

The color "variable": a system of connections.

"Tying color to information is as elementary and straightforward as color technique in art, 'To paint well is simply this: to put the right color in the right place,' in Paul Klee's ironic prescription. The often scant benefits derived from coloring data indicate that even putting a good color in a good place is a complex matter. Indeed, so difficult and subtle that avoiding catastrophe becomes the first principle in bringing color to information: Above all, do no harm."

These observations by Edward Tufte relate directly to the field of visual design, as defined by the pair information-communication. However, by quoting the painter Paul Klee, he suggests that we can often look at art for the solution of visual design problems.

Phase I

Analyze the relationship nature-culture as an analogy of the evolution of color from quantity to quality.

Select an example of a color system* from the fields of science, art, or design, and analyze its validity in terms of information, expression, and communication.

Color is a flexible, open system with a precise topological space. A space that can be stretched or compressed, depending on the various chromatic needs of a given context. The relationships between the colors constitute the system.

This is the research component of the problem.

Phase II

Based on the research conducted, develop one or two mini-systems of your own. Refer to diagrams for selections: expression and/or communication mode**.

This is the applied component of the problem.

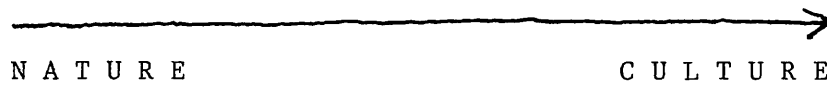
*System is used here in a broad sense. Examples could be: a painting, a color-coding system, the rainbow. Also, two or more examples from the same field can be studied at the same time.

**6-credit students are to choose one of the two.
9-credit students are to explore both.

Color as a process involving four parameters*



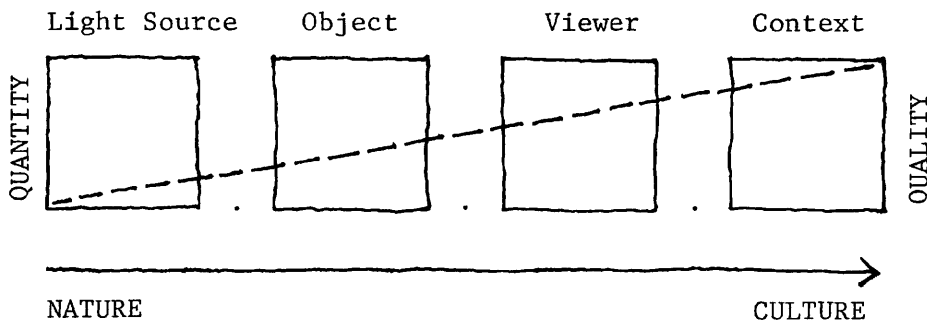
The process evolves from NATURE towards CULTURE.



the "QUANTUM" (how much, quanto) quantity is the constituent of nature the "WHICH" (quale) quality is the constituent of culture

