single one, is any one of ten colors, but finds a greater increase (15σ, difference of II. and III.) when the stimulus *re-acted to*, instead of being a single one, is one of ten colors, though the particular kind of color need not be recognized. Both the stimulus re-acted to and the one not re-acted to might be one of a larger or smaller, a more or less homogeneous group; but I am unable to find a record of such an experiment. The somewhat modified form of experiment adopted by Tigerstedt and Bergrist shows a similar result. They re-acted to a light, when either the light or a one to three place number might appear, in 297σ, and to the number (including its recognition) in 318σ. If the number of digits of the numbers that may appear is foreknown, the time is considerably reduced; and when either the light or a foreknown letter might appear, the time for recognizing the light was still further shortened (190σ). The same series of variations could be applied to adaptive re-actions (i.e., one or more, or all, of the modes of re-action might be associated with any member of a variable group of stimuli), but experiments designed to show the effect of such variations are lacking. Mention should be made, however, of the experiments of Münsterberg, in which he first re-acts with the five fingers to five categories, each limited to one term (XXIV. and XXV.); then to five categories, each comprising three terms (XXVI.); and then to five categories, each comprising a practically indefinite number of terms (XXVII., XXVIII., XXIX.); and finds an increase of time in making these steps, not only in the sensory mode of re-action (as cited in the table), but in the motor as well (as will be noticed below). Although other factors contribute to this increase in time, part of it may be referred to the decreasing definiteness of the foreknowledge of the subject. It may be added, that the mechanism by which an increase in the number of possible re-actions increases the re-action time is allied to that by which a decrease in the foreknowledge of the subject does so.

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NOTES AND NEWS.

A PROCESS of manufacture of filtering material is described by the *Engineering and Mining Journal* as consisting essentially in reducing ferric oxide by heating it in contact with gaseous fuel. Small pieces of iron ore, preferably hematite, are packed into a retort heated externally, preferably by producer gas. When the charge is at a cherry-red heat, gaseous fuel is admitted into the retort and brought into thorough contact with the ore. At the end of four or five hours, if the exit gas be inflammable, the process is finished, and the charge raked out and allowed to cool. Ordinary coal-gas or other gaseous fuel may be used instead of producer gas. The magnetic oxide so produced is available for filtering water, sewage, sugar sirups, alcoholic liquors, etc.

— The fourth annual session of the Iowa Academy of Sciences was held Sept. 4 and 5, at Des Moines, Io., in the High School Building, Science Rooms, corner of Fifteenth and Centre Streets. The following is a list of the papers read: "The Gall-Producing Cynipidæ of Iowa," by C. P. Gillette; "Evolution of Strophostylus," by Charles R. Keyes; "Two Quaternary Sections near Des Moines," by R. Ellsworth Call; "Abnormal Pelage in Lepus Sylvaticus," and "Additions to Catalogue of Iowa Hemiptera," by Herbert Osborn; "Further Notes on the Geology of North-western Iowa," and "Exhibition of Volcanic Ashes from Omaha, Neb.," by J. E. Todd; "Varieties and Structure of Oolite," by E. H. Barbour; "The Woody Plants of Western Wisconsin, a Contribution to the Local Flora of La Crosse, Wis.," by L. H. Pammel; "On a Quaternary Section Eight Miles South-east of Des Moines," by R. Ellsworth Call and Charles R. Keyes; annual address, by President F. M. Witter, Muscatine; "A New Cecidomid Infesting Box-Elder," by C. P. Gillette; "Age of the Iowa City Sandstones," and "Notes on the Red Rock Sandstone," by Charles R. Keyes; "Preliminary Notes on Fishes of Polk County and Central Iowa (exhibition of specimens), by R. Ellsworth Call; "Notes on the Life-Histories of Certain Hemiptera," by Herbert Osborn; "The Shore-Lines of Ancient Glacial Lakes," by J. E. Todd; "Some Parasitic Diseases of Iowa Forage-Plants," by L. H. Pammel; "Fishes of the Cedar River Basin," by Seth E. Meek; and "Report of the Committee on Iowa Fauna," by C. C. Nutting (chairman). The following are the officers for 1890: president, F. M. Witter, Muscatine; first vice-president, C. C. Nutting, Iowa City; second vice-president, C. P. Gillette, Ames; secretary and treasurer, R. Ellsworth Call, Des Moines; executive council, the officers, and Professors J. E. Todd (Tabor), Herbert Osborn (Ames), and L. H. Pammel (Ames).

— "Little Giant" Edwin Checkley, who has just broken the long-distance bicycle record between New York and Chicago, making the distance in a little over fourteen days, undertook the task without any previous special training, pursuant to the theories set forth in his book, "A Natural Method of Physical Training," which has been creating so much talk among athletes and members of the medical profession. Mr. Checkley opposes modern athleticism as practised in and out of the colleges, and argues that his own extraordinary strength and agility are to a great extent possible even to persons of comparatively sedentary habits, if a certain simple course is followed. Checkley, who was educated as an engineer, and is now studying medicine, is five feet five inches in height, and weighs only one hundred and twenty-five pounds; but he can lift two men, each weighing two hundred pounds, and trot with them for one hundred yards.

— The American Bankers' Association have devoted much time lately to a consideration of the question, "What can be done to prepare for their future careers those youths who expect to follow banking as a business?" In the course of their investigation, their attention was attracted by the work of the Wharton School of Finance and Economy,—a department of the University of Pennsylvania which has, among other courses, one in banking. Professor Edmund J. James, one of the senior professors in the school, who has devoted much time and thought to educational questions, was invited to deliver an address upon the school and its work before the convention at Saratoga, which met from the 3d to the 6th of September. The address, which was delivered on the evening of the 3d of September, includes, besides an account of the Wharton School of Finance and Economy, a discussion of the general subject of what our colleges are doing for the education of our business-men. It is pointed out that Mr. Carnegie, in his famous interview on the subject, was practically correct when he said that the colleges, speaking generally, are not educating the business-men of the community. A smaller and smaller proportion of the youth of the country are going to college. This is true even of those who expect to become lawyers and physicians, and still truer of the immensely greater number who expect to take up business careers. This fact is also emphasized by Professor Shaler of Harvard, in an article on the subject in the August *Atlantic*. Professor James takes the ground that this is very natural, considering the curriculum of our colleges. It is, however, very unfortunate. The higher education of our business classes is absolutely essential to our permanent welfare. Whether for good or ill, the control of our modern life, the school, society, politics,—the church, in a word, of our civilization itself,—is slipping into the hands of our business classes. The professional world is losing, the business world gaining. It is no longer the great lawyer, statesman, or clergyman, but the great banker, manufacturer, railroad manager, who speaks the decisive word in many matters of public importance. The higher education of these classes is therefore of fundamental importance to our social and political existence. The problem is to be solved by the addition to our existing college curricula of courses which have a direct relation to the wants of educated business-men in some such way as existing courses correspond to the wants of the future teacher, or engineer, or architect.