



the dark-adapted eye: understanding & using colour

by **Garreth Cruikshank & Nicholas Bennett**

Our review of Cersaie focuses on the resurgence of interest in colour. The following article addresses issues related to understanding colour and its application. To reinforce the colour trends that were evident at Cersaie, we have illustrated the article with images of the latest product releases from a variety of Italian manufacturers.

PART ONE

Understanding Colour

spirit

The story of colour is almost the story of civilization itself, and man's love of colour is as old as his time on earth.

All nature was coloured and ancient man tried to emulate it, copy it and symbolize it. Life and the universe were mysteries, and colour was no mere frill or decoration. Colour related to natural and supernatural forces which had to be kept in harmony.

Unlike his modern descendant, early man was little concerned with aesthetics. He was a mystic before he was an artist. Colour had symbolic import and he used it to express the ideal and mysterious, not to add charm to his environment.

Colour was also a language where every hue had definite significance.

The colours early man chose for his garments, artifacts or temples had nothing to do with modern conceptions of aesthetics. They were a sort of occult functionalism in which he set his own feelings aside and adhered to the dictates of the Mysteries, for he looked on colour as a spiritual, rather than a physical phenomenon.

Today, books are published on the science of colour, on the psychology, the physics and chemistry of it, as well as on the art of colour. In each instance the audience is generally distinct. In the writing of ancient times, however, no such distinction was possible, for man's culture was a vast tapestry into which everything of interest was woven; and it's warp and woof included his fascination with colour. The historical study of colour must, therefore, take into account almost every aspect of human life.

physics

The physics of colour has always been an enigma, unsolved even today. Colour has bewildered men because they failed to appreciate that its physical nature is one thing and human nature another. The study of colour is essentially a mental and psychological science, for the term 'colour' itself refers to sensation, and as sensation indifferent to the complex theories of electromagnetic energy.

In the human realm, the psychologist rather than the physicist speaks of colour with authority. Colour is a sensation, a mental and emotional interpretation of what the eye records. Physics and chemistry are not concerned with colour's spiritual, aesthetic or psychic qualities.

Vision is as much in the brain as it is in the eye. Stimuli received by the eye have no particular meaning until the



Fap, Crea

brain interprets them. If the eye has no previous experience to guide it in some particular instance, it may be difficult for the brain to interpret the visual phenomena correctly. So seeing is not a matter of recording external stimuli alone, but of bringing forth mental recollections and experiences.

In seeing any colour the eye has a tendency to bring up a strong response to its opposite. So pronounced is this reaction that it actually brings after-images to view. When staring at a red area and then at a neutral surface, a sensation of green will be experienced. The after-image of yellow will be blue. This phenomenon has great influence over colour effects and gives intensity to strong contrasts and mellowness to blended colour arrangements.

biology

Human vision has a flow which rises and falls with the whole physiological rhythm of the body. Illness may affect visual acuity and colour perception. The human nervous system is highly sensitive to the lowering of the oxygen tension in the blood. Lack of oxygen affects vision and reduces the ability to see clearly. Lowered visual acuity, less sensitivity to brightness and colour, and partial or complete disappearance



of after-images may occur as a result of oxygen shortage. Voluntary eye movements may be disturbed and tasks such as reading made difficult. Extreme fear may impair sight. Bright days will, through vision, effect a different attitude and even a different perception from dismal days. Man sees best when he feels best, physically and mentally.

Like all other living things, human beings apparently have a radiation sense (the way a plant will grow towards the light). Reactions to colour through the eye itself are many and varied. In the main, colour effects tend to be in two directions, towards red and towards blue, with the yellow or yellow-green region of the spectrum more or less neutral. Further, these two major colours cause different levels of reaction in the body and brain. Red seems to have an exciting influence. Scientists point out that tremor, torticollis and some conditions of Parkinsonism "can at times be diminished in severity if the individuals are protected against red or yellow, by wearing spectacles with green lenses".