quantum: unity of energy

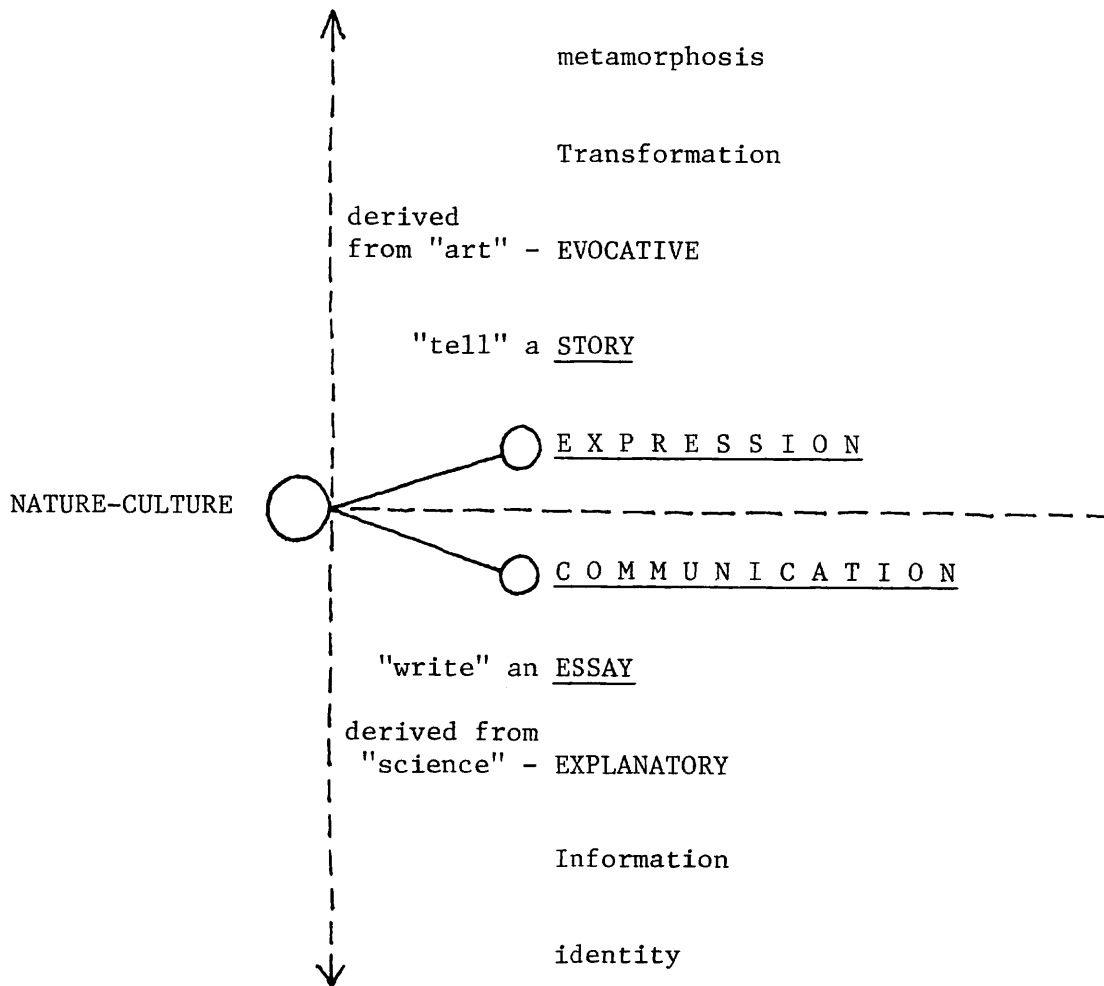
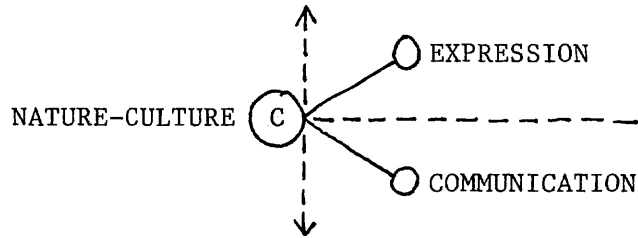
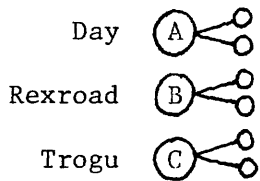
photon: unit of visible radiation



The element of culture increases as we move from color as quantity towards color as quality.

*Narciso Silvestrini, 1981.

Problem/Semester Structure



CDE 611
Visual Communication Workshop
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Trogu

Reading materials

Required:

TUFTE, Edward
Color and Information (pp 81-95)
in: Envisioning Information
Cheshire: Graphics Press, 1990

SILVESTRINI, Narciso
The color "variable"
in: Colore: Codice e Norma
(translated from the Italian edition)
Zanichelli: Bologna, 1981

Suggested:

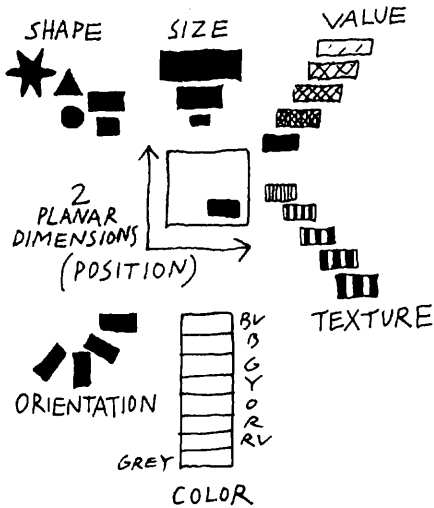
BERTIN, Jacques

Value Variation (pp 73, 76, 77)
Color Variation (pp 85-91)
in: Semiology of Graphics
University of Wisconsin Press, 1983

KLEE, Paul
(chapter on color) (pp 467-511)
in: The Thinking Eye
New York: Wittenborn, 1964

The color variable
by Narciso Silvestrini
1981

"COLOR is one of the variables of the system of signs and symbols with which information can be codified and communicated. Combined with the other variables, color contributes to differentiate the visual field, thus making it perceptually significant.



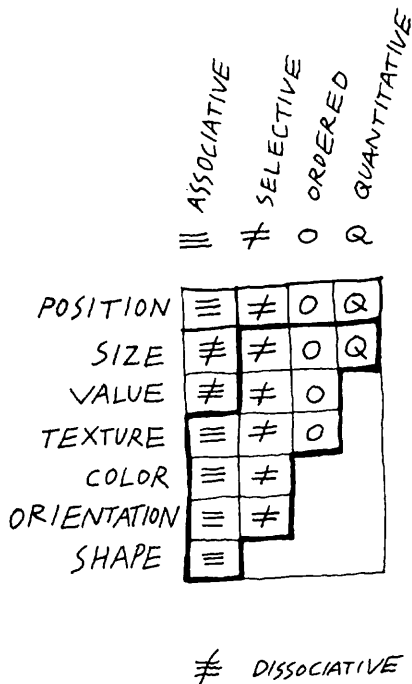
POSITION, DIMENSION, SHAPE, VALUE, COLOR, TEXTURE, and DIRECTION: these are the seven possible components of an image, be it in relation to the plane, or in space.

Each one of these variables is in reality a sub-set of the SPACE set, which is in turn intersected by the TIME set. Time has four visual sub-sets: movement, fluctuation, intermittency, and scintillation. Therefore, time is not the eighth variable, but a "variable apart", capable of setting in motion, emphasize, amplify or weaken each and every spatial variable.

The laws of cinematic expression are different from those of drawing and photography. In the same way, time as we experience it, shows an elastic and flexible, rather than a quantitative nature; time can be thought of as the nervous system of space. Every variable has its own longitude, or capacity to withstand the progressive degrees of fragmentation of information; its own latitude, or peculiar area of application; its own valence, or ability to organize itself with the other variables, towards the codification and transmission of information with maximum competence and minimum noise.

The level of the valence is established by the perceptual properties of the given variable. It can be of four types: ASSOCIATIVE, SELECTIVE, ORDERED, and QUANTITATIVE. (J. Bertin)

From this point of view, and towards its use as a code, color is not 'ordered' or 'quantitative'. This means that colors do not have an intrinsic order of succession or sequence, as it happens for instance with value. In this variable, the different grays are always ordered according to their progressive degrees of brightness. Nor is color 'quantitative', as is the case in the dimension variable, where one thing is differentiated from the other by virtue of its size: bigger or smaller. Color includes instead the 'associative' and 'selective' properties.



In the first property (association,) various signals are associated together through similitude - or likeness - of color. In the second property (selection), various signals are perceived as different through difference in color.

The variation of color allows a high and immediate selectivity (or selection) of the components of the visual field. Though, it cannot be properly used, at least by itself, when a precise ordering criteria is required. And the treatment of information is often a problem of order.

It is in relation to this area of competence that all the advantages and disadvantages of color, its role and necessity, must be considered and evaluated, towards design and communication.

