

A STUDY OF COLOR .

By

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Contributions of the Graduate School
Indiana State Teachers College
Number 101

Submitted in Partial Fulfillment
of the Requirements for the
Master of Arts Degree
in Education

1933

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In memory of my mother, Charlotte
Wise Hummel, who taught me my first
lessons of color from quaint bits of
calico of a bygone day, and from the
old-fashioned flowers in her garden.

ACKNOWLEDGMENTS

The author gratefully acknowledges the encouragement and assistance in the preparation of this study given by Dr. J. R. Shannon for his judgment and guidance, by Prof. E. E. Ramsey, who has made this study possible, by Prof. T. R. Turman, artist, teacher and friend, and by the librarians in their kind assistance. Acknowledgments are also due to F. Weber and Co., Inc., Winsor and Newton, Inc., Talens and Son, Inc. and Devoe and Reynolds Co., Inc. for the literature they have furnished me in making an analysis of artists' pigments.

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INTRODUCTION

General Statement. Color is a fascinating subject. Many people think it is a difficult subject. Probably this is because they try to make direct application of the use of color before they know its underlying principles. By means of study and experiments, an understanding of color may be developed which will bring about a much greater appreciation for this subject within the individual. Color is a vital force in our everyday lives. Few people realize how important a part color plays in creating happiness. In order to use color with the most pleasure, we must first have an understanding of the principles underlying it. A number of color theories have been worked out that will give people an insight into this intriguing subject. An understanding of color has been considered intangible and difficult to many persons because of the lack of knowing of a theory with which to study it. Color contributes so very much to our lives. It either makes for happiness or unpleasantness. We should therefore understand it and obtain joy and pleasure from using it correctly. Color relationships can be taught as definitely as grammar. It is a universal language and children should be trained to speak it beautifully, i.e., by using it knowingly in their everyday lives. Color is one of the basic units of art instruction and should be taught as such in the public schools.

There are a number of texts dealing with color theory. Other texts explain the practical use of color. A number of

authors treat the subject from the psychologists's viewpoint, while another group study it as seen in the field of physics. Very little helpful material is to be found concerning the extent to which color theory should be taught in each of the separate grades of the public schools. Whatever sources are available are too general in regard to the amount of definite subject matter to be taught. Before a knowledge of color can be passed on to the children of our public schools, art teachers first must know what to teach, and how to teach this subject matter. A study of color containing information on color theory, a practical use of color, and a course of study on color, should be more compact, convenient and useful to the art teacher than this same information contained in separate texts. The author has attempted to treat the subject of color in this study in a manner which will give a treatment of the subject such as art teachers should have so as to be able to teach color efficiently and intelligently in the public schools.

A new theory of color is not suggested in this study but rather a system of teaching color based upon the theories and practices of colorists and noted teachers of color. The material in this study has been classified under four separate parts. Part I deals with color theory, Part II with the practical use of color, Part III with a research of the teaching of color in the public schools, and Part IV a tentative course of study for the teaching of color.

Purpose Of Study. The purpose of this study is (I) to try to show that color study is essential to a happier life

and is one of the basic units of art instruction and should be taught as such, (2) to offer in one study to teachers of public school art, color theory, some practical applications of color theory, and how these two phases of the subject may be taught in the public schools and, (3) to see whether color is being recognized and taught as a separate unit of art instruction in the public schools.

Sources Of Information. In making this study, information was obtained from these sources: publications on color theory, publications dealing with the practical use of color and with the teaching of public school art, state courses of study, art courses of study of teacher training institutions, art courses of study of city schools, information gained by questionnaires, and replies to letters sent to superintendents.

It is hoped that this study will be beneficial to art teachers. By making a study that is beneficial to teachers, the author hopes thereby to help society, as teachers may pass on to their pupils the knowledge gained from this study and in turn the pupils can make application throughout their lives of the knowledge given them by the teacher.

PART I

COLOR THEORY

CHAPTER I. WE LIVE IN A WORLD OF COLOR.

COLOR FOUND IN NATURE. Is it not strange that so many people seldom give more than a passing thought to such a vital influence in our lives as color? They seem to take it for granted as they do the sun, moon and the stars or any other phenomena of nature. Color is a part of our lives whether we will or no. We live in a world of color. We are clothed in it. Our homes are filled with it. Nature abounds with color everywhere; the blue of the sky, green fields, grey trees in winter, brown and gold in the harvest grains, violet in the shadows, orange in the sunset skies, and red and orange in the flames and firelight. If we will observe more closely we can see about us a distribution of colors in some of the more specific objects of nature as bright-hued birds, the cardinal, blue bird, goldfinch and oriole. Bright greens and yellow-greens are found in the coloring of certain snakes, lizards and other reptiles, while many of our moths, butterflies and other insects are richly adorned with coloring of every hue. If we examine flowers we can find colors ranging from white through most all the tints and shades of every hue. The sea shells, stones, and even the very sand beneath our feet, show a very wide range of color. If we would but learn to see this wealth of beauty so that we might enjoy and appreciate it, then how much our lives would be thereby enriched!

The Source Of Color. Light is the source of all color. If a ray of white light, common sunlight, is passed through a triangular glass prism, the ray of white light will be spread out fan-shape and separated so that we can see all the colors

composing the white ray of light. This we call refracted light, for the ray is bent or broken from its regular path. There are a number of ways in which light may be refracted. The cause of refraction is the passing of light from a medium of one density into a medium of another density so that the ray of light strikes the surface which separates the two media at an oblique angle. Light may be refracted by glass, water, oil and other media. The colors composing a white ray of light which we see when it is refracted, are called the spectrum. A good example of refracted light and the spectrum colors which we may see in nature is the rainbow.

The physicist has studied the different colors that make up white light finding that each of the colors is due to variations in length and rapidity of vibration of the waves of light. If we arrange the colors in order as to rapidity of vibration and wave length, we would have them thus: red, the waves of which are the longest and vibrate least rapidly, then orange, yellow, green, blue, indigo and violet, the last having the shortest and most rapid waves.

Color Perception. Our eyes are so constructed that we perceive light-waves of different speeds and lengths and interpret them as colors. Sargent gives a very clear discussion on how we are able to see color. "The eye is a nearly spherical camera. In many ways it is like a photographic

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The physicist lists seven colors as making up the spectrum. The artist and colorist omits indigo in making the color wheel.

camera. Light enters the eye through the pupil. Just back of the pupil is a lens which focusses the light on the membrane at the back of the eye called the retina. The iris which we see surrounding the pupil is an adjustable diaphragm which enlarges or contracts the opening of the pupil. The lens focusses upon the retina whatever scene is before our eyes just as the lens of the camera focusses views upon the photographic plate. The interior is lined with black, which absorbs the light which would otherwise be reflected back and forth within the eye and thus dull or confuse the image on the retina. We line our camera with black for the same reason. The eyeball is filled with a gelatinous substance, which serves to keep it expanded and in shape, and to hold the retina in place.

The optic nerve, which conveys from the retina to the brain the sensation caused by light, is a bundle of nerve fibres which arises from the base of the brain and extends through an opening in the bone of the eye socket, and from there into the eyeball through what is called the "blind spot". The fibres of the optic nerve spread out and form the retina, which receives the image of external objects focusses upon it by the lens. The word retina means net. There are said to be about 137,000,000 of these nerve fibres. Each one terminates in a cellular formation. Because of their shape about 130,000,000 of these nerve-fibre terminations are called rods, and the other 7,000,000 are called cones. The cones are shaped somewhat like a nine-pin. The rods are shaped somewhat like the cones would be if they were stretched lengthwise and thus made narrower. They are microscopic

in size, and these millions of them exist in the retina, which is only about one inch in diameter.

The rods and cones are peculiarly sensitive to light. They are supposed to be the special nerve structures that interpret the vibrations of light and color. They behave as if they contained chemical substances especially susceptible to change under the action of light. The results of this chemical activity are transmitted to the optic nerve, and so on to the brain, where we are made conscious of them as sensations of light and color. Probably only the cones can give rise to the sensations of color, while the rods interpret light, but not the color. In other words, an eye in the retina of which only the rods were present would see forms of dark and light perfectly well, but would be totally color-blind. It would have what we might describe as colorless vision."

The eye perceives color when the vibrations are 350,000,000,000 per second, on up to and including 770,000,000,000 vibrations per second. There are colors of less and less of a greater number of vibrations than these which we are unable to perceive, such as infra-red and ultra-violet. One author says that approximately we are able to see only twenty per cent of the color waves, being blind to the remainder, while another author places the estimates at less than ten per cent.

Reflected And Transmitted Color. Most of the colors which

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Walter Sargent, The Enjoyment and Use Of Color

(Chicago: Chas. Scribner's Sons, 1923) pp. 37,38.

we see are visible because they reflect rays of sunlight. A which object reflects the greater part of white light which it receives, while a black object absorbs the light-rays and is without light or color. Some objects reflect just one color of light; that is because the quality of the object is such that it absorbs most of the light-rays except that one color. When white light falls upon a fabric which absorbs all the rays except the blue ones, blue rays will be reflected back to us and we say that the fabric is blue. This property of absorbing portions of white light which some substances have is called selective absorption that is, the color or colors which we see in the objects are reflected while the remaining ones are absorbed. Selective absorption occurs while the light passes through the substance and it is the light which has permeated the substance that is reflected from its surface as color.

Most objects reflect light in two ways. A part of the light is reflected directly from the surface without change and shows as white light. Such direct surface reflection is called specular reflection. Specular reflection is easily seen on hard smooth surfaces as polished copper or brass, pottery, or varnished woodwork. The painter represents specular reflection in his paintings as the high lights. An object seldom reflects just one color but usually reflects some of its related colors as well. An orange object will reflect both red and yellow rays of light in addition to the orange. In painting a representation of an object, much vibrancy can be added by the use of the related or adjacent colors.

Light is transmitted by objects which are composed of transparent materials, such as glass. The light rays pass through the object with little obstruction. Some substances absorb part of the light and transmit the remainder. When such is the case we have transmitted light which is then colored. Transmitted light is often stronger, more brilliant and colorful than reflected light.

The Effect Of Color. Some colors seem to give the effect of warmth, while others give the impression of coolness. These colors are cold warm and cool colors. The warm colors are red, orange, and yellow. The cool colors are blue, green and violet. The warm colors are associated with the glow of fire-light and the sun. They have greater luminosity, or reflect more light than the cool colors. They have a greater power of stimulation in contrast to the restful influence of blue and its neighboring colors. The more distant objects are best represented by the cool colors. The sky, water, distant mountains, shadows, ice and snow are represented with blues, greens and violets.

The warm and cool colors seem to have the property of advancing and receding. Perhaps it is because the warm colors are more frequently those of light, and the cool colors those of shadow. The effect of advancing and retreating colors may be due in part to the refraction of wave lengths when rays pass through the lens of the eye. If we place three pieces of paper, one of red, one yellow and one of blue directly in front of us, all the same distance away, we will see that the yellow appears nearest to us, the red, second, and the blue farthest away. Thus we see that

the color sensations seem to impress us as advancing or retreating which is due to the difference in wave lengths of the colors.

"Color has dimensions; orange, red and yellow seem to come forward while blue, violet and green seem to recede....Bright areas seem to make colors appear dark, and dark areas tend to make colors appear bright."³

Color Associations. Certain associations are made with each of the colors as red with war and bloodshed or yellow with sunlight. Red symbolizes anger, tragedy, war, immorality, power, destruction, danger, bravery, health, love, strength and blood. Yellow is symbolic of light and warmth and is thought of as being gaudy, gay and enlivening. Yellow is sometimes associated with cowardice as, "a yellow-livered coward", and with jealousy, deceit and inconstancy. Orange is considered symbolically as a modified yellow often used to show characteristics of its components, yellow and red. Brown is symbolic of strength, solidity, vigor and graveness. In nature it signifies natureness. When violet inclines toward red it signifies royalty. In ancient times violet colored dyes were hard to obtain and only royalty could afford garments of this color. Amethyst, purple and violet symbolize truth, passion, suffering and love. Green is used to signify youth, growth, vigor, life, immortality and inexperience. Green is the color of spring and used as such is emblematic of hope, victory

and plenty. Blue is characterized as dignified and soothing; it signifies sedateness and melancholy truth, fidelity, hope, serenity, generosity and intelligence.

White symbolizes light, purity, innocence, truth, modesty and peace. The symbolic uses of black are those that are supposed to white. Black signifies woe, gloom, darkness, crime and death. Among many civilized people it is the color of mourning and sobriety. It seems to assume similar attributes to its components, white and black. Symbolism of colors in America and most European countries differs somewhat from that used in the Asiatic countries. Our like or dislike for certain colors show that colors really have an effect upon our emotions. Even animals show a discrimination. Red is exciting to animals as the bull or turkey-gobbler. Red is generally pleasing to primitive people and young children as well. To enjoy colors of less intensity, an appreciation for color must be developed. Whether or not a hue is pleasing depends upon its surroundings. Color may seem dead and insignificant when seen with one color while it may appear very dazzling when used with another. Place a small square of orange paper on a larger square of red and note the effect then place the orange on a piece of black, then of blue; note the dazzling brightness in the latter case.

The Practical Use Of Color. The artist's and craftsman's approach to the study of color is from the application of color to practical uses in our everyday lives. His materials are pigments made into paints, dyes and inks, The artist tries to represent with pigments the physical phenomena of color. In

teaching the theory of color, we must rely upon pigments as the media to symbolize color. Their combinations produce results that differ in many ways from the combinations of light rays of color.

Since we use pigments in practical life to show color, then it is only practical to use them in teaching color theory. We study color so as to appreciate it more and to be able to use it properly, therefore we must use the simplest and most effective means of understanding it.

There are a number of color theories that are used. Some of the most noted color theories are those of Munsell, Rood, Brewster, Jacobs and Ross. The simplest and most widely used and understood theory seems to be the one based upon red, yellow and blue as the primary or basic colors. It seems to be the most practical for educational and general purposes. The explanations and demonstrations, also suggested experiments that follow are based upon this theory. Pigments are the media used, unless otherwise stated, for it is by their intelligent use that we can gain an understanding and appreciation of color. Colored papers, fabrics and other applied colors may be used as helpful devices in teaching color theory.

The method of approach for the study of color theory used in the public schools should be begun through the use of color wheels, scales and charts, teaching the hues, neutrals, values, intensities and color harmonies. The study of color harmonies may be begun with monochromatic harmony shortly after values of colors have been studied, leading on step by step to those of

greater difficulty. Monochromatic color harmony might be taught next, then analagous followed by the adjacents, then complementary harmony, and lastly the triads. Children derive much joy from the study while studying pure theory and later in studying its application. There is not way of measuring the inestimable amount of happiness to future generations that the teaching of color in our public schools may bring.

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CHAPTER II. THE PROPERTIES OF COLOR.

Qualities Of Color. The properties or characteristics of color are hue, value and intensity. Hue is that property which distinguishes one color from another and gives it individuality and identity. We speak of the various hues as red, blue or yellow.