Light and colour undoubtedly affect body functions, just as they exert influence over 'mind and emotion'. By what is

known as the unity of the senses, individual experiences are seldom confined to one organ or one sense. Colour affects muscular tension, brain waves, heart rate, respiration and other functions of the body, and also arouses definite emotional and aesthetic reactions.

Possibly because the brain takes in the world in one big, but complex gulp, it tends to mix things and let the reactions of one sense affect the reactions of others, e.g. colour preference can be related to season. From winter to spring, most persons are likely to fancy light, pale colours in the pastel range - a refinement of human desire. It may well be that more sunlight and heat affects the glands and causes an inner compulsion for delicate hues.

Virtually everyone is sensitive to the colours of foods. Appetite is affected by reaction to colour. Tints are neither as upsetting nor as

savoury as pure colours. Although pure red is succulent, pink is by no means so. The best tint seems to be orange.

In the early 1960's a clinical psychologist at the University of California reviewed the whole area of light and colour, and their physical and emotional influences. Robert Gerard sought to scientifically verify whether colours arouse different emotions, stimulate body functions, brain activity and personal feelings. In his experiments he used red, blue and white lights.

Body reactions may be summarized as follows: blood pressure, for the most part, increased under the influence of red light and decreased under blue light. Respiratory movements increased during exposure to red light, and decreased during blue illumination. Significantly, red consistently produced more pronounced effects than blue.

Blue seems to have particular merits as a relaxant and tranquilizer. General relaxation and relief from tension experienced by subjects suggested that blue may help to alleviate muscle spasms and perhaps nervous twitches.



Marazzi, Joy



Cipa Gres, Cremamarfil



Coll di Sassuolo, NoVopline

Because of its restful effects, dim blue illumination might be conducive to sleep in cases of insomnia. It might further contribute to subjective relief of pain through its reported sedative action.

Red and white light stimulation were much the same. Yet, while white light may stimulate the body, it may also be boring to the mind. Such 'white induced' boredom may prove irritating and hence be reflected in human indifference. Conversely, red might be useful in arousing persons with nervous depression or exhaustion.

psychology

There is in colour and light what might be called a "centrifugal action" - away from a person's self to his environment. With high levels of illumination, warm and luminous colours in the surroundings, the body tends to direct its attention outwards. Such an environment is conducive to muscular effort, action and cheerful spirit, and is a good setting for factories, gymnasia, certain areas of schools and the home where manual tasks are performed.

On the other hand, colour and light may have a "centripetal action" away from the environment and toward the individual self. With soft surroundings, cooler hues (gray, blue, green and turquoise) and lower brightness, there is less distraction and a person is better able to concentrate on difficult visual and mental tasks. Good inward orientation is aided. Here is an appropriate setting for sedentary occupations requiring use of the eye or brain - offices, study rooms, fine assembly in industry, class rooms and bedrooms.

Red incites activity and is favourable to emotionally-determined action; green creates the condition of meditation and exact fulfillment of the task. Red may be suited to produce the emotional background out of which ideas and actions will emerge; in green these ideas will be developed and the actions executed.

Outwardly-directed persons, 'nervous' persons and small children will relax in an actively coloured environment, because visual (and emotional) excitement in the environment will effectively "match" their spirits and thereby set them at ease. Attempts at pacification, through colour or anything else, only serve to bottle up such spirits to a bursting point. Inwardly-directed persons however, will ordinarily seek a more sedate environment - and it will provide the calm they innately prefer.

Relationships between colour preference and personality are myriad. Psychologists and psychiatrists have noted that visually, response to form seems to arouse mental processes while reactions to colour are more impulsive and emotional. Colour experience is much more immediate and direct than the experience of form, which is usually accompanied by a detached, objective attitude, whereas the experience of colour, being more spontaneous, is likely to contain far more personal impulses.

In general, warm colours - red, pink, yellow and orange - seem to be more important in the early years of life. With maturity however, red, blue and green become dominant, a phenomenon that seems to pertain regardless of race or nationality.

