A. H. MUNSELL DIARY

VOLUME B

1908 through February 1918

These 2 volumes have been interleaved 4/3/37

Dated 1908. Interspersed 1910. Given

A. M. Gove. Controller

A. H. Munsell
BOOK IV.

Page 1 contains a statement of the patent covering the five middle colors; also an advertisement of the Munsell Color System by Wadsworth-Howland & Co., Inc.

Sept 10-21, '08
Dr. Lawrence Henderson - on Marquette.
Is it practically conceivable that a change of hue may take place without a corresponding change of chroma. (see p.73)

R & Y (middle) are certainly new.
Why not show sphere to a scientific body?
How came you to do this?
"did you obtain middle value?
What does analysis of successful color combinations indicate as to balance?
1a. Specif 5R2 and 5 BC2 do not appear to balance at 1/5 centre of mercator or color score.

Score should show at what part of a picture the color noted occurs.

Given a pattern in 3 areas; (successful design) vary the same interval throughout the chart, and note change of centre of balance.

(1b is the original copy of la. After the question 1b, about analysis of successful color combinations there appear the following diagrams:)

May 8
1908
Took Leslie Thompson to lunch and to studio

Sent lecture notes to Royal B. Farnum -Cleveland School of Art - as loan for his course in Summer School of the South.

Rec. six copies "Color Notation" to be credited at $6 & $1 - $30 "$16."

23
Portait of Judge Charles F. Perkins - completed after five sittings - to be credited for $300. against legal services in connection with patents,... etc. Dr. to Nov. 15 $271.41

Rel. in my favor $20.00...
May 28  Portrait delivered- (----)
June 6  Sailed on "Venezia" for Naples -
meeting Dr. Lawrence Henderson] Harvard Medical
   Dr. Wm. Ford Smith
   Ed. W. Sawyer - sculptor
   Prof. Bright - Johns Hopkins.
Sept 10  Sailed on "Marquette" from Antwerp for Boston.
   Met Dr. Henderson again
   Prof. & Mrs. Franklin - Johns Hopkins
   Prof. Lecompte
   Prof. E.G. Harrison - Yale

Gave advance copy of "Color Notation" (2nd edition) to Eliza Vedder (Cpt.)
Loaned my copy to Mrs. Franklin.

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Equal departures on either side of C - 2.
make white (extin-) but points taken up on the straight line of the figure
unite to make their intermediate (blue).
The Yellow (blend) not like others, for it does not suggest its compone
ents - therefore Mrs. F. calls it a color fusion, and places it with R & G & B as a unitary color.

Dr. W. asks if the 3 point test - B.B.C.
does not fix the departures of B & G from BG. Mrs. F. thinks b', g' would also work. i.e. She questions the "degree of freedom".

(Can the opposite pairs be crossed together, and still pass the test?)

Degree of freedom
\[ x^2 + ax = b \]
\[ x^2 + ay = b \]
will b', g' serve for correct distribution as well as BG?

Mrs. F. wants me to arrange my 3 sets of discs to find middle green (leaning toward neither Y or -

\[ Y \quad C \quad BG \]

Also wishes to disperse a spectrum not according to wave-length but according to relative discrimination in each color.
Sept 23 11-1 At Studio - Mrs. Franklin & Dr. Henderson.

1. Color Sphere - total balance
2. Middle Colors - " " tested by pairs
3. Photometer
4. Charts - horizontal and vertical -
   large chart of 60V - masks to find balanced color
5. Color Tree.

Kael's curve for the spectrum, inside
the ideal triangle - (instrument now
in charge of Hagem of Berlin.)

Mrs. F. calls Y, V, and B - unitary colors
  Y + G Yellow - color fusion
  V + B White - " saturation
  B + G Blue-green - " blend
  Y + B Purple - " "

Color-fusion gives a new unitary color,
in which we can discern neither red nor
green, while YB - B - each suggest
their components. (She wishes to omit
purple, also calls it porphyry.)

Fig. of Hagem furnishes 1 standard
Colors, by perimetric test.

P & B are opposite (complements) - 1.e. R
fixes G - but G is a union of B & Y - 1.e.
R fixes Y & G - hence R fixes the equal
departure of G & Y.
Thus we have a system R & G as equal
dependencies from B.
B & Y are opposite (complements) of Y + B -
but BR is a union of P & R; i.e. it fixes P
and YB - YB - " " " "YB - " "
This stopping process will complete the circle
of color.