The color wheel is an arrangement of the spectrum hues in a circular band and is a device used in teaching color theory. Starting with yellow at the top of the wheel and moving to the left and downward, the colors are arranged as follows: yellow, yellow-orange, orange, red-orange, red, red-violet, violet, blue-violet, blue, blue-green, green, yellow-green, and back to yellow, the color from which we started. Finer gradations of color between the above listed hues are made and often used for advanced students, for the beginners of color theory, the above color wheel has been found to be quite practical. A normal hue is a color at its greatest degree of brightness, or as seen in the spectrum.

Primary Colors. The three basic hues are red, yellow and blue called the primary colors. They are called primary colors because they cannot be made from any other colors and are in themselves pigmentary elements. From these three colors all the other colors of the wheel can be made. The primary colors

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A box of transparent water colors will be needed to carry out the suggested experiments of this and the following chapters. The more of the experiments the student works out, the greater will his understanding of color theory become.

lie equidistant from each other in the color wheel. These colors are predominant in primitive art and make a stronger appeal to children and to people who have not developed discrimination in the use of color, than do the other hues of the color wheel.

Secondary And Intermediate Colors. If equal quantities of any of two of the prime colors are mixed, a secondary or binary color will be produced. Equal parts of red and yellow make orange, equal parts of yellow and blue make green, and equal parts of blue and red make violet. The intermediate colors lie between the primary and binary colors. They are produced by adding equal parts of the primary and binary colors. For example: red-orange lies between red and orange in the color wheel and is made up of one part of red and one part of orange. A further analysis shows that orange is made up of equal parts of red and yellow. Red-orange is therefore three parts of red and one of yellow. Each secondary color is thus made up of three parts of one prime color and one part of another prime color. There are six intermediate hues, yellow-orange, yellow-green, blue-green, blue-violet, red-violet and red-orange.

Tertiary Colors. Tertiary colors are those colors which result from mixing equal parts of binary colors. Equal parts of orange and violet produce russet, equal parts of violet and green produce olive, equal parts of green and orange produce citrine. A further analysis shows that the tertiary colors are made up of two parts of one prime color and one part of each of the other two primes. The analysis of russet is as follows: orange equals

1R plus 1Y and violet equals 1R plus 1B, 1R plus 1R plus 1Y plus 1B equals russet. This analysis shows that a tertiary color is really nothing more than a prime color grayed with equal parts of the other primes, or its complement, as we shall later see. The tertiary colors cannot be classified as separate and independent hues, as were primary, binary and intermediate colors.

The Neutrals. The neutrals are white, neutral gray and black. Oftentimes the neutrals are thought of as colors. They cannot be listed as colors for they are without the properties that produce color sensations. White pigment represents the entire spectrum combined as in white light, while black has the property of absorbing all the colors and does not reflect any of them. Neutral gray is a mixture produced by mixing equal parts of white and black, or vice versa. Dow speaks of the neutrals as three different degrees of value or notan as of the value of one tone against the other.²

Value. Value is the degree of light or dark found in a color. We say a color is light or dark as light green, dark green, meaning that the color is lighter or darker than the normal green as we have it in the spectrum or in the color wheel, or technically speaking, at its spectrum value. The Japanese use the term notan to indicate value or the degree of light and dark of either neutrals or colors.

The value of a color may be changed in different ways. If we wish to obtain a color that is lighter in value than the one we are using, we add a little water to our paint mixture

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Dow, Arthur W., Composition, Garden City, N. Y.

Doubleday Page & Co., 1927. P. 82.

if using water colors. This allows more of the white paper to show. We may also make it lighter by adding opaque white paint. If we wish to make the color darker, we add black paint to it, or we may add some of the color that is its opposite on the color wheel. A color that is lighter than its normal tone is a tint. A color that is darker than its normal tone is a shade.

A value scale is a helpful device in understanding values. Make a simple scale by mounting rectangles one-half inch by one inch of the three neutrals on a piece of paper nine inches by twelve inches with the white rectangle at the top, gray in the center, and black at the bottom. Mix equal parts of white and neutral gray paint, also of neutral gray and black. The first mixture is called "light" in the value scale and should be placed equidistant from white and gray in the scale. The mixture of gray and black in the scale is called "dark" and should be placed equidistant from gray and black in the scale. This is a graded value scale of five steps. We may increase the value scale from five to nine steps by adding "high light" between white and light, "low light" between light and gray, "high dark" between gray and dark and "low dark" between gray and black.

If we look through half closed eyes at the spectrum colors, we see that some of them are lighter in value than others. If yellow is made as dark as blue, it loses some of its brightness and is not a normal yellow, or if blue is made as light as yellow it also loses brightness and is lighter than normal blue. The degree between light and dark where each color comes to its full amount of brightness is called its spectrum value. Yellow is the highest

in spectrum value, that is it is the lightest at its highest degree of brightness while violet has the lowest spectrum value.

After the value scale of neutrals has been studied and understood, a value scale of each of the hues can be worked out. The first step should be that of placing the hue at spectrum value in the proper step of the scale and then make the remaining value steps in tints and shades of the hue. The colors of the color wheel range in seven degrees of value yellow is at high light. In making a value scale of yellow, we should have six different shades to add. The spectrum values of both yellow-orange and yellow-green are at light in the value scale and only one tint is needed. Add five shades to complete the value scales of these two colors. Orange and green are both at low light in the value scale, both red-orange and blue-green are at medium value, red and blue are both at high dark, red-violet and blue-violet are at dark, and violet is at low dark. None of the colors are as light in value as white nor as dark in value as black, therefore we have but seven steps in the value scale of colors. Scales of the other hues may be worked out in the same way as suggested above.

Intensity. The intensity of a hue is the amount of brightness in it. A hue that is as bright as it can be made or at its full color strength is said to be at full intensity. We indicate intensity when we say bright red or dull red. The dull red is less intense than the bright red. Intensity of a color is changed by making the color lighter or darker or by graying it through the use of its opposite color. Intensity of a color is also changed

by making it grayer by the use of a gray that is of the same value as the color. In this case the color would be neither lighter nor darker but grayer, less intense.

An intensity scale of five gradations may be made by placing the color at full intensity at the top of the scale and neutral gray at the bottom. The three steps between are made of mixtures of the hue and neutral gray. The degrees of intensity are called full intensity, three-fourths intensity, one-half intensity, one-fourth intensity, and neutrality. Three-fourths intensity is made by mixing two parts of the color pigment and one part of gray, one-half intensity is made by mixing equal parts of the color pigment and gray, while one-fourth intensity is made by mixing one part of the color pigment and two parts gray.

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CHAPTER III. COLOR HARMONIES.

General Statement. The aim of our color study is to create pleasing harmony, i.e., color schemes from which we will derive joy and satisfaction. To develop judgment in the use of colors we must learn how colors affect each other when used in different hues and in different degrees of value and intensity. The most beautiful color harmonies are those which give a single impression, an impression that all the colors of the scheme belong together, and yet have enough variety in the arrangement that it does not become monotonous. A color scheme is a group of colors harmoniously related to each other and which gives pleasure to the eye and mind when used in certain combinations. Color harmony depends upon adjustments of hue, value and intensity. In this chapter we shall study the adjustments or relationships of hue.

Classification. Color harmonies are classified as belonging to three large groups, (1) harmony of related or composite colors, (2) harmony of contrasting or opposite colors, and (3) triads, groups of three colors equidistant from each other in the color wheel. The color harmonies belonging to the first group are: monochromatic or one hue harmony, analagous harmony, and adjacent harmony. Those of the second groups are: complementary harmony, near-complements, split-complementary, and perfected harmony. Those of the third group are: the major, minor, sub-major, and sub-minor triads.

Monochromatic. Related colors are those colors which lie next to each other in the spectrum or the color circle and have

an element common to each other. For the beginner, the use of hues through self-tones of one color is a safe and easy harmony with which to start. This type of harmony is called monochromatic which means that any one color in various tints and shades may be used, and with the addition of the neutrals if so desired, or in other words, one color with different values and intensities may be used.

Composite Colors. Analagous harmony is the use of closely related, or neighboring colors. The colors of this harmony lie on one side of the color wheel and have an element which is common to all. This harmony may include one primary color but not two. Beginning with yellow and ending with blue-green, we have an analagous color scheme including yellow, yellow-green, green, and blue-green, all having the common element of yellow. This scheme, as well as any other, may be used in any combination of values and intensities of the colors that one wishes and the neutrals may be included also. An analagous color harmony gives a gradation of related hues which is an important element in beauty. It is a safe harmony to use and one that is full of brilliancy and texture. Pure colors are seldom found in nature. Examine a bright flower or feather; take the flower of a delphinium for example: notice how in places the blue has a greenish cast and again there are spots of the blue tinged with violet. Analagous colors usually give one a feeling of rest and quiet.

The two colors lying on either side of a hue are the adjacents of that hue, thus the adjacents of blue are blue-green and blue-violet, or if we are using just the primary and binary

colors, green and violet are the adjacents of blue; blue is the element common to all of them. Adjacents are easily seen in iridescent colors. Many butterflies and birds have spots upon them that reflect a variety of colors when seen from different points of view. The use of adjacents adds richness and depth to a color and are comparable to over-tones in music. The painter makes use of adjacents to produce a brilliant scintillating effect. He uses adjacents in painting the color of metals. Notice the orange and green used with yellow in paintings of brass pieces, also the red and yellow with orange for copper. The use of adjacents gives vibrancy and richness to colors of low intensity. The appearance of a space painted with intermingling adjacents as violet, blue, and green, will be much more brilliant and sparkling than if painted with just the blue paint. A color may be grayed most effectively by adding a portion of its adjacents.

Contrasting Colors. Contrasting colors lie directly opposite each other in the color wheel. The opposite color of any given hue is called the complement of that hue. Complements are in the strongest possible contrast to each other for they have nothing in common. They are opposite but enrich and enhance each other. Certain colors seem to demand other colors to complete them, that is, to satisfy the optic nerves of the eye. The complement of red is green, the complement of blue is orange, and the complement of yellow is violet. A hue and its complement includes all of the primary colors. We find that the complement of each color is a binary color and

from previous analysis that binary colors are composed of a mixture of two primes. Thus the complement of each primary color is one-half part of each of the other two primes.

Although complements have the power to add brilliancy to each other when placed side by side, if equal parts of a pigmentary hue and its complement are mixed, a neutral gray will result. If we wish to gray a color, or to lower its value or its intensity, the most effective way is to use some of its complement. Such grayed colors are subtle and baffling. They are more interesting and vibrant than colors grayed by the use of neutral gray or black. Many examples of colors grayed with their complements may be found in Japanese prints and nature abounds with them.

If we use colored lights instead of pigments, a color and its complement will produce white light. Light complements are different from pigmentary complements. Red and blue-green are light complements, blue is the light complement of yellow, and green is the light complement of violet. The artist takes advantage of the knowledge of light complements. The shadows cast by an object tend to go toward their light complements. The artist uses pigments to represent the color which we see, or the light complement of the object rather than the pigmentary complement of the color of the object. Suppose the painter is painting a red object and wishes to represent its shaded side in color. To represent the shaded side of an object as he actually sees it, he will paint it blue-green, the light complement of red rather than normal green, the pigmentary complement of red.

Place a red object against a white background. Look at the object for a few moments until the eye is tired. Remove the object and note what color is seen in its place. The color we see is the complement of the color of the object. We call this imaginary vision of a color the after-image. When the eye becomes tired it tends to make a blending of the remaining constituents of light due to the fact that the nerve endings of the eye which respond to red refuse to act for the time being. Instead, the eye can only sense the remaining constituents of light.

Mix washes of several colors and their complements. Mingle these colors by dripping drops of paint on to a piece of wet drawing paper. Use one color at a time and be sure that the mixture is clean and clear and that there is no other color on the brush but the one. Drip paint on to the paper of the complement of the color used, letting portions of the two colors intermingle and run together. Note the effect of each color upon the other and the grayed tones resulting when the colors mix. Many interesting effects can be produced by using this same experiment for any of the other color harmonies.

The eye is better satisfied with a color scheme that shows, somewhat, all of the color elements. Slight variations of complementary color harmony can be made whereby three colors are used instead of two. A harmony made up of a hue with the adjacents of its complement is called split-complementary color harmony, as yellow, blue-violet and red-violet. A near-complement of a hue is the color on either side of its comple-

ment as yellow with either red-violet or blue-violet. Perfected harmony is a hue with its complement and adjacents, as yellow, violet, red-violet, and blue-violet.

If a mixture of a hue with any of these near-complements is made, the resulting color will be very low in intensity and value, but will not quite approach neutral gray. In nature we see many such examples which are often hard for us to analyze. Note the color of the bark of trees, of stones, earth, faded leaves, and even feathers of some birds, and see how nearly neutral is the color. By using the near-complements of a hue in any of its three forms, a combination of greater variety results and one which still insures close relationship between the hues and their intermixtures. They contain all the elements of the complement but in different proportions.

Triads. The eye is better satisfied with a group of colors that shows all of the elements of color. The elementary of basic colors are red, yellow and blue, and are found to be equidistant from each other in the color circle. Any three colors which are equidistant from each other in the color wheel are called color triads. The red, yellow and blue triad is called the major triad and has strong and aggressive color sensations. If these colors are used full strength they must be handled with skill and care or they become disagreeable. When used in stained glass they are rich and gorgeous giving a satisfying and agreeable effect. By mingling the colors of this triad many interesting facts regarding the behavior of them may be learned. In this experiment more pleasing results will be obtained if one color is kept dominant, or

if so mingled, to produce a sufficient amount of gray to subdue all three of them and thereby form a unity among them. A pleasing tonal effect may be produced by veiling over the pattern with a wash of one color. Each wash of the different colors that may be used will give a very different atmosphere.

The orange, green and violet triad is called the minor triad. This triad is made up of colors complementary to the major triad. These colors mingled gives a very different effect from those of the major triad. There is more unity between them for they are partially related to each other. The colors of this triad are used extensively in modern art, while those of the major triad are found in primitive art as well as in the great paintings and decorations of the Renaissance.

Two other triads made up of the intermediate colors are the sub-major and sub-minor triads. Red-orange, yellow-green and blue-violet are the colors of the sub-major triad. The sub-minor triad is made up of yellow-orange, red-violet, and blue-green. The sub-major triad is a combination that is unpleasant to most people, while the sub-minor triad is perhaps the least common of the four triads, but is generally pleasing, it gives the effect of expressing exceptional and peculiar moods. There are other possible triads that could be formed by combining the colors that are formed by mixing the intermediate, binary, and prime colors, as orange yellow-orange, which would lie between orange and yellow-orange, but in a large measure they would be quite similar to the four triads just discussed. If well used, triads are the richest and most

baffling of all the color harmonies and are also the ones which need the most skillful treatment.

General Summary Of Chapter III.

