THE RAINBOW

Box Art Group Newsletter - Friday 9th December 2022

Written by and for the members of Box Art Group (No. 80)

Contents

Low Water

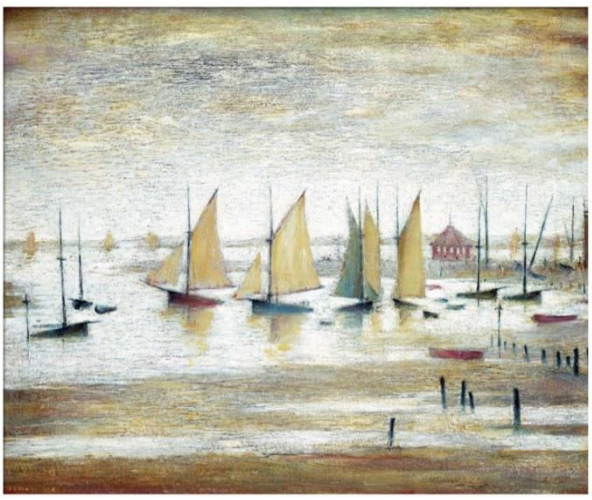
This image was taken from a painting by Arnold Lowry called 'Low Water', from his book Sea and Sky in

Watercolour.

Sheila F

And here are a couple of Lowry's atmospheric paintings.

Pete



Fake or Fortune

Bassin d'Argenteuil Pierre-Auguste Renoir

While on a recent holiday in SW Pembrokeshire, we visited Picton Castle. It was a delightful stately home rather than a castle, already decorated for Christmas. There were also extensive grounds, walled garden, greenhouses and an owl sanctuary to see. On display in the house was " Bassin d'Argenteuil" by Renoir. The painting was subject to examination on Fake or Fortune. I'm rather pleased no final decision was made as, if it was by Renoir, it probably wouldn't have been on the wall!

Nicky Philipps, renowned portrait painter and trustee of Picton, her ancestral home, asked the Fake or Fortune team to investigate this painting entitled: Bassin d'Argenteuil by Pierre-Auguste Renoir.

Bought in the 1930's by her great grandfather, Sir Laurence Philipps, after a visit to Claude Monet's studio, this unsigned painting has been dogged by doubt for half a century. Two rival art world authorities, The Wildenstein Institute and The Bernheim-Jeune Gallery disagree over its authenticity.

Gwen Philipps, daughter of Sir Laurence, recounted to Nicky while having her portrait painted, that she visited Monet's house aged 21 with her parents. Mme Monet told them that the painting they admired in the corner of the studio was a gift from Renoir during a period at Argenteuil when the two impressionists often painted the same views side by side.

Viewers of Fake or Fortune watched Fiona Bruce pick up the provenance trail at Giverny and gain access to the closely guarded Durand-Ruel archives in Paris to investigate the all important inventory of Monet's collection. International art dealer Philip Mould travelled to Berlin to investigate whether the pigments in this painting match those listed by Renoir, with the aid of cutting edge technology. Did the canvas itself hold any secrets?

The programme was broadcast to a record audience of 5.9 million viewers, all fascinated by the Picton Renoir mystery. The evidence gathered by the Fake or Fortune team was presented by Nicky to the Wildenstein Institute in Paris. Do you believe this painting to be by Pierre-Auguste Renoir?

Jill

Pastel Workshop

In October Jill Harwood and I attended a two day Pastel Workshop with Jan Whitton. We have been participating in Jan's workshops for a number of years and pleased when she was able to start them up again after the COVID break. Although very tiring we always come away satisfied with the long day's work.

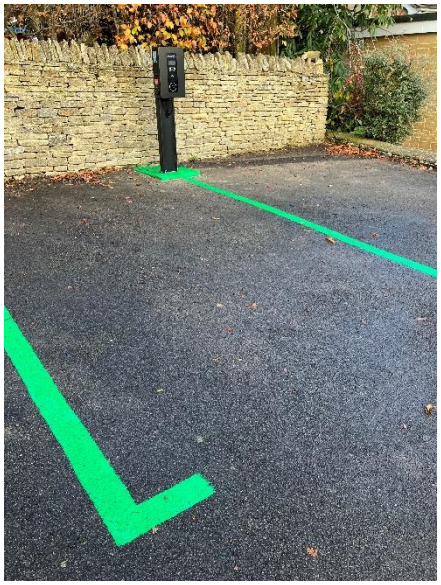
The topic of the first day was 'Tackling Woodland'.

