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Historical Survey of Teaching Color in Art and Design

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Abstract

A brief overview is offered of developments in color teaching in the visual arts from the sixteenth to the twentieth century. Other than artworks, surviving publications offer the most reliable guides, starting with Lomazzo's comprehensive *Trattato dell'arte della pittura*. As with later books, distinctions are made between objective observation of color and its subjective symbolism. Following publication of Leonardo da Vinci's observations, in 1651, the next major compilation of artistic theory was by Gérard de Lairese, in 1707. The influence of Newton then found its way into writings and diagrams by Jakob Le Blon, William Hogarth, Moses Harris, Mary Gartside and James Sowerby. Chevreul's *Du contraste simultané des couleurs* (1839) was the first of a new category of books for artists on color perception and science, culminating in Ogden Rood's *Modern Chromatics*, of 1879. What emerged out of their color scales, circles, and diagrams was an awareness that color seemed to possess intrinsic properties of its own. Abstract fine art, developing out of decorative art, began to investigate and explore such attributes, largely free of pictorial description or traditional meanings, which gave a new momentum to the study of color theory in early Modern art, as well as to new and varied ways of teaching it.



IN SURVEYING the teaching of color in art and design, a useful place to start is the *Trattato dell'arte della pittura*, by Giovanni Paolo Lomazzo (1538-92) (left), published in Milan in 1584. His 'Treatise on the arts of painting' offers a comprehensive record of Renaissance art education, and catalogs what its author considered visual artists of the time needed to know.¹ It was compiled in the dozen years after Lomazzo went blind, at the age of 32, and consists of a 700-page volume divided into seven books.

Over two dozen of its concise chapters are specifically on color, most of which are grouped in *Del colore*, its third and shortest part, showing that Lomazzo considered color as a subject in its own right. He begins by stating (1584, 19) that a painter expresses two things with color: first the color of the object, 'which he does with the like color, as the green color of a tree with a like green.' Secondly it expresses the light of the sun, or other luminous body, that reveals such colors – thereby stressing the link between light sources and colored surfaces, though not in any scientific sense. He later adds that, 'Neither does color only express the outward forms of things, but also reveals certain inward passions, painting, as it were, laying before our eyes the affections of the mind,' and that, when selecting colors and gemstones, 'one is always minded to have regard for the significations of those virtues attributed to them.'²

Artists had previously relied on scholars to inform them about the symbolic coloring of clothing in paintings, but now they had to find this out for themselves. Most of Lomazzo's guidance on the subject came from two contemporary sources: *Del significato de' colori* (On the signification of colors) by Fulvio Pellegrino Morato (c. 1483-1548), published in Venice in 1535, and the *Trattato dei colori nelle arme* (Treatise on the colors of arms, 1565), an Italian translation of *Le Blason des couleurs en armes*, by Gilles Corrozet (1510-68), first published in Paris in 1527.³

Whereas Lomazzo had little original to offer on color meanings, he does appear to be the first artist to write extensively about how mixtures of the four humors, identified as white phlegm, yellow choler, red blood, and black melancholy, inwardly affected the human temperament, and outwardly, skin complexion. The theory can be traced by back to Hippocrates (c. 400 BC) and the later revision of its principles by Claudius Galen was translated into Italian in 1548 by Lodovico Dolce, a close friend of Titian, who, as Lomazzo appears to confirm, applied the theory in his portraits.⁴ Hence Lomazzo adds that, when a painter adds color, 'he gives the last perfection to the figure, insomuch as whoever beholds it may be able to say: this is the picture of someone in love, or in fear, or of a bashful young man.'⁵

Assessing the presumed influence of the humors on the personality of depicted figures was once an essential part of color teaching, now long since forgotten. The theory survived until William Harvey's *De motu cordis et sanguinis* (1628) confirmed the circulation of blood. For decades after, however, color manuals continue to devote many pages to matching variations of human complexion, from pallid to fair, and flushed to swarthy. As late as 1835, in his *Chromatography*, George Field for instance noted that artists need to acquire skill in distinguishing between 'the redness indicative of anger and ardent passions, and the blush of bashfulness and shame,... the shallowness or yellowness of grief, envy, resentment, and the jealous passions, the cold pallid blueness of hate, fear, terror, agony, despair, and death.'⁶

The earliest complete painters' manual, by Cennino Cennini (c. 1365-1440), was not mentioned by Lomazzo, but he does amplify aesthetic advice from Leon Battista Alberti's *De pictura*, circulated some 40 years later.⁷ Other than the handling light and shade, or *chiaroscuro* in Italian, Renaissance painters also needed to master *sfumato*, the softening of color boundaries, and *unione*, or color harmonization.