Dr. Henderson says, "Use place your five colors
by wave-length, and see what their intervals
are."
\[ a - b = \frac{g}{h} \]
\[ b - g = h \]

Diagram:
- Two intersecting lines forming a triangle.
- Circle with points labeled R, Y, B, G, and BG.
- Table:
<table>
<thead>
<tr>
<th>R</th>
<th>Y</th>
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</thead>
<tbody>
<tr>
<td>G</td>
<td>B</td>
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</tbody>
</table>
can "measures" (such piece) be wound between
and still prove total balance.

(3)

Diametric work by transduction
but by related "measures..."
degree of freedom

\[ x^2 + ay = b \]
\[ x^2 + ay = b \]

Do two equivalent points prove correct distribution?

Will my research help?
Sept 24 9-10:30 At studio.
Mrs. Franklin wishes first to present this idea, which is ignored by the physicist:
"You cannot say that yellow is made of red and green, but only that yellow light can be made out of red and green light, though it may equally well be homogeneous.
(The dichromate sees yellow, tho' he sees no red nor green.)
Triadic colored-light mixture, but
Four fold phychic (or subjective) color-field.

No psychologist admits other than four real sensations. (Esquimos have 4 real colors - Rivers' expedition.)

When she speaks of Tichaner, Calkins, Baird & Mueller, - asking me to read their psychological works on color I question whether I could profitably attack a new and unfamiliar line of study, at my stage of physical research in color. Then she asks where the two pairs of her theory R-¢ and E-Y would fall on my equator of color. I say that she must furnish the particular colors she employs. My impression, however, is that the first pair are not complements (unless the green is bluish or the red purplish) and that they leave out a wide interval of cool color. (unbalanced circle.)

(i)mpressiveness)
As to terms - she thinks Chroma ( & ) two (saturation ) things.
I ask if that is not due to width of slit (spectroscopic) which makes overlapping spectra and diminishes saturation? - and quote confusion in all treatises on color: such as "brighter, intensity, tone, etc.
She wishes to distinguish between "color paper" and "color".

(In speaking of this theory with Mr. Gilman (tel.) he said he thought it might still be rebatable, rather than proved, - as her anxiety indicated.
I told him her criticisms of Helmholtz, Koenig's and Abney.

Triangular coordinates - rather than

in Koenig's diagram.
(Over telephone with Prof. Cross. - He thought the psychologists differed so much among themselves, that we should wait until they came to an agreement on color. The fact that 3 colors sufficed in photography seemed a good reason for adhering to the Helmholtz-Koenig theory.

(Page 5a consists of Mrs. Franklin's notes which are included in the previous page.)

Sept 28 At W & H Factory - Malden - with J. Otto Anderson and Mr. Carlsen.
Tested changes in old standards
- Find Red darkens and cools
- Blue lightens
- Purple " " to grow stronger.
Prepare 3 copper spheres (5") and old 6"
plaster globe. (To replace sphere of Sept 22)
10 hues - 9 values

Oct 14

Test circle by opposite pairs.
- 3 equidistant points
Test by photometer & discs.
- white template on gray
- white additions
- black template on gray
- black additions

(Pages 7a, 7b, and 7c consist of charts of the sphere.)
Oct 20  Prof. Cross tells me of Dr. Louis Bell's paper on the physiological Basis of Illumination. (Amer. Acad. of Arts & S. 43-4)

(5-6 Mr. Pritchard at studio.)

"color vagaries of the eye"
"co-efficients of reflection range from .80 to about .01
Fechner's fraction is from .02 to .0055

(visual acuity & shade perception)

iris aperture (without this assistance it would be extremely difficult to get about at night - even in moonlight.)

"the eye works most efficiently at moderate illumination. The retina has a certain amount of visual inertia, which furnishes protection against rapid changes - whether, as Mrs. Franklin surmised, there are definite intermediate phases of sensitiveness between the achromatic vision of the rods and the full chromatic vision of the cones is an important topic for research."

Mind N.S. 2. 473 et seq.
"In closing I may mention an interesting question which arises with reference to obtaining a light of high efficiency by building it up from the monochromatic primary components. Would the eye see clearly by such a light and could it discriminate colors properly? The answer is probably yes. The equation for white is roughly

\[ W = 20R + .30G + .50B \]

These are quantities as determined by slit width in the spectrum, or a like process.

