Resumen

Los cambios introducidos en la pintura italiana del Cinquecento son producto de la transmutación y transformación de las materias primas de naturaleza material e inmaterial que se dio en la época.

El color inherente a la arquitectura de Venecia, sea el de las fachadas de mármol y vidrio, sea el de la proyección de su imagen en las aguas, se hace calidoscópico con la interferencia de factores como los de las variaciones producidas por el reflejo del cielo, el movimiento de las góndolas, los efectos texturales y cambiantes. La mutación continua de los múltiples reflejos estaba grabada en el alma de los pintores venecianos, conscientes de que el complejo fenómeno de la luz no

MARIA JOÃO DURÃO

Sketching the Ariadne's Thread for Alchemical Linkages to Painting

irradia sólo desde arriba y de que el color tiene un carácter relacional con el contexto físico envolvente. La posición de Venecia como centro de comercio de la época facilita su acceso a los pigmentos más raros, descritos en el presente artículo por sus calidades y por el ritual inherente a la práctica de la pintura al óleo. Esta técnica, que en el Renacimiento superaba a la del temple, tiene potencialidades e implicaciones en la representación y en la percepción de la luminosidad, de la transparencia, de la intensidad y de la profundidad. La innovación de orden tecnológico asociada a la práctica de la pintura y las evoluciones importantes, como la del vidrio, repercute en los mecanismos de representación y de percepción del ambiente natural y en la concepción del mundo.

La perspectiva y los sistemas de modelación y representación volumétrica posibles con la técnica del óleo constituyen elementos de análisis desarrollado en el artículo. Las teorías del color de Alberti y Cennino y el redescubrimiento de los conceptos y temáticas platónicas y aristotélicas se conjugan con los elementos arriba referidos para la construcción de las temáticas pictóricas. Este artículo culmina con el abordaje de la obra de Ticiano, por considerarse su trabajo representativo de la escuela veneciana y notable en la innovación del colorido y en la manera de pintar articulando la materia prima con el encuadramiento perceptivo que permite transmutar en luz la sustancia cromática.

Pigments and techniques as agents of the sketch for transformation

Venetian painting in the first decade of the Cinquecento underwent such significant changes in pictorial vision and pictorial technique that their influence on the development of art in Europe was decisive. Venice was the wealthiest city in Europe and therefore allowed for luxuries both in the construction of palaces, churches and in architecture on the whole, conveying an image of chromatic exuberance.

The variety and richness of colour that is evident in Venetian paintings is the result of the transmutation of the colours of Venice itself that are revealed in the more obvious elements of perceived environment and in the implied sensorial inputs found in the variety of stimuli available. Depending on season and light typology, colour is dematerialized with more or less intensity on the cathedral of S. Mark, and the churches of Torcello and Murano, the facades of marble and glass palaces. This floating man-made colour of the materials of Venice is complemented with the natural light reflecting surfaces of the canals, the lagoon and the film that mirrors the images of the colours of the skies, of the surfaces and textures of buildings, bridges and the moving boats and gondolas reinforced by the overall kaleidoscopic atmosphere. The unlimited and continuous change provided by these multiple reflections is ingrained in the soul and imagination of the painters of Venice who are well aware that light in general does not only irradiate from above and that colours are relational in their context.

Venetian painting of the Cinquecento is especially famous for the intensity and vibrant power of its colour and it was well placed to provide a great range of important pigments from the East and elsewhere. Since the Middle Ages most pigments and dyes used in Europe were imported from other countries and continents, and were sold in Pisa, Amalfi, Genoa and also in Venice. Pigments and dyes came from Malay and Sri Lanka, such as cochineal, indigo, lapis lazuli, indian saffron or extracts of brazilwood, that was imported from Ceylon and later from South America. Arab merchants bought the pigments in India and took them to Persia, and then to the ports of the Mediterranean, Alexandria, Rhodes and Cyprus. Venice was also a centre of this pigment trade, so the finest pigments were available to be used by painters, which was to constitute a very significant aspect of the creation of the sixteenth century Venetian School that culminated in Titian.

Ultramarine blue, a mineral pigment extracted from the semi-precious stone lapis lazuli, came from Afghanistan and was described as being more expensive than gold, so for that reason it was only used in Italian

Medieval and Renaissance painting for the representation of the draperies of the Virgin Mary. Sometimes it was used with an underlayer of azurite, also a mineral, that is more available and less expensive, that exists in Italy, France and Spain, Germany and Hungary.

Indicum or indigo, a dyestuff extracted from plants such as woad and the indigo plant itself, was used in painting, but tends to fade. The fading action of light is less pronounced when indigo is used at high strength and is almost black in tone. It was transported in pans or squares made of compacted powder. The colouring agent produced indigotin, blue tint, and indirubin, red tint and also resulted in a more or less purple dye. Delamare and Guineau[1] report that in Antiquity indigo was imported as inicum in flat, dried bricks, and that Roman writers such as Pliny did not know that it was made from a plant, since its description in the *Natural History* reads as follows: "a certain silt that forms in frothy water and attaches itself to reeds. This colour seems to be black when ground, and yet when diluted it makes a certain very rich purplish blue."[2] The second claim of this same passage has been used by the author in another text[3] that discusses the perception and use of blue in Greek painting.