Again, generally speaking, an individual who reacts freely and agreeably to colours is likely to be a responsive personality, interested in the world at large. Love of colour for its own sake seems to be characteristic of extroverts, and indifference to colour, or requiring a semblance of realism in art forms if they are to make "sense" seems to characterize more introspective or introverted individuals.

aesthetics

While it is undeniable that, as we have stated above, the spontaneous experience of colour contains more personal impulses than the response to form, it is no contradiction to claim that, historically speaking, red, yellow, green and blue seem to be the most



Marazzi Fashion



Dado, Loft



Cir, In Tinta

universally appealing colours. Are these predilections eternal? In purely abstract choice - colour for the sake of colour - a fairly stable order for all humanity is found. Infants develop colour awareness at a very early age. In tests, red, yellow, orange and white have been found to head the list. Long wavelength colours seem to hold most attraction for the child. Yet after infancy, preference shifts toward hues of shorter wavelength, toward green, violet and most notably blue. Teenagers are more likely to prefer blue, red and green. Yellow decreases in popularity with age, while green increases.

As far as the art of colour is concerned its simple elements of appeal may be listed in a few sentences:

- 1 The eye is drawn to unique hues: red, yellow, green, blue, white, black. It prefers pure colours to modified colours.
- 2 The eye prefers lucid form in colour to indefinite form; because the eye distinguishes seven forms in the world of colour (the three primaries, black, white, gray, tint [hue + white], shade [hue + black], and tone [hue + black and white]), it tends to prefer precise form. A pure red, for example, will be pleasing. Yet, when mixed with a little white, it may appear faded and insipid - a weak form of a pure hue. When enough white is added to change it definitely to pink, however, its appeal is restored: the colour has shifted from a pure hue to a precise tint.
To strike the fancy, colour must have real character; extremely pure, bright or deep colours, or clear tints, shades, grays and tones unmistakably identified attract people.
- 3 The emotional quality of any colour will differ as its form differs. Ordinarily, primary hues are vigorous and impulsive. Secondary hues are more refined and perhaps easier to live with. Yet tints differ from shades or tones. Consequently, personality is as much influenced by form as by colour.
- 4 The red, orange, yellow region of the spectrum is warm. The green, blue, violet region is cool. Warm hues generally make the most pleasing shaded colours. Cool hues make the best tinted colours.
- 5 In the harmony of pure hues, all look well with black and white. Combinations in which analogy exists seem to relate to emotions. Dominantly warm and dominantly cool schemes inspire radically different 'feelings'. Combinations based on contrast seem to relate more to vision. Red with green and yellow with blue thrill the eye; but deep emotional qualities are lost because the warmth of one hue cancels the coolness of the other, to the detriment of both.
- 6 Apparently, true colours accord best when they are either similar or almost wholly unlike. There is evidence that either very small or very large differences in hue give more pleasing results than do medium differences. In short, schemes involving monochromatic or adjacent colours, or schemes involving opposites, are superior to others.
- 7 In the harmony of colour forms, pure hues combine well with tints and white; pure hues with shades and black; white with gray and black; white with tone and shade; tint with tone and black; pure hue with tone and gray - all these arrangements respect natural laws of analogy. They look right because they arrange colours in terms of sensation and seem to gratify the emotions.
- 8 The most neutral of all forms is tone, not gray. Because a toned colour contains pure hue, white and black, it naturally accords with all these primaries - and also with tint, gray and shade.

conclusion - part one

Though perception of colour may connote spiritual, emotional and aesthetic things to man, nature is less interested in beauty than in clear vision. Light and colour have biological significance. Colour sense aids perception. It has a functional basis, and was evolved by nature not to make men happy, but to assure their better adaptation to environment.

Using Colour

media

Several times a year dozens of fashion and decorator magazines publish features on this season's hottest colour trends. Home decorator magazines show us cleverly styled images depicting the current autumn shades, gelato and citrus tints, or hot and spicy hues from the exotic east. But we are treated as consumers with very short attention spans. Is it any wonder that so many of us feel overwhelmed by the amount of choice and retreat in confusion into a world of inoffensive beige, white and "easy to live with" pastels?