To use color harmoniously the selection of a color scheme to be followed must be made to suit the problem or be determined by the peculiar mood that is to be expressed. There are three classifications of color harmonies: related or composite colors, contrasting or opposite colors, and color triads. Related hues are similar and give likeness in color tonality: (1) a single color, (2) analagous colors, (3) adjacent colors. Contrasting hues give a balanced color tonality: (1) a color and its complement, (2) split-complements, (3) near-complements and (4) perfected harmony. Color triads are hues equidistant from each other in the color wheel, or they may be classed as a hue and the other two hues which when mixed will produce its complement. Related hues are safe and easy to use. Contrasting hues are brilliant and satisfy the eye. Triads are pleasing and well balanced but are difficult to use skillfully.

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CHAPTER IV. THE PRINCIPLES OF ART STRUCTURE APPLIED TO THE USE OF COLOR.

Elements of Composition. The three elements of a composition are line, light and shade, and color. Effective progress in composition depends upon certain principles that must be taken into consideration by the individual who would create. Dow states these principles as (1) opposition, (2) transition, (3) subordination, (4) repetition, and (5) symmetry.¹ To create good harmony by the use of these principles we must have proportion or good spacing. Some authors expand these principles somewhat by modifying them or by adding to them certain other principles. Emphasis and dominance are often given as two of the principles of art structure. However these two are so closely related to the principle of subordination that they need not be given as separate principles. Rhythm and repetition are also closely related. One of the easiest ways of securing rhythm is by means of repetition. Unity shows the relationship of the various parts of a design. It seems to hold the different parts of the design together making them form a unified whole. This design principle might be listed as a sub-point of proportion or space relationship. Symmetry is synonymous with balance, a term that is more commonly used. Radiation is the term applied to the growth of the various parts of a design from some central point or axis. This principle might be listed as a sub-point of balance.

¹Arthur Wesley Dow, Composition, (Garden City N. Y.:

Doubleday Page & Co., 1927), p. 21.

In the chapter just preceding, we considered the combination of the various hues and what part they play in making a color harmony. The value and intensity of the hues used in the color scheme is also of great importance. The principles of art structure apply to the use of color as well as to the use of lines and to the use of dark and light of a design.

Fitness To Purpose. In selecting a group of hues with which a harmony is to be arranged, thought and care should be given to see that the colors are fitting and suitable to the practical needs of the object and of the effect to be produced by the use of them. For example: many gasoline and oil stations are painted bright colors to attract the attention of the public; those painted bright yellows and reds, or a combination of the two colors, do attract then repel, especially on a hot summer day when their warm colors seem to add to the heat vibrations of the summer sun. A building painted white and green giving the effect of coolness is far more inviting to the weary travel-worn tourist than one painted in warm colors. In this case the advertiser fails to consider that the effects produced are of far more consequence than is the mere power to attract attention.

For a color scheme to be interesting, the mind desires variety and contrast; it also desires a close relationship of colors within this variety. A feeling of motion may be secured through certain color arrangements as a change in value, intensity, or hue. Color movement may also be introduced by gradation.

Balance. In order to have a good color arrangement, we must have balance. To have balance a design must give a feeling of rest. Balance is the appearance of equilibrium or rest and is the principle underlying one of the most important essentials of good color arrangement called, "The Law of Areas". This law states that "large areas of color should be quiet in effect, while small amounts may show contrasts; the larger the amount used, the quieter the color should be, and the smaller the amount used the more striking the contrast may become. These contrasts may be due to a decided difference in hue, value, or intensity."² Tints or grays should be used in larger masses and intense colors in small areas. The law of areas may apply to a balance of light and dark in colors as, a small amount of light color will balance a large area of dark color or vice versa. This small area of color which may be either lighter, darker, or brighter, than the others, is called the center of interest. Emphasis upon a certain part of a design may be obtained by having a center of interest.

Colors or values can be balanced by repeating certain color or value throughout the design. This repetition gives rhythm and movement as well as a feeling of unity. Observe how effectively the principles of rhythm and unity are used in all-over patterns and borders. Rhythm in color schemes easily leads the eye throughout the pattern. Too much repetition gives a feeling of monotony. To avoid monotony there

²Harriet and Vetta Goldstein, Art in Everyday Life (New York: MacMillan Co., 1925), p. 205.

should be varied amounts of color rather than equal parts. The most interesting balance is informal balance, sometimes called occult balance, that is the eye recognizes a balance of the parts which are of various sizes and positions as a rose balanced by its stem and leaves, or a tree with its branches. In any color arrangement there should be one dominant effect of color; the individual should be conscious of a main color, perhaps in various values and intensities. Other colors should be subordinated to this main color. Emphasis or a center of interest may be obtained by using another color in the pattern or by a difference in the intensity or value. Backgrounds should show less emphasis of color than the objects that are placed against them. A note of accent may be added by using a small amount of an opposite color. An example of this is a room decorated and furnished with warm colors, grayed tones of red-orange, and yellow-orange, and a vase of blue or blue-green on the table. The use of a bit of opposite color breaks the monotony and forms a center of interest.

Unity. Unity of colors gives the effect or impression that all the colors of the scheme belong to each other. A safe way of obtaining unity is by the use of related colors, those that seem to belong to the same family as the warm colors used together, or the cool colors used together; the choice of colors depending upon the purpose of the design and the mood to be expressed.

There are still other ways of unifying colors or making for harmony. There is a difference in degree of value of most

opposite colors when used at full intensity. If the intensities and values of the colors used are equalized, they are unusually pleasing. If we fill the areas of the design with colors brought to middle value the effect is apt to be pleasing. If we modify some of the colors so that there is about the same number of colors in value above middle value that there are below middle value, the results will be pleasing. Three colors may be balanced by using one at middle value, one above middle, and the other below. Any color at full intensity at about middle value looks well when used with any of the neutrals. If a scheme of opposite colors at full intensity is used, a pleasing effect may be obtained by outlining the spaces with black or white and thereby separating the colors. When two complementary colors are used side by side in a design, a shifting jumpy effect is produced at the edges because the eye is trying to adjust itself to both colors at the same time. By using a neutral line between, this unsettled effect is prevented, while the line affords a space wherein there can be a play of after-images.

Relation Of Line And Color. Certain line patterns often suggest a definite kind of color scheme and whether it is to be dominated by cool or warm colors. If we are representing some aspect of nature, the feeling is even more pronounced. An ocean scene immediately calls to mind an array of cool colors while a harvest field pictures itself to us in a combination of warm colors.

A design made up of parallel lines suggests similarity

or monochromatic harmony and a closely related scheme. Strong lines of opposition can be made more effective by using opposite or complementary colors. Opposite colors give dramatic effect, similar colors give an effect of restraint. Radiation brings to our minds the use of analagous colors....an element common to all, similar to the starting point of the radiating lines. Radiation and opposition both used in a design suggests a split-complementary scheme. Transition, which gives a softening effect of opposing lines, suggests a triad.

Big bold patterns seem to cry out for emphasis in color, while small finely divided areas can be filled with many bright colors. A pattern made up of sharply acute angles will call for different colors than one made up of rectangular spaces. Both of these would differ in turn from one made up of curves. If line and color harmonies are correlated, both will be easier to understand.

Taylor System Of Color Harmony. There are a number of devices on the market for finding color harmonies that are used for commercial purposes. These devices are helpful to people who are without much color knowledge or discrimination. One of these devices that is widely used is the Taylor System Of Color Harmony. This system is made up of a number of color charts showing the primary, binary, and intermediate colors in different values and intensities. There are three color masks to be used with the charts with directions for using each of the masks. If the masks are properly placed upon the charts, a harmonious group of colors is shown. This system of finding a color harmony is no doubt useful to the merchant, adver-

tiser, or any other men who are engrossed with the problems of managing a business, but the art teacher will find that the application of the knowledge of color theory gives more interesting results and is not so mechanical. Free will and imagination can also have free play in thinking the color scheme rather than in finding one mechanically.

General Summary of Chapter IV

The elements of a composition are line, light and shade, and color. Composition depends upon the principles of opposition, transition, subordination, repetition, symmetry, and proportion. Color harmony is dependent upon the correct use of hue, value, size of area, intensity, shape of area, and place in the pattern. It also depends upon the Law of Areas. Certain line patterns suggest definite color harmonies. The Taylor System of Color Harmony is a device that is useful for commercial purposes. However, a knowledge of color theory is more necessary and beneficial to the art teacher.

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PART II

COLOR IN EVERYDAY LIFE

CHAPTER V. COLOR IN DRESS.

General Statement. Men and woemn should be more concerned in the color of their dress than in the material. The color of a costume should be the just consideration. Dress has a great influence upon individuals, upon both the wearer and the people who behold the dress. A well-dressed person has confidence, poise, and self-command of himself. One's whole faculties are stimulated and energized by the consciousness of being becomingly attired for the occasion.

The individual's dress can be made to express his or her personality. Clothing should be selected with this thought in mind and all lines, colors and textures of the costume should be chosen with this end in view. One's costume should be so planned as to fulfill certain aesthetic requirements and should also be modest, healthful, and for the greater class at least, economical. Our clothing should be beautiful, yet should not be too conspicuous. Choose clothes that are not extreme styles but rather of a type suited to the individual. A woman should study the various parts of clothing as neck lines, sleeves, skirts, et cetera, and find which is suited to her beauty and adopt it as her own style. This will add to her natural beauty rather than take from it.

There are certain types of individuals classified according to the color of their skin, eyes, and hair. Certain colors may be effectively worn by these various types of individuals while other colors worn by them give an unbecoming and often repulsive

appearance. The individual should carefully study his or her type and bring out all the beauty possible by selecting the proper colors. Each woman should know her own type, admitting its defects or high points, and should not go beyond them. She should adopt a permanent mode of dressing that best accentuates her own personal charm.

If we would have a costume beautiful, we must follow the same principles of design and color as we would in creating any other thing of beauty as a piece of architecture, of furniture, or a painting. We should take into consideration the principles of balance, emphasis and subordination which are embodied in the law of areas, as discussed in the preceding chapter. The large areas of the dress or costume should be of subdued color while contrasts of hue, value or intensity may be used in small spots as the collar, cuffs, belt, or other trim. The emphasis should be so placed as to make the face the center of attraction. This may be done both by the type of the neck line used and by having a contrast of some sort in this part of the costume.

Rhythm. By repeating the color of the dress in different parts of it, we may obtain a rhythmic effect. We should be careful, however, to so place these contrasts of hue, value and intensity throughout the costume so that we may avoid spottiness. Rhythm may be produced by borders on the costume or by the use of an all-over pattern in the fabric wherein units are repeated at certain intervals throughout the cloth. The beauty of the rhythm produced by an all-over pattern

depends upon the pleasant relationship of the units to each other and the simplicity of the arrangement. Rhythm may also be produced by the graceful lines and the folds of the material when made into a costume and worn by the individual. Notice what graceful flowing rhythmic lines the Greek costume had, accentuating the grace and beauty of the curves of the body of the wearer. Rhythm and unity as well may be produced by forming a gradation of colors. This gradation may be effectively produced by veiling a textile of one hue and texture by another of a related hue or one of less or greater intensity by a fabric of sheer material as a slip of blue-violet satin worn under a dress of blue georgette crepe.

Proportion. Proportion, or proper space relationships, is an important factor in a well designed costume. We expect certain sizes to be properly related to the various parts of the costume. We naturally expect a large woman to wear large shoes, hats, and other accessories, else the costume will be incongruous. The opposite is true of the small figure. A woman with large feet and ankles finds that tight-fitting high-heeled shoes and slim skirts accents the size of the foot and ankle.

If the colors to be used in a costume are dull or low in value, the proportion of two parts of one color to three of another will be an interesting distribution. If the colors used are bright, or contrasting in value, it will require but a very small amount of one to be in the right proportion to the other color or colors. For example, if white is used

with navy blue, white collar and cuffs will in most costumes be sufficient trim of contrasting value to be in the proper proportion to the rest of the costume.

Harmony. For a costume to have harmony, the other principles of design must be properly applied to the creation of the dress. If any one of the other principles is violated, the harmony or unity of the whole costume is apt to be destroyed. If costumes are to be harmonious, the colors of them should be in unity with the natural coloring of the individual. We cannot be intelligent about selecting the right colors to wear until we understand why some colors are becoming and others are not. We must realize that the problem at hand is one of producing color harmony, a harmony between our natural coloring and the color of our clothing, rather than select a color which is pleasing to our eye alone and that satisfies a peculiar whim we may have for that color, as a person who always chooses blue, or red perhaps, for every occasion whether her skin tone is in harmony with that color or not.

Color For Individual Types. The three most important elements of our personal coloring are the skin, hair, and eyes. The skin by far is the most important of these elements to be considered in selecting our personal clothing. The basic coloring of the skin is usually orange; experiments with light tones of orange paint will prove this statement to be true. Complexions vary greatly. Even though the basic color of the complexion is orange, it may swing either way from orange, as the yellow-orange type, referred to as a

sallow skin, or the red-orange or ruddy florid complexion. Sometimes we see individuals whose skin tends toward red-violet, the coloring of the cheeks being especially noticeable.

If the individual would make the most of his or her complexion, he would study his type and then discover what colors will tend to bring out the red in the skin and subdue the yellow, or subdue the red if too outstanding. Experiments with colored papers or fabrics will prove to be of great help to the individual in choosing the colors most effective to the complexion. It will be found that colors that are complementary to the complexion will bring out more clearly or intensify the skin-coloring of the person. Violet is unsuited to a person with a sallow complexion as is green to one having a ruddy complexion.

To wear a dominant color that repeats the skin coloring, likewise emphasizes the color of the face. A yellow costume will make the face of a person having a sallow complexion look more sallow. The related colors of dull orange or orange-red are preferable to yellow; these colors are related to the yellowness of the skin and yet introduce a note of red which seems to bring out more coloring in the face.

Persons are spoken of as belonging to two general types of complexions, blondes and brunettes. Blondes and brunettes are usually distinguished by the color of the eyes and hair, a blonde having light hair and blue or gray eyes, and a brunette having black hair and black or brown eyes. There

are a number of variations of these types which need to be considered separately. As above stated, the skin is the most important factor to be considered in studying the complexion of these various types. The characteristic coloring of the Spanish, Mexican and Italian peoples is made up of a creamy orange with an orange-red flush in the cheeks. This type is spoken of as the warm type, because its colors are warm and without a hint of cool color.

The Norse, Sweedes and Danes are peoples who have a cooler type of coloring. The skin is fair and pale yellow-orange with a red-violet flush in the cheek instead of orange. The effect is colder since violet contains blue, which is a cold color. This type of complexion is called the cool type. Warm or cool coloring may be found in either the blonde or brunette type of individual. The problem of importance is to first find the type of skin color independent of the color of hair and eyes.

There is a type of complexion, known as the intermediate, having hair that is neither light nor dark but one of any of the numerous shades of brown; the eyes may be blue, gray, or brown. The eyes and hair of blondes and brunettes also vary as does the skin. A blonde may have a cool-coloring in her skin and may have blue, gray or green eyes, or occasionally, brown eyes; if her hair is light she is classified as a cool type of blonde whereas if her hair is red or red-orange, she is considered a ruddy type blonde. The brunette with dark

brown hair or brown-black hair is likely to have orange-red coloring in the skin and brown eyes, while the brunette with blue-black or green-black hair is likely to have cool coloring in the skin and gray, blue, brown or black eyes.