Manufactured pigments were also used, for example lead white, verdigris and Egyptian blue and these came from Greece, Rome and further away from Egypt, and China. Most of coloured materials that have been used as pigments belong to nature and are coloured minerals earths and ochers, or natural products such as dyes and resins. Earth colours are stable and are extracted from the mineral iron found in the earths crust in red, and yellow ochres, green earths, and hydrated iron oxides. Hematite or sanguine is a red iron oxide (earth colours containing hematite crystals can look red, red-orange or red-violet). Ochers made with yellow iron oxide- goethite- are yellow, but it turns into hematite when it is subject to heat so that red tints may be made from the abundant yellow ochres. When manganeseoxide predominates, then the pigment is black and therefore the brown tones of sienna and umber result from the mixture of manganese oxide with goethite. Ochres, siennas and umbers- provide a range of more muted colours from yellow, yellow-brown, and orange through to red, dark brown and black. Black comes from natural sources: charcoal from various woods and plants; carbonised bone and ivory blacks; coal, black chalk and graphite. White, on the other hand, was a poisonous lead compound-lead white-formed as a corrosion crust on metallic lead, exposed in the presence of carbon dioxide, in closed vessels to sour wine.

In the Renaissance period, pigments were associated to drugs, medicines and alchemy. There was almost a ritual involved in the process of

1 Delamare, F. & Guineau, B., *Colour, Making and Using Dyes and Pigments*, trans. Sophie Hawkes, Thames & Hudson, London, 2000.

2 Plínio, *Textos de Historia del Arte*, ed. Esperanza Torrego, A. Machado Libros, Madrid, 2001.

3 "cum cernatur nigrum at in diluendo mixturam purpurae caeruleique mirabilem redit" (*Natural History*, XXXV, 46), quoted in Durão, M. J., "O Diáfano e o μέλας", *Ar - Cadernos da Faculdade de Arquitectura da Universidade Técnica de Lisboa*, 6, 2006, pp. 144-147.

preparation of the pigments. The first step of grinding the minerals on a stone slab or in a bronze mortar, was followed by mixing with water for thinning and then the medium, either egg for tempera based painting or oil for a painting technique that would innovate and change the course of this art practice. In the case of oil painting they did not dry as long as they were maintained in water, however later in the seventeenth century the paint was stored in pig's bladders, and by the seventeenth century artists were able to obtain ready-prepared pigments, paints or canvases from professional suppliers.

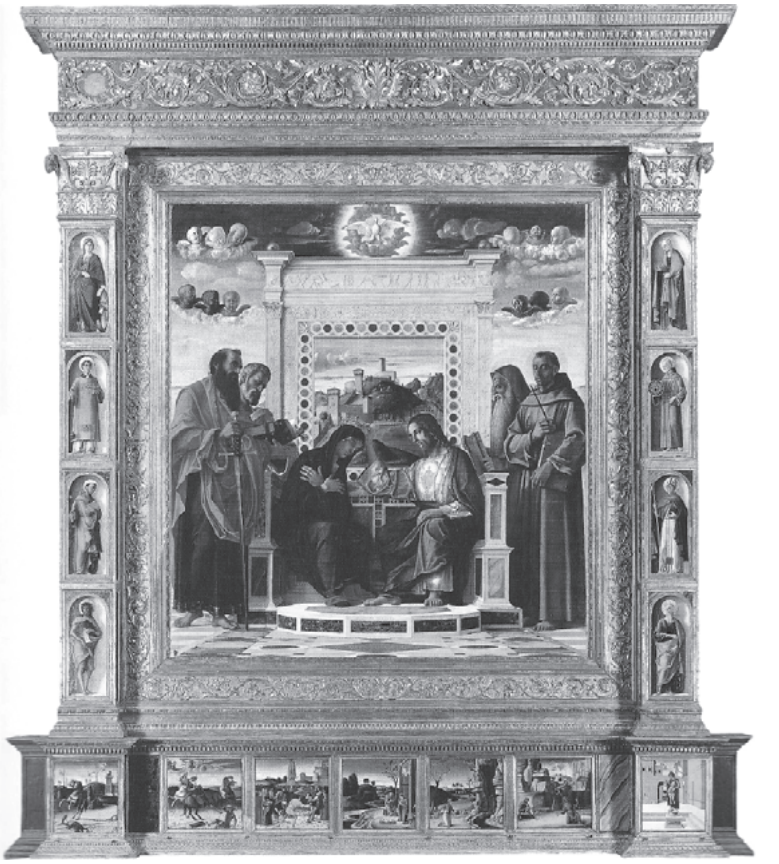
Paint consists of coloured pigments and the binder that holds them in place. A liquid diluent or thinner can be used to brush out the paint and as it dries the diluent evaporates and the binder dries up. Oils such as walnut and linseed or poppy oil, harden by combination with the oxygen in the air. Egg tempera dries quite quickly in comparison to the slow drying oil. This characteristic favours the blending of colours into transitions. The medium can be fluid or viscous when wet, flat or textured when dry, and the same pigment used in different media can appear glossy, matt, opaque or transparent, dull or brilliant. Some pigments are more opaque while others such as lakes are used for their translucency and suitability for glazes so that a more opaque paint layer can benefit from the final transparent oil layers that are applied over the first layer. Furthermore, the colour of the ground—the layer first applied before painting—also has a significant effect on the overall tonality of the painting, as well as on painting technique.