Oct 22 11-12:30 Sky very clear and blue (reflections from opposite buildings and ceiling of room)
With Mr. F. A. Olmstead - at Arthur D. Little -

Red\(^1\) \[
\begin{align*}
R & : 40 \quad 47^2 \\
G & : 21 \quad 23 \\
B & : 19 \quad 20 \\
\end{align*}
\]

Red\(^2\) \[
\begin{align*}
21 \quad 32 \\
20 \quad 20 \\
\end{align*}
\]

Green \(I\) \[
\begin{align*}
15 \\
28 \\
14 \\
\end{align*}
\]

Green\(^2\) \[
\begin{align*}
16^2 (E^2) \\
32 \quad 31 \\
18 \quad 32 \\
\end{align*}
\]

Clear blue sky required adjustment of sliding scale to R\(^3\)

Oct 29 Scales from Malden Factory

\begin{array}{cccccc}
\text{Red} & \text{Y} & \text{G} & \text{B} & \text{P} & \\
90 & 87^\uparrow & 82\downarrow & 83\downarrow & 86^\uparrow & \\
80 & 72^\uparrow & 62\downarrow & 72\downarrow & 72\downarrow & \\
70 & 62\downarrow & & & 52\downarrow & \\
60 & & & & & \\
\vdots & & & & & \\
40 & & & & & \\
30 & & & & & \\
20 & & & & & \\
\end{array}

\text{changes of value indicated by arrow.}
Nov 6  Studio 5-6 Miss Locke and Miss F-- come to talk over color in the elementary grades.

13  Studio 4:30-6 Same teachers with Miss Patrick - 1st evening talk 8-9 at M.N.A.S. - to Boston teachers.

14  Lecture at Huntington Hall, M.I.T. 10:30 a.m. 500-660 present. "A Measured Training of the Color Sense."

17  3-4  With Mr. Howland and Mr. Putnam. Presented question of making a Measured Value Scale 1 " " Color Atlas 2 Suggested north-lighted room at Malden factory, to properly test colors. Both favorably impressed, and Mr. H. will talk over with Otto.

Agreed to give evening lecture on color at the N.A.S. 50.

Nov 13  The Color Sense 20 " Measures
Dec 4  " Balance  Fridays 8-9
11  " Records
18  " Design

Illustrated by 9 grades of children's work (Somerville) Specimen lessons by students M.N.A.S.

Paintings
Japanese prints
Color Sphere
" Tree
" Photometer
" Beads, Crayons & Water colors
" Enamels
" Charts & Masks

Color Vision - pp181-183
Brightness is a misleading word to many uneducated people. Better to say darker rather than brighter. Red-blind matches a brilliant red with a feeble white. Violet " " yellow " " says "They are of the same darkness" - or "One is a little darker than the other. Abney says that when matched "equality of tone is established."

(Of red and green equalized by the slit of the spectrum - he says, "both alike and of the same darkness" - Equalization here is equality of V & C. (tone)
Training of the Color-Sense.

(Trans. Nov. 14, '68.)

Next Saturday, Nov. 14, at 10:30 A.M., in Huntington Hall, M.I.T., there will be an illustrated talk on the "Training of the Color-sense by Measured Intervals." This address is to be given by Mr. A. H. Munseal of the K.N.A.S., in response to frequent requests from those who have not had an opportunity to learn of the new methods, and who are attracted by the excellent results shown where the system is in use.

Among leading directors and supervisors of art education who have adopted it are Mr. Arthur Box of the Teachers' College, and Mr. James Hall of the Ethical Culture School in New York; Miss Haven of the Kindergarten Institute in Chicago; Mr. J. Frederick Hopkins of the Maryland Institute in Baltimore; Mr. Leslie W. Miller of the Museum and School of Industrial Art at Philadelphia; Mr. R. B. Farnum of the Cleveland Art School, and Miss N. L. Patrick, supervisor of
drawing in the schools of Somerville. It aims to replace color guesses by definite color measures, and some results will be shown.

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Errors in Color Teaching.

A. H. Munsell explains his measured training of the color sense.

"Measured Training of the Color Sense" was the subject of a lecture by A. H. Munsell of the N. A. S., in which he explained his system of teaching color sense.