The second day covered 'Creating a Winter Landscape'.

Unfortunately next year will be Jan's last as she has decided to retire. She will be 79 so well deserved!

Hilary T

Calling all Electric Car Owners (and Plugin Hybrids!)



The two chargers we have installed in the Hall Car Park are ready to use.

To begin with it will be on a first come basis. If we get too popular, we can introduce a booking system.

The intention is that residents may use the chargers at any time, but may find an overnight charge more convenient. For example, plug in at 10pm and pick up again at 7am. During that time you may want to charge all the time or just for say 4 hours. Your choice.

During the day time, we ask that you only stay at the point for the time you want to charge so that others may use it after you. Hall users will be able to charge whilst using the Hall.

The capacity of each charger is 7kw. Type 2 is the connection.

The easiest way to use the charger is by scanning the QR code. However, for regular users, there is an App – Monta, which is also available.

The cost initially will be 50p/kwh.

Any difficulties please contact me on 07580 234 657 or 01453 832345

Chris Ames, Hall Chairman

Iguana 2

Here is a pic of my latest scaly creation 'Leather iguana'.

Richard B

Colour Theory 2

What is a Pigment?

I make no claim that anything you read here will help you in mixing watercolours - though it may help you to understand why it is so difficult to match the colours you see in the world. I researched the subject to satisfy my curiosity - and perhaps yours too.

In my previous note on colour theory I reviewed the physical basis of colour, including that light is a wave phenomenon - a jiggle of electromagnetic radiation - and that different wavelengths of light appear to our eyes to have different colours. We also looked at how the eye perceives colour, with three different colour receptors sensitive to ranges around, respectively red, green and blue wavelengths (that is, long, medium and short wavelengths respectively). Hence, we can produce images on computer monitors by lighting up combinations of red, green and blue pixels (which are used as *additive* primary colours). In contrast our ink-jet printers use inks that take colour *away* from the incident white light, so we need at the very least cyan, yellow and magenta inks to act as *subtractive* primary colours (though in practice we also use black, and really good colour reproduction needs more inks to compensate for the imperfect qualities of the dyes used for the basic primaries).

We must also remember that colour is a psychological, not a physical phenomenon. The colours we actually report seeing can be affected by both the colour of the incident light and a number of other influences not strictly physical, such as nearby colours. Furthermore, there is some evidence that there are genetic variations in the photo-receptor chemicals in the eye - the “opsins”- potentially effecting the wavelength ranges to which the “cones” of different people are sensitive. We known that some people are colour blind, because their body does not know how to manufacture some types of opsins chemicals (typically one of the red/green sensitive chemicals), but it also seems possible that others may have *better* colour discrimination that the average person.

As artists we can produce coloured images in a number of ways, including our own direct use of inks and dyes, but many of us like to paint with oils, acrylics and watercolours, and the colour of these products comes from the use of *pigments*. The formal definition of a *paint* is a suspension of insoluble pigment particles in a *binder*.

Pigments are finely ground particles of certain substances that *absorb* some wavelengths of light and *reflect* other wavelengths. (Some may also allow light to pass through the body of the pigment particles, though this tends to be unimportant in the pigments used in artists’ paints. Watercolour paints referred to as “transparent” are *not* made using transparent pigment particles: they contain a relatively small amount of very strongly tinted and finely ground pigments, so a lot of light goes round the particles and reflects directly off the substrate.) The pigment is mixed into a binder (say linseed oil or gum arabic) which will dry out and fix the pigment particles to a substrate (maybe canvas or paper). There are literally hundreds of different chemicals used as pigments, but many have niche uses or are only of historical interest. Nevertheless, Windsor and Newton advertise over one hundred colours in their profession range and other ranges have more. (Though not all of these are pure pigments: some are “convenience” colours, already mixed pigments such as “Paynes Grey”.) The “best sellers” are more limited still - you can probably name the dozen or so that are found in typical paint “sets” from every supplier, which are also those usually recommended by tutors as a good starting point for the novice. As a whole there are probably forty or so fairly common pigments that every supplier needs to offer in some form and from which most artists compose their individual pallet selection. These also typically form the basis of manufactures’ “Student” series. (“Professional” colours tend to carry higher concentrations of more finely ground pigments - that is why they are more expensive.)