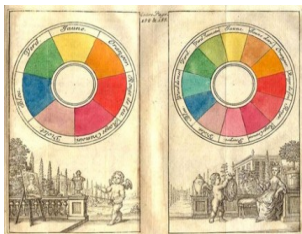


Like Alberti, Lomazzo offers a basis for comparing hues that agree or disagree, calling the former ‘friends’ (*amici*) and the latter ‘enemies’ (*nimici*). He also advises how to render ‘changeables’ (*cangianti*) when depicting shot silk cloths ‘having lights of one color, and shadows of another (and as employed by Andrea Mantegna, left).’⁸ This latter skill increasingly fell out of fashion after Leonardo da Vinci’s introduction of exaggeratedly dark shadows, reserving the local colors for highlights. Practical art manuals had their uses, especially for students unable to afford tuition. Though they frequently recycle passages by previous authors, they continue to offer insights into the changing nature of art education in general, and color theory in particular.

Leonardo’s notes on light and color were eventually published in 1651, and exerted particular influence on French artists in Italy, including Nicolas Poussin, whose own book on color was lost. Charles Dufresnoy’s long Latin poem on the art of painting (*De arte graphica*, 1668) was translated into French by Roger de Piles (1635-1709), and into English by John Dryden.⁹ De Piles became the most important color theorist of his time, favoring Rubens over Poussin, and publishing a practical manual, *Les Premiers Elémens de la peinture pratique*, with the painter Jean-Baptiste Corneille, in 1684.

Corneille’s father, Michel, was one of the first teachers at the Académie royale de peinture et de sculpture, founded in Paris in 1648. Later academies opened throughout Europe, but the vast majority of artists had to rely on studio apprenticeships, with theoretical advice provided by cheap manuals. The most popular of these was the *École de la miniature* (School of the miniature, 1673), attributed to Claude Boutet, on teaching art without an instructor.¹⁰ The next major compilation of artistic theory was *Het groot schilderboeck* (The complete painting-book, 1707), by Gérard de Lairesse (1640-1711). Like Lomazzo, Lairesse was an accomplished painter, known as the ‘Dutch Poussin’, before losing his sight (aged 50) and turning to teaching and writing. His two dozen chapters on color offer detailed advice on appropriate colors for clothing, on near and distant features in landscapes, and on human complexions, which he reduces to six – the healthy, the sick, and the dead, each applied to children, men, and women.¹¹

Belief in the virtue and power of color symbolism also diminished in the 1600s and, after Antonio Calli’s anthology of 1595, little else was published on the subject until Goethe examined color’s emotive effects over 200 years later.¹² This was probably owing to the puritanical Counter-Reformation, during which colorful clothing was zealously suppressed, followed by the rise of empirical rationalism throughout the ensuing Baroque period. The first scientific book wholly on color was Robert Boyle’s *Experiments and Considerations touching Colours* (1664), which adopts the term ‘primary colours’ for instance in referring to mixtures of red, yellow, and blue paints. Lairesse propagates the same color-mixing theory, but does little more than list basic meanings for white, black, yellow, red, blue, purple, violet, and green.¹³



Evidence of the prompt influence of Isaac Newton’s *Opticks* (1704) on art education was demonstrated by the inclusion of two color circles in the 1708 edition of Boutet’s book (left), re-titled the *Traité de la peinture en miniature*, using non-spectral purple to link the red and blue segments. Newton also influenced the engravers Jakob Le Blon, William Hogarth, and Moses Harris, who all published instructional books. Le Blon’s theory of three-color printing was described in his *Coloritto* of 1725, and applied in practice in his many tricolored mezzotint engravings. In Chapter 14 of Hogarth’s *Analysis of Beauty* (1753) a spectral palette of five ‘virgin tints’ was introduced as an alternative to the traditional palette of red and yellow ochers, with minimal use of blue, customarily employed in portraiture.