The address was given in Huntington Hall this morning, and the many teachers and artists present received it with enthusiasm. While this method has been in practical use for three years with good results, it has not yet been very generally adopted.

According to the speaker, his system, instead of one of personal bias, is based on the latest knowledge of the action of the eye. It begins with measured degrees of tempered color, just as the training of the other senses begins with tempered degrees. Harmonious middle colors, rather than extremes are used at first.

He criticized the present method of teaching that red, yellow and blue are primary colors and the basis of color harmony, claiming that the true basis is red, green and yellow. This is due to the action of the retina. The correct complementary colors, he said are "red and blue-green, green and purple, violet-blue and yellow." The old color circle of red, yellow and blue gave orange an undue field. Color has three dimensions, hue, value and chroma.

Mr. Munsell illustrated his talk with drawings on the blackboard and charts. At the close of his address, many of those present availed themselves of the opportunity to ask questions and secure more detailed information.

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Dec 4

"Color Notation" - Statement on cost and returns of first edition.

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<td>G.W. Ellis - 100th copies</td>
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<td></td>
<td>Advertising &amp; postage</td>
<td>27.</td>
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Total: $59.55
Dec 1903 Total rec. by cheque & cash
755 sold by G.H.E.
195 & given away by A.H.M.
17 on hand
17 damaged
15 distributed

Dec 1903 Total rec. by cheque & cash
755 sold by G.H.E.
195 & given away by A.H.M.
17 on hand
17 damaged
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Jan 2 Studio 9-9:30 Mr. Putnam - Charts & color scale - how large
what form) advise with Parsons, "cost) Daniels, Hall.
"Says we want to make at once." - patents will run out later. Mr. H. is ready: - paints at cut prices do not pay - but this protected system can be made to pay well.
I make appointment for 1:30 at store.

Mr. Howland's office 1:30-2:30
Talk over an understudy for Otto (Carlson or "Dann") - Talk over permanency of enamels - (in safe deposit)
I show how PB has darkened one step.
Discuss size of charts, no. of steps, and manufacture - Mr. P. wants some teachers of children to consult with me on these charts. (Parsons, Hall or Daniels)

Accepts idea of these two charts first.
1. Neutral scale - with chromas of color maxima
   Five middle colors, with lighter & darker of each.
2. Chart 50 - in skeleton -

Jan 27 Studio - James Hall, Mr. Pritchard, Miss Peterson, 17.
Mr. Anderson - Show sketch charts - full size -
Advisability of white mounts with gray margin to avoid thumb marks.
Mr. Anderson brings samples for test, - and to see how order of colors on sphere should run-Also to ask about width of colors on 15 color sphere (5")
I advise all of some importance.

With Mr. Drisco at M.I.T.
Triied spectro-photometric measures of the five middle colors - by daylight and by tungsten lamp.

To read each

& maxima

as check on my tests of Nov 17
Numerical Color System

Color properties in measured relation to the neutral scale of Value.

Folded.

[Diagram showing a circular scale with notations and a grid of boxes labeled with colors and values.]

Five hidden colors. Balanced with lights & darker values of each.

[Grid of boxes representing different values and colors.]

End of line.
All of 7V are too light (except B & P) -
P & R of 5V is too dark - and G
too blue - R too light
B of 3V is too dark, G too blue &
R too light -

Green 3 & 5 the only error in Hue - (too cold)
the other changes being caused by tendency to
exaggerate the value of 7V in R Y & G - and
darken the blue 3 - also th lighten R2 and to
darken the purple 2 - also to lighten R5.

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Dear Mr. Howland: -

This has been a poor light for color tests,
because of the raw blue sky, but I send you the results of
measuring the samples submitted by Mr. Anderson.

As the diagram shows, the only
change of hue needed is in the green,
which is slightly blue: but several
changes in VALUE are needed to make
the three color-levels right.
In the upper level (V1) red, yellow
and blue are each of them too light.
At the middle level (V2) the red is too light
and the purple too dark.
At the lower level (V3) the red is too
light and the blue too dark.

Perhaps it would be wise
corrections.

Yours truly,

Feb. 1, 1909.

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Jan 30 1st lecture W.N.A.S. - Color Measures) Class A -Public
Feb 6 2nd " " Balance ) School Class -
Feb 13 3rd " " Records ) Mr.Burnham, Phelps
Miss Wells -

See next page

(To create a definite mental image of all color
(relations - To train the memory of color arrange-
ments - (visualization and writing necessary for
(constructive imagination.)