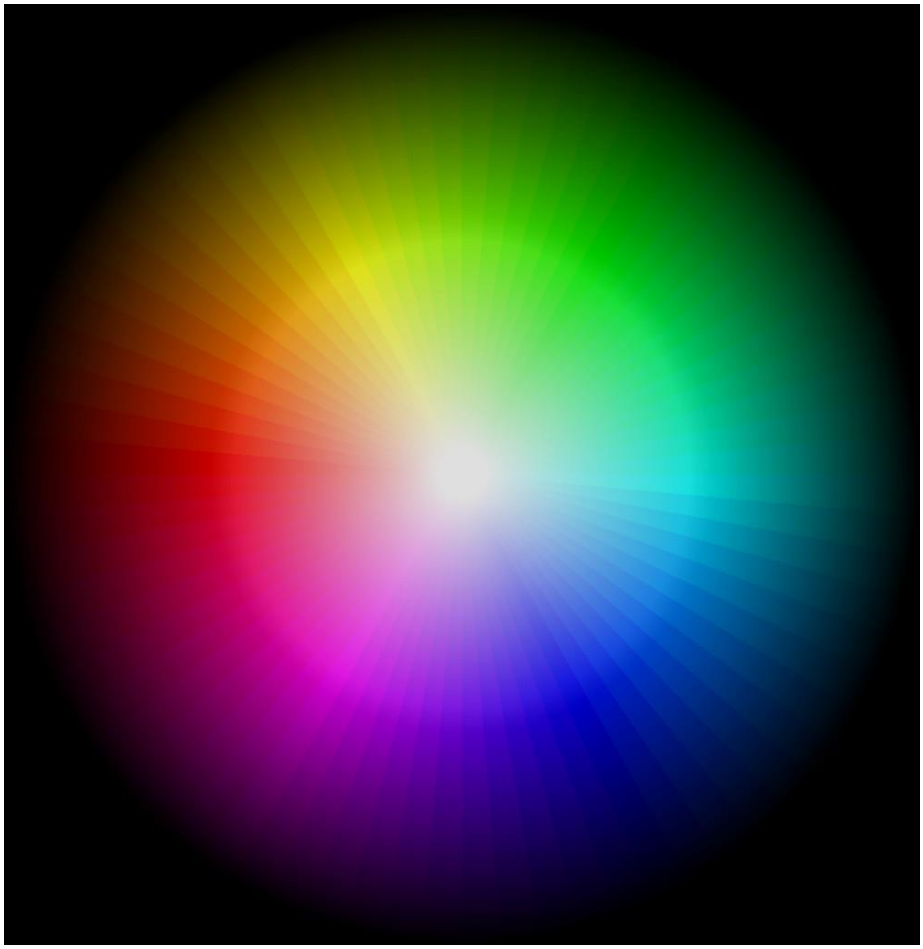
Some inks also get their colour from pigments - but ink pigments are usually very finely ground. Others are based on dyes which are solutions of colour-absorbing chemicals (frequently organic molecules). If you mix dyes together the individual molecules are intimately dispersed through the binder, so every ray of light will encounter molecules of each type, and each will have a chance to absorb some colour from the incident light, giving true subtractive colour mixing. Extremely finely ground pigment mixtures also mean that the incident light will tend to scatter between the particles of each of the pigment types before re-

emerging from the paint layer, which means that each pigment type is absorbing some of the wavelength range - again tending to produce an overall subtractive effect.

When pigment particles are larger, the behaviour of light in pigment mixtures can be more complex, and not always easily predicted. With suppliers' professional ranges containing so many options it is clearly not possible to understand the mixing characterises of more than a handful of familiar colours on a relatively limited palette.

Mixing: Additive or Subtractive Colours?

Naive colour theory suggests that we can produce a broad range of colours from a few *primaries*. Indeed, this does work reasonably well for computer monitors (three additive primaries: red, green, blue) and printers (subtractive primaries: cyan, magenta, yellow + black). I programmed my computer to show the full range of colours that can be displayed on my computer monitor using the additive colour process. The figure above may look slightly different on *your* monitor because there are a number of different display technologies in use at present - but it will still be more or less representative of the range of colours your monitor can display.



A colour wheel, showing maximum saturation halfway to the edge, with brightness fading outwards, and saturation decreasing inwards. This is every colour displayable on my computer monitor (though it may look slightly different on your monitor). It is NOT every colour perceivable to the human eye.

