

to the reader. That there are other causes, especially the erotic instinct, at work in the origin of these æsthetic qualities is not denied, but at the same time is not duly emphasized. The origin of the lyric and the drama is lightly but suggestively treated. This is another contribution showing that the so-called æsthetic arts have had a reason for their being on account of their utility. Henle's essay, *Ueber die Grazie* (Anthropologische Vortraege) also bears witness to the truth of the above statements. He remarks that those movements are graceful which attain their end with the least expenditure of means.

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Two Cases of Synæsthesia. By GUY MONTROSE WHIPPLE, A.B.
[From the Laboratory of Cornell University.] Amer. Jour. Psy.,
Vol. XI., No. 3 (April, 1900), pp. 377-404.

Mr. Whipple has found two good cases of colored hearing, in one of which the colors seem to have a real objectivity, and in the other there is a feature, considered by the investigator to be unique in the history of synæsthesia, viz: a phonism aroused by pain.

The two subjects, *M.*, a young woman student in the Cornell department of psychology, and *R.*, an undergraduate in the college, were subjected to similar series of experiments. The retinal colors were first carefully observed for 10 minutes and described. Then the photisms resulting from I. (*a*) simple noise and tone, (*b*) single tuning forks, (*c*) tuning-fork fusions, (*d*) piano compound clangs, (*e*) tones of church organ (various stops), (*f*) successive fork tones, (*g*) continuous tone change, (*h*) musical pieces on piano, phonograph and church organ; and II. (*a*) tastes (sweet, acid, salt and bitter), and (*b*) smell. Other synæsthetic phenomena such as colors and other characteristics of capital letters were observed. The photisms were projected, also, upon black, and colored, screens. No photisms could be produced by merely *thinking* the music. With both cases the relative position and shape of the colors were noted.

In the case of *M.* the violet end of the spectrum prevailed in most of the photism, while with *R.* red was a prominent color. The subjects projected the photisms upon a chart of colors arranged to show hue and saturation in slight gradations. The chart color that 'matched' in all cases was recorded and this method was used in all the experiments. With *M.*, the colors were frequently of highest saturation and luminous, the saturation being less with piano clangs than with fork tones and the clangs being less pleasant. Organ tone colors were clearer than those of piano clangs but paler than fork photisms.

In the case of *R.* the colors, while not always bright enough to project, were both definite and constant. The pitch and quality of mental auditions aroused by pain were for blunt pressures from a^1 to f^1 and for sharp pressures from b^1 to e^2 . One algometer pressure of 2.1 kg. produced c^4 .

It is to be hoped that the subjects will continue to be available for systematic research; and that there may be, later, enough experiments to warrant some generalization of results; which Mr. Whipple is at present careful to avoid.

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EXPERIMENTAL.

Ueber die Eigenschaften der Schrift bei Gesunden. Von AUGUST DIEHL. Mit einer Figur im Text, Psychologische Arbeiten von EMIL KRAEPELIN, Dritter Band, 1 Heft, s. 1-61, 1899.

The aim of this research is, from an investigation of the writing of normal individuals of a given class of persons, to develop a basis for the interpretation of the writing of abnormal types of the same level of education. The specific problems guiding the investigation were inquiries, first, in general, as to the mutual relations which exist between the various factors involved in the writing process (extent of stroke, rate, pressure, time occupied in the actual inscription, time consumed by pauses), and, secondly, and more specifically, the effects of various conditioning influences such as practice, diversion, habit, variation in the emotional state, fatigue, etc., and especially to determine the results which followed from making the writing more difficult in various ways. To this latter end, the Arabic figures 1 to 10, were required to be written (1) carefully, the ordinary size, (2) as small as possible, (3) in the way easiest and most natural to the subject, (4) in the reverse order, from 10 to 1. The method followed was essentially the same as that of Gross in his 'Untersuchungen über die Schrift Gesunder und Geisteskranker' published in Vol. II. of the same journal. The chief improvement on the side of apparatus is his employment of the 'Curvenmesser' which makes possible a more accurate determination of the actual extent and rate of the writing-process.

Diehl's conclusions are briefly as follows:

1. The extent of the stroke decreases with the difficulty of the task imposed when this increase in the difficulty takes any of the following forms, an acceleration in the rate, an abatement of the stimu-