Both medium and support suffered developments since the fifteenth century in Italy when oil superseded egg tempera as the preferred paint medium and in the sixteenth century wooden panels gave way to canvas supports. This innovation can only be compared to the revolutionary discoveries in colour and pigments that took place in the nineteenth century. The invention of oil painting is usually ascribed to Johannes and Hubert van Eyck, however, in the *Libro dell'Arte*[4] of 1390 Cennino Cennini already commented on mixing pigments with oil. He recommends the use of a pigment mixed with egg yolk to create a velvet effect on a drapery, but then to use a miniver brush to depict the threads in a pigment mixed with oil. Charles Eastlake in *Materials for the History of Oil Painting*, quotes sixth century medical writer Aetius' description of linseed and walnut oils: "It has a use besides a medical use, being applied by gilders or encaustic painters, for it dries, and preserves gildings and encaustic paints for a long time".

The father of Venetian painting is Jacopo Bellini who is also the father to two painters Gentile and Giovanni Bellini, both influential in the work of

4 Cennini, Cennino d'Andrea, *The Craftsman's Handbook (Il Libro dell' Arte)*, trans. Daniel Thompson, Dover, New York, 1933.

FIG. 1
Giovanni Bellini, *Coronation of the Virgin* (c. 1471-4).



the next generation of painters. Of Jacopo´s paintings very little remains but the London and Paris sketchbooks reveal that, like with Mantegna, Jacopo Bellini had learnt from Fabriano, Uccelo, Alberti, and Donatello.

Giovanni Bellini painted the *Coronation of the Virgin* (fig. 1) in the 1470's, when he moved from tempera based to oil based medium. The shift from tempera to oil in Venetian painting had several implications on the changing views on colour and luminosity, yet the pigments Giovanni Bellini used did not change much from tempera to oil technique, yellow ochre, copper resinate, lead-tin yellow, lake, vermilion and verdigris. Blues were painted with an underlayer of azurite, with the final layer mostly from lapis-lazuli, mixed with lead white. Due to the rarity and difficulty in access of ultramarine blue, extracted from lapis-lazuli, and in order to economise on its use, an undercolour of a cheaper pigment such as the green reflecting azurite was used with a layer of ultramarine on the surface.

Venice was one of the most significant trading ports of Europe and an important centre not only for pigments, but for textiles and glass-making as well. Benefiting from the glass-industry, Bellini mixed the lapis lazuli with a product of glass industry, smalt[5], a pigment of ground potassium glass with cobalt as colorant. The use of blue, whether ultramarine, azurite or smalt, mixed with white in Bellini's oil work creates luminosity as well as intensity and depth, precisely the opposite of the behaviour when blue was mixed with white in tempera or fresco.

5 Smalt is a manufactured pigment that is made by adding cobalt oxide to a potash-rich molten glass that is then cooled and crushed. It loses its colour with time particularly in oil, but even so, it was used because it was cheap and easy to obtain in the sixteenth and seventeenth centuries.

Pictorial space and ragione di rilievo *including shadows*

First discovered by the Egyptians, glass affected the concepts of spatial visualization. Stained-glass was considered the most beautiful medium and intense in colour, through which light penetrates but does not break. The symbolism of medieval stained-glass of cathedral windows was substituted by the Renaissance purification of glass, a clear medium through which unchanging colours could be seen.

Besides the clarity in perceiving colours and shapes, the naturalistic view provided by glass expanded the vanishing point. As Lewis Mumford[6] explains, by the sixteenth century the telescopic optics had shattered man´s naïve conceptions of space and extended his perceptions of an expanding world. This had implications in the way reality was depicted. Giovanni Bellini's Doge *Agostino Barbarigo kneeling before the Virgin and Child* (1488) (fig. 2) a painting on canvas gains spatial unity in the different layers and depths of space with colours that shift planes and

6 Mumford, Lewis, "Agents of Mechanization and the Eotechnic Phase", *Environments: Notes and Selections on Objects, Spaces and Behaviour*, Brookes, Cole, California, 1974.

FIG. 2
Giovanni Bellini, *Doge Agostino Barbarigo Kneeling before the Virgin and Child* (c. 1488).

create a wide range of distances such as the experience of walking around in Venice and observing the transformation of colour and texture as the reality gradually gets closer to the observer.

