

	Eric Jordan, 1912	Eric Jordan, 1917	David Starr Jordan	Marjorie Edwards	Edith Snow
A	red	red bright	brown red	colorless	golden
B	bluish	gray	green	brown	dark blue
C	white	white	yellowish white	pink	pale yellow
D	bluish	gray	blue	purple	dark green
E	pale green	yellow	red	colorless	blue silver
F	red brown	brown	pale scarlet	scarlet	silver
G	pale brown	yellow	pale yellow	dark blue	pale brown
H	green	yellow	brown red	heliotrope	pale green
I	black	black	lead black	red	silver
J	dark blue	greenish	lead black	dull green	red
K	brown	brown	lead violet	pink	plum color
L	pale green	green	green	yellow	dark green
M	red	brown	lead blue	dull rose	dark brown
N	pale greenish	light brown	brown red	pale green	brick red
O	light blue	black	white	orange	white
P	yellow	yellow	lead color	lavender	lemon yellow
Q	pale red	red brown	bluish white	yellow	drab
R	dark green	dark red	bright green	red	black
S	silvery gold	silver	bright yellow	green	pale red
T	white	silver	green	yellow	pale bluish green
U	yellow	yellow brown	yellowish	colorless	drab
V	silver	white	violet blue	black	blue green
W	red brown	brown	lead blue	white	blue black
X	silver	silver	scarlet	blue	red
Y	silver	white	blue	colorless	dark yellow
Z	reddish	dark brown	scarlet	green	dark red

color with the letters of the alphabet. This faculty has been called "Pseudo-chromæsthesia," which, I take it, means sensitiveness to false colors. It has been misunderstood by writers, who have imagined that the peculiar individuals having this trait actually see the color on the letter, which is not the fact. It is a mental association, not a false vision. Some have attributed it to a recollection of color blocks from which letters have been learned. To the "pseudochromæsthetic" this explanation is nonsense. It is, however, a fact that the tendency of this association of letters with colors is hereditary, and that it goes with a certain interest in word-using and in the use of color, features capable in each case of development.

When my son Eric was eight years old, no one ever having spoken of it to him before, I asked him what is the color of A? He responded at once that it is red. At that time, 1912, I made out a list of the alphabet with the colors assigned to each. Quite recently (1917) I repeated the question, never having mentioned the matter since. He said at once that A was red and seemed slightly surprised that any one should not see the difference in

innate color between red A and yellow E.

A few changes appeared, however, in his chromatic scale. These seem, however, to indicate vagueness of color, as the same impression might be described as bluish in one case and greenish or gray in another. For the sake of those this note may interest, I append my own chromatic scale which has not changed appreciably since I first thought of it, with those of two former students, the one my own niece, Marjorie Edwards (now Mrs. Frank Blake), and Edith Snow, daughter of the late Dr. Frank Snow, former president of the University of Kansas. DAVID STARR JORDAN

A SIMPLE DEMONSTRATION FOR EULER'S DYNAMICAL EQUATIONS

TEACHERS of analytic mechanics may perhaps be interested in a demonstration which I have used for the past two years and which seems to illuminate Euler's equations for the rotation of a rigid body. The experiment is so simple that it has doubtless been used before, but I do not recall ever seeing it described.

GH is an ordinary support rod some 70 cm. long. IJ is a suspending cord. The ring I is set at such a point that when the rod is at rest

the angle $G I J$ is somewhat less than 45° . The center of gravity of the system then lies vertically below the cord. Choose axes fixed in the body as follows: For the axis 1 take a horizontal line through the center of gravity and perpendicular to the plane $G I J$, for axis 2 take the axis of the rod, and for axis 3 take a line

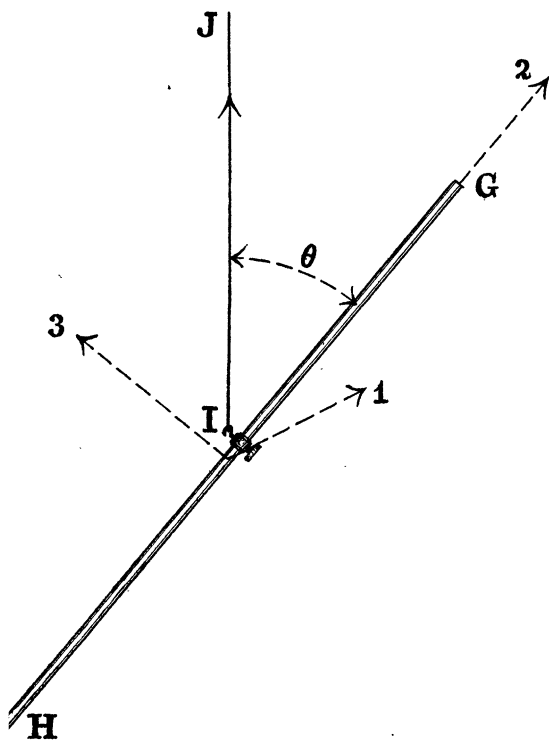


FIG. 1.

through the center of gravity and perpendicular to the plane of 1 and 2. 3 will then lie in the plane $G I J$. These axes are represented in the figure, where the axis 1 is supposed to project directly towards us, and the coordinate system is consequently right handed. Take right-handed rotation as positive. Then Euler's first equation may be written

$$A \frac{d\omega_1}{dt} - (B - C) \omega_2 \omega_3 = L, \tag{1}$$

where A , B , and C stand, respectively, for the moments of inertia about the axes 1, 2, 3; ω_1 , ω_2 , ω_3 for the angular velocities about those same axes; and L for any external torque

which may be acting about axis 1. In the present case we have very nearly $B=0$ and $C=A$, so that equation (1) becomes

$$\frac{d\omega_1}{dt} + \omega_2 \omega_3 = \frac{L}{A}. \tag{2}$$

Now give to the system a right-handed rotation about $I J$. We then have $\omega_2 > 0$ and $\omega_3 > 0$. If the center of gravity were to stay immediately below the cord we should have $L=0$ and therefore $d\omega_1/dt < 0$. But this would increase the angle θ and so throw the center of gravity out from underneath $I J$. The weight of the system and the tension in $I J$ would then supply a positive torque L . It is possible to have this torque of such magnitude as to make $d\omega_1/dt = 0$, in which case the torque is entirely non-momental. The reason for the necessity of this non-momental torque is easily seen by considering an element of the rod near G or H . When the rod is rotating there must act upon this element a centripetal force directed toward the axis $I J$. This force is supplied by means of the torque L .

A rotation of sufficient magnitude to make θ very evidently greater than it is when the system is at rest is easily imparted by hand.

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A UNIQUE HORNET'S NEST

In the magazine, *The Guide to Nature*, Vol. 10, No. 1, June, 1917, Earl A. Newhall, of Shelburne, Mass., under the title "The nest of an unknown hornet," mentions a hornet's nest of peculiar form which he found hanging under the eaves of an old shop. An excellent photograph of this strange nest accompanies the article. Newhall wrote to Dr. L. O. Howard, of the Bureau of Entomology, sending a photograph of the nest. Dr. Howard states:

I never saw a hornet's nest like the one in the photograph and I have referred your letter to Mr. S. A. Rohwer, of this bureau, who has studied these creatures for many years and he replies as follows: "I have never seen a nest like this before and do not know if it is an abnormal one or not. If possible, I should like to have some of the ma-