This brief analysis of types of complexions shows what variety exists among various individuals. As before stated, each person should study his type, and then make the most of it by selecting proper clothing.

Dark values of colors and black seem to take color away from the face. For those people who have much natural color, these dark values are of good choice for them. Light values seem to produce an opposite effect and add color to the face. A person of light complexion should add a note of contrast to such a costume by having a collar of darker value. A light collar on a dark dress will likewise relieve the monotony the same as in the preceding case. Large areas of bright color overpower the color of the complexion and should be avoided. Intense colors should be used in small enough quantities so as not to over-balance personal coloring. A bright tie, collar or bit of embroidery will given enough contrast and interest without fading out the complexion.

People belonging to the intermediate type with good complexions and not too much contrast between their skin and hair can wear most any color or value if the proper balance or law of areas is observed and colors are chosen that are fitting for the occasion.

The best colors for the cool type of complexions are

analagous, or adjacent colors of the cool hues. Blues, blue-violets, violets, blue-greens, and greens may be worn. A note of contrast may be used in ties, trimmings and other accessories.

Persons belonging to the warm type of coloring can wear brighter and warmer colors. They can wear dark and middle value of colors better than those in lighter values. The warm colors as yellow-orange, orange, red-orange, red, and often red-violet, can be worn successfully by this type of person. The grayed warm colors spoken of as brown, especially reddish-brown, can be worn very effectively by people of this type. If grays are used, they should be warm grays. Notes of accent may be chosen from the opposite or cool colors, thereby adding a note of emphasis and interest to the costume.

Texture Of Fabric. The texture of the fabric should be studied to suit the needs of the individual and the occasion as well. Hard, shiny textures which reflect the light conspicuously, as satin, are difficult for anyone to wear except individuals having a perfect complexion. Satin emphasizes the lines and shadows of the face and is therefore uncomplementary to the woman of middle age or older. Dull soft textures as crepes, tricotine, flannel and jersey are more becoming to most people. A material of trying texture may often be toned down and improved by the use of a lace collar or other material of soft texture to change the effect of the hard lines.

There is no safer nor surer means of self-expression or personality than by means of dress. Let each person study

his or her type and select designs and colors that will make the very most of what natural beauty nature has given.

General Summary of Chapter V

Dress has a great influence upon people and is an expression of the individual's personality. Costume should be created according to the principles of design and color just the same as any other thing of beauty. Types of complexions should be studied and each individual select costumes suited to his or her type. The skin is the most important element of the complexion. There are three types of complexions, the warm, intermediate and cool types. A color that is complementary or of the same dominant color as the skin should be avoided by individuals, as these only emphasize the defect. Costumes should suit the occasion for which they are worn, should be of suitable texture and color as well. Each person should adopt a type of costume that will bring out the best natural qualities of the individual's appearance, and in that way feel sure of his or her personal appearance.

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CHAPTER VI. COLOR IN THE HOME.

General Statement. "There is no place like home" is indeed a truth in more ways than one. Our homes are what we make them. A home should express the personality of its occupants. How much time and thought is really given to the home so as to make it a fitting background for the ones who live in it. A home is the material expression of the love of the homemaker for his family and in a large degree, expresses his capabilities and how he controls them.

If we have chosen the proper structural lines in making our homes, by having a good choice of color, we can produce whatever effect we wish. Color, because of its powerful emotional appeal, is a dominant element in the art of decoration. It creates atmosphere, and can cheer or depress; it has a powerful influence on us whether we realize it or not. Undoubtedly many cases of "nerves" can be traced, in part at least, to the color scheme of the home or place of dwelling. Imagine what an effect a room with red wall-paper would have upon an individual!

To make a study of the home, we should consider it from two separate viewpoints, the interior and the exterior. The study of properly arranged and furnished interiors is the problem of the interior decorator, while the landscape artist is the one who is mainly concerned with exteriors. The architect should study the outer appearance and effect of a house before building it and plan for simplicity of beauty adapted to the owner's needs and means or for the practical use of the house. Our homes make up a great part of our environment and have a great effect upon our daily lives whether we realize it or not. We should spend sufficient

time and thought upon them so as to make them the most desirable and restful places possible to us.

The Interior. A properly furnished house is a matter of much importance to the individual. Knowledge of how to properly furnish a house is therefore most needful, especially to girls and women, as they are more directly concerned with homemaking than are men. Women can acquire such knowledge if they will only realize that it is founded on certain principles and that an understanding of these principles must first be had before they can be applied. A beautiful and comfortable home does not come by mere chance but by the use of reasoned processes.

Interior decoration is a creative art to a certain degree. The professional decorator selects such materials as are necessary to his purpose and arranges them in such a way as to produce a harmonious beautiful whole. This art does not require dexterous hands or skill in craftsmanship but rather skill in selection and arrangement. The homemaker should keep in mind the people for whom he is decorating and keep the decoration in harmony with them, as the interior of a home is often all the background against which the people of the home are seen. Colors and effects should be chosen to bring out the best qualities of the personal appearance of the woman and man of the house just the same as their clothing should. Purples in decoration will make a person of sallow complexion look even more sallow as this color is one that is in direct contrast with a sallow complexion; or green wall-paper or drapes will make a man or woman of ruddy complexion appear conspicuous when seen against them.

The decorator must first have an idea as to what he wants to do before he begins working. Beautiful interior effects are produced by definite relationships of form and color. Each room should suggest a dominant idea to be expressed when finished. Form requires a mental process for understanding, while color does not, but rather has an emotional effect on the individual and is therefore more powerful in its appeal. The home decorator's main concern is with the combined use of form and color in his composition. Beauty cost no more than ugliness and is less expensive for one does not tire of it.

Adaptation Of Color Scheme To Use Of Room. In decorating a house, the decorator should first of all keep in mind the fitness to purpose of the materials and colors he uses. The orientation of the room must be taken into consideration; then too, the purpose for which the room is to be used must be considered. What man wishes to be housed in his own private room all fixed and "fussed" in pale pinks, blues, or orchid tones? The very thought is enough to make him rebellious! The living room should radiate welcome and warmth. As we use this room most in winter, a suitable orientation would be to the south so that the cheer of winter sunshine could pour through the windows. Golden browns in various values and intensities are always cheerful and appropriate to use for this room. A room located in the north part of a building should avoid the use of blue or other cool colors, for enough of these will be obtained from the shadows given to this part of the house. Warm colors are much better to use. If it is a bedroom thus located, the wall decorations can be in a high value of a warm color as pink, pale yellow or orange, or yellow-green.

Most every household has a collection of articles which were contributed by loving friends or relatives as gifts; then there are hand-me-downs from past generations which are considered as family heirlooms. How often these well-meant gifts and family relics become a veritable nuisance to the home because of their lack of fitness to the other surroundings. For the beauty of the home, it would be well to pack these articles away in a box where they are out of sight if they cannot be dispensed with. One piece at a time might be taken out for awhile if the owner be too conscientious. If there is a piece to which the owner is highly devoted and must have in order to be happy, then study the piece well and build all the rest of the room to be in harmony with it both as to line and color. Perhaps this piece is a vase, or even furniture. See what its possibilities are and choose colors and lines in harmony to make the most of them.

The room as a whole should be unified and present a composition in itself. Colors should be used as to make for unity and certain colors or values be repeated in various parts of the room. If a golden brown scheme is being used for a living room the brown in the woodwork and furniture may be repeated in drapes, blinds, and upholstering. The tone or value may vary somewhat. Again, the curtains may repeat the same scheme in a light tone as cream or blege.

In decorating the walls and floor, it is well to keep in mind the idea of the earth and sky effect. The floor coverings should be of the dark shades of the color scheme selected and the ceiling be the lightest. A floor covering with a design that is too conspicuous will attract too much attention from the rest of the

room and will destroy the harmony of it.

Orientation. The orientation of the room will be the first factor in deciding the color of wall coverings. If pictures are to be hung on the wall, then plain wall coverings are best. The ceiling should be lighter than the side walls so as to reflect a maximum amount of light, and the floors should be darkest of all three. If bright colored draped and upholstery are to be used, then the floor covering should be indefinite as to color and design, but if the carpets are of definite design and color, then the drapes, cushions, etc. and walls should be plain, otherwise the effect will be a feeling of unrest to the eye in trying to find a center of interest. Whether a color makes a good or bad effect depends upon its use with other colors, values, and intensities.

Furniture might be classed as belonging to two types; one type is the immovable larger pieces which maintain the balance of the room, and the other is the smaller movable ones which seem to be designated more for the purpose of individual pleasure. Here again the color and form should be appropriate to its use. The color of the furniture should fit into the general scheme of the room. How out-of-place is the chair or table finished in bright enamels and lacquers if the living room is a color scheme of yellow-orange, and just as out-of-place is a piece of furniture or framed picture in oak or mahogany in the bed-room whose general scheme is ivory or blue, or other light tones.

Straight lines suggest strength and durability while curves suggest freedom, buoyancy, and grace. A mission type of furniture is appropriate for people of large build and of stern face, but how inappropriate for the lithe dainty woman adorned with ribbons

and lace! Chairs or divans with small spindle curved legs are certainly out of keeping with a man of six foot stature and who is broad and heavy.

Backgrounds. Much consideration and thought should be given to the choice of color in the making of backgrounds or wall coverings. A safe way is to choose the general color as yellow-orange, then make the paint much lighter by adding white, then neutralize it somewhat by graying it. In this way, there will be color but its value and intensity will be changed so that it will not detract the attention from furnishings which can have more intensity of color. An effective method of painting walls is to paint the first coat a solid color, then stipple on a bit of related color of lighter value and one of darker value, as a gray yellow-orange background stippled with a very light red-orange and a dark red-orange which approaches neutral gray in value. Such treatment of wall surfaces gives a vibrant effect, yet the colors are related and the observer is hardly conscious that more than one color has been used. A wall painted in one flat color is less interesting than the stippled effect.

There are two ways of choosing the background. One way is to decide upon the general color and choose the furnishings that will go with it. A less expensive way, and often more practical, is to choose the center of interest first, and what furniture is to be used, then select a background color that will bring out the color of the furnishings to the best advantage. To select the color by the latter method, choose colors from this central object of beauty (it may be a picture, a piece of brocade, wall hanging or some other object of beauty) either by taking one

or more of its neutral colors, or by making one of its colors lighter.

Placement Of Pictures. We should give as much care and thought to the hanging of pictures as to any other part of the decoration. Any picture should be appropriate as a piece of decoration before being selected. It should be selected for fitness to its purpose. The next thing to consider is that it must be in harmony with the general color scheme of the room and its frame should also be in harmony with the general color scheme of the room. For example, if the walls of the room are in a light value, pictures frames should be of a value that is but little darker. A picture framed in a black or dark brown frame as seen against light walls calls undue attention to the picture. The effect is somewhat that of a hole in the wall. The size of a picture should be carefully studied in relation to the space in which it is to be hung. Do its lines help make rhythm with this wall space? Does it use here make the space look crowded or not? Pictures should not be used unless they enhance the room and unless they are necessary to complete a definite part of the decoration. A room that is overtrimmed smacks of vulgarity and bad taste. Keep the choice and amount of decoration so that the room will be one of rest and repose. Simplicity makes for beauty and rest, over decoration for fatigue and weariness.

Center Of Interest. The decoration should be carefully built about the center of interest. Choose what the center of interest is to be and then arrange the furnishings accordingly. In the living room, the fireplace is an easy and fitting part of

of the room, to choose for, the center of interest, it indicates cheer, warmth, and hospitality. In planning the color of the fireplace, the mantle and tile should be in harmony with the general color scheme of the room. To help make the fireplace the center of interest, a painting can be hung over it, or a clock or brass candlesticks might adorn the mantle, or a vase which is in contrasting color to the general scheme used. Place the furniture in such a way that the eye is led to the fireplace as one looks about the room. If it is a vase or lamp on a table, or if it is a picture or wall-hanging, subdue the other colors of the room to this piece and as before suggested, make such an arrangement of furniture that the lines will help lead the eye to this particular piece used as the center of interest.

Flower Arrangement. Flowers are an effective means of decoration to add color and interest to the room. However, they should be so selected as to be in keeping with the general color scheme of the room just the same as any thing else used to ornament or decorate. For flowers to be used most effectively they should be placed in a vase that has little or no decoration, or one that will not detract attention from the flowers, at least, and which is also in keeping with the color effect of the room. Flowers should be so arranged as to look natural and to show the grace and beauty of growth which the flower shows when a part of the stem and leaves are allowed to show. A single rose in a vase is much more beautiful than a bowl of them squeezed and crowded together looking as if they were suffocated. The Japanese give much care and study to flower arrangement. They try to imitate the flower in its

natural state of growth. Attention is given by them to proportion, symmetry, and other structural elements in this kind of creation as well as in any other. They use an uneven number of lines as five, seven, or nine, and try to arrange the flowers so as to give the effect of beautiful, graceful curves.

The Exterior. There are more people who see the exteriors of our homes than those who see the interiors of them. We should exercise as much thought and care in planning the exteriors of our homes as we do the interiors. We should make the outer appearance of them hospitable and inviting. In producing a beautiful effect for the exterior of the home, color again is one of the main elements. First, as above said, the house should be appropriate in type to its owner, and should fit in to its surroundings. This is a problem which the architect should solve when drawing up the plans and specifications of the house. What are the materials to be used for the outer walls, roof, walks, etc.? If stone, brick, wood, or tile, what is the effect to be? This must be decided upon and then the proper materials and colors be used. The roof, walls, chimneys, walks, etc. should be in harmony with each other in color as well as in line and form.

Plantings. The house should be the center of interest in the grounds, and the front entrance door should be accentuated. The plantings can be so arranged that this may be very well done. Plantings should not be scattered about as specimens in a hodge-podge manner, but in a well-ordered, unified arrangement. The grounds of our homes should be considered as an out-of-door living room and treated as such. Care should be given to the planning of the plantings, for once they are there in place, they are there

in place, they are there to stay. Trees and shrubs, cannot be moved when grown, except with great risk of loss, and too, it is a very hard and expensive process to try to move them after they have grown large.

Foundation Plantings. A certain amount of foundation planting is necessary to form transitional lines between the perpendicular lines of the house and the horizontal lines of the ground. Foundation plantings will also soften harsh architectural lines of the house, or they may be used to cover up some unattractive part of the structure. Low growing evergreens and shrubs are very effective for this. If the house is snuggled close to the ground and windows are rather low, select dwarf evergreens or shrubs, as the light coming in at the windows should not be obstructed by foundation plantings. The general effect of these plantings should be studied as to the leaf texture of the plants and should be kept in harmony with the structural materials of the house. A house made of rough materials, or having a rough surface as plaster, will be in keeping with plants giving the effect of rough texture, that is plants having rough or large leaves. Some plants have large glossy leaves, while others have foliage that is small, and still others may have rough leaves. Foundation plants makes any house look more homelike and inviting than one that does not have such planting. Foundation planting should be given the first consideration in landscaping the home grounds.