In parallel with the innovation of technological order, Leon Battista Alberti's *Della Pittura* of 1435-6 changed representational art forever with its revolutionary description of single point perspective for drawing three-dimensional space on a two-dimensional surface. Until then, painters were familiar with Cennino Cennini's *Libro dell'Arte*, a handbook written in the vernacular for use in the workshop that presents a system mainly for painting in fresco and on panel with egg tempera that worked as an instructional guide for the late medieval painter.

One of the central themes of the *Libro dell'Arte* is the use of colour, described as the *glory of the profession*. The text is of practical advice on the preparation of raw materials of painting and on "how to make draperies in blue and purple", "how to paint water", as well as draperies, landscapes and all the themes usually represented by the painters in terms of the sequences and the layers of presenting combinations of colour with natural and artificial pigments. Cennino instructs on such diverse crafts as how to make drawing paper or brushes, how to apply gold, how to paint frescoes, how to paint in oil on walls, panels, irons, how to colour gold on velvets, among so many other topics that include the colouring of faces, hands feet and flesh. Although he makes reference to colour along the book, a chapter is dedicated to the description of colour pigments.

For twelve years Cennino was a disciple of Agnolo Gaddi, whose father was a disciple of Giotto. He establishes his descent from Giotto before instructing "Come tu dédare, (secondo) la ragione della luce, chiaro e scuro alle tue figure, dotandole di ragione di rilievo". In fact, contrarily to the usual description of this handbook of painting, it also speaks of light in terms of its behaviour and direction in a painting. On the subject of shading and depiction of the shadow on coloured draperies, Cennino recommends the use of colours in their pure form in the deepest shadows and the progressive mixture with white towards the lit parts, with highlights of pure white. However, because saturated colours seem to advance, by placing them in the deepest shadows these too seemed closer than the lit parts, reversing the intended effect.

While Cennino's colour systems were devised for painting in fresco and egg tempera, predominant in the Quatroccento, Alberti's *Della Pittura* considers modelling with light and shade to build form using pure colour adding white (to model up from pure colour) and adding black (to model down from pure colour). Shadows are full of stray reflections

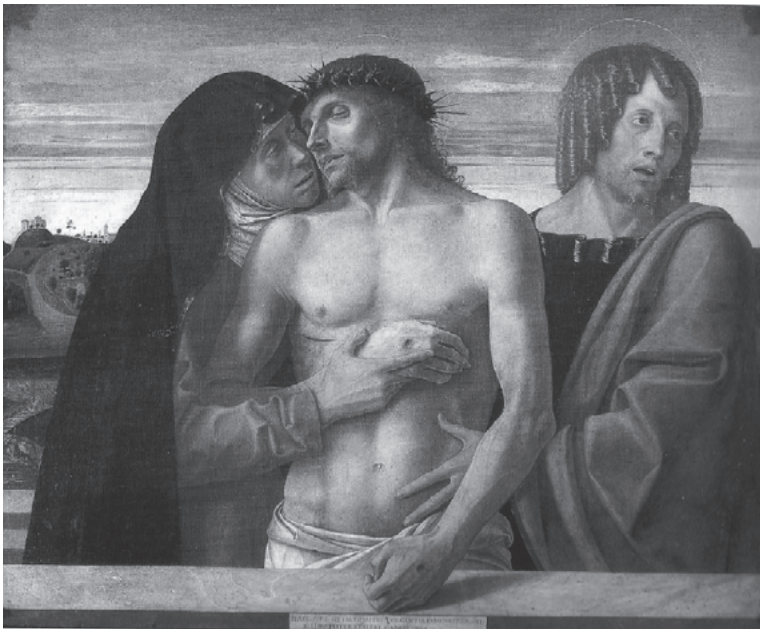


FIG. 3
Giovanni Bellini, *Pietà* (c. 1460).

from surrounding light sources and painters since the Renaissance have included them to reinforce the sense of roundness and form of objects on their unlit sides.

In Giovanni Bellini's *Pietà* (fig. 3) the shadow that Mary projects onto Christ's arm initiates the possibility of creating pictorial space with interactions between colour and shadows. Giovanni Bellini's paintings create volume and depth through the understanding of the characteristics of the oil-medium which is slow in absorption and rich in creating layers of paint and glazes. His paintings do not have the tonal unity of Leonardo's, but they create visual unity between diverse drapery colours.

These subtle gradations of light and dark values with different shades of the same hue were used before the sixteenth century *chiaroscuro* mode of colouring initiated with Caravaggio, whose *chiaroscuro* reduced the colour complexity to a dramatic contrast of light and dark, the very essence of chiaroscuro. In *The Burial of Christ* (1604), a strong light is cast on the figures carrying the corpse, with parts in the shadow overpowering the space with its darkness, whilst colour is reduced to isolated hues. The chiaroscuro mode of painting separated light from colour and they only reunited with Veronese and Rubens. In their paintings, the surface colours in draperies, reflected lights, or distant

views were orchestrated with shades of luxurious and beautiful colours taken from nature, from birds, flowers, or the human body. In the seventeenth century, Vermeer would use coloured shades and cast shadows in a tonal scale using contrasts between yellow and blue and very subtle gradations of tone of yellow and of blue, thus anticipating the liberation of colour from chiaroscuro, i.e. Delacroix's 'peinture claire' of luminous shadows and reflected light.

