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OF

JAMES McKEEN CATTELL

1860—1944

BY

W. B. PILLSBURY

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# JAMES McKEEN CATTELL

1860-1944

BY W. B. PILLSBURY

Through most of the beginnings and early fruition of scientific psychology, Cattell was a dominant factor in introducing the experimental technique in America. It is true that James and Stanley Hall antedated him; for each the scientific method was grafted upon an older theoretical approach. Neither did much in experiment of the modern type themselves. Hall developed a school of workers, but not quite in the modern method. Cattell on the other hand came in with the experimental method, held the first chair in psychology, and developed one of the first laboratories in America. As editor of journals and head of one of the most productive laboratories in America, he was one of the men who presided over the destinies of psychology for generations of scholars.

James McKeen Cattell was born in Easton, Pa., May 25, 1860. His father was first professor of classics, and from 1863 to 1883 president of Lafayette College. Cattell received his A. B. from Lafayette in 1880, the A. M. in 1883. Following his graduation he studied for two years in Göttingen, Leipzig, Paris, and Geneva, then spent the year 1882-83 as fellow at Johns Hopkins. He then returned to Leipzig, where he studied with Wundt and received the Ph.D. in 1886. Cattell's associations with Wundt were very close during this period. He said once that he told Wundt that he needed an assistant, volunteered for the position and was accepted. He took some credit or blame for Wundt's large literary output, saying that he gave him an American typewriter, without which so much could not have been written.

The period at Leipzig was very fertile in investigation. Six articles were published in the *Philosophische Studien* and several of them were adapted for publication in *Mind* and *Brain* in England. They dealt with various phases of reaction times and association, together with the simpler processes of reading.

All were fundamental to the topics discussed and have been taken as classics in their field.

In 1887 Cattell returned to America as lecturer in psychology at the University of Pennsylvania and Bryn Mawr College. The following year he spent as lecturer at the University of Cambridge. He developed a laboratory there and continued his investigations. This year was especially fruitful for the close contact with Francis Galton, whose methods and ideals Cattell specially admired. They inspired much of his own work in individual differences and in the study of distinguished men that was so important in the middle and later portion of his life. This year he met and married Josephine Owen of London, who was a great help and support all through his career.

The following year Cattell returned to the University of Pennsylvania as chairman of the department of psychology. He established another laboratory and began a vigorous research program. The most important contribution of this period was a study of the perception of small differences in collaboration with Professor G. S. Fullerton of the department of philosophy. The results gave a new turn to the previous interpretations of psychophysics that was influential on the later developments in that field. He showed his usual vigor in putting psychology at once upon a firm footing in the university by the students he attracted and by the respect that he won from colleagues.

Cattell was called to head the department of psychology at Columbia in 1891. He was also acting head of the department of anthropology from 1896 to 1902, and of the department of philosophy from 1902 to 1905. Previous to his appointment the work in psychology had been given in the department of philosophy. Under his direction psychology at Columbia became one of the strongest departments of research and advanced teaching in the country. He gathered about him a group of scholars of the first class. Some remained on the staff, others manned important institutions elsewhere. Forty-six members of the American Psychological Association received Ph.D. degrees during his tenure. He was also in charge of the work

in psychology at Barnard College and for a few years taught in Teachers College. He called strong men to the departments of anthropology and philosophy, so they too prospered through his influence.

As a teacher Cattell left his students much on their own with direction when needed, but with no constant tutelage. They could count on him for admirable counsel when it was needed and he was alert to see that they did not go wrong, but they were encouraged to depend on their own resources and develop their own strength to the limit. The benefit is seen in the later careers of the better men.

From the beginning Cattell took a strong position in the faculty for an independent position of the university professor. He stipulated that he need be at the university for a specific number of days a week and established his residence on top of a hill near Garrison, forty miles from New York. Later he equipped offices and laboratories where he could do his editorial work. This gave him freedom from many of the interruptions of university life. He also contended that many of the administrative problems that dealt with education should be decided by the various faculties and not by deans and the president. This led to many controversies of varied nature. He led a protest against taking a site that had been used as a faculty club for an educational building. A much more elaborate club was secured in consequence, or at least after the protest.

These controversies were probably a factor in Cattell's final separation from the university. The last step came during the war in 1917. Cattell wrote a letter to Members of Congress protesting against sending conscientious objectors to combat duty overseas. The president and trustees interpreted this as an act of treason and dismissed him from the university. In furtherance of his stand for the rights of the professor, Cattell sued Columbia for a large sum for libel. The case was settled by granting a large annuity.

