement, therefore we are planning to arrange a joint chair system with the Hobart membership which at this time seems to be more encouraging. Glenne Hunn may arrange the meetings in Hobart while we will continue here in Launceston. There is the potential for membership from her connections with her business and TAFE Hobart. The Division will then have two sites with meetings to be arranged alternatively and at Campbell Town, about midway between two centres.

Dr Walter Slaghuis (Psychologist) gave his promised talk in Launceston in March at our 'then' new meeting venue. Scotch Oakburn College. His talk was sequential

on his first on the topic of how humans and also animals perceive Colour. Only three members attending marred the excellent talk. The venue was first rate but we had to discontinue using it due to excessive costs which had to also include a fee for Public Liability Insurance. With such a small current membership it was unsustainable. Since then the Division has only held small more social, meetings at the Chairman's home. The planned talk by Tim Lack of Foote & Plaistead did not eventuate and he has since not continued as a sustaining member.

A proposal to give a series of talks on Colour for the Adult Education Branch in Launceston has been successful, atleast as far as approval is concerned. The lectures will be for two two hour periods in the last week in September and the first week of October. The lecturer's fees will be paid to the Division so it is hoped that the attendance will be successful. Denise McNeill and Kai Johnson may assist the Chairman with some of the time on their specialities. Hopefully this plan may result in an increase in membership for the Division. It is appreciated that other divisions may also have a common problem of getting members to meetings, but Tasmania is somewhat unique in having

DIVISION • • *Reports*

» Faces from the Victorian
» Division's Christmas Dinner
»



a smaller population to work with than the others. Negotiations are continuing to present the Hobart-Launceston proposal and it is hoped that this may improve the membership numbers.

The adult education courses which were planned at the time of this report are now completed and very successfully with 11 attendees.

Denise McNeill and Kai Johnson did half hour lectures each on Interior Design and Colour Control in Multimedia respectively which were very well received. Al Pegler himself did the other 3 hours of the four hour presentation period speaking on a wide range of topics.

The Tasmanian Division now has got a new meeting venue in Launceston at the Home View Centre at 262 York Street and the first meeting will be held there on November 9th - details to be announced later.

» Al Pegler

» Victoria

This year has been very interesting for the state of Victoria in sporting terms sandwiched between the Commonwealth Games and the greatly anticipated Ashes Test Match on Boxing Day, two very highly hyped events. Artistically we have had the Picasso exhibition and the sumptuous cultural delights of a vibrant performance arts calendar where colour has been a fundamental feature of the programme.

With our Victorian meeting programme we have not reached such dizzy heights, but

we have had a rich and varied programme. We have had 2 joint meetings with other organisations, a social night, site visit and 2 presentations - one artistic the other technical but with a very practical focus.

We opened with a joint meeting at the beginning of May with the Society of Dyeists and Colourists in enjoying a presentation by Barbara Marshall on an analysis of contemporary tools for the designer to use when specifying colour. Barbara's analysis was the culmination of many years studying the subject and the many systems available and prompted a lively discussion and question and answer session within the audience of over 50, many of which were students.

For our second meeting in June we tried a new format and venue. We invited 3 artists to talk informally about their use of colour and how they use colour in their work in relation to the emotions they are trying to stimulate. This proved popular with the audience but the venue chosen in a South Eastern suburb was not judged to be as convenient as a more central one in the city.

For July we arranged a social evening of Christmas in July celebration held at the St George's restaurant part of NMIT Preston campus. Attended by 18 happy and excited celebrants, sporting at least one item of clothing in Christmas colours, we entertained ourselves by talking about our "colours of Christmas" and entering in to the spirit of this very colourful celebration. The evening ended with yours truly donning a Santa outfit and giving out from Santa's sack the Kris Kringle of a colourful present to the value of no more than \$10 brought by each celebrant. This proved to

Reports

be very popular judging by the creativity of the presents brought.

August saw us with our 4th different event for 2006 with a site visit to Brighton Primary School where member Serge Couturier has been retained over a period of in excess of 5 years to provide interior colour designs for classrooms, halls, offices and meeting spaces throughout the school. His colourful designs have been well received by students, teachers and parents (who helped raise some of the money) as testified to us by the head teacher. Using before photos to explain the canvas he worked from Serge was able to explain his thinking and colour themes he created.

September saw us return to a favourite venue Dante's of Fitzroy to hear a presentation by member Peter McGinley of Dulux Australia on work he has been doing on understanding the performance of undercoats in relation to opacity. Although the meeting was technically based there was some very practical aspects which were taken on board by a very interested audience.

In October we held our second joint meeting for the year by joining the Surface Coatings of Australia (SCAA) Victoria Branch to hear a presentation by Bruce Jackson. Bruce led a team of sign writers and glass guilders on a project to do all of this type of signing for the new Disneyland in Hong Kong. A fascinating commission with many interesting aspects that were of interest to a large audience.

There was no meeting organised for November and due to a change in my personal circumstances my contact details

have changed. It is now time to look forward to our programme for 2007, so, if you have ideas or suggestions please email or ring me. We will have our planning meeting in February and I will look forward to seeing you there and developing another interesting programme for 2007.

» **Derek Grantham**

» **Queensland**

Following our AGM in August, our new Queensland Committee: President: Lexie Smiles, Secretary: Julie Blackmore, Treasurer: Sande Bamford

MARCH

Greg Rogers

A change of venue to Illustration House and talk by well known children's book illustrator, Greg Rogers, stimulated a larger than usual attendance of almost 30 people in March. Greg introduced us to his work and life as an illustrator. He discussed where his inspiration came from, and how he develops these ideas, the process and who puts it all in motion regarding publishing. He has an agent who is also a lawyer, who directs him. The writer and the illustrator need to be separate identities. The publisher judges a book on text, not on illustration, they are the ones who choose the illustrator. The illustrator determines the size and format of the book.