Relations between contrast or "friendship of colours" and actions of emergence of light

Besides Alberti, da Vinci had stated that the most beautiful colour contrasts were opposites. The use of opposite complementary colours was essential to Delacroix who painted the colours of the shadows with the complementary of an adjacent highlight and noted that these phenomena were caused by physiological reaction of the human eye[7]: after looking at a strong colour for a while everything becomes tinged with its complementary colour. This phenomenon of induced colour was explored by the Impressionists, whose half-shadows were painted with the complementary colour of the highlights. Michel-Eugène Chevreul, director of dyeing at the Gobelins, formulated laws of simultaneous contrast of colours and showed that opposites on the colour wheel enhance each other when placed side by side, thus confirming with observation and communicating through diagrams what Alberti, da Vinci and Goethe had already claimed and painters had in fact verified in their painting practice.

The embryo of the phenomenon that developed into the theory of complementary colours is found in Alberti's fifteenth century treatise *Della Pittura*[8]: "there is a certain friendship of colours so that one joined with another gives dignity and grace". This concept of colours enhancing each other and being harmonious when placed together originated colour harmony theories that relate to the placement of colours is also present in Alberti´s work: "If red stands between blue and green, it somehow enhances their beauty as well as its own. White lends gaiety not only when placed between grey and yellow but almost to any colour. But dark colours may be placed with good effect among dark".

One of the relational aspects of the nature of colour is the contrast between adjacent colours in a certain colour field and the varying degrees of lightness reflected from that visual field. For example, brown exists only when the wavelengths from a yellow object are darker than their surrounding colours and maroon and olive are other examples of these colours[9]. Colours such as brown do not exist in spectral light and

7 Goethe in his *Theory of Colours* refers to this phenomenon as follows: "every decided colour does a certain violence to the eye and forces it to opposition", in Goethe, J.W. von, *Theory of Colours*, trans. Charles Lock Eastlake, MIT Press, Cambridge, MA, London, England, 1994 (1st ed.,1840).

8 Alberti, Leon B., *Della Pittura* (1435) published as *On Painting*, trans. C. Grayson, Penguin, London, 1991.

9 Walsh V. & Kulikowski, J. "Seeing Colour", ed. R. Gregory, J. Harris, P.Heard & D. Rose, *The Arful Eye*, Oxford, 1995.

in pigment colour such as in stained glass red, violet or grey were used instead. With oil, the variety of glazes provided the warm tones of the brown region of the colour palette. These were colours that Bellini used to contrast with brighter colours such as in *The Coronation of the Virgin* (fig. 4). Bellini uses brown greys for the shadowed areas with undertones of blue and warm rose mixed with lead white and brown in the "white" mantle of Christ.

Alberti´s system is influenced by that of Aristotle and connects the earth colours to ash (*cinereum*) conforming to the Aristotelian system of scale polarized in black and white leaving the *brunum* out of this scale, a *color mortuum*. For the Greeks colours were situated on a scale between lightness and darkness, and were discriminated by hue as well as lustre and brightness. Empedocles had already established a correspondence between "simple" primary colours to the four elements that correspond to 4 essences of reality: air, fire, earth, and water. However, the first text to make reference to the four colours was Theophrastus' *De Sensu* where he comments that Democritus considered as "simple" colours white, black, red and green and aligned them with the properties of poetry not with the behaviour of pigments.

Pliny also considered four the number of colours used by the great Ancient immortal painters: "Quattuor coloribus solis immortalia illis opera fecere-ex albis Melino, e silaciis Attico, ex rubris Sinopide Pontica, ex nigris atramento-Apelles, Aetion, Melanthius, Nicomachus, clarissimi pictores, cum tabulae eorum singulae oppidorum venirent opibus." (*Natural History* , XXXV, 50)[10]. These colours-white, yellow, red and black-do not correspond to primaries, since blue is missing and consequently green too, for it is obtained from the mixture of yellow and blue, but created confusion and debate on the use of colour in Antiquity. According to a tradition that came down from Anaximenes (c. 545 a. C.), Aristotle also believed that colours were the result of the mixture of light (white) and shadow (darkness) in variable proportions and quantifiable: red, the purest of colours is a mixture of light and a small portion of shadow: the quantity of shadow increased to obtain green and violet the darkest, and the others were the result of the combination of the three simple and primary colours: red, green and violet. In one of his treatises of natural history, *Parva Naturalia*[11], Aristotle establishes 7 types of colour: yellow, purple, red, green and blue, situated between white and black, while the remaining colours come from the mixtures of these.

Renaissance themes gained by exploring new ideas and rediscovering others, namely the Greek and Roman mythologies, many painted on canvas. As a substitute for murals in fresco, monumental scale canvases

FIG. 4
Giovanni Bellini, *Coronation of the Virgin* (c. 1471-4), detail.

10 A more detailed discussion on the concepts of colour and its use in Greek painting is found in Durão, Maria João, "O Diáfano e o μέλας", *Ar - Cadernos da Faculdade de Arquitectura da Universidade Técnica de Lisboa*, 6, 2006.

