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JAMES McKEEN CATTELL—IN MEMORIAM

ORGANIZER OF AMERICAN SCIENCE

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THE measure of a man's influence on science in his own and future generations may be taken (1) by his personal contributions to knowledge in his chosen field and (2) by his contributions to the organization of agencies, facilities and institutions which serve to coordinate and implement the labors of others. The former may be called his individual, the latter his social contributions to the advancement of science. Measured by either of these scales the work of J. McKeen Cattell was very important. His work began and his reputation was made with detailed work in experimental psychology. For ten years from 1885 to 1895 his published work was limited to researches in this field and resulted in more than thirty contributions from the psychological laboratory. Throughout his long life he maintained active interest in psychological research and its influence permeated all his later work.

The social aspect of his work, represented by the organization of science and scientists, had its rise and center in his work as editor and publisher of scientific journals and the opportunities which this brought him. The weekly journal SCIENCE, which he acquired in 1894, became under his ownership and editorial management one of the most important factors in the organization of science in America. A brief review of the earlier and later history of this journal will indicate the nature of the problem which it posed and the splendid way in which Cattell met it.

Science, An Illustrated Journal published weekly, was started in 1883 and was published first at Cambridge, Mass., by The Science Company. I have found no statement of the persons composing this company, but it is known that Alexander Graham Bell and one other person gave it large financial support. From 1883 to 1885 S. H. Scudder was editor and N. D. C. Hodges assistant editor. From 1885 until 1894, when its publication suddenly ceased, N. D. C. Hodges served as editor and his name replaces that of The Science Company on the title page, indicating that he was the owner. Volumes I to IX appeared in a format similar to that of *Nature,* with

28 pages of text and 4 cover pages in each number, and with many illustrations. Beginning with Vol. X, July, 1887, it appeared in a larger format of 16 pages and the subscription price was reduced from $5.00 to $3.50 per volume.

There are many evidences in these later years that the publisher was having financial difficulties. In addition to economies in format and production there were many attempts to increase circulation. In the issue for October 14, 1892, the following announcement was made:

SCIENCE owes its existence to the munificence of two gentlemen, whose names we do not feel at liberty to publish, who contributed very nearly $100,000 toward the support of the paper in its early years. There is no longer need of such liberal subsidizing, but we do need cash subscriptions from all who feel at all interested in a weekly journal of science in America.

Again in the issue of December 16, 1892, this announcement appears:

There is at present much more material offering for publication in SCIENCE than can be used so long as the paper remains at its present size. It now rests with the scientific public whether the size of the paper shall be doubled and the price raised from $3.50 to $6.00. (Blank forms of subscription, with club rates of four subscriptions for $20 follow.)

In the issue of January 6, 1893, the following announcement appeared:

The enlargement of *Science* by doubling the number of pages will have to be indefinitely postponed as the result of our efforts for three months to get eight hundred new subscribers, at the proposed increased price, has been too small to justify our going to further expense.

In the same issue this optimistic announcement is made:

More than one thousand of the leading scientific men and women of America and Europe have agreed to contribute to the paper during the coming years; and as others are constantly joining in this move to make the paper more valuable than ever, it cannot be long before there will be over two thousand competent users of this weekly medium of scientific discussion.

But in spite of the contributions of this large number of scientists the journal was a financial failure and with the issue of March 23, 1894, it suddenly ceased to appear. Its failure, as we now see, was due largely to lack of proper organization of support among American scientists and scientific societies. At this opportune time Dr. Cattell, who was newly established as head of the department of psychology at Columbia University, acquired title to SCIENCE and set about securing the cooperation of leading men of science in America in the support of a new series of SCIENCE.