After being freed from university responsibilities Cattell gave much more time to the editorial work that had long taken much of his energies, and to the organization of other scientific

activities. Cattell's first editorship was of the *Psychological Review*, which he founded with J. Mark Baldwin in 1894. He continued as joint editor until 1904, when he sold his share of the enterprise and retired. The *Review* was influential from the first and still continues, having been taken over by the American Psychological Association as its organ. Later he founded the *Archives of Psychology*, which has been edited from the beginning by Woodworth. A companion volume, "The Archives of Philosophy, Psychology, and Scientific Method," lasted but one year but contained much valuable material in the volume published.

Much more demanding in time and administrative ability was the editorship of the series of general scientific and educational journals that Cattell fathered. In 1895 he bought *Science* from Alexander Graham Bell, who had founded it in 1883. Cattell at once made *Science* an important medium for the American scientific world and in 1900 it was made the official organ of the American Association for the Advancement of Science, which relationship still holds as it was given to the Association at his death. In 1900 he acquired from Appletons *Popular Science Monthly*, which he also put upon a successful basis both financially and scientifically. The name was later changed to the *Scientific Monthly*. In 1908 he assumed control of the *American Naturalist*. In 1915 he founded *School and Society* as the weekly medium of communication of American education. It was immediately popular and still continues.

Cattell had a wide range of acquaintances among men of science through his long connection with the American Association for the Advancement of Science and the National Academy of Sciences. His editorial activities with scientific periodicals constantly extended this range. A work, partly a study of the nature and origin of scientific ability and partly a convenient work of reference, resulted in the *Biographical Directory of American Men of Science*. This was unique in that he asked a number of competent men in each field to rate their colleagues in order of merit and then starred a proportion of the total list in each science. The number starred varied

with the number active in each science and was set at a thousand for all the sciences. After the first edition the starred men were asked to select the new men. The volume provided an index for administrative officers of the scientists available. Cattell used the results of estimates for an objective study of the origin and distribution of men of science of different degrees of effectiveness. The directory proved its value on the practical side and the scientific results were highly important. The sixth edition of the work appeared in 1938, and the seventh, under the direction of Jacques Cattell, in 1944. A companion directory, *Leaders in Education*, was published in 1932 and 1940. To print the various journals and books which he had developed into a considerable business, Cattell founded the Science Press in 1923.

In 1921 Cattell took the initiative in founding The Psychological Corporation, a non-profit stock company for the application of psychology to various problems in industry. The stock was held by psychologists and the proceeds were devoted to the advancement of psychological research. Cattell was first president and then chairman of the board. The society has had a long period of usefulness, and tends to increase in the services it performs.

Cattell was very active in many general and special scientific organizations. He watched the course of all that he was connected with very keenly and was always influential in the selection of policies and personnel. He was one of the founders of the American Psychological Association in 1892 and was its president in 1895. He was long a member of the American Association for the Advancement of Science and much of the time chairman of the executive committee; was vice-president of the section in anthropology in 1898 and of the section in education in 1912. He was president of the Association in 1924. He was a member of the American Society of Naturalists (president, 1902), of the New York Academy of Sciences (president, 1902), of the Eugenics Research Association (president, 1914), of the Washington Academy of Sciences (vice-president, 1921), and of Sigma Xi (president, 1913-1915).

He was elected president of the International Congress of Psychology at New Haven in 1929, which by tradition marked him as the outstanding American psychologist of the period. He was a member from 1901 of the National Academy of Sciences, of the American Philosophical Society, and of the American Physiological Society. These honors indicate his eminence in different fields of science.

Cattell's scholarly work shows distinct phases in different periods of his life. His early years, as a student and in the first years of his professorships, were devoted to definitely experimental research, what James called "brass instrument psychology." Then there was a period in which individual differences and the ecology of the man of science dominated his interest. This was in line with the work of Galton, and the Cambridge men, although it was begun some years after the English period of his life. Subsequently, after his separation from Columbia, he continued his studies with tests and in the conditioning of the scientific man and added various other practical applications. Much of this later period was devoted to establishing favorable conditions for the teacher in universities and in facilitating work in research and the publication of the results of research.

Cattell's first study was of the time of exposure necessary to read letters, words, and colors. This divided into two parts in later investigations. One was a measure of the number of simple objects that could be seen with a short exposure, the other the time required to name the object after it was presented. The first series that began the experiments on the span of consciousness were fundamental to later studies of reading. The second problem was a continuation and amplification of the work in reaction times that began with astronomers in their elimination of the personal equation in transit observation and then was taken over by the physiologists and by Wundt and his students.

Cattell's studies of reaction times improved upon his predecessors' in his greater recognition of the importance of deviations from the mean, which had frequently been considered as

less important by the earlier men. He also was not content with the relatively small number of different measurements of the older men. A considerable part of the advance that Cattell made was due to the decided improvements he made in the instruments that were used for presenting the stimuli and in recording the response, especially in speech. The new activities he measured were mainly the times of perception under different conditions and the so-called will time. Possibly most important for later work was the study of the difference in time between free and controlled association. The time required for association had been measured only for free association, and that somewhat roughly. Cattell found that response with abstract words required less time than with the concrete words that were more usual in free association. This was stressed more than a decade later by the pupils of Külpe and Ach.