11 Aristote, *Petits Traités d´Histoire Naturelle (Parva Naturalia),* "De la sensation et des sensibles", trans. Pierre-Marie Morel, Flammarion, Paris, 2000, p. 82, 442a), 20-25.

FIG. 5
Giorgione, *The Tempest* (c. 1505-6), detail.

were used in the *Palazzo Ducale* and the *Scuole of Venice*. However another more intimate scale of painting for private collectors was done on the new support. Canvas has the texture of cloth that permeates an interaction with the matter of oil painting providing new possibilities, namely the approach of painting toward light from the base of a darker layer, a technique developed in Giorgione's *The Tempest* (fig. 5) where light emerges from dark. Having landscape presumably as apparent subject matter (considered by many as obscure and poetic), the centre of the pictorial field opens to nature and to the atmosphere charged with the energy of a storm. In a time where landscape was being 'discovered', Giorgione liberates it from the complementary role it had before, and makes it a central theme of his paintings. *The Tempest* has been taken to symbolize mother earth due to the representation of the mother nurturing the child. This implied movement resembles nature and its dynamism in the way he captures the sudden streak of lighting, as metaphor for nature's process of constant recreation.

Giorgione´s paintings are created spontaneously on the canvas with the exploratory character of the free sketch carried out with oil painting and free brush strokes. This tendency led to a famous *disegno versus colore* debate on whether drawing or colour was more important in painting. The debate occurring since Aristotle had more to do with "formality versus spontaneity", and went on through to Poussinistes and the Rubenistes in the French Academy in the 1660's and 1670's. Cennino and Alberti gave them equal importance, but Georgio Vasari[12] critised Giorgione's working directly on the canvas "without making drawings" and failing to see that, "if he wants to balance his compositions… he must first do various sketches on paper to see how everything goes together". Vasari, nevertheless, recognized two elements of Giorgione's art, the oil medium and its tonal structure 'that gave a powerful sense of movement to the things he rendered by a certain, well-understood dark shadow' and considered him to be one of the founders of 'modern' painting.

12 Vasari, G., *Lives of the Most Eminent Painters, Sculptors and Artists*, Macmillan and the Medici Society, London, 1976.

When in 1508 Giorgione worked with Ticiano on the murals for the *Fondaco dei Tedeschi,* a warehouse on the Grand Canal, their painting styles were close and this made attributions sometimes difficult. Both Giorgione and Ticiano painted the Venus. Giorgione's *Sleeping Venus* of ca. 1510 (Gemaldegalerie Alte Meister, Dresden) surrounded by a peaceful landscape and enveloping shades of yellow and earth colours bathed in radiant light constitutes a poetic homage to beauty and nature. Titian's *Venus of Urbino* of 1536 (Galleria degli Uffizi, Florence) replaces the landscape environment for an intimate room and invites the spectator to become part of the painting through the use of compositional resources as well as the eyes of Venus looking straight at the spectator.

Looking through matter, space and time: the alchemy of painting

It is clear that the invention of perspective allowed for the representation of distances in space, however the distances in the per-spective, i.e. in the perception of the "look through" have a double meaning, it is spatial and temporal. The observer can no longer choose a fragment of the painting to look at in isolation, he is pulled to participate with the temporal dimension of the scene, but this requires that the observer keep a distance away from the painting. Titian's paintings had to be viewed from a distance.

Giorgio Vasari visited Titian in 1566 and commented on his technique. He considered his early works to be executed with fineness and an unbelievable diligence, but the last pictures were executed with broad and bold strokes and smudges, so that nearby nothing can be seen whereas from a distance they seem perfect: "Works are carried out in bold strokes, broadly applied in great patches in such a manner that they cannot be looked at closely but from a distance appear perfect". Queen Mary of Hungary had the same perception of Titian´s work. Responding to the dissatisfied comment by Philip II on his *Portrait in Armour* by Titian in 1550/51, where he complains of the haste with which it had been painted, his aunt, Queen Mary of Hungary wrote (when lending this portrait to Queen Mary of England, who was to marry Philip II) that the painting *had to be viewed from a distance*.

As with Georgione, Vasari[13] critised Titian's painting methods, even though he believed that the technique produced 'judicious, beautiful and stupendous results'. When Vasari introduced Michelangelo to Titian in 1545, when he was working on the painting *Danae* (fig. 6), Michelangelo told Vasari that 'Titian's colouring and style were pleasing to him but that it was a pity that in Venice men did not learn to draw well from the beginning, and that those painters did not pursue a better method in their studies.' As with Michelangelo, Vasari also believed that the correct way to paint was to start with sketches on paper, to work out the details of the composition in careful drawings and then transfer to the canvas the drawing to be coloured in.