It was not until nineteenth-century Impressionism that Hogarth’s palette (imaginatively illustrated left) became popular, though variations of it were often used by watercolorists overlaying transparent glazes. The color circles included in Harris’ *Natural System of Colours* (1766) utilized this method of color mixing, and was dedicated to Joshua Reynolds, first President of the Royal Academy, who, like many teachers of his time, expressed disappointment (in his *Discourse XV*, 1790) that the great colorists of the past had not passed their ‘color secrets’ down to later painters.



Another such artist was Mary Gartside (c. 1760-1809), whose *Essay on Light and Shade, on Colours, and on Composition* was published in 1805. Three centuries earlier, Leonardo had proposed that, by throwing a sponge, soaked with various colors, against a wall, interesting compositions might be imagined in the resulting stains, such as heads of men, animals, battles, rocky scenes, woods, and so on. Gartside proposed something similar, and illustrated her book with a series of hand-painted examples of watercolored stains (left), for which she adopted the term *nebulæ*.



Fifty years later, chemically induced, abstract chromatograms, similarly intended to stimulate the artists' imagination, were presented by Friedlieb Runge (1794-1867) in *Der Bildungstrieb der Stoffe*, on 'the evocative power of blots.' Other illustrative color manuals included *The New Elucidation of Colours* (1809), by James Sowerby (left), linking hue and chroma with watercolors glazed at three different strengths, plus Philipp Otto Runge's *Farben-Kugel* (1810), introducing his three-dimensional 'color sphere', and Matthias Klotz's *Farbenlehre*, of 1816, with its original gray scale and 24-section color circle.¹⁴

The next important color publication was *Du contraste simultané des couleurs* (1839), by the chemist Michel-Eugène Chevreul, the first of a new category of scientific books for artists, examining perceptual illusions rather than methods for dyeing or painting. Later books informed artists of various developments in physics, the best two of which were Wilhelm von Bezold's *Farbenlehre* (1874) and Ogden Rood's *Modern Chromatics* (1879). Importantly, what such books revealed was that color appeared to possess a syntax or grammar of its own that could be explored both educationally and artistically. Observations of color in the decorative arts, by Bezold (Chapter 5) and Rood (Chapter 18), could later also be applied to what was to become abstract art. Additionally, illustrations in many color books dating back to Gartside, Sowerby, and Goethe offered magnificent if small-scale examples of 'abstract' color designs.

The Boston printer Louis Prang issued a translation of Bezold's book in 1876, and later (with Mary Hicks) published *Color Instruction* (1893), offering a teaching course for public schools. In nearby Springfield, Massachusetts, another lithographer, Milton Bradley, influenced by Friedrich Froebel, published *Color in the Schoolroom* (1890), *Color in the Kindergarten* (1893), and *Elementary Color* (1895), plus similar textbooks by Mark Maycock (1895), Helena Chace (1896), and Caroline Van Helden (1902).¹⁵ Froebel promoted teaching methods that allowed children to play creatively, and his boxes of toys included colored balls in red, orange, yellow, green, blue, and purple. Like Prang, and later Albert Munsell, Bradley also manufactured and marketed papers and coloring materials in standard colors.

Rood's *Modern Chromatics* mentions every important color scientist since Newton and, though intended for artists, he only names two: Philipp Otto Runge and John Ruskin. In the 1850s, Ruskin had taught at the Working Men's College in London, out of which came his short but excellent teaching book, *The Elements of Drawing* (1857), the third part of which is on color. Rood's Chapters 10 and 15 not only reviewed Chevreul's researches into color-contrast effects but also refer (1879, 140) to Ruskin's 'admirable' book in relation to 'the custom of placing a quantity of small dots of two colors very near each other, and allowing them to be blended by the eye placed at the proper distance' – a proposal that profoundly impressed the young Georges Seurat. Though sometimes dismissed as a passing fashion, Pointillism freed color from the drawn line (as had Gartside's *nebulae*), and almost every important painter working in Paris between 1885 and 1915 experimented with some form of it, much as many later experimented with the fragmenting of form in Cubism.