Specimen Plants. Specimen plants should be studied not only as to their springtime and flowering appearance but also their appearance at the different seasons of the year. They should also be studied in combination with other plants or trees, for if

they are not, a clash in color is likely to be the result. The color effects of plants during the fall season are varied. Some specimens have yellow foliage at this time, some orange, some red, others brown, and occasionally a variety with a purplish cast to the frosted leaves. Then there is the matter of color effect during the winter months that is given by the ripened fruit or berries. The bittersweet, some varieties of roses, snowberry, Indian current, and various other shrubs, plants or trees have bright colorful fruit that is very beautiful in winter as contrasting with the snow. All these items should be taken into consideration before a decision is made as to what plants are to be used in planting the home grounds.

Climbing Plants. The use of vines and climbing roses can often be used to great advantage in planting the home grounds, and some of them may be included in the foundation plantings. An ivy vine growing up the side of a chimney or upon the walls of a stone or brick house gives a very charming effect. A trellis for roses, clematis, or other climbing plants may be used. The once popular song entitled The Love Nest, states in a somewhat sentimental and beautiful way several plantings suggestive of joy in the home. It goes like this, "A veranda with some sort of clinging vine. Then a kitchen where some rambler roses twine". Such a vision from the kitchen window cannot help but lighten the heart of any housewife! However, one should so plan this planting that it does not overbalance or attract more attention than its share. Make it fit in as a part of the whole general planting and be suited to the location much as we would choose a picture to hang in a certain space as its fitness to purpose.

Ugly views, as well as the service yard may be effectively screened off by vines or tall growing shrubs as lilacs, snowballs, honeysuckle, syringa, and the like. Try to choose flowering shrubs that will harmonize with each other if the two are blooming at the same time. Red and yellow often clash if planted near each other and both specimens are in blossom at the same time. Most any arrangement of primary colors in plantings will do the same. If such a choice is made, then try to plant them in such a location that they will not vie at each other for attention and thus cause an inharmonious view.

If flower specimens are to be included in the plantings, the hardy bulbs and hardy perennials be the most satisfactory as they are easily cared for and propagate from year to year without any attention other than hoeing, trimming, fall covering and an occasional watering. If the right selection of plants is made, an array of color may be had from early spring to freezing weather. Perennials are most effective planted in borders with trees and shrubs forming the background. A few hardy bulbs may be used as well, for early spring color, if so desired.

Perennials. Perennials range in height from the eremurus (native in the plateaus of Africa) of seven or eight feet to the sedums of a half-inch. Of course the tallest plants should be planted in the background next to the shrubs, ranging forward in the border according to their relative height, care being given to produce a beautiful color scheme by their arrangement when the plants are blooming. Low growing plants are fine for border edges as well as rockeries, pools, and walks; sedums are especially adaptable to planting along walks or between the stones if

stepping stones are used, while dwarf iris, violets, phlox subulata, and many more low-growing plants are fine to place along the side of stepping stones in a natural way.

Border Plants. Peonies and German iris are well adapted for the edge of the drive, or used as other borders if they are to be planted alone. They are greedy feeders (iris especially) and multiply rapidly and are therefore better if planted alone than with other specimens. They are too tall-growing to be planted by the side of narrow walks. They may be used in the perennial border if sufficient space is given them to allow for their spreading habit and heavy feeding.

The garden may be so planted that it may be brought close to the house and really be a part of it. When so arranged, it is most enchanting, for we can live right in the midst of it enjoying it all the while from window or veranda. The beauty which such a garden contributes to our daily life is inestimable and an asset of equal importance to any other part of the home.

General Summary Of Chapter VI

The home is one of the most important parts of the environment of any individual. The home should be a place of rest and repose, and of harmony and enjoyment. The home should be adapted to its surroundings and to the type of persons who occupy it.

The home is made up of two important elements, the exterior and the interior. The color scheme should be carefully planned for both. The orientation of the room is of great importance in planning any interior color scheme. The interior should be a background for its occupants and a color harmony planned that will enhance the individuals who live there. The ceiling should be lightest, the

the wall next, and the floor darkest in value. Furnishings should be chosen for their fitness to purpose and should be keyed into the general scheme. The effect of any room should be that of simplicity, rest, and repose. Skillful use of color can give any effect that is desired.

The house should be the center of interest in the home grounds by foundation plantings which form transitional lines. The seasonal changes of the trees, shrubs, and flowers should be studied and the color effect desired be decided upon before any planting is done. Some tall specimens should be planted so as to form a background for the house and other plants. Plantings should be used to create a unified whole of the grounds, each one being used for a definite purpose and not scattered aimlessly about. Use tall-growing specimens farthest back in the border and range forward with them according to their height and the color effect desired.

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CHAPTER VII. COLOR IN BUSINESS.

General Statement. A man who is successful in business must be a good salesman. The public must be made to feel a need for the product at hand before sales can be made. A prospective buyer must first have his interest stimulated and aroused before he will begin to feel a need for the product advertised. If an appeal is made to his emotions, he hardly realizes or understands why he is interested but soon within him is a desire for the product. If he is a thoughtful man who uses organization as a part of his code of living, in his mind he will begin to find reasons why he should buy, and finally he will be convinced that he should buy the product. There is another type of person to whom beauty of color arrangement makes such a strong appeal that he cannot resist buying because of the pleasing arrangement in the show-window or other display space. Merchants should take notice of this emotional appeal of color upon individuals but alas! what an infinitesimal number of merchants know anything about color appeal themselves! A clever salesman learned in color theory and the psychology of color could dangle a few bright objects that were in harmony with each other before the eyes of such unsuspecting merchants and in the great majority of cases the salesman would sell to them. Most merchants are completely sold on the idea that it is money that talks, without stopping to consider any other factors of business. Whenever they become educated to the fact that it is color that talks in the field of advertising their business,

they will become better merchants. The head of every business management should "know his colors" and how to use them. If he feels he hasn't the time or his eyes aren't discriminating enough to become educated to the proper use of color, then he should engage the services of a person who is learned in the use of color.

Window Display And Decoration. Every merchant, no matter how small and modest his place of business may be, has one means of making a very direct appeal to the public and with very little added expense, unless he wishes to be elaborate, and that is the show-window. A show-window should be attractive and be as appealing in its beauty as possible. Too many show-windows are dusty and neglected, often repulsive. Windows of this kind send the trade on elsewhere rather than inducing the passerby to enter. If a window is to be made attractive, it must be based upon art principles of form, line, mass and color just the same as any other object of beauty. Cleanliness is the first requisite of a well-ordered store, especially the store that sells food products or clothing. Colors should be selected to suggest cleanliness. The cool colors for summer may be used in tints and are very effective for carrying out the suggestion of cleanliness. The outer appearance of the store should be considered by the merchant as well. A coat or two of paint will do much to improve the outer appearance of a building. A place of business should be attractive to the public and invite people to enter. Unsightly advertisements often make stores unattractive, causing them to have a cluttered,

disorderly appearance.

The show-window should contain an orderly arrangement of articles and should have one part of it that draws the attention more than the other parts. It should avoid the feeling of being crowded. If there are a number of articles to which the attention is to be called, use one article as the center of interest each day. How unattractive is the drug store window, for example, that has a cluttered up window full of tooth-paste, rubber goods, corn pads, patent medicines, and perhaps a dozen other varieties of articles all on display at the same time. Instead of advertising all of these articles at one time, the effect is that of confusion and lack of interest on the part of the passerby.

The show-window should have a suitable background that will show off the products to the best advantage. To do this the color value of the article must first be studied then the background be of such color value to be in contrast with the article. For example, an article that is white should have a background that is below middle value, for if lighter it would be seemingly absorbed by the large background space because of lack of contrast.

The grocer is most fortunate in having a wide variety of colors with which to decorate his windows and to display his goods at the same time. What an array of color is found in fresh fruits and vegetables. Many grocers fail to take this fact into account, but instead feel that their windows are not satisfactorily trimmed unless strung with crepe paper or similar materials, which in reality are nothing more than dust catchers and a good roosting-place for flies. Such "decorations" should be carefully guarded against as they repel instead of attract. The product that the

grocer is trying hardest to advertise, or is perhaps in season, should be used as the emphasis of the window. Suppose strawberries are in season and the grocer is advertising this fruit by means of his show-window. Instead of having the window filled with crates of berries or even many small boxes of them, have an arrangement of a box or two of berries in the window with some of the fruit spilling out over several fresh crisp lettuce leaves. A card might be placed in the window stating that berries could be had by the box or crate and the price they were selling for that day. A few other articles could be displayed but should be in keeping with the color harmony and should be unified in the whole scheme. Accessories to the consumption of strawberries or to the canning of them might be used.

The lighting of the show-window is of much importance. Artificial lights should be concealed from the view of the observer, and should be placed so as to get the maximum amount of efficiency from the way they focus upon the various parts of the window. Colored lights are also necessary if certain lighting effects are to be produced. By the use of colored lights, some objects can be made to be of more intense and outstanding color while others may be the opposite. Colored lights are necessary to produce a certain atmosphere also. The effect of a night scene may be produced by the use of blue and green lights, and if the background used is a snow scene, then the use of a blue light will give an effective winter atmosphere. The furrier could take advantage of such an effect as this in displaying fur coats or other similar articles.

Posters. The poster is one of the most widely used agencies in advertising. Whether or not it is an effective means of advertising depends upon its composition. The three primary elements of a poster are: (1) the design or representation, (2) the lettering, and (3) the open space, as margins, space between rows of lettering, etc. Posters may be classed as being made of either formal or informal balance. The designer of posters should study his subject and choose which type of balance will be the most appropriate one to use. Formal balance suggests dignity and repose, while informal balance can be made to suggest a dynamic condition, movement, action, gaiety. The use of lines of opposition, as a number of vertical lines and a horizontal line, denote strength and stability.

The poster should be an expression of one idea and not a number of them. By limiting a poster to the expression of one idea the wording can be more simple, clear-cut and direct. The parts of the poster should be unified, all things being taken into consideration to fit the subject and the purpose. Suppose the poster is advertising spring millinery. The colors used should be dainty and light in value suggesting springtime, while the letters should suggest femininity.

The poster as an expression of an idea should have a long range of visibility, for most posters are seen out-of-doors and from a distance and when people are moving. The poster artist should realize the difference in the carrying power of colors and apply his knowledge. Experiments have been made as to what combination of colors have the greatest carrying power and it has been found that they range in the following order:

"1. Black on yellow. 2. Green on white. 3. Red on white. 4. Blue on white. 5. White on blue. 6. Black on white. 7. Yellow on black. 8. White on red. 9. White on green. 10. White on black. 11. Red on yellow. 12. Green on red. 13. Red on green."¹ Posters must be designed so that they can be comprehended quickly, at a single glance. In any case, use the greatest contrast of light and dark of colors.

A few hues in flat colors are more effective in the color of a poster than a great number of hues. The printing process of colored posters makes the use of very many colors almost prohibitive because of the expense. Posters used to be thought of as a big picture, many of them being composed of a scenic effect with a small amount of lettering. For most purposes, such a poster would be ineffective, as the picture part of it would hold the attention of the observer and he would probably feel it was such a pity to spoil the picture with lettering pretty much as the average person feels about many calendars given at New Years by the well-meaning merchants.

The purpose of the poster must be forceful enough to make more than a mere impression upon the observer. It must appeal to the instincts, emotions, reason, and judgment, for to be successful the poster should not just demand the attention, but should hold it and create a desire to buy, give or stay, and should obtain an actual response of buying, giving or staying.

¹ M. Luckiesh, Color And Its Applications, New York, D. Van Nostrand Co., 1921, p. 136.

Some of the desirable qualities of a poster in the design and color are: (1) simplicity, one idea dominating, (2) change from the ordinary, a good poster should be different or unusual and not commonplace, (3) suitability, design, lettering and color should be related and in harmony with the idea, (4) tone and color, strong contrasts of light against dark, or dark against light. Bright colors usually make a better impression than dull ones do, also the place where the poster is to be hung and its surroundings should be considered. If the poster is to be hung in a dark hall, a light background with light letters is effective, if placed in a window, the opposite contrast should be used.

Structurally, posters may be divided into two classes: (1) those in which the letter space is dominant, and (2) those in which the picture is dominant. Posters must fall into one of these two divisions for if they do not they will lack subordination, one of the most important principles of art structure.

The lettering of a poster should be carefully considered. Too much variety in the letters of a poster will give confusion. The form of the letters should be legible. Letters that are made with narrower lines are, as a rule, more easily read than an extremely heavy, block style of lettering. The relation of the width to the height of the letter and to the space in which the lettering is to be placed should be carefully studied. Letters can be designed to express an idea of quality and should conform to the thought that is being expressed by them. Dignity, force, femininity, masculinity, etc., can be expressed by the weight and style of letters. For example, a poster advertising

babies' clothing would be very different in style, form and quality, from those used in a poster advertising coal. The color too would be less intense, and lighter in value, suggesting daintiness and purity. Legibility, expressiveness and good proportion are necessary requisites of lettering for good posters. Good lettering rightly placed should add to the value and effect of the picture. The two taken together and rendered in suitable colors should be one, a unit of design.

Color In The Theater. The theater is a business enterprise which is greatly dependent upon the use of color. The most important part of the theater is the stage, for this is the part to which the attention of the public is drawn. Color used in other parts of the theater is a matter of interior decoration quite similar to that of other public buildings and need not be discussed. The stage scenery, lighting and costumes are the important elements of the stage wherein color plays so great a part. The actor is the center of interest on the stage and as such must have an appropriate background to help express the mood of his acting. The art of stagecraft has developed from a crude, almost non-essential part of the theater to a place which is almost parallel to that of the acting. Costumes, lighting and settings play a most important part in the theater.

When designing a scene for the stage, many problems enter in. Probably the point of most importance is the appropriateness of the scene to the play. The play should first be carefully studied. The designer should consider the country, the climate, the time of year, time of day, the weather conditions and the

architecture or natural scenery prevalent in that country. The question then arises, what part of the scene should be emphatic or outstanding? Perhaps it is a door, a stairway, a tree.

The old style of stage scenery was realistic, trying to represent a thing as it is in nature. The modern style is suggestive rather than representative, or better known as decorative. In making a decorative rendering of a scene, certain characteristic features of the subject are chosen and made to stand out in a highly simplified and striking manner at the willing sacrifice of the details. The new settings are designed with some end in view, the eye centering on this or that spot, while the other parts contrast with it and lead up to it. Beauty, dramatic emphasis and subjective truth should be present in all stage settings, for they represent three of the principal tendencies of the modern stage scenery.

In the use of color, the atmosphere of the play must be considered. Is grief, passion, anger, fear, cowardice, the leading emotion of the play? Let the choice of colors show the emotion portrayed. Certain effects as the mood of the actor, the season of the year, the weather, the time of day, are more dependent upon the colors used than upon any other factor. Color should be intense or fade out according to the acting. During the climax the color should be less intense as the acting is at its highest peak at this time, but when the acting is less absorbing, color should play a more important part.

The primary colors of light are red, green and violet.