One consequence of these fashion colour features is that we begin to lose faith in our own taste and judgement, and anxiously contemplate the prospect of another make-over.

To understand how to effectively use colour in our homes and to reclaim control of colour in our lives we must first understand what colour is, how it appears to the viewer and how it behaves in different conditions. Colour theory may seem too removed from the practical issues of selecting floor-coverings, paint and wallpaper, but an appreciation of how colour works can help when you are trying to compose a complex colourscheme for your home or office. Knowing which colours naturally and harmoniously coalesce, and why certain combinations fail, is invaluable in creating an attractive, comfortable living or work environment and, not least, to help avoid costly mistakes.

seeing colour

When we see a colour we are actually registering the waves of light which bounce off an object and are reflected back to us, striking the light-sensitive cells of the retina (the rods and cones), the tissue which enables us to see. It is here that the electromagnetic energies of wavelengths are converted into nerve impulses that flow along the optic nerves to the brain where the visual information is coded and assimilated - enabling us to respond appropriately.



Lea, Progetto

Colour has a number of properties which are important in determining how to employ it. For example, colours have temperature, both real and psychological. When lightwaves strike an object most of the waves are reflected back to us, but some lightwaves are absorbed. The darker the colour of the surface, the more lightwaves are absorbed, where the light energy is converted into heat. Feel a dark surface and a light surface on a summer's day. The dark surface will be much hotter and will radiate that stored heat for longer than the light surface.

The colour of your floor tiles or exterior walls take on greater significance in regions like Tasmania or Queensland where thermal insulation and heating are important considerations. Colour's thermal properties should also be a key factor when selecting flooring for sunrooms, conservatories, terraces, pool surrounds and courtyards.

Just as colours have temperature, they also appear to move and so affect our visual perception of space and scale. Warm colours and dark tones advance. Cool colours appear to recede, as do pale tones. This is important to keep in mind when choosing the finishes for a small room.

The Qualities of Colour: Colour has dimensions or qualities which are referred to as HUE, CHROMA and VALUE, or tone. There is also TINT, SHADE and GREY. Colours are described as belonging to the PRIMARY, SECONDARY or TERTIARY groups from which all colours are mixed: PRIMARY - Red, Yellow, Blue: SECONDARY - Orange, Green, Purple: TERTIARY - Olive, Russet, Citron. Secondaries are a mixture of primaries, and tertiaries are mixtures of secondaries ad infinitum.

HUE is the perceived quality of colour we refer to when we use common names like 'red', 'blue', 'yellow', etc. The relationship of hues is depicted by the colour wheel. The next dimension of perceived colour is CHROMA or saturation. This

refers to the purity of colour, by which we mean the degree to which a hue is diluted or not by greyness or whiteness. In paint terms, pastel or weak colours are relatively unsaturated - they contain only a small amount of tint into a white base. With saturated colours the reverse is true. The third dimension of perceived colour is VALUE or tone, which extends from black to white, with all the shades of grey in between. The issue of tonal value will be looked



Ker Av, Mosaicanda Mediterranea

at further when we consider the importance of light.

Colour Association: Depending on what colours you place next to each other, they can appear to change. (See 'Part 1: Aesthetics' for a more detailed analysis of this aspect).

colour and light

As colour is essentially the reflection of light off a surface, our perception of it is governed by changes in the amount or quality of ambient light. Our psychological reactions to various tonal schemes vary depending on the amount of light available. Human beings are extremely sensitive to light and any changes in its intensity has a powerful effect on us. These stimulus-response mechanisms can be divided into four categories corresponding to times of the day: SUNLIGHT, TWILIGHT, DAWN & DARKNESS. Our reactions to these stages are universal and primeval. Therefore, the tonal value of any colour scheme is of major importance. Tone is the first impression received on entering a room and engenders an emotional reaction, irrespective of the colour(s).

In the context of colour and light in an outdoor location, Australia's relative clean air, intense light (some states more

may be uncomfortably, dazzlingly bright in the summer sun.

