

DISCUSSION AND CORRESPONDENCE.

COLOR ASSOCIATIONS WITH NUMERALS, ETC.

TO THE EDITOR OF SCIENCE: In SCIENCE, Vol. VI. (1885), p. 242, I printed a note of experiments on color-associations with letters of the alphabet, days of the week, etc., in the case of my daughter Mildred. The subject was again treated, at more length, in *Nature* for July 9, 1891, p. 223. On p. 224 a table was given showing the color-associations for my daughter in 1882, 1883, 1885, 1887, 1889, 1891. Since that time I have tested her color-associations on two occasions. In February, 1895, her replies agreed exactly with the last column of the table cited except that the color for 8 was marked as 'white.' An experiment in August, 1899, agrees precisely with the results of 1895. I think the present note has a value because the experiments it describes now cover a period of seventeen years and give a history, not an isolated record.

EDWARD S. HOLDEN.

THE WAGNER FREE INSTITUTE OF SCIENCE
AND PROFESSOR DALL.

ON Monday, October 30th, the Wagner Free Institute of Science in Philadelphia presented to Professor William Healey Dall, of the Smithsonian Institution, a gold medal as a slight token of their appreciation of his work in connection with the Transactions of the Institute. The medal has the head of the founder of the Institute on the obverse side, with the name of the Institution. On the reverse is engraved "Awarded to William Healey Dall for his investigations and writings in Paleontology—1899."

Accompanying the medal was a very handsomely engrossed book of resolutions stating that "Whereas, Professor William Healey Dall has contributed greatly to the advancement of Science by his investigations in the department of tertiary geology and has rendered most valuable service to the Wagner Free Institute of Science by enabling it, through his numerous and exhaustive contributions to its Transactions, to publish the results of his investigations to the world. Now, therefore, be it Resolved by the Board of Trustees and the Faculty of the

Wagner Free Institute of Science that a medal be prepared and presented to Professor Dall in recognition of his distinguished services in the cause of Science and in testimony of the high appreciation of his work by the Trustees of this Institute."

The work on the Tertiary Fauna of Florida, begun in 1886 under the auspices of the Wagner Free Institute of Science, constitutes one of the most important advances in American Paleontology. The discovery of the Pliocene beds of the Caloosahatchie river by Professor Heilprin and Mr. Joseph Willcox in 1886 and the subsequent investigations by Dr. Wm. H. Dall have completely revolutionized the geological theory as to the formation of the Peninsula of Florida and the adjacent States.

The Transactions of the Institute have not only met with the highest commendation from American Paleontologists and Conchologists but from the European scientists as well. On several occasions prominent men from various parts of Europe have visited the Institute to see, as they said: "The Institution that has published such valuable and finely executed Transactions."

Some idea of the amount of labor involved in Dr. Dall's work may be gained from the following summary:

The total number of pages in the four parts of Vol. III. is 947, with 85 plates that contain 639 figures, and one map.

Part I. On the Gastropods. Contains references to over 300 species including the descriptions of 122 new species and varieties, that are represented on twelve plates by 192 figures.

Part II. Is a continuation of the Gastropods, as introductory chapter on the Marine Pliocene Bed of the Carolinas, and is followed by references to upwards of 400 species including the descriptions of 156 new species and varieties that are illustrated by 203 figures.

Part III. Forms an introductory chapter to Part IV. containing a new classification of the Pelecypoda, with an enumeration of the differential characters of the orders, suborders, superfamilies and families, a statement of their range in geological time, and an enumeration under each family of the chief generic groups believed to be referable to it.

Lay, Wilfrid

Psychological Review: (1896) 3: 92-95

resentation of Broad and Arch streets, in Philadelphia, where I had seen a store at which the *Microbe Killer* was sold, the store being on that side of the street where it would have been in New York on Thirty-fourth street, if I had been correct in my first impression. Now the interest of the case lies, not merely in its being an ordinary case of redintegration (was there any association between the words Broad street and Broadway?), but in the fact that the space relations in the false and the true recollections were the same and that my illusion about the store was not discoverable until I formed a visual representation in memory of what I had seen in Philadelphia and could compare it with the knowledge or consciousness of any actual place in New York.

But I will not urge the case as proving anything. I narrate it here with the dreams only to encourage observations of others in the same direction. I do not know that such a phenomenon as is narrated in my second dream and the waking state following it is at all common. I should like to know whether others have had a like experience. It is of special interest as suggesting how little tactual sensations have to do with space perception and localization in it except as tactual experience is conceived in terms of visual space. Not that I mean to imply that we cannot obtain any notion of space whatever by tactual and muscular sensations, but that in this case at least they seemed to have no power whatever to determine it. I certainly find in my own case no reason to accept the Berkeleian doctrine of space and our localization in it, and this wholly apart from the dream experience just narrated. In this case, however, the localization was definitely related to the visual representation of my place of living. The only question that remains is to know whether such a phenomenon occurs often enough in the experience of others to give it anything more than individual significance and interest.

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THREE CASES OF SYNÆSTHESIA.

The subjects of this report are three sisters, D, C and K, aged respectively 9, 10 and 12. Their father and mother are good visualizers, the father having definite number forms. There are also two younger brothers one of whom, aged about 5, visualises his alphabet so vividly as to be able to read it off backwards with unexpected rapidity. His alphabet form is traced to the perpendicular series from which he

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learned his letters. No such early association can be discovered in the case of the three sisters, though they too have elaborate forms for numbers, months, days of the week and the alphabet. They are all musical.