The written text comes first and, in the beginning, Greg worked closely with the writer, as in "Tracks" and "Aunt Mary's Dead Goat", a hard covered book. Then he changed he changed to his view of

the story's world, not the writer's, like "Postman's Race" in which he could invent and interact in his own world of illustration, not just react to the storey, with his coloured pencil illustrations. His most recent book (with no words), "The Boy, The Bear, The Baron, The Bard" about a boy who goes back in time to Shakespeare's Globe Theatre, is a 32 page picture book which has to link right through. His story-boards and finished roughs in millennium marker, watercolour and colour pencil, have to be shown to the publisher during the process. An Australian run consists of 4 -6,000 books, and for the UK market, it has a different cover. It was selected in the top 10 children's illustrated picture books in the USA by the New York Times. He's working on a sequel, "Midsummer Knight".

In 1995 Greg won the prestigious Kate Greenaway Medal for his illustrations in "Way Home". He is the first Australian to have won this British award. "Way Home" also won a Parents' Choice award in the USA and was short listed for the ABPA book design awards. "The Boy, The Bear, The Baron, The Bard", the first book Greg has written and illustrated, was also short listed for the 2005 CBCA Book Awards. In 2002 he was an entrant in the Archibald Prize with his portrait of the Lions' football coach.

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JUNE

Derek Grantham

Our June offering was a powerpoint presentation on Coloured Concrete by CSA National President, Derek Grantham, which brought interested parties from related industries. He explained that concrete is durable - like liquid rock, and can be light or heavy. It can be coloured with pigments, be textured, moulded or stained and re-coloured with polymer modified pigments. He enthused about the versatility concrete has to offer.

Pigments can be inorganic and thus UV stable as well as being inert and so, concrete compatible. They are fine powders, synthetically produced, while, on the other hand, natural pigments used are black (from Norway), red (from Australia), yellow (from Tasmania) and white. Any pigments need to be checked for colour consistency and retained in place by a cement matrix, the saturation of which is 8% of the weight of the cement. For best results, consideration needs to be given to: detail, careful mixing, the cement, sand, aggregate and any additives. Derek pointed out that the designer needed to apply research, attention to detail, give time to develop ideas and allow the producers of the coloured concrete time to have the test panels poured, as it's not a surface finish.

The versatility of the material allows for achieving intricate shapes and moulds, surface finishes like polishing, stamped patterns, exposed aggregate and seeding with stones and pebbles. It can be used for renders and mortars. Coloured concrete can be pre-cast, e.g. for a wave wall water feature, or can be used for paving to blend in with nature, or to be in patterns or stamped impressions, or to define steps

in colours for safety. It can provide roofing tiles or architectural features like the jungle paths at Taronga Zoo or classical columns and ballustrading. Sand blasting is another applied surface finish.

The uses of coloured concrete are just up to one's imagination and include restaurant floors, pool surrounds, school playgrounds, noise barriers, ornaments and street furniture and street sculpture, as in the Roma Street Parklands, Brisbane, with paving designs, pink seats and walls.

Dr Anoma Kumarasuriyar presented an intriguing insight into Islamic art, explaining how in a diverse Islamic community, it is viewed as divine art where there is unity in multiplicity and multiplicity in the unit. By repeating motifs, the aim is often to fill the space completely and this is particularly evident in mosques where the interior walls are covered in different forms of decorative art. Humans and animals are rarely depicted due to a fear of imitating God. Most of these decorative patterns are stylised floral and vegetable patterns or variations of script with religious meanings.

Dr Kumarasuriyar showed us some beautiful images of how tiles are used in this way, with some baked separately for added brilliance and others with all colours painted at the same time, giving a blurred result. Evident in these decorative patterns were harmony in adjacent colours, harmony of opposite colours and/or multilevel colour systems. Colours used were divided into two basic groups: white, black and sandalwood; red, yellow, blue and green. Meanings were associated with particular colours. For example, red indicated joy, success, creativity, morning,

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Blanche Merz

Our colourful friend and long time Victorian member and CSA supporter Blanche Merz was in the news recently.

The Mathematical Association of Victoria, celebrating their centenary, has recently published their book 'Master Classes in Mathematics: Centenary Publication of The Mathematical Association of Victoria 1906-2006'.

The book is a record of selected talks given to the Association between 1954 and 1960, and includes a talk, titled "Notation", given by Blanche in 1959. At the time of her talk she taught mathematics at St Catherine's School, Toorak, in Melbourne. Blanche is a former Vice-President of the MAV.

The photo is of Blanche speaking at the launch where she delighted the audience with her speech. Seated beside Blanche is Max Stephens, author of the book, Secretary and Honorary Life Member of the MAV. The launch was held at the Red Rotunda, Cowen Gallery, State Library of Victoria.

The publishers and the MAV tracked Blanche down through the CSA. The

publisher's editor who worked on the book is living interstate in Queensland, and previously produced Spectrum for us with our previous publisher. He recognised the name Blanche Merz, contacted us, and we were more than happy to reconnect the MAV, the book publishers and Blanche. Hence the invitation for Blanche to attend the launch.