13 *Idem.*

Titian used a very different technique to 'colouring in'. Titian's was the first to explore the richness and variety of oil paint with an open brushwork and his loose handling of forms and colours. In this he was also 'modern' and the compositions built directly in paint on the canvas represents the essence of *colore*. His brushwork was much of the feelings of movement and vivacity he conveyed. He often painted very thinly for an effect of translucency or with broad strokes and a loaded brush that contrasted with

FIG. 6
Titian, *Danae* (1553-4).

the fine depictions of translucent colour. Even Vasari acknowledged that this technique that appeared to be spontaneous and easy required hard work: 'It is known that these works are much revised and that he went over them so many times with his colours that one can appreciate how much labour is involved' In fact, the intermediate stages, between the inventive and the retouching was often left to his workshop assistants that were at least 30.

Palm Giovane, one of his assistants who did not go on to become a great artist in his own right, like Tintoretto and El Greco, left descriptions of Titian's working process: He used masses of colour on the foundation of the compositions of the paintings; he would turn them to the wall and leave them there for several months sometimes without looking at them. Over long intervals he would build up his figures, correct and revise them and make any changes he felt necessary. Finally he would retouch the work, moderate the highlights by rubbing them with his fingers and harmonize the colours and tones; or he would, again with his fingers, add dark strokes or bright red spots to liven up the composition.

The *Danae*[14] is precisely an example of the importance given to painting as a whole, not a detailed depiction of sections of the canvas. Danae was the daughter of the king of Argos, Acrisius, who, frightened by the prophesy that his daughter would have a son who would kill him, ordered that she be locked up with her female slave in the highest tower of the

14 Bridget Riley presents an excellent description of Danae's pictorial colour *in* Lamb, T. & Bourriau, J. (Eds.), *Colour: Art & Science*, Cambridge University Press, 1995.

city. However, the isolation of Danae did not prevent the immortal gods from seeing her, namely Zeus who had fallen in love with her. From this divine love Perseus was born. The painting represents the moment Zeus transformed himself into a shower of golden rain to be with princess Danae (fig 6).

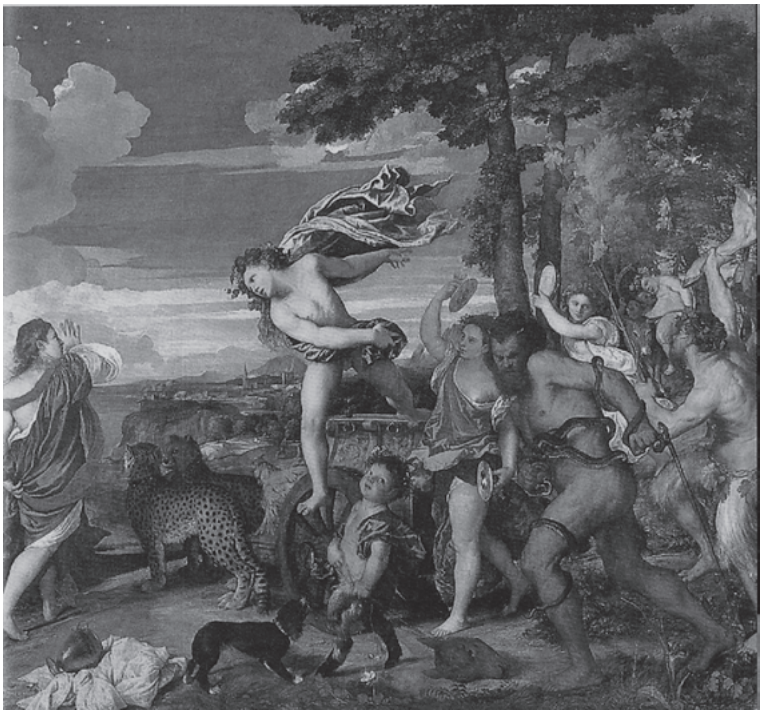
In terms of composition, unity is achieved with the orchestration of colour that develops through the painting binding it all together as Titian relates the tones of the body of Danae to the surrounding colours. Golden yellows are used as contour and picked up by the bracelet that resonates the colours of the dog. Titian's paintings capture the whole visual world, the delicacy of the female body, the softness of the flesh, the colour of highlights blending with the gray-blues of the cloud, which are again, picked up by the slave's clothes in contrast with the yellow shadows on Danae's body in perfect harmony with the magenta embroidery on the white bed sheets that in turn match the magenta draperies.

Bellini had innovated by unifying figure and landscape through light but shadow was the unifying element in Giorgione´s compositions. This tonalism provided a tonal continuity that resonated poetry of landscape, but in Titian's painting, the chromatic clarity and formal clarity are not compromised by shadow or tonalism. Titian´s paintings are complex and *Bacchus and Ariadne* embodies bold and dynamic attitudes towards all aspects of composition with colour. The scene depicts God Bacchus coming from India and his encounter with Ariadne after Theseus had sailed off. Bacchus flings himself towards her, and she half turns, to see the destiny changing.