In his third chapter, Rood reprints his recent article from the *Popular Science Monthly* in which he gives the 'three constants' of color as hue, luminosity, and purity – later adapted by Munsell (for pigment-colors) as *Hue*, *Value*, and *Chroma*. Munsell's own color system, first published as *A Color Notation*, in 1905, was later propagated for example by Anna Marie Anderson, in her *Syllabus of Design and Color* (1933) and by Maitland Graves (at Pratt Institute, Brooklyn), in *The Art of Color and Design* (1941). After Munsell, some three dozen other color-order systems were introduced in the twentieth century, the most influential of which were those devised by Wilhelm Ostwald (1916, adapted from Bezold's study of spinning discs), by Lawrence Herbert at Pantone (after 1962), and by the Swedish Color Centre Foundation (after 1964).¹⁶ Ostwald's system was based on the theory that any painted sample can be defined in terms of hue, white-content, and black-content. Though few painters mix colors in this way, his system gained popularity in European schools, and was propagated by Scott Taylor and Oliver Tonks at Winsor and Newton, who manufactured tubes in Ostwald's standard colors, plus Eugen Ristenpart in Germany, Frits Kerdijk in Holland, and Aemilius Müller in Switzerland.¹⁷

While acknowledging the liberty of fine artists' not to consult his book, Bezold stressed its value in other, related disciplines, and stated in his introduction (1876, xi): 'This is more especially true of those branches of art-workmanship which are compelled to employ colors that have been fixed upon beforehand, such as the weaving of colored stuffs, for instance, or the manufacture of paper-hangings, chromolithography, and similar art-industries.' Rood noted, more succinctly (1879, vi), that, 'in short, a certain amount of rudimentary information tends to save useless labour.'

In 1584, Lomazzo (Book VI, Chapter 8) had compared types of people suited to wearing dark garments, such as 'philosophers, the poor and the solemn,' with those suited to bright colors, such as 'nymphs, youths and harlots.' This was not entirely unlike Goethe's later proposal of which colors best suit particular categories of occupation.¹⁸ A revival of interest in color symbolism then occurred after the publication of Frédéric de Portal's *Des Couleurs symboliques, dans l'antiquité, le moyen-âge, et les temps modernes* (1837), almost the first book wholly on the subject since Calli's *Discorso* of 1595.¹⁹ As color eventually became less expensive to print, designers began to examine how it could enhance the marketing of consumer goods. Color symbolism then diversified into various branches of design, commerce, and psychology.

In 1879, Grant Allen's *Color-sense*, 'an essay in comparative psychology', was published in the same year that Wilhelm Wundt founded the first laboratory to research the subject, at the University of Leipzig. After the impulsive use of color by such artists as Vincent van Gogh and Edvard Munch, European Expressionism would move away from Impressionism, and later justify excuses by teachers for not teaching color theory at all – upholding the opinion that 'intuition' was all that mattered. Of two main artistic factions that emerged, one was based on the *relativity* of colors (as observed in nature), and the other on the *singularity* of colors, so that each could be allotted a specific meaning.²⁰ A subsequent book analyzing such color interpretations commercially was *Light and Color in Advertising* (1923), by the lighting engineer Matthew Luckiesh (1883-1967). The pioneering color consultant Faber Birren (1900-88) later launched his career with *Color in Modern Packaging* in 1935, and eventually became the most prolific color writer of the century.

Early abstraction widened the scope of what 'color theory' could mean – and demanded new ways of teaching it. Those artists who rejected pictorial realism needed to consider how organizing abstract elements (primarily line, tone and color) might give as much integrity to their artworks as chiaroscuro and perspective had given to traditional pictorial art – something decorative artists had long since solved by combining geometry with regular patterning. Among the most prominent artist-teachers who accepted the challenge were Johannes Itten (1888-1967), Josef Albers (1888-1976), and Paul Klee (1879-1940), all of whom taught at the Weimar Bauhaus in the 1920s. Itten's color theories were adapted from his influential teacher, Adolf Hölzel, and integrate the three sequential categories of 'impression' (or objective observation), 'expression' (emotional response), and 'construction' (color in relation to form). In each of these, the seven color contrasts to be explored are listed as contrast of hue, chroma, and value, cold and warm contrasts, complementary contrasts, simultaneous contrasts, and contrast of proportion.²¹