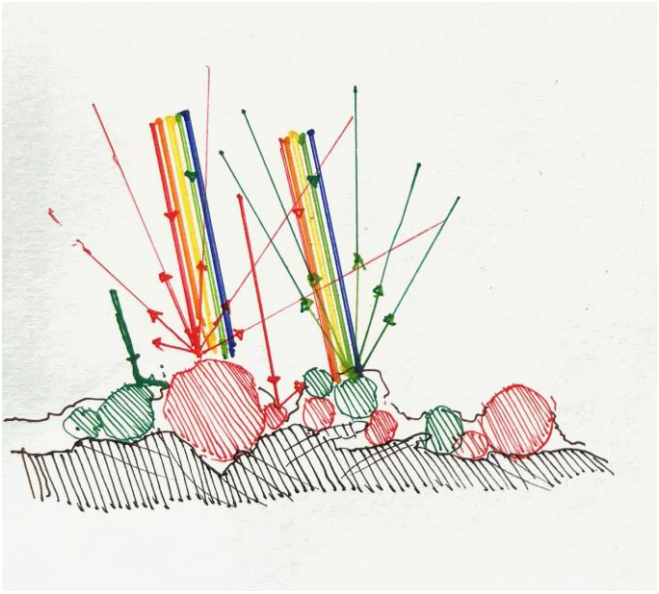
The three additive primaries (red, green, blue) are spaced at 120 degrees around the colour circles with the subtractive primaries (cyan, magenta, yellow) opposite to them. These are also known as *complimentary* colours, which those that give the maximum colour contrast to the respective primaries. In this diagram the subtractive primaries look bright because they are constructed by adding two primaries. (The total brightness in say, yellow, is in fact adjusted downwards to take account of the fact that red and green pixels are both lit - they are not turned on to their full extent in the pure yellow bar. However, it is difficult to make the algorithm take account of the psychology of colour perception: yellow always *looks* bright.)

There are very few real pigments that will behave like the brightest saturated colours (that is, they reflect *all* the incident light in their colour band). See this diagram from the *Handprint* website https://www.handprint.com/HP/WCL/cwheel06.pdf which shows how real pigments lie on a colour wheel. Many common pigments only manage to reflect between 60 and 80% of the incident light. All real pigments also absorb some light over the whole wavelength range (even in their nominal colour band) which limits their maximum brightness, compared to the incident light.

In addition all real pigments reflect *some* light over the entire wavelength range - that is the reflected light always contains a component of white, which limits the maximum colour saturation.

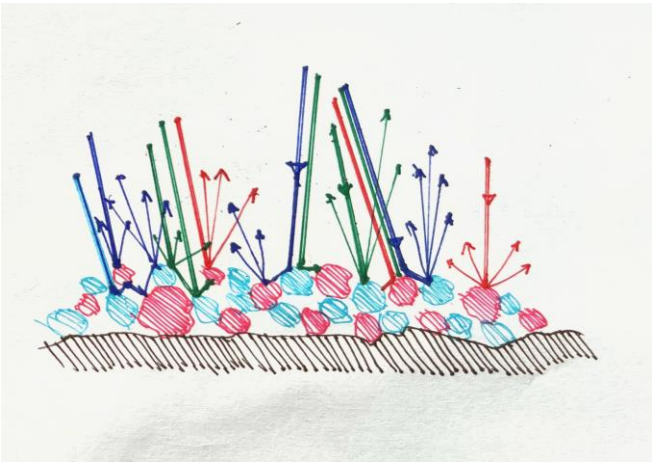
If you pick a typical red, green and blue from your palette (or a green-blue, purple and yellow) you are likely to find that quite a lot of your mixing experiments produce very dull colours. What is wrong with the basic colour theory?

Firstly, you need to remember that subtractive colour mixing only works well with highly transparent primaries (such as the best printer inks, which are the product of years of chemical development). A good subtractive primary, say magenta, takes out only one of the additive primaries (in the case of magenta it takes away green light) and it lets through very nearly all of the other primary colours. The cyan should takes out just the red and the yellow should take out just blue. Remember, however, that “white light” is a continuous range of wavelengths - a mixture of all the colours (though in fact, most of the energy is in the wavelength range we see as a slightly green-yellow - you can thank psychology for our perception of a sheet of paper as white).