The photograph is reproduced here with the permission of the Executive Officer of The Mathematical Association of Victoria

"Master Classes in Mathematics: Centenary Publication of The Mathematical Association of Victoria 1906-2006" ISBN: 978-1-87694-932-7
Available through the Mathematical Association of Victoria
See www.mav.vic.edu.au

Blanche was also a topic of discussion at the 40 year reunion of former pupils of St Catherine's School, Toorak. When asked during the course of the evening who had been their favourite teacher during their years at the school, a great many of those present named Blanche Merz.

spring, childhood, while blue suggested cold and dry, heaven, night, winter, old age. It was a very enjoyable presentation and discussion, resulting in our having a greater understanding and appreciation of Islamic art.

SEPTEMBER

Visit to Dr. Hugh Kunze's colourful, sub-tropical one and a half acre garden.

OCTOBER

John Tucker's talk on "The Experience of Colour with reference to the Work of Rudolf Steiner and Goethe". It will encourage us to think about colour as a synthesis of human experience and our place in the world. Some main themes will be: colour and the symbolic language of nature, colours' personalities and dynamics, the internal and external experience of colour, Newtonian theories v. Goethe and Steiner, the human being and colour perception, intuition and understanding, colour as much more than pigment - the whole is greater than the sum of the parts, and the scientific and artistic worldview of Goethe and Steiner's Anthroposophy.

DECEMBER

Christmas dinner.

Attracting more people to our talks, with the long term goal that they will join up, has been a constant focus for our executive. With that purpose in mind, we have tried to cover a diverse range of topics, hoping to interest people from different disciplines within our email invitation list. In the last year we have varied the time of our talks, occasionally holding a talk or visit on a Saturday morning. We have also varied the location away from our usual venue

at QUT. Our two most successful talks (regarding attendance) were examples of these variations: nearly 30 people attended a talk on illustration at Illustration House, South Bank; close to 20 people attended a talk on Aboriginal Art at the Queensland Art Gallery on a Saturday morning. We have had many attempts at attracting students

with contacts at various Universities and Colleges posting our notices on their email lists. We occasionally get a few students - it seems unless the subject relates directly to their field of study, they do not have the time between study and work demands to attend just out of interest.



HOLA, HULLSOME!

The Spanish entrant, Iberdrola, in the America's Cup is resplendent in a palette of 17 hues thanks to Resene Automotive and Performance Coatings.

Resene staff painstakingly matched each hue to exacting Pantone standards in Durpox. Each sample was then sprayed out and flown to Valencia for approval before the careful task of hull painting could begin. The Spanish shore crew are rapt with the result so it's now up to the racing team to make the most of their new boat.

NEXT MEETINGS AND CONGRESS OF THE AIC

2006

AIC Interim meeting, 24-27 October
Johannesburg, South Africa
"Colour in Culture and Colour in Fashion"
Organiser: Colour Group of South Africa

2007

AIC Midterm meeting, 12-14 July
Hangzhou, China
"Colour Science for Industrial Applications"
Organiser: Colour Association of China
The date of this meeting is coordinated with the 26th Session of the CIE, *Commission Internationale de l'Eclairage*, to be held from 4-11th July.
Contact: Prof. Ye Guanrong:
ygr@moi-lab2.zju.edu.cn

2008

AIC Interim meeting, 15-18 June
Stockholm, Sweden
"Colour - Effects and Affects"
Organiser: Sweds Colour Centre Foundation
Contact: Berit Bergstrom
berit.bergstrom@ncscolour.com

2009

AIC 11th Congress, 20-25 September
Sydney, Australia
(being a general congress, all colour related topics are included)
Organiser: Colour Society of Australia
Contact: Nick Harkness
nickharkness@dia1.net
www.aic2009.org

OTHER COLOUR MEETINGS ORGANISED BY AIC REGULAR MEMBERS

HUNGARY

2007, APRIL 24-26
International Conference on Colour Harmony, held in Budapest. Organised by The Hungarian National Colour Committee.
Abstract submission: 31st October, 2006.
Information: colour.harmony@t-online.hu
See page 36 for more details.

2007

Middle East Coatings Show

CAIRO INTERNATIONAL CONFERENCE CENTRE
EGYPT, 13-15 MARCH 2007

This is the premier event for the Middle East and Gulf regions, and has expanded this year to a three day event. In particular the emphasis is on protective coatings for construction and marine applications. The possible commencement of free trade agreements in the area with the European Union will ensure a high number of visitors.

ASIA COATINGS CONGRESS

EQUATORIAL HOTEL, HO CHI MINH CITY
VIETNAM, 28-29 MARCH 2007

This is the third time this event has been held and is establishing itself as a well attended show in the region. The Exhibition and Congress is a two day event and will cover paint, inks, wood and powder coatings.

ASIA PACIFIC COATINGS SHOW

QUEEN SIRIKIT CONVENTION CENTRE
BANGKOK, THAILAND, 6-8 JUNE 2007

This event, while almost 12 months away is one for the diary as it is one of the premier exhibitions in the Region. Growing in size every year, next year's event is expected to again host record numbers of visitors and exhibitors. The focus of the event will be on automotive finishes.

SCAA/APMF Joint Conference

Hyatt Regency, Sanctuary Cove
Queensland, 2-4 August 2007

The theme of the conference is Performance, Progress, Prospects to reflect the climate of innovation to profitability and sustainability in manufacturing industry. Papers written from the perspective of technology, production and business operations will be presented. For further details contact Ms Lisa Bateson, LTSC c/- geeksRgood, PO Box 4032 Chermside Centre 4032. Tel: (07) 3852 6755, Fax: (07) 3852 6799, email: lisa@geeksrsgood.com.au

CONFERENCES & SNIPPETS

HOW GOOD IS THE *Farnsworth-Munsell* 100 HUE TEST?