Comparable methods of investigation were offered in Hilaire Hiler's *Color Harmony and Pigments* (1942) and in Paul Renner's *Ordnung und Harmonie der Farben* (1947).²² Albers replaced Itten at the Bauhaus in 1923, and later taught at Yale University, where his *Interaction of Color* was published in 1963.²³ Informative and insightful though the text was, it presented only one facet of his teaching, and omits a great deal. The extent of what artists and designers ideally need to know about color can be summed up in a list of eight subjects, namely, source, surface, sight, semblance, standards, significance, structure, and strategy. While Albers' publication examines color semblance (optical illusion) fairly thoroughly, and offers a teaching strategy, it largely ignores analyses of light sources, colored surfaces, and vision, color measurement and symbolism, as well as structure and variety of form. In attempting to encompass a fuller list, I published *Lights and Pigments: Colour Principles for Artists* in 1980.

Not long after Albers' *Interaction of Color* appeared, a short analysis of it was offered by Anton Ehrenzweig in *The Hidden Order of Art* (1967). Ehrenzweig approached the subject from the viewpoint of experimental psychology, and discussed color interaction for example in relation to figure-ground perception. Examining one aspect of this, he wrote that, 'If the interest of the subject matter makes us focus with greater intensity on a particular shape, this shape will become separated from the rest of the painting; hence its colours will be isolated' (1967, 157). From this he deduced a simple principle that degrees of color interaction can be controlled by comparing stronger with weaker figure-ground divisions, and the formal devices that regulate them. In proposing such a theory, Ehrenzweig realized that a degree of intellectual or even systematic control could be introduced into color teaching by experimenting with varieties of form able to influence color interaction, while taking care not to inhibit creative expression.

One possible option, offering numerous possibilities, was summarized in the second half of my *Color Influencing Form*, which offers a strategy for exploring color and form in the contexts of figure-ground division, contour, tonality, transparency and pattern.²⁴ In his book of 1857, John Ruskin had presented other options, and offers open-ended possibilities of exploring form under the nine headings of principality, repetition, continuity, curvature, radiation, contrast, interchanging, constituency and harmony.

In writing on 'The Decorative or Ornamental Arts,' Bezold had insisted that 'The color must be adapted to the form' (1876, 176).²⁵ Ehrenzweig later observed that the important relationship between color and form was commonly neglected in writing about color, even by Albers, who was clearly aware of it. In other words, while Albers stated that, 'Color, in my opinion, behaves ... in two distinct ways: first in self-realization and then in the realizations of relationships with others,'²⁶ he makes little attempt to explore *variety* of form sufficient to bridge the gap between his geometric color exercises and the irregular forms, or complex pictorial imagery, employed by most visual artists. Klee's formal vocabulary is far wider, and much more apt to relate simple exercises to creative artworks, pictorial or abstract. Albers further avoids what Klee referred to as 'the question of content,' meaning subject matter or implied symbolism. Numerous interrelationships of color and form permeate Klee's teaching notes, reassembled by Jürg Spiller in the 1950s.²⁷ Additionally, while Albers (Chapter 20) admitted that his color course offered no opportunity 'to decorate, to illustrate, to represent anything, or to *express* something – or *one's self*,' Klee, like Leonardo, Gattuso and Friedlieb Runge before him, might create 'abstract' color imagery upon which he allowed his imagination to act, and was therefore able to move freely from realism to abstraction and back again.