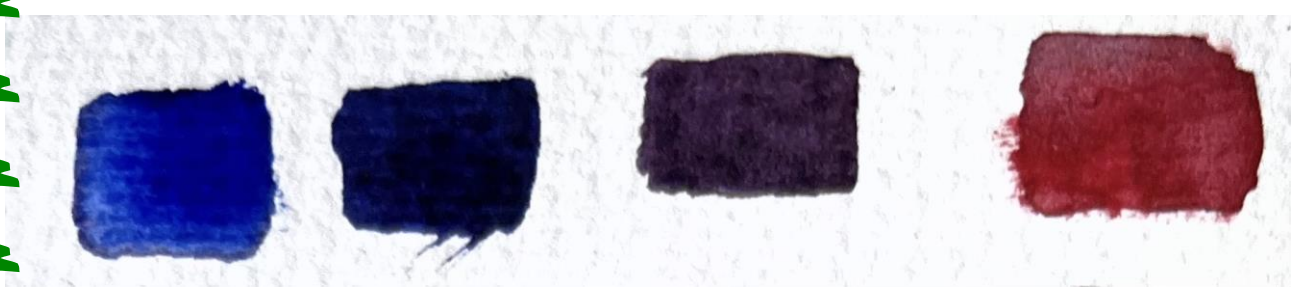
Here we see red light reflected from red particles and green from the green pigment, giving mainly additive colour mixing - but most of the incident light is absorbed, producing a dull result.

Most pigments, however, take out at least some light from the whole of the wavelength range, and if you insist that you want a pigment to reflect only a narrow range of wavelengths - say a very pure red - it may well have a dull appearance because although it is very pure in colour, it is just not returning much light because the narrower the range of wavelengths you select the less energy you return from the incident light. Hence, pigments that appear bright will tend to be reflecting over a broader band of wavelengths, so they colour will inevitably appear less pure and the mixing behaviour will perhaps be more complex. As a result, mixing a pure red (which takes out everything except red light) and a pure green (which takes out most colour except green) will inevitably remove most of the incident light - if you are left with anything it will be a very dull yellow (i.e. a muddy brown). That seems to be well in agreement with practical experience.

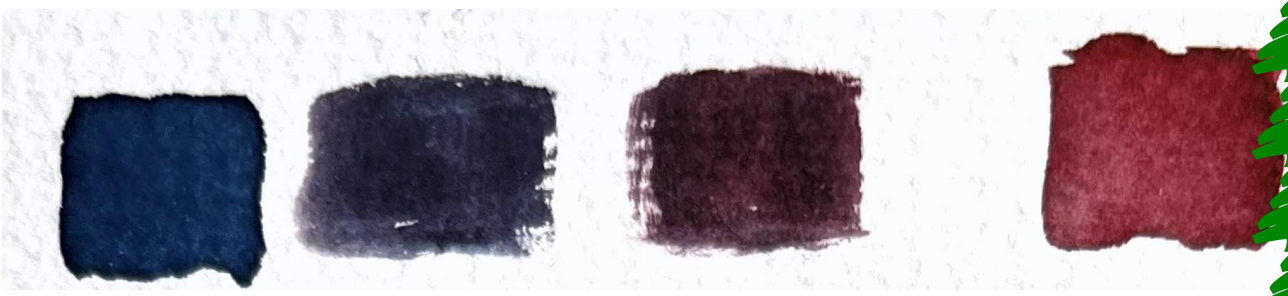


With a mixture of small pigment particles light can scatter within the pigment layer, and there will be some subtractive colour mixing as well as the additive mixing with the light reflecting from the surface.

On the other hand, with a mixture of very opaque pigments, we might expect that we are seeing on the surface of the paint a mixed combination of the light from different pigment particles. So, red and blue mixtures will indeed show as a purple - though perhaps not very bright. As I have already noted we can indeed we get yellow from a mixture of red and green, but it is just a fairly low brightness yellow, which happens to look like mud. It therefore turns out that artists actually need a mixture of additive primaries and their complimentary colours from the colour wheel in order to get a reasonable coverage of colour with paint mixing, so we need a minimum of six pigments plus black and white. Clearly the effect you get also depends on whether the binder medium is watercolour, oil or acrylic. Oil and acrylics are typically able to carry a denser pigment load with higher opacities, and water-colourists aim for transparency.