The great value of texture as a design element is that where only one colour is used, variations in texture can be employed to create visual interest. This is a deft response to handling small or awkwardly shaped rooms with generally elegant results.

colour and nature

Colour is the cornerstone of decorating, but how do we see it? Colour begins with nature, and nature is what all our subjective colour memories have in common.

RED & PINK are vibrant and stimulating to the senses including appetite. Rich shades such as crimson, burgundy and plum are suitable for dining rooms, a tradition that dates back many centuries.

ORANGE is flamboyant, fiery and aggressive. However tones like pumpkin and apricot are mellow and comforting.

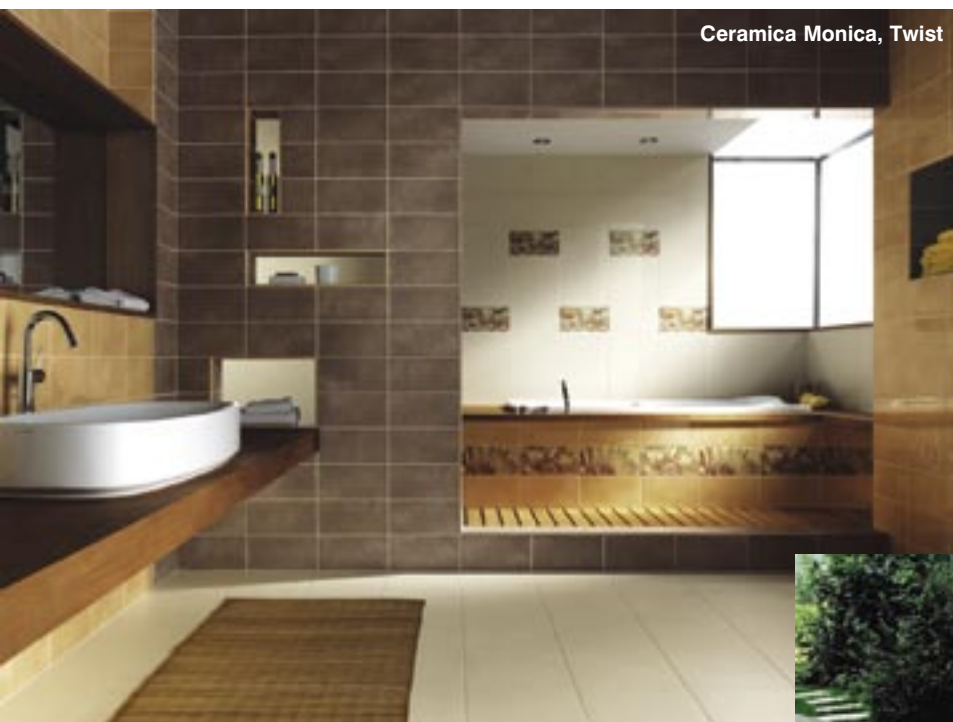
YELLOWs are energetic, vibrant, the epitome of warmth, bringing a lively freshness to a room. Unless combining it with other primaries or using it as an accent in a white or grey scheme, choose muted tones. Greeny yellows such as lime can be startling in large areas, so use judiciously.

BLUE communicates feelings of peace and tranquility. To psychologically cool a hot tropic or dry desert room, choose duck-egg blue, turquoise, aquamarine, or tones close to violet, e.g. lavender.

GREEN is used to bring the outdoors in. Mint, blue-greens and jade are especially effective. Rich emerald and teal create drama and are excellent accent colours.

PURPLE VIOLET is a regal colour and suggests great opulence and grandeur. Tones of pale heather and lilac strike a balance between warm and cold.