» The Society of Dyers and Colourists UK

The Society of Dyers and Colourists (SDC) would like to investigate the use of the Farnsworth-Munsell 100 hue test as a reliable part of a quality assessment audit for colourists in the international textile supply chain.

BACKGROUND

Colourists in textile retail are engaged at many stages in the global supply chain process. For example, colours are visually assessed many times in the production life cycle, in the dye house, they can then be assessed at a garment manufacturer's facility and then finally they will be assessed by the retailer.

The professional colourists need to be able to accurately perceive very small colour differences and then describe and communicate this information. Every day dyers and their QC assessors will be making decisions on suitability for colour on many thousands of metres worth of textiles. Currently visual Pass/Fail is still widely used by the industry. Mistakes can be costly, wiping out profitability as profit margins are tight or possible resulting in business closure. Professional colourists all receive training in the importance of consistent illumination, background colour (simultaneous contrast) sample preparation and other standardised best practices to minimise inconsistency. To date no colour vision test is mandatory for this type of job role.

Currently there is confidence that the Farnsworth-Munsell system will quickly identify if a person has a significant colour vision problem, e.g. Red/Green confusion.

The SDC would like to gain greater understanding that if there are any colour vision defects which are not as severe as this, and as an 'ordinary' person may go undetected and are not a problem for every day life. If small colour vision defects exist this could significantly impact on a successful quality supply chain process for colour.

QUESTIONS FOR INVESTIGATION

1. Do small colour vision defects exist which would effect the perception of small colour differences?
2. Could the Farnsworth-Munsell test be successfully used to identify these defects?
3. Does a scale for assessment already exist within the Farnsworth-Munsell test which could be used?

"... professional colourists need to be able to accurately perceive very small colour differences and then describe and communicate this information ..."

4. Would a new scale need to be researched and developed?
5. Is there a better test than Farnsworth-Munsell?
6. Any colour vision method of assessment would need to be applied on a global scale, easily accessible, not cost prohibitive and with unambiguous results.

The SDC supports and promotes the use of instrumental colour communication and pass/fail measurement, but in the global economy there are still significant numbers of brands and producers who currently still use human visual assessment as their primary method of colour approval. The SDC still needs to help and support their members who would still like to work by this method.

The views and experiences of the Colour Society members would be highly valued.

Please contact Janet Best who is representing the Society of Dyers and Colourists. Email bestjanet@btinternet.com
Telephone: 020 8850 2260 Mobile: 07782 200653

INTERNATIONAL CONFERENCE COLOUR HARMONY

Budapest, Hungary
April 24-26, 2007
Call for Abstracts

Organizers: Hungarian National Colour Committee International Foundation Light and Colour **Co-organizers:** Technical Sciences Section, Hungarian Academy of Sciences Association of Hungarian Fine Arts & Applied Artists **Conference Venue:** Main building of the Hungarian Academy of Sciences 1051 Budapest, Rooseveltter 9

TOPICS

The following main topics will be covered:

1. Theory and the colour harmony (harmony systems and models, colour vision, colour preferences etc.)
2. Colour harmony in architecture architecture, interior decoration, environmental design etc.)
3. Colour harmony in art and design (fine arts, graphic arts, applied arts, arts and crafts, handcrafts, fashion etc.)
4. Colour harmony in the folk art (colouration and toning in the folk architecture, folk wear, folk handcrafts etc.)
5. Colour harmony in the nature (lifeless nature, living nature etc.)
6. Computer technology and the colour harmony (web design, colour displays etc.)

Please return completed form to:

ICCH'07, International Foundation Light and Colour
1145 Budapest, Muegyetem rkp. 3. Hungary - Europe

E-mail address: colour.harmony@t-online.hu Phone/Fax: 36-1-2202618

ABSTRACTS

Abstracts should be by conventional mail or electronically.
Abstracts should have no more than one page A4 in length.

Acceptable file

format is Adobe pdf or Word doc format. You may specify whether you would prefer to present your work in the form of a poster or as an oral presentation.

Proceedings

Papers (ca. four pages) of the conference contributions will be published in a conference compact disc. The abstracts will be printed in a abstract booklet.

DEADLINES

Oct. 31, 2006 - Abstract Submission
Nov. 30, 2006 - Decision about the abstract
Dec. 31, 2006 - Regular registration
Jan. 31, 2007 - Submission of manuscript

REGISTRATION FEE

	before Dec 31, 2006	after Dec 31, 2006
participant	200 EUR	250 EUR
student	100 EUR	150 EUR

CORRESPONDENCE

Mailing address: ICCH'07

International Foundation Light and Colour

1145 Budapest, Mu'egyetem rkp. 3.

Hungary - Europe

E-mail address: colour.harmony@t-online.hu

Phone/Fax: 36-1-2202618

Web: <http://aic.kee.hu/colour-harmony>



International Conference on Colour Harmony: April 24-26, 2007 Budapest, Hungary

Reply form ICCH'07 information for the organizers

Name: _____
title forename surname

Organization: _____

Address: _____

Phone and/or fax: _____

E-mail: _____

I intend to submit a contribution to:

I prefer oral / poster presentation

We said: red wine can stop deafness

Drinking red wine can stop you going deaf in later life, medical experts have discovered. The tippie acts as an antidote to ear damage which can be caused by loud noise and antibiotics. Delicate hairs in the inner ear can suffer from exposure to chemical agents called oxygen free radicals. Antioxidants in red wine can help neutralise the radicals - protecting against hearing loss as people age. Similar benefits are gained from drinking green tea or taking aspirin ... Researchers also say moderate amounts of plonk can help protect against cancers and heart disease.