References

- 1 Most of what was known about Renaissance color science was included by Giambattista della Porta in his *Magiae naturalis* (1558, expanded 1589), Naples, Matteo Cancer.
- 2 Giovanni Paolo Lomazzo, *Trattato dell'arte della pittura, scoltura, et architettura*, II, 5 (1584, 116) and VI, 59 (1584, 467). See also Roy Osborne (2016), *Leigh and Lomazzo on the Virtue of Colours*, Raleigh NC, Lulu Press.
- 3 For translations of both, see Roy Osborne (2015), *Telesio and Morato on the Meaning of Colours* and *Sicily Herald and the Blazon of Colours*, Raleigh NC, Lulu Press.
- 4 See Lomazzo, op. cit., I, 1 (1584, 24-25), and Lodovico Dolce (1548), *Oratione di Galeno*, Venice, Gabriel Giolito de Ferrari.
- 5 Lomazzo, op. cit., VI, 59 (1584, 469).
- 6 George Field, *Chromatography* (1835, 12).
- 7 See Cennino Cennini (c. 1395) and Mary Merrifield, translator (1844), *A Treatise on Painting*, London, Edward Lumley; and Leon Battista Alberti (1435) and Cecil Grayson, translator (1991), *On Painting*, London, Penguin Classics.
- 8 Lomazzo, op. cit., III, 10 (1584, 198), *Dell'ordine che si tiene in fare i cangianti*.
- 9 Charles-Alphonse Dufresnoy (1665) and John Dryden, translator (1695), *De arte graphica: The Art of Painting*, London, William Rogers.
- 10 For a later English translation (1729), see *The Art of Painting in Miniature*, London, John Brotherton and Thomas Bowles.
- 11 See Lairese and William Craig, editor (1817, 21), *A Treatise on the Art of Painting*, I, 10, 'Of the Different Colouring of the Naked, in a Child, Man and Woman.'
- 12 Antonio Calli (1595), *Discorso de' colori*, Padua, Lorenzo Pasquati; Johann Wolfgang von Goethe (1810), *Zur Farbenlehre*, Tübingen, Johann Cotta.
- 13 Lairese, op. cit., IV, 1 (1817, 134), 'Of Colouring'.
- 14 Philipp Runge (1810), *Farben-Kugel*, Hamburg, Friedrich Perthes; Matthias Klotz (1816), *Gründliche Farbenlehre*, Munich.
- 15 Mark Maycock, *A Class-book for Color Teachers*, Buffalo NY; Helena Chace, *Practical Color Work for Primary and Ungraded Schools*, Springfield MA; Caroline Van Helden, *A Note on Color for Teachers of Elementary Schools*, Springfield MA.
- 16 Wilhelm Ostwald (1916), *Die Farbenfibel*, Leipzig, Unesma; Lawrence Herbert, editor (1963), *Pantone Color Specifier*, Moonachie NJ; Anders Hård, Gunnar Tonnquist, and Lars Sivik (1979), *Swedish Standards Institution Colour Atlas*, Stockholm.
- 17 Wilhelm Ostwald and Scott Taylor, editor (1931-33), *Colour Science*, London, Winsor and Newton; Oliver Tonks and Arthur Allen (1934), *Colour Practice in Schools*, London, Winsor and Newton; Eugen Ristenpart (1926), *Die Ostwald'sche Farbenlehre*. Leipzig, Theodor Martins; Frits Kerdijk (1927), *Orde en harmonie in het rijk der kleuren*, Apeldoorn, Marten Talens; Aemilius Müller (1944), *Das ABC der Farben*, Zurich, Scholl.
- 18 See Rupprecht Matthaëi, editor, *Goethe's Color Theory* (1971, 188). Clockwise, in the circle sketched by Goethe (before 1810), the predominantly green quarter is associated with the sanguine humor and 'bonvivants, lovers and poets,' the predominantly blue one with the phlegmatic and 'teachers, historians and orators,' the predominantly purple one with the melancholic and 'monarchs, scholars and philosophers,' and the predominantly red (or orange) quarter with the choleric and with 'despots, heroes and adventurers.'
- 19 See Frédéric de Portal and Elihu Rich, translator (1844), *An Essay on Symbolic Colours, in Antiquity, the Middle Ages, and Modern Times*, London, John Weale.
- 20 While many fine artists currently have negligible interest in color symbolism, it remains alive and well on supermarket shelves and on advertising billboards.
- 21 See Johannes Itten and Ernst van Hagen, translator (1973), *The Art of Color*, New York, Reinhold.
- 22 See Paul Renner and Alexander Nesbitt, translator (1964), *Color, Order and Harmony*, New York, Reinhold.
- 23 Josef Albers (1963), *Interaction of Color*, New Haven CT, Yale University Press.
- 24 First drafted in 1984, and published in an abridged form in 2004.
- 25 Wilhelm von Bezold and Edward Pickering, editor (1876, 176), *The Theory of Color in Its Relation to Art and Art-Industry*, Boston MA, Louis Prang.
- 26 Josef Albers and Tom Rosenthal (1972/2006), *Formulation: Articulation*, New York, Thames and Hudson; notes to II, 17.
- 27 Paul Klee and Jürg Spiller, editor (1956), *The Thinking Eye*, London, Lund Humphries.