Ultramarine with Alizarin Crimson - note that the mixed colours using two approximately additive primaries are low brightness.

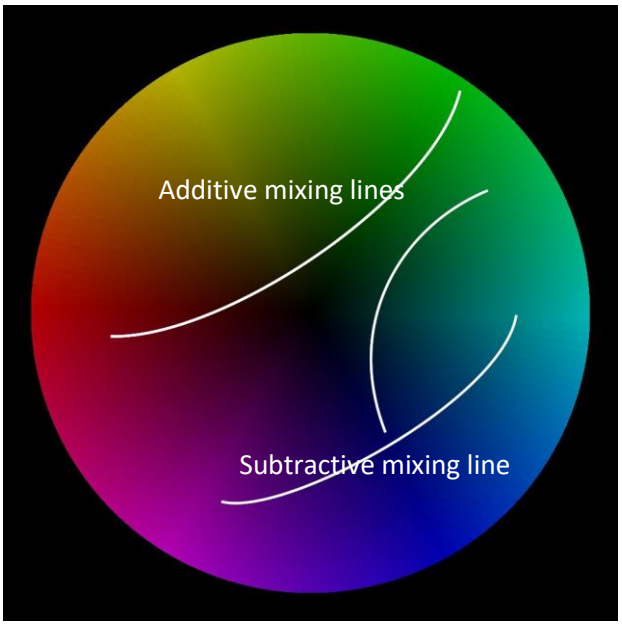


Pthalo Blue with Alizarin Crimson: produces somewhat different results - still low brightness.

All of this means that it is not easy to predict the effect of mixing two different pigments, unless you have more data that most practicing artists wish to take into account. Colour professionals can do this (and need to do it to produce pigment mixtures for the paint mixing machines down your local DIY store) but if you want to have a flavour of the complexities, look up the extensive investigation of modern colour theory on the Handprint website

https://www.handprint.com/HP/WCL/wcolor.html. Be warned! There are equations and graphs here and there! I am a physicist and it took me a while to digest this material - but I found both professional and artistic interest.

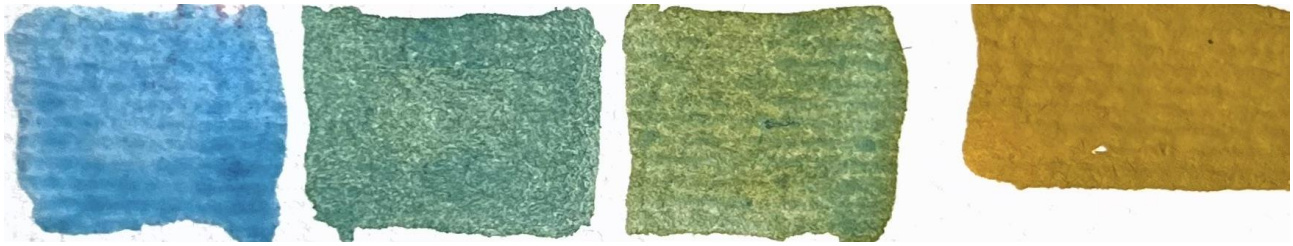
In fact careful experiments with colour measuring instruments - as discussed on the Handprint website - can accurately place the colours mixed pigments on the colour wheel, and the "mixing lines" (actually curves as sketched in the image to the right) which join pure pigments at either end and shows the progress when increasing proportions of one are mixed with the other. Note that when mixing red/blue/green primary colours the mixing lines curve *towards* the centre of the wheel (that is lower brightness), because these pigment are absorbing a lot of colour outside the ranges they reflect. Mixing secondary primaries, such as cyan and magenta can,



Illustrative "mixing lines", showing the colours that can be produced by mixing varying proportions of the paints at the ends of each line. The additive primaries mix to low brightness colours, while their complements mix to brighter colours

however, *increase* the brightness because cyan paint reflect both blue and green and magenta reflects both red and blue, hence it is possible to get a some *additional* brightness in the blue. (In practice, the effect may not be very pronounced given that available magenta and cyan-like pigments start with fairly low-chroma.)

Viridian with Alizarin Crimson: a somewhat muddy mix.



Cerulean Blue and Chrome Yellow: mixtures are relatively bright.

A magenta and chrome yellow mix tend to produce a brighter mix.