When mixing light complements, the result is white light instead of neutral gray as in the mixing of pigments. The pairs of light complements are: red and blueish green, orange and greenish blue, green and purple, violet and greenish yellow, yellow and blue.

By the use of colored lights, the hue, value or intensity of a scene can be changed instantly. An entirely different effect can be produced by using the same piece of scenery if the color of the lighting is changed. Marvelous effects can be produced by the wise use of pigments in the stage settings when combined with colored lights. A color painted on the canvas may appear as black to the audience until called forth by a light of similar color. If a black effect is desired, then a light which is the pigmentary complement of the color painted on the canvas is used, as red on the canvas appears black if a green light is thrown upon it. If two complementary lights are used at the same time, however, white light results.

Joseph Urban has developed a complex system of coloring which he calls pointillage. He spots or points his canvas with all the colors he intends to bring out on it in the course of a scene. At a distance the spaces between the points are not visible as such, so when he throws a red light on the scene, all the red spots jump out of the canvas and blend together to make a red surface. Similarly, if he now throws a green light, the red spots retire into darkness, and the green takes possession of the whole surface. The result to the observer is nothing short of magical. The process becomes complicated through the fact that one does not always throw a pure primary light on the

scene; if the light is a mixture of green and red, then both the green and red spots become visible, according to the proportions of green and red in the light. If a mixture of all three primary lights is thrown upon the surface, all colors painted upon the canvas appear. This means that usually either white light must not be used or that the pigments must be used in such proportions that the desired color will appear under the white light. For instance, if the surface contains spots of all three of the primary colors, two portions of red, two portions of blue and four portions of green, the two portions of red, blue and green will blend to make white, and the two remaining portions of green will stand out as green, only tinted with a strong white light. If the white illumination be strong, even this will not be successful, since the strong white light will reveal the spotting.

By the suggestion of the light effects found in nature, the lighting may suggest the time of day, the season of the year, or the weather conditions. It may create a feeling of space, distance, and atmosphere that can be obtained in no other way. The purpose of lighting in the theater of yesterday was merely that of illuminating the stage, done by means of the footlights. To-day its purpose is to create an illusion rather than for the purpose of mere visibility. In interior scenes the lighting makes canvas seem as very wood and stone, and human beings living creatures in their world of reality or fancy. In more poetical pieces, it actually makes lifeless things seem part of the living drama, as Appia has done in his settings of the Wagner music-dramas. Trees and stones and castles seem to partake of the mood of the

play and change and grow with it, now mysteriously and foreboding, now hard and relentless.

General Summary Of Chapter VII

A good advertisement is one that appeals to and stimulates the emotions, interests and judgements of the public and then actually causes a response. The show-window is a means of advertising that every merchant has. The decoration of the show-window should avoid giving the feeling of confusion to the observer by displaying just a few articles at a time which are related to each other in form, size and color, and which are appropriate to the article receiving the emphasis. The background of the show-window should be of such color and value so as to be in contrast with the articles displayed.

The poster is a device widely used for advertising. The three primary elements of a poster are: (1) the picture, (2) the lettering and (3) the open space. Posters may be made up of either formal or informal balance. The poster should be (1) simple, expressing but one idea at a time, (2) unusual and interesting, (3) unified in lettering, design, color, and purpose and (4) should have contrasts of color and value.

The theater is very dependent on the proper use of color. Certain effects as mood, emotion, climatic and weather conditions, and time of day can be expressed by color. The stage settings are dependent upon the use of colored lights for their effectiveness as backgrounds. A color in the setting may appear as black until brought out by a light of similar color. One of the modern methods of making stage settings is by the use of small colored dots. Different effects are then obtained by the use

of colored lights. A color on the canvas that is bright when seen under one color of light will be neutralized when the opposite colored light is flashed upon it.

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CHAPTER VIII. ARTISTS' COLOR PIGMENTS:

General Statement. The artist is dependent upon color pigments to give expression to the creations of his imagination and the ever-changing aspects of nature. Many masterpieces of modern painting are rapidly deteriorating, often within the life-time of the artist who painted them. In contrast to these paintings, there are so many works of the old masters that still retain great brilliancy and are in a good perfect state of preservation. These facts have caused much scientific investigation to be done as to the kinds of artists' materials used, chiefly the selection of colors and color composition. During the past decade, the chemist has given a wide variety of paints through his discoveries and combination of pigments so that the artist is likely to become bewildered by the vast array of bright sparkling paints beguiling him to try them. Those artists who were tempted and bought of many of these paints often did so to their own sorrow, for within a few years their brilliant paintings had changed to darkened dull masses due to the pigments that were fugitive to each other and that were not permanent to the exposure of air and light. To-day the chemistry of painting forms a part of the training of every art student who is trained in a reputable and reliable art school. It is essential that the artist know his working materials intimately so that he will be assured of the permanency of his work.

Criticisms often are made of the manufacturers of artists' pigments because they sell paints that are not permanent. The aim of the manufacturer is to supply the demands of the purchaser and just so long as he wishes to buy fugitive non-permanent paints,

just that long the manufacturer will sell them. Generally the ones who purchases the fugitive colors are those who are uninformed. It is the artist who must know what is of lasting quality and buy it, rather than to lay the blame to the manufacturer. Many manufacturing firms now publish literature on the composition and permanency of their paint products. The artist should secure such information from the manufacturer of the brand of paint he uses and then set up his palette accordingly. Most of our leading artists use a limited number of colors, selected on the basis of their permanency and ease of mixing to obtain other hues. The artist himself can make such mixtures to meet his requirements more safely than the manufacturer for he knows what other colors his palette contains.

Classification Of Pigments. There are three general classes of pigments used in paintings: pastels, water colors, and oil colors. The pastel pigments are quite destructible and paintings made with them should be framed under glass. There are two kinds of water colors, transparent water colors, and opaque or tempera water colors. The transparent water colors lend an air of delicacy to some subjects often flowers, that is impossible to obtain with any other media. The binder of transparent water colors is usually gum water which fixes the pigments on the surfaces to which they are applied and serves as a varnish. Transparent water colors are difficult to use because of their transparency and change in color that results when they are dry. Opaque or tempera water colors have a body of Chinese White and a binder of egg white, glue, or similar substance. Opaque colors do not depend upon a part of the surface material to which it is applied shining through to make the high lights as do

the transparent water colors. Both the transparent and opaque water color paintings should be framed under glass to maintain any degree of permanency. Oil colors are of greater importance to the artist than either of the other two pigments because of their greater degree of permanency, resistance, and durability, properties most necessary and important of pigments that are to be used for painting. For oil paintings the pigments are ground in such vehicles as linseed and poppy oil.

Sources Of Pigments. The natural pigments come from two sources (1) mineral of which they are natural minerals as the ochres, and artificial minerals, made of chemical compounds just like the native mineral taken from the earth, and (2) organic, being made up of animal matter as carmine from the cochineal insect, vegetable as indigo or madder made from these plants, and the artificial organic as the alizarins derived from coal-tar made as a substitute for the lakes and madders. The natural pigments are prepared for commercial use by grinding, washing, and testing them, in a number of ways.

Causes Of Deterioration Of Pigments. It has been found that the most common causes of the deterioration of pigments are due to gases, moisture, chemical interaction, heat, and light. The permanency and durability of pigments is determined by a number of different factors: (1) they are tested by their permanence according to the average conditions to which they would be subjected in every day use. What are those conditions? Constant exposure to light, heat and changing atmospheric conditions found in the average living room of a city. Light has a bleaching action, so pigments must be exposed to light to test their durability and permanence. Changes of temperature must also be tested, due to the

climatic differences of temperature that prevail in winter and summer. The average city atmosphere contains gases, differing degrees of moisture and dust. If this atmosphere is analyzed it will be found to contain gases that are sulphurous, alkaline, acid, and also a certain amount of water-vapor; pigments used direct upon walls as decoration must also be tested for their resistance to lime. (2) Pigments must be tested as to their permanence when mixed with each other. Certain chemicals are fugitive when intermixed as shown when Prussian blue is compounded with the Vermilions or cadmiums. (3) Pigments must be tested so as to find their reaction with the vehicles used. Some pigments change their color when used with vegetable oils. The use of linseed oil with some paints cause them to darken, especially white lead paints and some of the blue paints as Prussian blue change to a greenish cast. Poppy oil as a vehicle does not cause a change in the coloring of the pigments, but is less durable because it causes more porosity than the use of linseed oil.

Classes Of Pigments. Artists' pigments can be grouped into a number of classes or series, each class or family having a certain basic chemical composition. The following is a list of the more important groups of pigments: the lakes and wadders, chromes, cadmiums, earth colors, vermilion and cobalts. Under each group there are various numbers of individual color pigments. There are many other pigments that are not grouped in families but are listed separately, and some of these pigments are indispensable as ultramarine and emeraude. It is essential that the artist know the chemical composition of each group and what reaction it will have when intermixed with other pigments.

Lakes And Madders. Most of the lakes and madders are made from coal-tar dyes. Formerly they were made from the roots of the madder plant and some of them from animal matter as from the cochineal insect, but are now made synthetically and are more permanent; however, the madders made from the plant were of greater beauty and color. These pigments are transparent and should not be used as mixtures, except with blue to make purple. Rose-madder used with ultramarine-dark produces an excellent purple color which is more permanent than any purple that can be bought. The madders should never be combined with the natural earth colors as raw sienna, raw umber, and the ochres. The alizarin and madder lakes are safe and durable when used with burnt earth colors. Alizarin Lakes should not be used with ultramarines. When the lakes and madders are used with white, the white should be derived from lead. The lakes and madders may also be used with genuine vermilions and cadmium yellows. When used with chromes, they have a tendency to fade. All lakes and madders are impractical for frescoes. They are at their best when used as glazes over dry paint. Most of the artificial lakes and madders are made from artificial alizarin, a coal-tar product.

Chromes. The chromes are a lead product, and are fairly permanent when used with non-fugitive paints. They are effected by sulphurous gases turning dark after they have been exposed any length of time. They may be mixed with other lead colors. They are reasonable permanent to sunlight. They come in three degrees of depth; pale, medium, and deep. They should not be mixed with any pigments containing free sulphur. They should not be used with ultramarines, vermilions, lithopone, white, or cadmiums. The chrome greens are obtained by

mixing Prussian blue with chrome yellow. A more satisfactory substitute may be used by mixing emeraude green with cadmiums. The chromes may be made more permanent to the atmosphere by covering them with a coat of transparent varnish.

Cadmiums. The cadmiums are composed of sulphide of cadmium and are permanent when used with zinc colors. They cannot be mixed with lead. They range in color from lemon through the yellows and oranges. The lighter cadmiums are faded somewhat by sunlight, but the deeper colors are quite permanent.

Earth Colors. The earth colors are made up of clay and iron rust. The principal families of the earth colors are the ochres, siennas, and umbers. The earth colors are the oldest known and most permanent. They are not subject to change by ordinary light or affected by impure air or by the action of lime. Iron is the principal coloring matter of them. They cannot be mixed with lead colors, with madders or lakes, either from the plant or coal-tar products. When the ochres, siennas, and umbers are roasted or burnt, their color changes from yellow to red or **brown**. This group of colors is the most dependable and permanent and is indispensable to the artist.

Vermilions. The vermilions are made up of a compound of mercury and sulphur. Vermilion darkens when exposed to strong sunlight. If vermilion is overglazed with alizarin madder it seldom changes its color. Impure air, sulphurous gases, or moisture do not affect the vermilions. The vermilions inclining towards a bluish tinge have a greater degree of permanency than those of orange or scarlet hue. They should not be mixed with any colors containing copper or lead such as any of the chromes. Vermilion may be made more

permanent by giving it a coat of transparent varnish.

Cobalt. The basic element of the cobalt family is oxide of cobalt. When combined with other chemicals a number of colors are formed, depending upon what chemical is added. The cobalt series contains cobalt blue, cobalt green, cobalt, violet, and cobalt yellow, the last being known also as aureolin. Cobalt blue is a compound of cobalt and alumina, cobalt green a compound of cobalt and zinc, cobalt violet a compound of cobalt and arsenic, and cobalt yellow a compound of double nitrate of cobalt and potassium. The cobalts are all very permanent colors and can be safely used in all techniques of painting. They are very permanent to light and air, and are not affected by alkalies, acids, or sulphurous gases. Cobalt yellow causes decomposition of madder or alizarin lakes when mixed with them. It should not be used with ultramarine.

Whites. The artist uses more white than any one of the other pigments. There are a number of whites to be had, white lead being one of the oldest. The commonly known lead whites are cremnitz white, lake white, lead white, silver white, and Dutch white lead. The lead whites have a great covering power as they are very opaque, lead white being the best of these in this respect, being equaled only by permalba. The lead white has a tendency to turn yellow as it ages and to flake and brush off. It is affected by sulphurous gases and salt atmosphere. It is fugitive to the vegetable lakes, except the madder lakes and madder carmines also to orange and red leads, king's yellow, massicot and gamboge, but ultramarine, red and orange vermilions, yellow and orange chromes, madder colors, sienna earth, Indian red, cadmiums and

all the ochres may be successfully mixed with the Lead Whites.

Zinc white is whiter and has more relective power of white light than the lead whites. It stays whiter, and is little affected by sulphurous gases and salt atmosphere. It is also less fugitive to other colors in mixture. Pure zinc white is a durable pigment in all painting techniques. It possesses exceptional tinting strength and produces true tints of high color value. Zinc white has a tendency to crack. Permalba is a white that was put on the market a few years ago and is highly recommended. When compounded with zinc white the two form a very beautiful and durable mixture.

Permanency. Permanency to light and air should be the first requisite of a series of paints that the artist selects for his palette. The second requisite should be non-fugitive paints in their chemical composition. If it is found that a certain color is indispensable when making a composition, then the palette should be so set up as to have permanent colors that are agreeable to the first color selected.

Winsor and Newton, one of the most reliable manufacturers of artists' colors recommends a list of paints to choose from that are considered to be most permanent and durable. The pigments are classified according to color as red and purple, orange, and yellow, ^Lreen, blue and violet, brown, and gray, and black and white. Devoe and Reynolds also suggests three permanent palettes that can be safely used by the artist.

1

The Composition And Permanence of Winsor & Newton's Artists' Colors, pamp. 11, 1930. Pp. 21-23

The following colors have been chosen by some of the leading artists of to-day as being durable and permanent and of which they make up their palettes: zinc white, permalba white, ivory black, rose madder, madder lake, Chinese vermilion, alizarin crimson, Venetian red, cadmium light, lemon yellow, yellow ochre, cadmium dark, cadmium orange, ultramarine blue, cobaltblue, permanent blue, emeraude green, permanent green, terre verte, burnt umber, burnt sienna, raw umber and raw sienna.