WHITE is the safest and easiest colour to use. It is the perfect backdrop for all the other colours. Used by itself though, it's



than others), higher ultra-violet concentrations, and the more dramatic shadows which characterise the Australian landscape all invite the use of stronger, cleaner colours than are preferred in Northern Europe, where muted tones work better.

colour and texture

Our perception of colour is also influenced by the texture of a material, which affects the ability of a surface to reflect light, e.g. WHITE: compare the differences in texture and reflectivity of wool and silk damask, velvet and laminate, polished marble and tumbled marble. The higher the gloss, the greater the reflection of light and the more vivid a colour will appear. This has relevance not only to the type of wall tiles, stone and/or laminate used in a bathroom or kitchen, but for the paving used outside on a balcony or around a pool and the cladding on outside walls. A large, smooth white or very pale material in such areas



clinical purity is hard to live with, requiring interest in the form of texture and pattern if using a white-on-white scheme.

BLACK conjures up feelings of mystery, elegance and sleek sophistication. Patterns using black and white never seem to date or lose their quality of elegance.

GREY can seem depressing, but there are many variations from granite, slate and charcoal to soft smoky or dove grey. It combines well with other colours, especially brights.

how to use colour

There are six different basic methods of arranging colour schemes and by referring to the colour wheel you can understand the principles of colour arrangement:

MONOCHROMATIC - this scheme is based on only one colour, with shades and tints of it alone;

COMPLEMENTARY - consists of two colours which are directly opposite each other on the colour wheel, e.g. red and green, yellow and purple, with tints and shades of these two colours;

SPLIT COMPLEMENTARY - employs a colour with two other colours, one on either side of its complementary, e.g. yellow, violet and blue;

TRIAD - is three colours equidistant from each other;

HARMONIOUS - schemes contain three or four colours in the same quarter of the colour wheel;

ANALOGOUS - is a parallel of two or three colours adjacent to each other on the wheel, e.g. yellow-green, green, green-blue.

The ability to use colour well comes with practice, like the ability to use a foreign language or play a musical instrument. No one can run the City to Surf without training first. However, to increase the likelihood of success we must satisfy the basic principles of design: harmony, contrast, balance, rhythm and dominance, or scale.

Colour can effect an almost magical transformation to the



appearance of a room. The clever placement of blocks of advancing or receding colour can expand or contract a space; changing its 'apparent' dimensions and proportions.

Pale colours can enlarge a confined area, giving the illusion of space. The smaller the space the more reason to adopt a monochromatic colour scheme - the cool tones of palest pastel green, grey and blue are the most effective at achieving this illusion.

While it is certainly true that very dark colours will make a small room seem tiny, the convention that we should decorate all small bathrooms, hallways, etc., in neutrals and pale tones is merely that - a convention. Small rooms can in some situations take bright, strong colours. Accepting a room's limitations and opting to create a dramatic, visually interesting space instead, may be a more rewarding route to travel. Consider this approach for your W.C. or laundry, especially if they are inherently dull.

Rooms which we use frequently, but for limited amounts of time, e.g. halls, stairs, toilets or en-suites can accommodate bright uplifting colours.

Obviously, large rooms can take stronger colours, and a bolder, more thematic decor is possible. Modern houses with their larger rooms and big windows are well suited to a bolder colourscheme. It is not uncommon in Victorian and Federation houses to convert a bedroom into a bathroom, where the original bathroom is sometimes just too small for practical purposes.

In such houses where the ceiling can be extremely high, thereby reinforcing the impression of confined space, a strong colour used for the ceiling will make it look lower. In this way, by employing a light colour on the walls and a dark or warm colour on the ceiling, you can alter the appearance of a small Victorian bathroom, investing it with a more human proportion.

To achieve colour harmony, limit your palette so as to avoid fragmenting the surfaces and creating a busy or chaotic look. If you wish to use a wide range of colours, then other aspects of the décor should be handled with restraint, e.g. a simple room plan with simple, streamlined shapes.

Where decorative objects or strongly coloured bathroom or kitchen furniture are to be featured, a monochromatic tile scheme (various tones of the one colour, ranging from light to dark) is harmonious, non-intrusive and desirable.