Scale of Value (photometer) united by Meaning of
" Chroma (maxwell discs) color tree & Middle
" Hue (spectroscope) color sphere Colors
Feb 13  Daily importance of a trained color sense.
  Discrimination
  Imaginative use (gratify desire for color
  pleasure as soon as possible.)
The Color Sense - Its mechanism - Color blindness
  rarity
  menace to life
Aim of color study - to perceive, define, relate, imitate and
  memorize - later to enjoy and use (balance )
  (accent )
  (translate) -
picturesquely, decoratively
  (invent )
Centre of sphere (light & dark) (Desire to
a centre of balance (weak & strong) area as a (regain
(warm & cool) compensater (Visual Emas

Each point (Hue Scale) Chroma written (self-described (Value "") as a sub-script (5YR 4
Groups & silhouettes - Search for laws of harmony.

Feb 25

Colonial Club - Cambridge 6:30-10

Dr. Henderson invites me to meet Prof. Richards -
I show color sphere - V & H charts & notation chart - Prof. Richards says "it is convincing". Now
I can clearly relate and describe what before was
confined in my thought about color.
"I shall study to find pigment bases and media
that will make these "middle colors chemically
permanent.""

Dr. Henderson remarks how any real quantitative
work finds valuable application in many fields of
study. Thinks this research will be especially
valuable to the new dept. of commercial chemistry.
Prof. R. in discussing color-blinds - tells me
of the report by Lord Rayleigh - in Trans. of the
Royal Soc. for 1893.

Green blind

Red "

Red & green blind

which seems adequate proof of the 3 retinal sensa-
tions - (I tell him how both Mr. Ross and Mrs.
Franklin wish to omit purple - which leaves no
balance for YG) also Rood's "Your five fold idea
seems to me a good one", - and give him a box of
the crayons (5) with the pamphlet "Children's studies"
which he will give his daughter, to whom he is show-
ing color schemes.)

Mar 4

Prof. F.M. Richards at studio - 5.0 - 6 P.M.

Has tested his children on middle value comparisons,
and says Miss Norton is interested in these balanced
colors. Sees photometer (too dark for tests) but
reads his grey (5) - I give him Tech, reprint &
he asks when I made sphere.
Tell him of twirling double pyramid -(1878)
Empiric scale of values 1893
Maxwell discs (velvet & white) 1898
sensations)
Spherical diagram for night pictures Nov 12, '38. Sphere used to plot colors Sept
"War Cloud"
(Ross' exhibition at Botolph
Photometer works in Jan. 1901
Referes to his nephritoscope for matching cloudy media.

Show him photos of portraits. & some canvasses.

************

Mar 6 Mr. Arthur S. Gibbs brings Prof. Clifford's
photometer which I fit with new eye piece,
Intends to compare with a Weber P. in testing
the illumination of several theaters & halls.

<table>
<thead>
<tr>
<th>P</th>
<th>G</th>
<th>R</th>
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<td>30°</td>
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Light \( \left\{ \frac{P}{G} \right\} \) to dark.

Middle \( \left\{ \frac{P}{R} \right\} \) to dark.

Mar 11 Otto Anderson takes photometer (no. 11) away
after readings of the maxima.

4-6 p.m. - clear. Photometric readings of
the color maxima.

<table>
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<tr>
<th>Anderson</th>
<th>Self</th>
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<td>Neutrals</td>
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(Here there is pasted into the book a clipping on which is written "Mr. Schenck-Coraopolio Record - Feb. 11, 1909 - Pittsburg." It tells of a lecture on the Munsell color system given at the meeting of the Bible Class of the First Methodist Episcopal church Sunday school at the home of Miss Hahn on Fifth Ave.)
Young 1802 - Color by

simple

Pigment

pigment imitation of spectrum
by glass in rotating dice
also by

Young (s)

color by mixture (artificial)
not sensations

Nehring - Red, Yellow, and one green [complementary]

white (gold)

[red, green visual elements] complementary

yellow blue

Daltón - Blood looks like both green

reddish - seeing way

monochromatic vision, very rare [imitates photographic plate]

We can place two patches of white light in the screen, and gradually reduce one in intensity, keeping the other of its original value.