Emma Morton, Health Reporter, *The Sun*, May 11th 2006

The Society of Dyers & Colourists, UK COLOUR MUSEUM TO COLOUR EXPERIENCE

IN A MOVE designed to capitalise upon its success in delivering colour education and knowledge, the Bradford-based Colour Museum, owned and managed by educational charity the Society of Dyers and Colourists (SDC), has decided to focus exclusively on workshops and colour-related activities for schools and groups.

As a result, the Colour Museum is no longer open to casual visitors and has been re-named the Colour Experience in line with its educational Colour Experience website launched in 2005 which is currently logging over 500,000 visitors a year, www.colour-experience.org

Comments curator Graham Alcock, "The museum has enjoyed considerable success in providing a variety of workshops for schools from all over the country. We have therefore decided to concentrate our resources in order to meet this growing need."

In addition to continuing with its programme of talks and workshops on many aspects of colour, the Society is now developing a series of initiatives designed to take the message about colour to teachers and other key educational groups. One recent example is the specialist workshop devised and delivered for the UK Museums, Libraries and Archives Council at the University of Bradford on the subject of natural dyeing.

The existing gallery space is currently being converted to a layout more suitable to its new role. It includes the creation of a Perkin Suite named in honour of Sir William Henry Perkin, a former president of the Society. In 1856, at the age of 18, Perkin discovered the first synthetic dye and is credited with founding the modern chemical industry.

The Colour Experience is now taking workshop bookings for 2006/7. Schools, or any other organisation wanting to know more about colour, should call 01274 390955 or email colour.experience@sdcc.org.uk





Dulux now makes it a joy to coordinate colour for your home exterior with the launch of the NEW Perfect Exterior Schemes Fandeck

Choosing a colour for the exterior of your home can be extremely daunting for many reasons, not least the fact that there is not much advice out there to help you determine, which white goes with which blue or which brown goes with which green.

To help with the huge task of selecting the perfect colour to highlight the exterior of your home Dulux has launched their new Perfect Exterior Schemes Fandeck.

Aimed to inspire consumers and to take all the stress out of creating an exterior colour scheme, the fandeck is a collection of coordinated colour schemes taken from traditional research and the latest in exterior colour trends.

Created by the Dulux Colour Design team, this Fandeck is divided into six Australian architectural colour segments:

- Traditional Weatherboard
- Traditional Render
- Contemporary Weatherboard
- Contemporary Render
- Painted Trim
- Outdoor Living



Each of these colour segments contains four different colour schemes, providing a huge range of possibilities for you to choose from.

Following Dulux's other successful colour scheming tools, the Perfect Exterior Schemes Fandeck will take all the guesswork out of choosing an exterior colour scheme that's right for you.

With a recommended retail price of \$9.95 the Dulux Perfect Exterior Schemes Fandeck is a must have tool when designing a new look for the outside of your home.

Plus, when you buy a Dulux Perfect Exterior Schemes Fandeck you receive a \$20.00 voucher redeemable towards a personal Dulux Colour Consultation.

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THE SOCIETY OF DYERS

colourists

www.sdc.org.uk

Are You Interested in Colour?

If you are active in the creative use of colour in design and related areas and are looking for an outlet to publish your work, *Colour: Design and Creativity*, the new colour journal from the Society of Dyers and Colourists (SDC), is waiting to hear from you.

The SDC is the world's leading professional society devoted entirely to colour, and is launching a new online journal to appeal to Colourists, designers, artists and other professionals:

Colour: Design and Creativity Here's what we offer you as an author: A high-quality peer review process operated by an international editorial panel of high-profile, respected experts in many aspects of colour and design that will validate and enhance the status of all work published; Timely publication of accepted material-Attractive and impactful presentation of published material; Dissemination of work of an international audience.

Call for papers *Colour: Design and Creativity* is a new electronic journal that aims to become the premiere forum for the publication of reports of research-based and practice-based work in colour and design-related fields. Its philosophy is to act as a multidisciplinary journal addressing all aspects of colour and design, featuring articles that systematically describe evidence-based applications of colour in design, art, architecture, fashion, etc. Articles reporting basic, applied, and theoretical research related to colour will also be included. All authors will be encouraged to discuss the practical implications of work reported. Review and explanatory papers, case studies, essays, and reviews of books, events, collections, installations, etc. are also sought. In addition there will be peer-reviewed 'gallery' sections, showcasing submissions that are mainly graphical in content, for professional and student work, and an events listing page. The readership will include academics, students, designers, technologists, manufacturers, retailers, or indeed any profession where colour is an important part of the products or services concerned. The fields of interest include, but are not limited to:

Colour communication, Colour design, Colour emotion, Colour fashion design, Colour forecasting, Colour harmony, Colour in art theory and practice, colour in marketing, colour in the built environment, Colour philosophy, Colour perception, Colour psychology, Colour and cultural and global issues, environmental Colour design, Colour in graphic design, Colour and human factors analysis, Colour and Interactive design (creation of human-machine

interfaces). Colour and sensory design, visual colour research, and any discussion on an interdisciplinary Colour approach.

Material offered for publication should not have been published elsewhere or have been submitted at another conference or journal.

2006 SDC PERKIN INNOVATION AWARD: WINNER ANNOUNCED

In the year that marks the 150th anniversary of the discovery of the world's first synthetic dye by William Henry Perkin, the Society launched the 2006 Perkin Innovation Award to honour an individual, company or organisation that has made an outstanding contribution to colour in recent years. The winner was announced at the Gala Awards Dinner, following on from the 2006 SDC Colour Conference in Belfast on 13 October.

The 2006 Perkin Innovation Award went to Dr Ram Sabnis CCol (USA) for the development of the world's first coloured bubbles. The prize included a specially commissioned Perkin trophy, along with a cheque for £2500 to be spent on education and training in the field of colour.