When Theseus arrived in Crete, Ariadne, the daughter of Minos and Pasiphae, fell in love with him to the point that she betrayed her stepbrother by giving Theseus a magic ball of string made by Hephaestus, with which Theseus could reach the Minotaur but also find his way back out of the Labyrinth. In exchange for this, Ariadne asked him to take her away with him. So Theseus, having slain the Minotaur, escaped from Crete and headed towards the island of Naxos. Theseus abandoned Ariadne, who had fallen asleep on the beach. When she woke the princess found herself alone with Theseus' ship at a far distance. At some point she heard singing. This moment corresponds to the painted scene: Titian describes Dionysus (Bacchus) appearance with his band of maenads. The god Dionysus saw her and fell in love. The movement depicted by Dionysus' body relates to the thrust of the crown he offered the princess and was transformed into the new constellation of Corona Borealis. Atlas, the celestial Titan, was a protohistoric constellation at the pivot of the ancient North Pole. During the classical period, his right arm,

FIG. 7
Titian, *Bacchus and Ariadne* (1522-3), detail.

FIG. 8
Titian, *Bacchus and Ariadne* (1522-3).



originally represented the arc of stars the Greek amputated to create the constellation known as *Corona Borealis,* the crown given to Ariadne by Dionysus.

Titian used practically all the available pigments in Venice, including imported and unusual pigments to paint *Bacchus and Ariadne* (fig. 8). The most precious and rare ultramarine was used extensively in the blue of the sky, in Ariadne's drapery, in the draperies of the Bacchante with the cymbals, and less expansively in the depiction of the irises. Azurite is used for the colour of the sea since it reflects green.

The scarlet of Ariadne's sash is made with the pigment vermilion, that from early times was obtained by pulverising cinnabar, but is also a compound of mercury and sulphur since the ninth century in Europe, both of which are brilliant and dense. When compared to the brilliancy of red sash, the red lake used in Bacchus' drapery is saturated and translucent. This red lake, purple in tone, is made from a dyestuff obtained from plant (brazil wood and madder) or insect (lac, kermes and cochineal) sources. For the Bacchante's drapery two colours are in full contrast: the ultramarine blue and realgar, an orange mineral. Titian also orchestrated colour

combinations and contrasts of opposition in the red and blue draperies of Ariadne. The lead-tin yellow, a dense and opaque pigment is used on the urn and balances the other primary and intense colours that dominate the painting.

There is interplay between the effects of translucency that the glazes provide, the more opaque surfaces and the light that he conjured up in the painting depends on an overall impression, and hence, often described anachronistically as 'impressionistic', with great masses of colour sketched in the painting with large brushstrokes[15]. The earth colours weave the composition together: the viewer has to stand at a certain distance to take in the whole of the composition otherwise the painted surface is dissolved in blots. For the stronger greens of landscape and trees another mineral pigment is used: malachite, and verdigris, a manufactured copper-based pigment known from ancient times, and a very powerful intense colour, forms a deep green translucent glaze.

The spectator is drawn to the painting through the dynamic characteristics of the composition. Like Bellini, Titian avoids the obvious rectilinear representation of space. Both painters also avoided the orthogonal of linear perspective and instead used diagonals in their compositions. A diagonal line drawn from the top right side of the painting to the bottom left side separates it in two very distinct sides. Dionysus (Bacchus) and Ariadne on one side and on the other side, the fauns, satyrs and bacchantes. The top left of the painting is calm, spacious and predominantly blue, and the opposite side is turbulent, crowded, and noisy and in shades of earth colours, in harmony with more earthly beings that contrast with the celestial and spiritual associations of blue.

As we have seen, when painters abandoned the egg-tempera technique to adopt a technique that used oil, innovative systems of representation of volume, shadow and depth were created. The transparent and translucent qualities of the glass were translated into painting approaches. For example, both in Bellini and Titian, the areas of colour create curvilinear space. In the paintings of Titian, colour helps in the projection of space, by representing the forms and the position of the forms in pictorial space.

In the Italian Cinquecento, technology, technique and aesthetics moved hand in hand to transform European painting practice in tune with humanist values where attention to authorship was growing. The urn on the lower left side of the painting provided the opportunity for Titian to exhibit his painting skills by representing gold with colour, rather than using it as a painting material, a procedure recommended by Alberti. On the urn Titian inscribed his name (fig. 7).

15 The ephemeral nature of colour and light in relation to the qualities of the materials that reflect colour, "participating in the delight of light" is the subject of a paper on the concepts that inspired the creation of the object "Alchemy of Light and Colour", commissioned by the Birdhouse Foundation – Osaka (Durão, Maria João, "Drawing on the Ephemeral", *6th International Conference on Design History and Design Studies Proceedings*, Osaka University, Osaka, 2008.)

The alchemical process of creating pictorial space in Venice in the Cinquecento involves the *materia prima* of the imagination and perception framed by aesthetic theories. The transmutation of the light reflected from all angles and directions, the spatial light and dark interchanges, the glossy surfaces flickering light and colour, the coloured fields that are covered in mosaics, the multiple reflections of the building materials, the coloured film on the moving surface of the water that reflects light from all angles, like states of liquid moving into solid or gas, the phenomena of transparency, translucency and irradiation are all sources of the Venetian *colorito* that is fuelled by an innovative manner of painting, and inventive painting techniques, supports and pigments.

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