The second of the classical fields that Cattell worked in was psychophysics. The most important of his studies in the topic was an investigation with G. S. Fullerton, professor of philosophy at Pennsylvania, of "The Perception of Small Differences," published in 1892. This differed from earlier work in the field of Weber's Law both in the methods used and in the formulation of the results, and applied a modification of the method of average error. The main advantage was that each response gave a usable value. When the time permitted for the response was controlled the measurements were superior to those of other methods. The most important result of the investigation was to indicate that accuracy of perceiving differences varied not directly with the absolute intensity, as Fechner had found, but more nearly as the square root of the intensity. Woodworth, after a survey of a large number of investigations by different authors, asserts that the results indicate a range between Weber's Law and the Cattell-Fullerton Law of the square root. Results for some men in certain senses are nearer the Weber formula, some nearer the Weber-Fechner formula. The study showed Cattell's wide interest and originality in a standard field of investigation.

The most immediate influence of the period at Cambridge with Galton was an interest in individual differences and means of measuring human capacities. Most directly an outcome of this interest was the study with Farrand: "Physical and Mental Measurements of Columbia University Students" in 1896. The work applied many known tests to 100 students. It was avowedly a preliminary exploratory investigation. It argued for the accumulation of more data and the desirability and feasibility of measuring individuals in useful ways. It did not receive the general application of Binet's work done ten years later because it did not hit upon a simple way of establishing a scale as Binet did in his age scale or as Cattell did later in his establishment of relative position. This and other more general articles by Cattell in the *Educational Review* and in *Mind*, however, did lead to a series of tests made at the St. Louis Exposition and to many researches in different laboratories in this country and abroad. They initiated an interest in tests.

Cattell's discussions of the problems of university administration were always acute, not to say provocative. His volume "University Control, 1913," and his many articles in *Science* kept the problem in the limelight for university men. He was very active in the formation of the Association of University Professors, which has been a great force in improving the status and tenure of the professor. The thesis that he advanced early and firmly maintained, that the professor should have an effective voice in all university administration, has been widely accepted in the university world since he began his campaign. A considerable part of the change must certainly be ascribed to his efforts.

For more than a half century Cattell held a unique position in psychology and in the editorial work of science in general. For a score of years at the turn of the century he was a force in the organization of laboratory and teaching work in his own science. More students were trained to the doctorate at Columbia than at any other institution during that time. Through his publications and their relation to scientific and educational societies he did much in the same period to improve the morale

of scientists in investigation and in teaching. His personal standing was made evident by his selection as president of the International Congress of Psychology in 1929, more than ten years after he had ceased to be connected with an educational institution.

Cattell was more concerned with method in psychology than with theory. He desired first of all to establish facts and to adopt methods that insured accuracy. He leaned to objective statement before behaviorism came into vogue, but did not specifically accept the latter doctrine when it was proposed, nor ally himself with that or any other school. He always opposed limiting the selection of facts to fit any theoretical presupposition.

Personally he was always classed as a fighter. Wells suggests that it was appropriate that his home was on Mt. Defiance. While it is true that he never hesitated to uphold his views against any opposition, and the more entrenched the opposition, the more delight he took in controverting it, he was essentially a kindly man. He always gave encouragement to younger colleagues and was essentially fair in all his relations. He seldom used the lecture method, preferring the informal discussions of the seminar. He always won the respect and affection of his students and held it throughout their careers. The impress he left upon his students as well as his own contributions gave him a very high standing among psychologists.

Dr. Cattell died on January 20, 1944.

KEY TO ABBREVIATIONS USED IN BIBLIOGRAPHY

- Amer. J. Psychol. = American Journal of Psychology  
Ann. Amer. Acad. Pol. and Soc. Sci. = Annals, American Academy of  
Political and Social Science  
Educ. Rev. = Educational Review  
J. Cons. Psychol. = Journal of Consulting Psychology  
J. Phil. Psychol. = Journal of Philosophy, Psychology and Scientific  
Methods  
Mem. Nat. Acad. Sci. = Memoirs, National Academy of Sciences  
New Rev. = New Review  
Phil. Rev. = Philosophical Review  
Phil. Stud. = Philosophische Studien  
Pop. Sci. Mo. = Popular Science Monthly  
Proc. Amer. Assoc. Adv. Sci. = Proceedings, American Association for  
the Advancement of Science  
Proc. Amer. Psychol. Assoc. = Proceedings, American Psychological  
Association  
Proc. Nat. Cong. Race Betterment = Proceedings, National Congress  
for Race Betterment  
Psychol. Rev. = Psychological Review  
Publ. Univ. Pa. = Publications, University of Pennsylvania  
Sci. Mo. = Scientific Monthly

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