The winning entry involves breakthrough colour-change technology that led to the creation of coloured bubbles whose colour disappears when exposed to air, water and pressure. Dr Sabnis comments, 'I am extremely happy to have been declared the winner of the SDC Perkin Innovation Award for the synthesis of novel non-staining, environmentally-safe, colour-changing dyes which form coloured bubbles. This technology demonstrates applications in many areas including entertainment, healthcare, consumer products, agriculture and security.'

The two other finalists in this competition were Dr Philip Double (Fujifilm Imaging Colorants Ltd, UK), for the development of black colorants for ink-jet printing, and Dr Hossein Izadan (University of Leeds, UK), for the development of a digital imaging method of colour fastness assessment using an optical scanner.

Comments Dr Ian Holme, chair of the judging panel, 'The level of entries, from both the UK and overseas, was very broad ranging. It made judging extremely difficult, but in the end we were unanimous in deciding that the unique technology of the winning entry met all the criteria set for the competition.'

GOETHE'S *Science*

» **Ralph Brocklebank**

Ever since his polemical outburst against Newtonian thinking, Goethe has been held to be beyond the pale by scientists, particularly in the realm of physics. But Goethe was not so much reacting to Newton himself, as to Newtonians of the eighteenth century, who had become very dogmatic. Indeed, they bitterly attacked Thomas Young because he was seen to be anti-Newtonian. It is in the field of colour science that the clash occurred, and Goethe's other forays into science, such as his ideas on metamorphosis in plant and animal forms, are mostly seen as interesting but non-controversial essays in typical eighteenth-century speculation. In their approach to colour, it is instructive to compare and contrast Goethe's method with Newton's.

Newton was constructing a refracting telescope, and was worried by the coloured fringes on every image seen through his lens. His purpose was to eliminate the colours, and his concern was to investigate the nature of light.

In this, he was brilliantly successful, and his findings laid the foundation for the study of optics which still holds good today. He made three crucial discoveries:-

- 1) Light is not an elementary substance, but a mixture of parts.
- 2) These parts form a single variable which can be laid out in a linear array.
- 3) The array can be determined, and the place of any part within it specified, by a simple geometrical measurement. (Newton used the degree of refrangibility, but nowadays we use either wavelength or frequency - the principle is the same.)

Beyond this sound beginning, Newton was almost entirely wrong or mistaken. For instance, he presumed that the degree of dispersion was proportional to the degree of refraction, and thus concluded that achromatic lenses were an impossibility (so he abandoned his work with the refracting telescope using lenses in favour of the more difficult reflecting telescope using mirrors). Again, he argued that the nature of light could not be in the form of waves, since that would indicate the presence of diffraction and interference patterns, which he had not observed. In fact these patterns exist, but at a scale very much smaller than Newton had imagined possible, implying microscopically small wavelengths, as Thomas Young calculated. Perhaps Newton's biggest misapprehension was in his famous one-to-one correlation. He stated that for every degree of refrangibility there is ever the same colour, and for every colour there is ever the same degree of refrangibility.

We now know that this is true only in the strictly limited case of monochromatic lights seen under restricted conditions of viewing, usually the dark-adapted eye. If mixed lights are considered, then many different combinations of parts can yield the same perceived colour (what is known as metamerism), and if different conditions of viewing are taken into account, then one given structure of light, even if monochromatic, may be seen as many different colours (what we call adaptation). Yet in spite of these mistaken views, Newton is rightly seen as the founder of modern optics, and is widely revered, although his modern reputation relies more on his work on universal gravitation than in optics.

Goethe was not interested in the theoretical nature of light, but in the appearance of colours. He was motivated by the way colours affect our feelings, and the manner in which artists can evoke a mood through the use of colour in their paintings. He was a bit of a watercolourist himself, and was fascinated by the contrasts of light and shade, warm and cool colours, and so on. Determined to discover the nature of colours (not of light), he set out what he considered to be a sound scientific method, namely, first to collect all the relevant phenomena, and then to arrange them in such a way that the underlying principles would be made obvious. Even modern scientists admit that this is not a bad procedure, although they may disagree with his conclusions. Recognizing that his field of study was not what is now called optics, but rather the psychology of vision, Goethe made some fundamental contributions. His concept of Polarity - the contrasts of light and dark, blue and yellow, and red and green - forms the basis of modern opponent-colour theories of vision. His conclusion from his study of contrast effects, that a particular colour is seen in relation to the whole setting, is crucial to our understanding of adaptation, while his idea of compensation, that if a change is made to a colour so as to alter its appearance, then another change might be made to bring it back to its original condition, could be said to be the underlying concept of metamerism. In spite of these successes, not often acknowledged, he certainly made some blunders. His notion that colours arise from light and dark as a result of one shining through the other or vice versa, may loosely apply to some atmospheric effects (though not to all) but his attempt to explain prismatic colour effects by this analogy fails to convince, and his strenuous insistence on this idea was what led to his theory of colours being dismissed in scientific circles. But what really annoyed the scientists was his attack on the revered Newton, and it resulted in Goethe being reviled.

One example of the dogmatic prejudice that Goethe fought against lies in the statement, often heard even today, that "white contains all the colours." Newton himself was much too cautious to fall into this trap, and clearly stated that the rays themselves were not coloured, but separately evoked colours in the sensorium. In other words, the rays were not perceived as such, but were abstract concepts designed to explain the phenomena. This is just the sort of thinking that worried Goethe. For him, whiteness, if it were anything, was a direct perception in which colours are signally lacking. In fact the current definition of white is a perceived colour in which there is no hint of any coloured hue nor of any trace of greyness. That white light can be turned into any colour depends on what you do to it. In fact you can colour it in any way you like, but that does not mean that "white contains all the colours", even potentially. Goethe's view is phenomenological and realistic, not theoretical and abstract.