The further apart we start around the colour wheel the closer mixing may take you to the centre. The tendency to shift to the centre gets worse if you mix more than two pigments. Hence, if you want to mix bright colours, you need to start with pigments that are not too far apart on the wheel and already both at fairly high chroma. This is why a minimum painter's palette tends to have at least six colours (plus black and white) and painters will add more if their style requires more subtle mixing in some part of the colour wheel.

Showing mixing lines on colour wheels is not in practice all that useful. Colour professionals are more likely to employ the CIE gamut map that I showed in my *Colour Theory 1* note last month, because the mixing lines are much closer to showing the change in hue as straight lines. (They actually need to use three-dimensional graphs, in order to fully take account of changes in brightness and saturation. To visualise this, of course, you need the right computer software.)

The type of binder also affects how much light gets reflected and how much penetrates the pigment surface. A big difference in refractive index (which measures the ability to *bend* light) between the pigment and the binder increases reflection over the entire wavelength range, reducing the potential colour saturation. (This is why colours may change when paint dries: the binder's solvent evaporates and the reflective index contrast between pigment and air is usually larger than that between, for example, most pigments and water.) Smaller pigment particles can also work their way into paper fibres, so some light gets reflected from the paper before it gets to the pigment.

The behaviour of light in paint layers is potentially even more complicated: some of the light will be reflected directly from individual pigment particles, so a thin layer of red particles and green pigment particles (as you might get with watercolours) can *add* red and green light together (though the intensity of light will be low, because so much has been absorbed). Hence, mixing red and green paint does not give bright yellow, but probably a muddy brown - that is a yellow of very low intensity because most of the light has been absorbed.

On the other hand with a thicker pigment layer, a light ray may scatter off one colour of pigment particle, and then hit a different colour pigment before scattering back towards the viewer, so both pigments will successively take colour out of the incident light. Extremely finely divided pigments with more likelihood of internal scattering, as in some inks will tend to increase the tendency to behave according to subtractive theory.

Many of the naive descriptions of colour mixing do tend to forget that pigments absorb a lot of light, so mixtures widely separated on the colour wheel will absorb light over a lot of the spectrum and are therefore almost certain to produce dull results.

The size of pigment particles also matters in mixing: the typical particles of a C*erulean Blue* pigment may be fifty times as large as those of *phthalocyanine* pigments. As a result the smaller particles may be masked by the larger opaque particles. On the other hand the larger particles may *granulate* and settle down to the bottom of the paint layer in clumps, while the smaller particles may remain suspended. Small particles, however, may also *flocculate* (that is, also clump together, as apparently do some of the *quinacridone* pigments) and also mask whatever is underneath.

As if this were not complicated enough: student-quality paints are marketed with similar names to the artists-quality colours from the same supplier, but may be made with different (cheaper) pigments. Different suppliers may indeed give the same marketing names to different pigments - or different names to the same pigment. You need to look carefully at the label for the pigment identifier. (E.g. Cerulean Blue is a form of *cobalt tin oxide* designated as PB35 or PB36 in the definitive *Colour International Index*). Any paint which has the word "Hue" as part of its name is not the traditional pigment associated with that name, but aims to match its colour. There may be entirely valid reasons for this: the original pigment may now be considered dangerously poisonous, or lack light-fastness (such as the very fugitive *rose madder*). Others are now just impossibly expensive or unavailable (e.g. the semi-precious lapis lazuli - the original

Professional Winsor & Newton paints, with pigment IDs (some as "convenience" mixtures).

ultramarine which used to come only from Afghanistan). Sometimes, of course, it may be just a cheap substitute with only a few of the qualities of the original. Any paint that does not specify the colour index on the package should be avoided - you have no idea if it is even the same stuff you bought last time.

You will have to learn most of your colour mixing technique through experiment and experience, but I found this page on the Handprint site more helpful than most: https://www.handprint.com/HP/WCL/intstud.html - but it does not try to hide the complexities as you find with more elementary guidance.

Jane Blundell's website also contains a large number of painted colour swatches, demonstrating mixing effects. See https://www.janeblundellart.com/painted-watercolour-swatches---introduction.html and other pages under her "Resources" tab. She is also careful to point out that because of differences in paint manufacture from different suppliers (i.e. pigments ground to different sizes) you can get different results using nominally equivalent pigments from different ranges.

I am not sure how much of my explorations help with practical colour mixing - but at least you may appreciate that the difficulties of getting just the right shade are not entirely due to your lack of skill: it really is more complex that most books would have you believe.