Color is a property of light which, in turn, is an aspect of a defined segment of the electromagnetic spectrum of radiating energy. Therefore, color belongs to one of the four fundamental interactions: the electromagnetic interaction. (The other three are: weak interaction, strong interaction, gravitational interaction.) The radius of action of the electromagnetic interaction, like that of gravity, is infinite. Therefore it can inform us -- visually in part -- about places and bodies of the distant universe. Within the theory of models, color is useful in looking at what is considered to be the most elementary stuff of matter: quarks or pre-quarks. Maybe that is the reason why color has such an evocative power, it is present in all areas of communication: non-biological, biological, animal, and social communication. The issue then, is not about "color" and "non-color", but in asking why our vision is "in color", and why color always presents itself as a double.

In communication theory, it must be as COHERENT as possible - colored, monochromatic - as in the laser, in order to avoid interference with the information which is being carried through it. On the contrary, in information theory, light must be as INCOHERENT as possible - non-colored, white - thus interfering as much as possible with the bodies, in order to disclose their structural and formal characteristics.

In a sense, LIGHT is about INFORMATION, force, and COLOR is about COMMUNICATION, form. Saturation, being the relationship between color and light, between color and non-color, expresses the levels of interaction between information and communication.

When we examine the role of color in safety regulations, identification codes, or scientific information, we speak of "intentional meaning" of color.

Definitions such as "symbolism of color", "meaning of color", or "semiotic code" (Sahlins, 1966) are arguable, when we consider that the "number of colors identified by man as perceptual categories is very limited, especially if compared to the infinite variety of colored things" (Tornay, 1976.)

Colors do not, in themselves, constitute a code. "They may be used as elements of a code, but this is a marginal aspect if we compare it to the cognitive and operative value of its perception, and also in relation to the symbolic function of the mind. [The complexity of color is apparent in the variety of structural and] ... cultural associations which take place between colors and perception, colors and concepts, colors and objects, etc." (Tornay, 1978.)

In examining various codes and regulations, the distinction between "intentional meaning" and "actual meaning" may sometimes become blurred. We consider the former as being formulated by the source, where the latter is elaborated by the receiver.

The meaning of bands of color on a pipe, to identify the liquid running inside, is intentional. The meaning of the spectral lines emitted in the identification of a chemical element, is more actual than intentional.

The distinction between code and regulation also relates to the intentional aspect. We speak of regulation when the signification of color, its physical and measurable characteristics, and the definitions of its uses, are prescribed by law, or by a consistent usage which has evolved into an accepted rule.

We speak of code when the reference color-meaning is either freely agreed upon, or simply recurrent in the observed phenomena.

In looking at examples from the industrial and the scientific fields, one notices a progression towards safety, identification, description, transcription... a tendency of color to move from the "state of things" towards the "statute of things," in which signals can be assigned marks (signs) and these marks (writing) can amount to a language.

Translated by Pino Trogu, 1991.
Original title: La variabile "colore",
in "Colore: codice e norma", by Narciso Silvestrini, 1981.

Bibliography

Selected titles on color

Perception:

ALBERS, Josef
Interaction of Color
New Haven: Yale University Press, 1963, 1971, 1975.

ARNHEIM, Rudolf
Art and Visual Perception: a Psychology of the Creative Eye
Berkeley: University of California Press, 1954.

Painting:

ITTEN, Johannes
The Art of Color
New York: Van Nostrand Reinhold, 1961.

The Elements of Color
New York: Van Nostrand Reinhold, 1970.

KLEE, Paul
The Thinking Eye
New York: Wittenborn, 1973.

The Nature of Nature
New York: Wittenborn, 1973.

Philosophy:

GOETHE, Johann Wolfgang von
Theory of Colors
Cambridge: The M.I.T. Press, 1970.

WITTGENSTEIN, Ludwig
Remarks on Colour
Berkeley: University of California Press, 1978

Physics:

NEWTON, Sir Isaac
Opticks
New York: Dover Publications (reprint), 1979.

ROSSOTTI, Hazel
Colour: Why the World Isn't Grey
Princeton: Princeton University Press, 1983.

GRE

GREGORY, Richard L.
Eye and Brain: the psychology of seeing
New York: McGraw Hill, 1966, 1977.