D sees the letters black on a background of indefinite color, but as if they were *behind* the patches of the color to which the letters correspond. The color is seen only when she thinks the words separately, not when she reads them or hears them spoken connectedly in a sentence. The position of the word and color is close to the eyes and not to the head.

C sees the words from a foot to a yard away. Sounds and smells are yellow to her except thunder, which is black; but the color is very dim and she herself is somewhat uncertain about it.

To K the colors are 'far away,' but seem to come nearer when they are closely attended to. Her brightest words are the yellow ones.

All three have had these pseudo-sensations as long as they can remember, but their peculiarity was not noticed until about a year ago. They have not influenced one another in the coloring of letters or words, as they have been observed always to disagree about the same letters in the same way.

Subjoined is a table giving in the children's own language the colors, if any, of all the letters of the alphabet, days, months, certain proper names, certain common nouns selected for their phonetic orthographical peculiarities and certain numbers. Roman numerals are colored after the letters (I, V, L, C, etc.) composing them.

	D	C	K
A	white	reddish brown	white
B	blackish blue	white	bluish white
C	white	white	blue and white
D	white	green	white
E	blue	greenish yellow	brown
F	brownish	black	reddish
G	green	brown	grey
H	brown or green	brown or black	red
I	black	black	yellow
J	red	brown	dull red
K	crimson	black	white
L	yellow	white	yellow
M	blackish red	red	bluish black
N	red	brown	light brown
O	white	white	white
P	black	white	black
Q	yellow	white	yellowish
R	pink	blue or as initial red	red
S	white	yellow	very light yellow
T	black	black	black
U	yellow	greenish white	yellow

V	blue	white	grey
W	brownish	green	blue black
X	no color	yellow	brown
Y	yellowish black	black	yellow
Z	black	yellow or white	brown
&	yellow	black	no color
1	black	black	white
2	white	brown	blue
3	red	white	brown
4	blackish or no color	black	red
5	yellow	green	bluish white
6	black	red and white	red
7	black	black	light yellow
8	brown	green and white	bright yellow
9	black	brown	crimson
10	white	1 black, 0 white	black
11	yellow	black	dark
12	white	black and brown	darker than 11
13	red	black and white	brown
14	no color	and so on to 20	red
15	yellow		white
16	white		red, duller than 14
17	black		yellow
18	yellow		yellow
19	black		crimson
20	white	brown and white	{ "dull white, like steel"
30	red	white	brown
40	no color	black and white	red
50	yellow	and so on to 90	like 20
60	black		duller red than 40
70	red		yellow
80	white		yellow
90	no color		dark red 99 red
100*	white	white	white
200	white	brown and white	white like 20
300	red	white	3 brown 00 no color
400	no color	black and white	red + no color
500	yellow	green and white	white
1000	blackish white	greenish or white	no color
2000	white	brown and white	no color
347	red	3 white 47 black	{ 3 brown 4 red 7 yellow
896	red	{ 8 green 9 brown 6 white	8 yellow 9 crimson 6 red
Dorothy*	white	white	white
Quincy	yellow	white	yellow
Grinnell	green + red	brownish green	greenish brown
Charlotte	white + bluish	red	bluish black
Katharine	red	black	white
Laurence	yellow	white	reddish brown
Robert*	red	red	red
Morgan	blackish white	red	blue and black
Maria	yellow	red	{ M light I red rest indistinct
Isabel	{ Is brown; a white; bel	yellowish	I yellow, rest yellow- ish brown
John	yellow	brown	black
Sally*	reddish	yellowish white	white
Stephen	white	yellow	brown
Spencer	brownish	{ Spen yellow; cer white	brown
	no color		

Hilda	yellowish	brown	red
Madeleine	whitish yellow	dark red	not distinct
Louise	yellow	black and white	red like Hilda
Mary	white	red, sometimes white	like Maria
Edith	yellow	white	white
hurt	brown	brownish red	dull brown
pert	black	green [red]	purplish black R re
smell	always yellow	yellow	brown
spell	all colors	yellow	brown
stop	st black of white	yellow	lighter brown
break	brown	black and white	no color
try	black	black	blue
house*	brown	brown	dull red
Cæsar	white	white	C and A white
fairy	white	{ white with black spots	yellow, R red
how	white	brown	red
few	black	red	yellow brownish re
straight	black sometimes white	yellow	doesn't know; yellow
trait	black	black	no color
rate	red	RA red TE black	R red
ate	yellowish black	doesn't know	no color
at	{ written, A white, T black	black or no color	no color
hat	black and white	brown	H red, rest no color
that	black and white	black	{ T's have black back ground
handy	{ black and green and white	brown	red (dull)
hand	black and white	brown	red (dull)
and	white	green	no color
an	white and green	brown	no color
a	white	red sometimes brown	no color
eight	blackish yellow	greenish white	yellow
ate	blue and white	doesn't know	no color
bow (=bough)	white	white	no color
bow (=bō)	white	white	no color
Monday	red	pink	blackish blue
Tuesday	black	{ red with yellow stripes	yellowish black
Wednesday	dark orange	green	blackish blue
Thursday	black and white	black and brown	dark brownish black
Friday	light red	black	greenish
Saturday	white	green and white	brown
Sunday	light yellow	color of the sun	very light yellow
Jan.	red	green and black	reddish brown
Feb.	black	darker	brown
Mar.	green	red and white	red
April	yellowish white	red and white	red
May	white	pink	white
June	dark red	yellow	red
July	darker red	yellow	red
Aug.	hay color	yellow and black	yellow
Sept.	black and white	yellow and black	brownish yellow
Oct.	black and white	white and black	grey
Nov.	red	red and white	no color
Dec.	white	white and red	white