Having said that, the real complexities of colour theory start with the psychology of colour perception. It is possible, for example, to make people perceive colours that, in a physical sense, are not really there at all. (As I mentioned last month, I have a daughter who sees printed numerals - black and white to my eyes - in colour. This is probably due of some unusual - but not all that unusual - cross-wiring in the brains of people with synethesia.) It is also certainly possible, with skill, to make the viewer of an image believe that colours are more intense and brighter than a scientific instrument would actually indicate. These are potential effects that are in fact exploited instinctively by experienced artists, and worth exploring.

I know already that I will need to do a lot more digging to identify reliable source material, but if I manage to understand enough of this to produce some practical advice I may return with a Colour Theory 3 - watch this space.

Bibliography

The three websites that I have found most useful in my endeavours are:

- The "Handprint" website https://www.handprint.com/HP/WCL/water.html contains a mass of detailed information about watercolour brushes, papers and paints - more than you will ever want to know. He seems to have researched his material carefully and has not taken anything for granted. Nevertheless, he is a practicing artist so keeps his eyes on the ultimate purpose. See in particular
    - https://www.handprint.com/HP/WCL/cwheel06.pdf for the location of real pigments on a colour wheel.
    - https://www.handprint.com/HP/WCL/wcolor.html for his master index of colour theory.
    - https://www.handprint.com/HP/WCL/intstud.html for some practical examples of how pigment mixing really works.
- The Jackson Art website (https://www.jacksonart.com) also has a number of useful articles about art materials and technique from well-informed practicing artists that seem to be well-sourced, once you have navigated around the product hyping.
- I also like Jane Blundell's website (see for example https://www.janeblundellart.com/getting-started-in-watercolour.html) which again does not assume naive colour theory, but takes an experimental approach to colour mixing.

Michael M

Magnolia

Watercolour and gouache.

Sheila F

Christmas 2022 Competition

What remains after Christmas?

- Your interpretation of this theme can be as broad or specific as you like. I have looked at a number of approaches but you may have other ideas that are just as valid.
- The period after Christmas Day until we resume our everyday lives is different for everyone. Some people enjoy the time to be lazy, pick up on reading, others are super active. It is often a time for reflection and planning. Your work should reflect something about that time, in any media.

Some ideas…..

Collage of wrappings and wrapping paper

Guitar – *Pablo Picasso*

That after party feeling has been depicted by many artists

Andy Warhol

In many different ways

William Claesz Heda

It might be the sadness of saying goodbye

Tissot

Jo Bradney

Thomas Schaller

Or the sheer amount of washing up

It could be decorations starting to fade

It could be the lovely memory of visitors

Artists unknown

Or a happy time out in the landscape

Jill Ray

Claude Monet

You might want to depict how you feel after Christmas

Kathy Herring

Or what you got up to – it's up to you…

Jack Vettriano

Judging will be on the first session back, Thursday 12th January

Upcycling

I came across a half dozen roof slates, each about 24in long x 10in wide when we moved into the house over 20 years ago. I've finally thought of a use for them, as slate chalk boards for shopping lists, etc.

I've used acrylic paint to decorate them, with a white base to improve the visibility of the design. The photo shows a damselfly in preparation, and I was quite pleased with the dunnock, but the orchids were tricky. I suppose it should have been a mouse. *Pete*

Spring Term

The Spring Term begins on 12th January. This session will include a critique by Beth of the paintings for the Christmas competition, so bring your submissions along.

The hall with be closed on 23rd March for the Box Village pantomime. An alternative to this session could be a visit, and several venues have been suggested, such as the Museum in the Park, Stroud, or a nearby National Trust House. Members' suggestions would be welcome.

Date	Tutor	Programme
12th January	Beth	Christmas Competition critique
19th January	Beth	
26th January	Roxy	Still life
2nd February	Roxy	
9th February	Beth	
16th February	Beth	
23th February	Roxy	Still life
2nd March	Roxy	
9th March	Beth	
16th March	Beth	
23rd March	*****	Village Hall Pantomime
30th March	Beth	Still life

N.B. The summer term begins on 20th April and ends on the 1st June.

If anyone would like a short tea break demo or tutorial of a subject of their choice, please let Beth or Roxy know.

There will be a space on the sessions notice on the notice board to write your subject on too.

Many thanks to Roxy and Beth.

Lynne