Science today, following Newton's example, insists that all observations should be measurable. Goethe thought that this was unnecessarily restrictive, and widened the scope of his observations to include descriptions in areas hitherto considered purely subjective, such as the appearance of colours, our feelings and emotions. These are now routinely covered by sciences such as psychology and sociology, though Goethe gets little credit. A recent programme explaining how unscientific religious beliefs were elicited the comment that scientists must be careful not to make Science into a religion, adding that science has not yet come to terms with God. Goethe would have had no problem with that!

Rudolf Steiner went one step further than Goethe. He argued that if you could observe your thinking in the activity of thinking, there need be absolutely no limits to the realm of knowledge. It is widely thought today that thinking is a mere abstract juggling with concepts, and cannot lead to certain knowledge, which is limited to those realms that can be observed and measured. Well, that is what they think! On the other hand, Steiner thought that by taking thinking seriously, one could explore far into the realms of the spiritual. It has been said that Steiner's Spiritual Science is not really a science, because its observations have not been repeated by others. Though this may well be the case at present, the possibility that such observations may yet be made remains open. Steiner believed that in times to come many people would follow the course of development he described and would attain faculties such as he had, and would then amply confirm all that he had to say about the spiritual world. Surely it would be presumptuous to deny that this could ever happen.



COLOUR SNIPPETS

Why is the Belgian Queen Elisabeth known as 'The Red Queen'?

Elisabeth Gabriele Valerie Marie von Wittelsbach married Prince Albert, heir to the throne of Belgium, in 1900. Upon her husband's accession to the throne in 1909, she became queen.... During the Fifties, she aggravated the Americans by visiting Communist Russia, China and Poland, on humanitarian trips that led to her being known as the 'Red Queen'. Queen Elisabeth died at the age of 89, on November 23, 1965.

Red bins for knives

A knife amnesty was launched in England and Wales yesterday, with hope that 30,000 blades could be dropped into special red bins. The amnesty runs until the end of next month and anyone who hands in a knife will not face prosecution.

Tomato 'that fights cancer'

A new tomato said to have cancer-fighting properties goes on sale tomorrow. Tesco will launch the £1.89-a-pack vine tomato, bred in West Sussex to contain twice the usual amount of lycopene, the anti-oxidant that makes the fruit red. Studies in mice have shown lycopene to cut the growth of human prostate cancers by up to half.

Lifesaver tomatoes!

Scientists have found a substance in tomatoes that can help prevent heart attacks and strokes. It works by helping to stop blood becoming sticky and forming clots that can cause potentially fatal blockages in arteries and veins. The lycopene which gives tomatoes their red colour is known to protect against various cancers. The anti-clotting properties are found in the yellow fluid surrounding the seeds. The tomato extract, called Fruitflow, is in a range of juices by Sirco that have been endorsed by the charity Heart UK.

Cheers to 200 years of the cocktail

B is for Bellini: White peach puree topped with chilled Prosecco sparkling wine. Created by Giuseppe Cipriani at the famous Harry's Bar in Venice, this pink drink is named after the 15th-century Venetian painter Giovanni Bellini, who used lots of pink in his work. W is for White Russian: Vodka, kahlua, double cream and milk. Very popular in Finland.... Leave out the cream and milk and add cola for a Black Russian. Top that up with Guinness for a Black Irish. Replace the vodka with rum to make a White Cuban.

Thirsty, chaps? Grab a Bloke Coke

Coca-Cola is to produce a version targeted at men. Coca-Cola Zero has been called Bloke Coke by those in the drinks industry because it is specifically aimed at a young male audience who do not like the taste of Diet Coke, which is seen as a 'girl's drink'. Coke is embarking on a multi-million-pound marketing drive for the drink, its first product to ditch the traditional red and white colours and go for a black can.

Thanks to Ray Osborne, Colour Society, GB.

DEADLINES for the next edition of SPECTRUM

Autumn/Winter 2007 issue

DEADLINE: February 15, 2007

Spring/Summer 2007 issue

DEADLINE: September 15, 2007

**All Contributions
are Welcome**

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The Colour Society of Australia
welcomes these new members:

NSW

Pauline Plumb
Georgina Noble
Candy Sinead

Queensland

Lynda Fischer

Victoria

Sharon Hinsley
Smilka Jakobi
Lindsay Glover



COLOUR SNIPPETS

Beware the yellow peril

There's a black cloud on the horizon for hay fever sufferers. Or rather a yellow one. Hundreds of baffled residents have contacted the Met Office after finding their cars and homes sprinkled with golden dust. Tests are being carried out to identify the substance. But if the chorus of sneezes across the land is any indication, it is probably birch pollen - and bad news for those plagued by the early summer allergy.... In the satellite pictures, however, the irritating golden dust actually looks a rather restful shade of green. Forecasters said record amounts of birch pollen has been produced in Denmark this year. Julie Wheldon, Science Correspondent.

Sunny Delight spills into river

A river turned bright yellow after 8,000 litres of orange juice concentrate used to make Sunny Delight leaked from a soft drinks factory. Dozens of fish died after it leaked into a ditch linked to the river in Bridgwater, Somerset.

Odd couple from Arles

For 62 days in 1888 Paul Gauguin and Vincent van Gogh shared a home, the Yellow House, in Arles, in the south of France.... Van Gogh was slovenly, rude, attention-seeking, aggressive and frequently out of control. Yet he longed to live with a fellow painter. As soon as he had signed the lease for 2 Place Lamartine, with its yellow walls and green-painted woodwork he began to fantasise about setting up a band of brother artists.