General Summary Of Chapter VIII

The rapid deterioration of modern paintings in comparison to the durability of the old masterpieces has caused much investigation to be made as to the composition of artists' materials, chiefly color pigments. In order for pigments to be termed permanent they must be (1) resistant to exposure of light and air, (2) they must not be fugitive to each other in intermixtures, and (3) must not react with the vehicles employed nor change their hue when used with such vehicles. There are three general classes of pigments used in paintings of which the oil pigments are the most important because of their greater degree of permanence and durability. Oil colors may be classified in large groups according to their chemical composition as the lakes and madders chromes, earth colors, cadmiums, vermilions, and cobalts. The artist should study the permanency, durability and chemical composition of paints

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Pigments Used For Artists' Oil Colors, Chicago, Devoe & Raynolds Co., pamphlet, 1920.

and choose from these for his palette a series of colors that can be relied upon. Manufacturers give lists of colors stating the chemical composition of their colors, and many manufacturers suggest safe palettes to use.

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PART III

AN ANALYSIS OF COURSES OF STUDY

CHAPTER IX. AN ANALYSIS OF COURSES OF STUDY

Introduction. In making an analysis of subject matter for this section of the study of color, courses of study were chosen in the belief that they would yield as much information on the teaching of color as could be found. Three types of courses of study were examined: (1) art courses of study of the leading cities of the United States, (2) art courses of study from Class A teachers colleges as classified in the American Association of Teachers Colleges, of more than three-fourths of the states, and (3) elementary, and high school art courses of study as outlined by the separate states in their general outline of subjects taught in the public schools. This study is representative of all geographical sections of the country.

Questionnaire. In examining the art courses of study there were two queries. (1) Is art one of the required subjects to be taught in the public schools of your state? (2) If so, is color theory taught as a separate unit of the art instruction, is it taught as a sub-topic of design, or is it taught incidental with other subject matter of the art instruction?

Analysis of State Courses of Study. To the above two questions the following data are submitted. (1) Art is not one of the required subjects to be taught in the public schools of twelve states. Thirty-one states list art as a required subject in their courses of study, twelve of these states listing color to be taught as a separate unit of art instruction in their public schools. No information was obtained for five

TABLE I

AN ANALYSIS OF STATE COURSES OF STUDY

States	Art a Required Subject in the Public Schools	Color Taught as a Separate Unit of Art Instruction	No Data Obtained
Alabama	X		
Arizona	X		
Arkansas	X		
California	X	X	
Colorado			X
Connecticut			
Delaware	X		
Florida	X		
Georgia			
Idaho			
Illinois			X
Indiana	X	X	
Iowa			
Kansas	X		
Kentucky	X		
Louisiana	X		
Maine			
Maryland			
Massachusetts	X		
Michigan	X	X	
Minnesota	X		
Mississippi	X		
Missouri	X	X	
Montana			X
Nebraska	X	X	
Nevada			X
New Hampshire	X		
New Jersey			
New Mexico	X		
New York	X	X	
North Carolina			X
North Dakota	X	X	
Ohio			
Oklahoma	X	X	
Oregon	X		
Pennsylvania	X	X	
Rhode Island			
South Carolina	X		
South Dakota			
Tennessee	X		
Texas	X		
Utah	X	X	
Vermont			
Virginia			
Washington	X		
West Virginia	X	X	
Wisconsin	X	X	
Wyoming	X		
Total	31	12	5

states. The data were obtained from available courses of study of twenty-six states, questionnaires being sent to the other twenty-two states. Seventeen states replied making a total of forty-three states from which data have been used for this study. An analysis of the state courses is given in Table I.

In some states that do not list art as a required subject to be taught in the public schools, art is recommended to be taught wherever possible and some sections and counties of these states as well as many of the cities teach art as one of the required subjects of the curriculum.

Analysis Of Courses Of Study Of Teachers Colleges. An attempt was made to examine art courses of study from at least two Class A teachers colleges of each state so classified by the American Association of Teachers Colleges. However, some states do not have any teachers colleges belonging to this organization. Whenever this was the case, art courses of study of other teacher training institutions of these states were examined wherever available. Art courses of study of teacher training institutions of thirty-nine states were examined for this study, thus giving a fair representation of the country as a whole. A total of sixty-seven art courses of study of teachers colleges were examined. From this number, twelve list color to be taught as a separate unit of art instruction. These institutions are: Arizona State Teachers College, Flagstaff, Arizona; Colorado State Teachers College, Greeley, Colorado; Western State College of Colorado, Gunnison, Colorado; Northern Illinois State Teachers College, DeKalb, Illinois;

Ball State Teachers College, Muncie, Indiana; Indiana State Teachers College, Terre Haute, Indiana; Kansas State Teachers College of Emporia, Emporia, Kansas; Louisiana State Normal College, Natchitoches, Louisiana; State Teachers College, Moorhead, Minnesota; Western Reserve University, Cleveland, Ohio; New Mexico State Teachers College, Silver City, New Mexico; Marshall College, Huntington, West Virginia. Fifty-five of these institutions teach it as a sub-topic of design or as incidental to other art instruction. The art courses of study of this type of institutions were examined with the thought in mind that if color were taught as a separate unit in teacher training courses, it was likely to be so taught in the public schools.

Analysis Of City Courses Of Study. The art courses of study of cities examined from some of the leading cities of the United States and are fairly representative of the different geographical sections of the country. On writing to the superintendents of city schools, it was found that a number of these cities had revised or written a new course of study within the last five years, while there were still other cities which were so engaged at the present time. Because of this, a number of cities were unable to furnish art courses of study during the first part of the school year of 1932-1933, when the data for this thesis were gathered. In some of the other cities written to the art courses of study were out of print, while a number of other cities had never had printed art courses of study. In this study some sections

TABLE II
AN ANALYSIS OF CITY ART COURSES OF STUDY

Cities	Color Taught as a Unit of Art Instruction	Art Courses of Study Under Revision	No Courses of Study Available
Atlanta	x		
Baltimore	x		
Cheney			
(Washington)	x		
Chicago	x		
Cleveland		x	
Cleveland Heights	x		
Denver		x	
Des Moines	x		
Detroit	x		
Indianapolis			x
Long Beach	x		
Los Angeles	x		
Milwaukee	x		
Minneapolis			x
Nashville		x	
New Orleans			x
New York City	x		
Oakland			x
Philadelphia	x		
Phoenix			x
Richmond			x
Sacramento			x
Salt Lake City			x
San Francisco			
Sante Fe			
Seattle	x		
Spokane			x
St. Louis	x		
Toledo			
Topeka	x		
Washington, D.C.			x
Total	15	3	10

of the country seem to have an undue representation of cities. Wherever this is the case, it is because these cities have very fine art courses of study.

A total of thirty art courses of study of cities examined represent nineteen cities. A list of these may be found in the Appendix of this study. These courses of study were for elementary schools, and junior and senior high schools. Other information was derived from replies of superintendents of city schools. Out of a total of thirty-four superintendents of city schools written to, thirty-one replied.

Of this total number of art courses of study of cities examined, fifteen cities teach color as a separate unit of the art instruction and four do not. Three city courses of study were at present under revision and ten were unavailable. The best courses of study of cities outlined as teaching color as a separate unit of art instruction are Long Beach, Seattle, Philadelphia, Detroit, New York City, St. Louis and Milwaukee. An analysis of the city courses is given in Table II.

Conclusions. The conclusions reached in examining these courses of study are that: (1) too many states do not realize nor recognize art as a subject that should be taught in the public schools, (2) color is not recognized nor being treated as one of the most important fields of art instruction, (3) the art departments of a large number of teachers colleges do not give sufficient thought to the making of their art courses of study in that they fail to teach color as a separate unit of art instruction which is of equal importance to

design, representation, and other phases of art, (4) the cities are setting the standards and leading the way in the teaching of color as a separate and important unit of art instruction.

The recommendations are to be found in Part IV written as a tentative course of study for teaching color in the grades, the subject matter of which is based upon Parts I and II of this study, and the objectives, materials, and procedures are based upon the material found within the art courses of study of cities and teacher training institutions examined.

PART IV

A TENTATIVE COURSE OF STUDY

CHAPTER X. A TENTATIVE COURSE OF STUDY
FOR TEACHING COLOR IN THE GRADES.

General Statement. The course of study herewith suggested is based upon the work in color that is given in outline form within the courses of study examined which are listed in the appendix of this study and upon the author's experience in teaching this subject.

To many teachers of art the work in this suggested course of study may seem to be too difficult for grade children to do. The author has taught this work to average grade children for a number of years and has found it to be within their capabilities. The author has found that the study of color is a subject that is a very interesting one to children, even to many children below average ability. Many of the devises herein suggested have been found helpful in the teaching of color.

No definite statement as to the amount of time given to the teaching of this subject can be made, as the division of time may vary. Since color is one of the most important fields of art, it should have as much time given to the teaching of it as its importance would warrant. Color is taught in a number of ways: as pure color theory, as a subdivision of design, and again as incidental to other phases of art. The time suggested herein applies to the teaching of color as color theory and not as to any other way of presenting the subject. Because color theory may be interwoven and correlated with other fields of art, less time can be set aside

for the teaching of it than otherwise would be necessary. From ten to fifteen per cent of the total time given to the teaching of art throughout the school year should be given to the teaching of color theory. This subject should be taught early in the school year so that it can be applied to other phases of art work.

GRADE I

I. Objectives:

1. To give children a consciousness of color and a desire to use it.
2. Ability to recognize the primary and binary colors and neutrals.
3. The ability to match primary colors with a variety of materials.
4. To encourage freedom in the use of color.

II. Materials:

Crayons, seissors, paste and brush, bogus and manilla paper, toned poster and construction papers.

III. Subject Matter:

1. Teach the primary colors and the names of them.
2. Teach the binary colors and that they are founded from mixtures of the primes.
3. Teach the matching of these colors, insisting on an exact matching of the primes.

IV. Procedures:

1. Have the children illustrate a color story as Red Riding Hood, using the color named in the story.
Tell color stories as of the color fairies and rainbow.

2. Have a number of drill lessons on the primary colors, then lead up to the binary colors by making an intermixture of the prime colors. A color experiment can be made by holding thin colored papers over each other, or by using one color of crayon over an other as red over yellow, or by the intermixture of flat washes of water color paint as red in one glass, then blue in another. Pour equal amounts of these washes into another glass and observe what color results.
3. Match colors by studying one color per week. Paste a small rectangle of normal red, for example, at the top of a sheet of paper making a color matching chart. Have the children bring in colored materials as bits of string, textiles, feathers, etc., to match. When an exact match is found, paste the material under the colored paper at the top and write the child's name opposite.
4. Keep the activities within the child's interests. A number of activities may be taught as the making of colored balloons, feathers for Indian headdress, or for special seasons of the year or holidays, as Christmas candles, kites, fans, flowers and birds. Some of these may be repeated in border arrangements. A simple craft problem in cut paper or cloth may be made.
5. Have the children arrange pairs of colors together

trying to find the most pleasing arrangement, which is a beginning step in color harmony.

GRADE II.

I. Objectives:

1. An increased interest in the recognition and use of color through production and choice.
2. An ability to recognize dark and light colors.
3. To arrange the six main hues in the same order as given in the color wheel.

II. Materials:

The same as used in Grade I.

III. Subject Matter:

1. Review the work of the preceding year.
2. Teach the tints and shades of colors.
3. Teach the relation of colors by gradating one color over another then arranging them in order of their relation into a color wheel.

IV. Procedures:

1. Continue the work of matching of the colors to develop an appreciation of exact colors. Have the children look for such colors in the school room, in pictures, textiles, display windows, etc.
2. Tints and shades of colors may be taught by showing colored papers ranging from light to normal and on through to dark. Cutouts from colored paper may be made into flower forms, butterflies, lanterns, and other interesting shapes, wherein light and dark

colors may be used. Monochromatic color harmony may be introduced at this time having contrasting values of the same color used with each other.

3. Have each child construct a color wheel of six hues and after this is done illustrate the use of the six hues in a little different way by using all the colors in one, composition, as a basket of fruit, using a neutral for the basket. Discuss then and have the children arrange the colors in a pleasing manner before pasting them.

GRADE III.

I. Objectives:

1. The ability to know the meaning of the primary and secondary colors.
2. The ability to recognize, name and produce the intermediate colors.
3. An ability to associate light, dark, and normal color values with color environment.
4. An ability to recognize the warm and cool colors.
5. An ability to recognize and use the principle of dominance in color.

II. Materials:

Crayons, pencil, ruler, assorted poster and construction papers, bogus paper, manilla paper, paste and brush, scissors, box of stick prints.

III. Subject Matter:

1. Review the work of the preceding years and lead up to

the teaching of the intermediate colors.

2. Teach a further knowledge of values to the children by using two tints and two shades and the normal color.
3. Study the color wheel, one side at a time taking it in groups. Show how colors are thus called warm or cool through warmth or coolness.
4. Teach the principle of dominance and subordination in the use of color that bright intense spots of color should be used in small spaces and that the larger spaces should be of less intensity or less brightness than that used in the smaller spaces.

IV. Procedures:

1. The work should be a continuation of that of the preceding year. The intermediate colors may be introduced by means of a color story to show the position of them and how they are formed. Have the child draw a design six times coloring each one a different hue, then color each of the six designs a light coat of the primes. Two of the designs will be colored the second coat by the same prime as orange and violet will each be colored the second coat red, violet and green will be coated with blue, and green and orange coated with yellow. Color charts for matching colors may be used as in the two grades preceding.
2. Study what effect is given by the use of the warm or

cool colors. Study these colors in their association to objects giving the effect of warmth or coolness. Use the same design coloring it with warm colors, then use another like it and color with cool colors. Study the appropriateness of each set of colors as adapted to the giving of a certain effect desired.

3. A further study of the values of a normal color should be made by using two tints and two shades. An all-over pattern or border may be made by using a design unit in three or more values of the same color. or by adding a neutral to several values of the color. Dominance and subordination may be taught with this lesson as well.
4. The teacher should strive to develop the child's creative ability in all of the art work taught. The child's interest should be kept alive by having the work within the range of his experience. There are many types of projects that may be worked out. Children like to do craft work. Some of their creative color designs may be applied as decoration for blotter pads, booklets, boxes, wall papers and curtains, the two latter to be used in a doll's house, the making of the house to be a class project. The boys can work on the construction of the house proper and the exterior decoration. Stick prints are useful for teaching color as one hue may be printed over the other. Stick prints are excellent for making design

units to be made into borders or all-over patterns. Sticks may be whittled out by children and designs cut out upon the ends of them.

Children of this age become thoroughly absorbed in the making of animal toys as Peter Rabbit, Jimmy Coon, etc. These toys should first be designed, then worked out in pleasing colors and then transferred to thin wood and cut out with a coping saw, and after tacking between two strips so they will stand, decorate them with enamel. These animal toys may be used as paper weights, book ends, door stops, or to play with.

Seasonal projects may be planned wherein the color theory taught may be put into practice. The planning of a flower or vegetable garden is of interest to children of this age. Choose flowers or vegetables according to color so as to represent at least six colors, then carefully plan the combination of colors and the arrangement of the cut outs on the page.

GRADE IV.

I. Objectives:

1. An increased color sensitiveness and ability to use color.
2. Ability to mix the intermediate colors.
3. Ability to make clear even water color washes.
4. An understanding of color contrast by using dark against light and light against dark.

