Another common belief, that motor accompaniment of regularly recurrent sensations tends to aid the estimation of their time values, is also combated by Dr. MacDougall. He claims that the process of motor adjustment either distracts the attention and thus injures the judgment, or else the material of judgment is transformed in value by being changed to agree with some rhythm of the organism.

Professor MacDougall agrees with those who make time estimation dependent on 'widespread tensions and releases in the organism. Moreover, he believes that this process cannot be 'localized in a single mechanism,' as Mach attempts to connect it with the ear.

In regard to number perception, attention is called to the experiment of Dietze that rhythmical integration is involved in the apprehension of serial impressions beyond about six members.

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EFFECTS OF ALCOHOL AND OF FASTING.

Ueber die Dauer der psychischen Alcoholwirkung. ERNST RUEDIN.

Ueber die Beeinflussung geistiger Leistungen durch Hungern. WILHELM WEYGANDT. Psychologische Arbeiten, Vierter Band, 1. Heft.

The entire number is given up to these two papers. The purpose of the first experiment was to make a further test on a number of individuals of the effect of a single dose of alcohol upon simple mental processes like choice reaction, associations, adding, and committing to memory. The experiments were made in the laboratory of Professor Kraepelin, and according to the methods well known to persons who have followed Professor Kraepelin's work. They were carried out upon three subjects for eight days and upon a fourth subject for eleven days. The effect of alcohol upon a single subject has been worked before so that the present study is an attempt to determine individual reactions to its effects and the duration of them. Tests were made in the morning at 9 o'clock, in the afternoon at 2:30 and in the evening at 9. The test of each mental process lasted for half an hour and five-minute pauses were allowed between the tests of the mental process. The order was association test, pause, adding, pause, and committing to memory. Only subject 4 took the choice reactions, and one hundred reactions constituted a test. The dose of alcohol was the amount contained in a half liter of Greek wine, 90 to 100 grams of absolute alcohol. It was taken by all subjects on the fourth

day of the experiments a half hour before the evening test. The evidence of the effect of the dose was found in the amount the regular practice increase from test to test was reduced in the tests following the drinking. The conclusions stated at the close of the paper are: (1) The effect of a large dose of alcohol of 90 to 100 grams upon four different persons shows great diversities in reference to direction, strength and duration. (2) The effect of alcohol consists in general in slower adding, difficulty of committing, shortening of choice time with increase of error reactions and finally in an increase of associations, especially those resting upon speech forms. Only with one subject was this last clear. (3) The duration of alcohol effects is generally from 12 to 24 hours, appearing in one case for 48 hours. The shortening of the choice time disappeared most quickly to give place then to a lengthening of the same with a continuation of error reactions. (4) The sensibility to alcohol is not alone dependent upon habituation to the poison, but it can be slight even after very long abstemiousness.

The second paper is devoted to a study of the influence exercised by fasting upon mental process. The method followed is somewhat similar to that followed in the alcohol research. Six reagents volunteered their services. All alcoholic and stimulating drinks were proscribed for several days before the experiments began and during the time they lasted. The tests were made upon the first day and this constituted the normal or control day for the series. On the second day all food was abstained from for twenty-four hours. In two series both food and drink were denied, and in one the time of fasting was lengthened to 48 hours and in another to 72 hours. The tests were continued for two days after the fasting to discover the duration of the effects, or after effects. With one reagent the experiments were continued for nine days, two days intervening between the periods of fasting, and with the other reagents the experiment lasted for only four days as indicated. The psycho-physical methods employed to test the effects of hunger were generally the space threshold for the cheek bone and the glabella, the time for 50 associations, the test of perception (*Auffassungsfähigkeit*) indicated by the reading time of 277 one-syllable words and 287 nonsense syllables pasted upon a revolving drum, the time for 200 choice reactions, continued associations for five minutes from a given word recorded by a stenographer, and a half hour devoted to learning nonsense syllables by heart. Not all reagents took the same tests in the same numbers or in the same order. The details with which the results are worked out are extremely complex and quite up to the standard of the German investigator.

The most important conclusions of the paper are: (1) Psychical development experiences a clear change during the abstinence from nourishment. (2) The effect is a sharply limited one in so far that some processes are much, others little and still others not at all, affected. (3) The capacity for perception or apprehension (*Auffassungsfähigkeit*) is not affected by hunger. (4) The conceivable connection in associative thinking is weakened; inner associations decrease; associations based upon use in speech increase; sound associations cease. The temporal flow of association is not changed. (5) Adding is measurably slowed. (6) The work of memorizing becomes continuously and clearly slower. This disturbance affects only attention and not the rapidity of speaking. (7) Choice reactions show a slight lengthening; the number of error reactions is somewhat increased in places. The effect of practice, mental fatigue, distraction, emotional excitability, are either only slightly or not at all affected by hunger. It is much to be regretted that so large a piece of work, covering as it does more than 130 pages, should not have yielded more definite results. Nothing new or very striking has come from either research communicated in this number, and they must be laid aside with some feeling of disappointment. They, however, emphasize the enormous difficulties that are encountered in work of this kind, and Professor Kjaepelin is to be congratulated upon not having long since lost his patience and given up. The work is painstaking and careful and it is to be hoped that others will be incited to attack these same problems in different ways.

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NEW BOOKS.

Development and Evolution. JAMES MARK BALDWIN. New York and London, The Macmillan Company. 1902. Pp. xvi + 395.

Elements of Experimental Phonetics. EDWARD WHEELER SCRIPTURE. New York and London, Charles Scribner's Sons. 1902. Pp. xvi + 627, and 26 plates.

Vorträge über Descendenztheorie. AUGUST WEISMANN. Jena, Fischer. 1902. Vol. I., pp. xii + 456; Vol. II., pp. vi + 462.

Die Grundsätze und das Wesen des Unendlichen in der Mathematik und Philosophie. KURT GESSLER. Leipzig, Teubner, 1902. Pp. viii + 417.