Sun Spot

Visitors to Peru have been warned to wear sunglasses and large hats if they have blue eyes - because they are regarded as a sign of the DEVIL.

NATIONAL EXECUTIVE & COUNCIL

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Keith Simpson-Little

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Al Peglar
Denise McNeil
Dianne Peglar

WA

Tony Marrion
Annie Hoar
Barry Maund

Memberships

To all members who have not yet renewed for 2006/07 - this will be the last edition of Spectrum that will be mailed out using the 2005/06 database. For renewals please use the membership form at the back of this issue.



Membership Application

The Colour Society of Australia The Colour Society of Australia **The Colour Society of Australia** The Colour Society of Australia

Title: _____ Name: _____

Preferred mailing address: _____

State: _____ P/code: _____

Preferred contact details: Phone (1): _____

Phone (2): _____

Email: _____

Membership Grade & Annual Fee Structure

☐ **Individual \$60**

(single membership)

☐ **Concession \$30**

(full time student or pensioner;
students must provide suitable ID)

☐ **Non-Profit organisation \$60**

(multiple membership for non-profit
institution, association or organisation)

☐ **Joint \$70**

(two people with same
mailing address)

☐ **Sustaining \$120**

(multiple membership for company,
institution, association or organisation
- advertising rights apply)

The Society's membership year is from July to June. If a member joins between January & June, a 6 month membership fee is payable.

Method of Payment

☐ I enclose my cheque made payable to The Colour Society of Australia for \$ _____

☐ Electronic Funds Transfer to BSB: 015-356 Acc No.: 1027-97911

☐ Please charge my membership fee of \$ _____ to my: ☐ Mastercard ☐ Visa

Card Number: _____ Expiry date: _____

Cardholder Name: _____

Cardholder Signature: _____

The Society holds ABN 74 173 598 045 but is exempt from the collection of GST, so the membership is GST free.

Please give a brief description of your business activities and areas of interest in colour. (Course of study details are needed for full-time student concession membership):

Please return the completed form with payment to: **The Treasurer, The Colour Society of Australia**
24 Sunlight Crescent, East Brighton Vic 3187

TB: (03) 9263 5733 H: (03) 9592 8852

The Colour Society of Australia was inaugurated on July 1st 1987 and has divisions in all states. The Society is a member body of the Association International de la Couleur (AIC) and is a member of CIE Australia (Commission Internationale de L'Eclairage). The CSA has representatives on Standards Australia committees and is affiliated with the Powerhouse Museum of Sydney.

Objectives The membership is drawn from people whose work and interests involve colour. Our objectives are:

- Provisions of a forum on colour and its application in science, industry, the visual arts and education
- Promotion of colour consciousness, both within colour related spheres and in the wider community, by accessing existing educational resources and generating a programme of seminars and demonstrations throughout Australia
- Fostering international collaboration in colour
- Provision of avenues from the acquisition of colour information for all members of the community
- Encouragement and promotion of research into all aspects and application of colour

Meetings Local divisions hold regular meetings with presentations on colour by members and guest speakers, covering a broad spectrum of topics such as colour vision and visual perception, computer technology and colour optics, the reproduction of colour in photography, television, film and printing industries, colour in visual arts, architecture, interior design and theatre, pigments and dyes for use in plastics, paper, surface paints and textiles, colour and light measurement, and colour communication.

Conferences The Society holds a national conference every two years with local divisions taking turns to stage the event. Each conference has featured distinguished guest speakers from Australia and overseas. Papers on a wide range of colour related

topics are also contributed by members. Exhibitions, excursions and social events complement the formal aspects of each conference.

Journal Spectrum - the journal of the Colour Society of Australia is published twice each year. It contains information about events and developments within the Society and in the international arena. It includes the text of papers delivered at the national conferences and divisional meeting; all members receive copies and they are also encouraged to submit original material for publication.

Education The Society arranges short courses, workshops, exhibitions, demonstrations of new equipment and technology, and visits to commercial, industrial, artistic and scientific places of interest. Members may participate in special projects, present papers for publication, and represent the Society on committees, and source information on any aspect of colour. The Society promotes innovation in colour usage and measurement, and can advise on colour education to relevant courses in universities, art and technical colleges.

The International Colour Association (AIC) The AIC was established in 1967 in Washington DC, USA. Every four years there is a congress at which experts present the latest ideas and research findings from a wide range of disciplines. In the intervening years there are meetings that focus on specific topics such as colour measurement, colour vision, colour order systems and colour in environmental design. The next congress is scheduled for Sydney, NSW in 2009. Members are kept informed of forthcoming congresses and meetings.

Color Research & Application Journal The Colour Society of Australia, as an endorsing society, is represented on the editorial board of the authoritative international journal Color Research and Application published by John Wiley & Sons, Inc. Subscriptions are available to

Colour Society of Australia financial members at the concessional rate of US\$150 p.a. The Associate Editor is Associate Professor Stephen Dain (NSW).

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The Society The Colour Society of Australia was inaugurated in July 1987 and has divisions in New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia. The Society is a member body of the Association Internationale de la Couleur (AIC) and is a member of CIE Australia (Commission Internationale de l'Eclairage). It has representatives on Standards Australia committees and is affiliated with the Powerhouse Museum of Sydney, NSW.

The Colour Society of Australia is represented as follows.

AIC voting representative: Dr Ken Pidgeon (SA)

CIE Australia representative: Dr Peter McGinley (Vic)

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