II. Materials:

The same as in Grade III with the addition of water colors, four-pan boxes, water color brush, paint pan and cloth.

III. Subject Matter:

1. Study colors in objects used in every day life, as in paintings, Japanese prints, textiles, objects in nature as flowers, feather, shells, lettering and posters.
2. Mix the binary colors from the use of the primes then mix the intermediate colors by using additional color of the primes. Make flat washes of them and construct a color wheel.
3. Study contrast of color in various objects and see why certain patterns are more readily observed than others. Lead the class to see that it is because of the contrast of light and dark.

IV. Procedures:

1. A new medium, that of water colors is given to the children of grade four to use. The class should be taught in the very beginning a few points which are most necessary to good work in the use of water colors and follow up these points in each lesson until certain habits are fixed. The water pan should be placed ~~in-~~ the upper left hand corner of the desk, color box horizontally placed below the pan, the box opened with the lid nearest the pupil, the paper placed at the the left side of the desk.*

*Directions given are for right-handed pupils. The opposite would be true for those using the left hand.

Teach the class how to make a flat wash as a beginning lesson with water colors. After the wash has been mixed, fill brush full of the wash and begin working at the upper left hand corner of the paper moving horizontally across the page and working toward the bottom.* Most of the other work in water colors is painted direct from the cakes. Before putting away brushes, they should be thoroughly cleaned and brought to a point. Pupils should be taught how to wash brushes throughout the lesson without making the water dirty.

2. While the pupils are learning the above technique, let experiment with the mixing of colors trying to match those in the color wheel. After flat washes of the twelve spectrum colors have been made, trace circles on each of the papers painted with the flat wash, cut out and make into a color chart. This procedure will do much to fix in the mind of the child the colors and their arrangement in the color wheel. They may also experiment with the gradation of colors, also with the making of tints and shades. They may also try to mix washes to try to match colors found in leaves, or other objects in nature, in textiles, or in advertisements.
3. In learning brush technique, some of the problems that may be carried out are brush drawings of flowers

*Directions given are for right-handed pupils. The opposite would be true for those using the left hand.

in silhouette, also grasses, animals, plants, and simple landscapes with trees, etc. Teach both the dry and ~~wet~~ paper water-color technique studying the effect given by each. Make studies of trees both with and without foliage.

4. Study the contrast made by using light color against dark, or dark against light. After the principle has been understood, work out in some problem. This may be executed with colored papers and cut out and pasted on a background if desired, or units painted and then cut out and pasted on the background which is a contrasting value. Work for originality in color and design letting the children make their own choice of colors under skillful guidance of the teacher.

GRADE V

I. Objectives:

1. The ability to recognize and use five values of neutrals starting with white and ranging to black.
2. The ability to recognize and use five values of a color.
3. The ability to recognize and use related color harmony in analagous schemes.
4. The knowledge that analagous colors produce movement.
5. The ability to use full intense and neutralized hues in pleasing area relationships.
6. An appreciation of beautiful colors in environment and nature.

II. Materials:

Same as Grade IV.

III. Subject Matter:

1. Study five values of neutrals by using white, light medium, dark, and black in a value scale.
2. Teach the study of values of colors continued from the preceding grades.
3. Teach analagous color harmony leading from the study of warm and cool colors. A simple succession of analagous colors allows the eye to travel easily from one color to another. This sequence of color produces movement and rhythm.
4. Teach that balance may be secured by using a large area of duller less intense color as opposed to a small area with brighter more intense color.
5. Show ways of changing the value of a color, by adding neutrals or by addition of other color so as to have a portion of all the three prime colors present in the mixture.
6. Continue studying objects in the home, in merchandising, in nature, in art and asking children about what they have seen and studied. Look for analagous schemes. Select a scheme found in nature and apply it to a design.

IV. Procedures:

1. Make a value chart in five values of neutrals white, light, medium, drak, and black. Later in the year or in Grade VI four other values may be taught.

Show pictures and photographs to illustrate the values being studied. Have the class collect materials from newspapers, magazines, and other sources, so as to better understand this subject. Make designs in three values, then next render them in five values. Have the class interchange different values in the same space studying the effect produced by each rendition of values. Teach this same type of work in studying the values of a color. A pencil sketch may be made in three or five values and tinted with color. This will illustrate the values of the color by the addition of black applied first to the surface texture of the paper.

2. In changing the value of a color, the class should experiment so as to see how it is done. A most beautiful effect in changing the value of a color may be obtained by adding a bit of the two prime colors to the basic color to be changed. For example if we wish to change the value of red, add a touch of both yellow and of blue. If a binary color is to be changed, study its composition and add a bit of the prime color not present in it, as orange made up of red and yellow may be changed by adding a bit of the remaining prime color blue.
3. After viewing warm and cool colors the class should be led up to the study of analagous color harmony. Teach color rhythm in connection with this subject.

Make constant use of the color wheel, having the child refer to it at all times when necessary, or until he is thoroughly acquainted with the colors and their arrangements. A certain amount of drill work should be done preceding the application of this piece of knowledge. When the child begins using this color harmony have him also apply the principle of values he has learned.

The class should be so interested and motivated in this new phase of color theory that the children will be ever conscious of color in their environment, seeking out pleasing color schemes. Outside of class they should be collecting examples in textiles, prints, advertisements, and from other sources any materials that will illustrate the subject. Each child should keep such collections in a book used for this purpose.

Designs of various types may be executed in analagous color schemes. Craft problems, as toys or similar projects may be done by the class. A class project dealing with the home might be worked out, both for the interior and the exterior. The girls could take charge of the interior decoration while the boys could do the exterior and landscaping. All the colors should be carefully planned for this project before trying to carry out the work. In studying the interior decide as to what portions should have a lower or higher value than normal color. Decide where bright color should be used and the amount.

GRADE V

I. Objectives:

1. The ability to recognize the spectrum value of colors.
2. A knowledge of the meaning of the intensity of colors.
3. An understanding of complementary color harmony as composed of the whole of color or the three basic pigments.
4. An understanding that the complement of a color neutralizes it.
5. A knowledge that a color or analagous colors may be balanced by smaller areas of a complement.
6. A knowledge that complements used together seem to make them brighter.
7. The ability to choose color harmonies from the color chart.
8. The knowledge that balance may be obtained by using duller colors in large areas and bright colors in small areas.

II. Materials.

Tempera paints, manila paper, toned papers, bogus paper, assorted construction paper, assorted poster papers, water colors, paint pan and brush, scissors, pencil, ruler, paste and brush.

III. Subject Matter:

1. Review the work in color values and lead up to the study of the intensity of colors. Make intensity

- charts. Show how intensity may be changed.
2. Study the value of colors as they are placed in the spectrum according to their amount of dark or light. Make a value scale of neutrals on a page opposite the color wheel showing what the spectrum value of each color is.
 3. Study opposite colors, first complementary harmony, next split-complementary harmony, then perfected harmony. Show how opposite colors balance each other and appear to be of greater intensity when used together.

IV. Procedures:

1. Review the work in color values and from this lead up to the intensity of colors. Make an intensity chart of five steps. Show that the intensity of a color is changed by adding any of the neutrals, by adding more water to a wash if using water colors, or by adding the complement of a color.
2. Show the spectrum value of the hues of the color wheel at their fullest intensity and how they would range from high light to low dark in the value scale of neutrals if a photograph were made of them. The grayed hues with very little color are much more pleasing when used with another color at full intensity. Make application of the study of intensity and values by planning and executing a color scheme for the decoration of rug designs, book covers, blotter pads, etc.

3. After the complements have been studied and drilled upon, have the class experiment with them by mingling complements, that is dripping drops of pure color of the opposites and letting them run together on the paper. Note how the intensity of the complements is heightened, also how the color is neutralized where the two mix and how the value is lowered. Study Japanese prints to find colors neutralized by their complements.
4. Find color harmonies in textiles, prints, reproductions of paintings, magazine advertisements, in objects found in nature, as leaves, birds, butterflies, shells, flowers. Analyze these color schemes and see what type of harmony they are, related or opposite color harmony. Apply some of these harmonies found to a design suitable for a piece of pottery, a rug, a quilt block, linoleum pattern or wall paper. Apply to the decoration of an interior decoration of a room. A still-life composition could be studied and painted to illustrate value, intensity, and color harmony studied as well as balance of color in large and small areas. In such a study have the child show the high lights and shadows in the composition so as to test his knowledge of value and intensity in a realistic subject. Posters are excellent problems to carry into execution the work being taught. Also craft problems suitable to the grade and seasons of the year are good.

GRADE VII

I. Objectives:

1. An understanding of adjacent color harmony and that the use of adjacents adds brilliancy to a color.
2. An understanding of triad color harmony with an ability to balance and use intense and neutralized color in the development of this scheme.
3. An understanding and use of advancing and receding colors as applied to everyday needs.

II. Materials:

Same as for Grade VI

III. Subject Matter:

1. Review the work of the preceding year and from perfected color harmony study adjacent color harmony. Show how a hue may be changed in value and intensity by the use of its adjacents, also that more brilliancy is obtained and greater richness by using the adjacents with a color.
2. After the adjacents have been studied lead up to the color triads and show that complete color balance is obtained by the use of them and that much skill is required in order to use them successfully. Continued study and use of the values and intensities of the colors will need to be done, as a good color composition is dependent upon the balance of light and dark areas in their space relation to each other.
3. Advancing and receding colors is just a different way of realizing the effect produced by each group of

colors on either side of the color wheel. Study subjects in which these colors can well be illustrated. By way of experiment try the opposite set of colors to the subject to see the different effect that will be produced.

IV. Procedures:

1. Review related and opposite color harmonies studied in previous years. Show how adjacent color harmony is a related color harmony having a note of all three of the primes rather than of two of them as in the analagous harmony. Study various objects in nature to see how adjacent colors are used in them and how these adjacent colors add to the richness and brilliancy of a color. Work out designs in adjacent colors. A window transparency might be made or a design for a stained glass window fashioned. This harmony may be applied to many problems that are within the interests and execution of the child.
2. After the adjacent colors have been taught and understood, lead up to the color triads showing how a widening away farther from the original color gives a scheme of more brilliance and contrast, until at last the three colors are equidistant from each other in the color wheel. Each of the four triads produces a different effect. Study the suitability of each of the triads to produce a certain feeling or effect.

3. Study advancing and receding colors as groups and show how and why they produce this effect. Give the class an understanding as to why warm colors seem to advance and cool colors seem to recede. Travel posters of various countries could be made to illustrate this point. Have the class observe some piece of scenery about them at different seasons of the year. Make a rendering of a decorative landscape showing the four seasons of the year and see what effect each group of colors makes in the composing of such landscapes. Another way of producing an effect with an advancing or receding color is to make a design and glaze all over the top with the same color, as red over a landscape. Artificial light has a similar effect of dulling some colors and seem to make others more brilliant.

GRADE VIII

I. Objectives:

1. An ability to recognize colors lying between the twelve spectrum colors.
2. An ability to form color harmonies of contrast by using two or more colors balanced by opposite color.
3. The recognition of a keynote color to which other colors of the harmony are balanced.
4. A knowledge of the relative force or carrying power of color.
5. Joy in the use of fine color harmonies in creative work.

II. Materials:

Same as for Grade VII.

III. Subject Matter:

1. Do further study of color in that other hues lie between the twelve spectrum colors used in the color wheel that has been used and studied in the work in color theory. Make a color wheel of twenty-four colors for this grade.
2. Study color harmonies of contrast using two, three, or more colors and their complements. Or three colors may be balanced by two opposites, four colors by three opposites, etc. If a group of colors is to be balanced by a smaller number of colors, then the mutual complement to two of them should be used, as red, orange, yellow, yellow-green balanced by the mutual complements blue-green and violet red-violet or red, orange, yellow balanced by blue-green and blue-violet. A group of colors balanced by their complements as red, orange, yellow, balanced by green, blue, violet. The use of all twelve of the spectrum colors on the chart at one time should be avoided as they would give a sensation of white to the eye.
3. The use of a keynote color and other colors selected should be chosen in subordination to that color so as to balance the scheme. The keynote color chosen may be the dominating color of the composition or may be so used as to be the center of interest.

4. Study colors in their juxtaposition to each other and what combinations have the greatest carrying power.
5. Continue studying color found in the child's environment, analyze color harmonies, and form an appreciation for beautiful color combination found.

IV. Procedures:

1. The teacher should have toned papers to show that there are colors lying between the twelve used in the color chart in the work of color theory up to this grade. A color chart that shows twenty-four colors should be made or purchased. After the work has been studied, each of these twelve new colors should be analyzed so as to show what proportions of each pigment should be used in making them. The class should then mix washes and try to match the twenty-four colors of the chart being studied. The pupils should then construct a color chart themselves from the colors they have mixed.
2. Additional study of color harmonies may be made from this new color chart. Arrangements of contrasting colors are especially interesting. A group of two or more colors may be selected and balanced by their opposites or by their mutual complements, as yellow-orange and orange balanced by blue-violet and blue, or by the mutual complement of the two colors, that is, the color lying between the complements of the

two colors or blue blue-violet. Groups of colors may be balanced, as two colors by one color or the mutual complement, three colors by one, four with one, etc., or three with two, five with three, five with four, etc. Any number of combinations may be worked out once the principle is understood by the class. Any combination of opposite colors may be used except where all the spectrum colors are used, except where all the spectrum colors are used, which would give the effect of white light. This particular work gives an unlimited amount of freedom to the child's creative ability. This work in color may be applied to designs which may be used later for craft problems, interiors, posters, decorative landscapes, designs for stained glass windows, and in many other ways. An interesting problem would be the making of a mosaic by using colored beads onto a background with a filling of gesso.

3. Study a color used as a keynote of a design, that is, a color which is either used as the center of interest of the design, or a color that is used as the general color scheme throughout the design, as the design may be one wherein red is the keynote color and will be found to occupy the larger spaces of the design, the coloring of the spaces varying in different values of red. In such use of a keynote color it would be considered as a dominant color scheme. If the key-

- note color were first selected and others used to balance it, the colors so chosen would be in subordination to the first color and would stand out as the center of interest. Have the class work out designs illustrating each of these uses of a keynote color. An interesting use of keynote color may be made in planning an interior decoration, a garden, a costume.
4. Place colored papers in different combinations and see what effect they have upon each other as red with green, with blue, yellow, white, black, etc. Study the carrying power of colors as to which combination can be seen the farthest away. Apply this knowledge to advertising, especially posters. Study advertisements to note whether dealers make use of this important fact that some combinations of colors have more carrying power than others. Carry out this work by making posters, arrangements for show windows, or decorations for a puppet stage.
 5. An appreciation and use of fine color harmonies should be perhaps the highest aim to be accomplished in all the work in color in the grades. The experiments and experiences of the children throughout the grades should be so planned that this aim will be accomplished. The class should be alert to color found in environment outside of the school and should become discriminating as to what is or is not a good color harmony. If color theory as a unit of art is taught throughout the grades, an appreciation of color will be formed

and, a foundation laid so that the child will be able throughout his life to enjoy and to make application of the color theory learned in the school.

APPENDIX

Annotated Bibliography

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