Monochromatic schemes can be enlivened by contrasting accent colours such as vanity tops, wall friezes, floor borders, painted skirtings and architraves. Complementary colours are the most effective as accents. Alternatively, choose neutral coloured furniture placed against boldly coloured walls which can be repainted at relatively little cost, when necessary.



Brunelleschi, Arké



In the southern hemisphere a south facing room, or one with small windows, will need a colour that amplifies the available natural light - colour with a high reflective quality.

In a north facing room the amount of light is greater, so you will have more freedom in the colours you choose. Rooms with an east or west orientation receive direct morning or afternoon sun, therefore the amount of brightness required in the room should dictate the choice of cool or warm colours.

Next, consider the architectural style of the house or apartment and ask yourself whether your design plan will complement the architecture, ignore it completely or do you intend a modern interpretation of the style? Your choice of colours and materials will follow logically from your answer. Different periods have been characterized by different colour palettes, and this can

be a very useful guide to colour selection. Finally, make up a colour board for each room, with samples of the materials and finishes you propose using - tiles, paint, laminates, timber, etc., and leave them in the room for a few days, looking at them in the constantly varying lighting conditions and moods. The size of the swatches should be proportionate to the amount to be used in the final scheme. You run the risk of putting an incorrect value on one of the elements, exaggerating or diminishing its importance and thereby getting the balance of the room wrong otherwise.

If you are intending to mix colours, the challenge is to achieve the right balance. One approach is to use colours of equal tonal value (see Pt. 1: Aesthetics).

Ensure that blocks of colour are balanced both in value and in proportion to one another. In the bathroom, make sure that large coloured objects such as vanities are balanced by the use of the same or similar colour in other parts of the room. This will establish a sense of equilibrium.

Distributing colour around the room can also create a feeling of rhythm - whether it is by the progression of similar colours through different textures, shapes or patterns, or the repetition of a single colour/texture combination. This is a common practice of wallpaper and fabric designers.



Brennero, Les Petits Brill

choosing a colour scheme

Start with the colours you prefer. Do you like warm colours, cool colours, neutrals? Are you conservative or bold in your taste, introverted or extroverted?

Next, consider the function of the room and the mood you want to create. The mood of the kitchen will probably be quite different from the bathroom, and the mood of the en-suite will most likely relate to the bedroom rather than the entry hall.

Does the room need to be light, airy and open, or dark, rich and bold? How will the room be used and by whom? Bear in mind the age of the users - are they teenagers or pre-schoolers?

Consideration should also be given to the important issue of maintenance. In working areas, kitchen and laundries, pale bright colours make for greater comfort and efficiency, but can require constant attention to look clean. Similarly heavy traffic areas, such as entries, halls, kitchens and rooms that give onto the garden.

Practicality and maintenance should figure high on the list of criteria when choosing an appropriate colour for flooring.

Take stock of the shape and size of the room. Are there any problems that could be overcome by clever use of colour or light (see the earlier comment about small Victorian bathrooms).

an australian perspective

To a large extent the language of colour is universal, deriving meaning from associations with nature.

However, culture plays an important role in shaping our responses; white is symbolic of purity and innocence in the West, hence its choice for weddings, but in China red is the colour for marriage and white is the colour for death.

By now it should be clear that there is an Australian perspective of colour which takes inspiration, not only from our landscape and the way we live our lives, but from our distinctive culture, which is not English, not American, but is in fact our own. This is not to deny the debt which we owe to these countries, nor others such as Italy, Greece, Germany and China, or the relatively recent impact of Aboriginal art.

Today, in this country, we are witnessing the dawn of a truly Australian 'aesthetic.' It is manifested in forms as diverse as cuisine, furniture design and architecture, cinema and fashion. The common denominator is the eclectic mix of other styles, ideas and materials, which are combined in a decidedly Australian way, which means that the end result is much more than the sum of its parts. It has to do with our optimism and our casualness and a certain emotional rawness as a people.

In the final analysis, when decorating, it is what you like, or what you and your partner can agree on, that will result in the greatest satisfaction. Never, never choose colours based on the possible tastes of a future buyer. It's your house. You only live once. **TT**