The first issue of this new series appeared January 4, 1895, with the support of an editorial committee consisting of eighteen of the first-rank scientists of America representing as many different fields. The leading article of two columns was by Simon Newcomb, recognized dean of American scientists. It begins:

After a brief period of suspension this journal again appears, greeting its readers with the compliments of the season. The interest in its future which has been shown in various quarters during the last few months, convinces its editorial staff that there is room for a journal devoted to the promotion of intercourse among those interested in the study of nature. . . . The experience of centuries shows that great success in advancing scientific knowledge cannot be expected even from the most gifted men, so long as they remain isolated. . . . We need a broader sympathy and easier communication between widely separated men in every part of the country. Our journal aims to supply the want of such a medium, and asks the aid of all concerned in making its efforts successful.

President Gilman, of the Johns Hopkins University, follows with an article entitled, "*Scriptoribus et lectoribus, Salutem,*" in which he points out the ideals which should be kept in mind in the conduct of SCIENCE. Then comes the introductory address of Daniel G. Brinton, president of the American Association for the Advancement of Science, the notable address of G. Brown Goode as retiring president of the Philosophical Society of Washington, papers by T. C. Mendenhall, J. W. Powell, C. Hart Merriam and Samuel H. Scudder—all indicative of the fact that the editorial committee was taking an active part in the new SCIENCE. Reviews, Notes, Meetings of Societies and Academies, Scientific Journals and New Books are listed and all appear in the attractive format with which we have become familiar during the past fifty years. The new SCIENCE was a thoroughly cooperative enterprise, the name of J. McKeen Cattell appearing only as one of the editorial committee and as "responsible editor," in instructions to authors. But it is plainly evident that all this cooperation had been brought about by the labors of Cattell.

It is also evident that it took money, courage and high ideals to convert the financial failure of the old SCIENCE into the eminent success of the new. It was carried on at a financial loss for several years, but by hard labor on the part of Dr. and Mrs. Cattell and by its growing importance as a means of rapid publication of reports of scientific societies and of scientific discoveries and news it soon became the leading scientific publication of America.

The cooperation between SCIENCE and the American Association for the Advancement of Science has been of the greatest value to each of these. In a notable

article on "The Organization of Scientific Men" first published by Cattell in *The Scientific Monthly* for 1922, and again reprinted by him as one of his last publications, he wrote: "The American Association for the Advancement of Science has made notable progress beyond the similar associations of other nations by the support of a weekly official journal and by affiliation with the national societies devoted to the different sciences."

At the meeting of the American Association for the Advancement of Science in New York in June, 1900, it was reported that "many members do not think that they receive an adequate return for their dues" of $3. "The Council then decided to send SCIENCE free of charge to all members of the Association next year, and to publish in it the official notices and proceedings. This action will increase the membership of the Association and the interest of its members in its work, while at the same time extending the influence of the journal and promoting the cause to which both the Association and the journal are devoted—the advancement and diffusion of science." There is no doubt that this bold and at first costly arrangement on the part of both the Association and SCIENCE had precisely the effect anticipated, and out of it grew the provision that has long been in force that members of the association may receive SCIENCE for $3 per year.

Following this New York meeting the American Association for the Advancement of Science proposed that the week between Christmas and New Year's Day be recognized by all the national scientific societies as "Convocation Week" and that as many of these societies as found it desirable to do so should meet with the American Association for the Advancement of Science during that week. This was approved by seventeen of the national scientific societies and by thirty-four universities and scientific institutions, and the first great convocation of these societies and the American Association for the Advancement of Science was held in Washington in the Christmas holidays of 1903.

In all this cooperation between the American Association for the Advancement of Science and SCIENCE and between the Association and other national societies Cattell took the leading part. The Association with its affiliated and associated societies is now the largest scientific organization in the world and from the beginning of the new series the reports of the meetings of these national societies has occupied a large place in SCIENCE. Many who took part in these meetings will remember how constantly Cattell was present and how urgently he invited authors of good papers to submit them for publication in one or another of his journals.

Cattell was one of the first of American scientists to recognize the great power of the press in the promotion of science and to provide the means for such publication. With J. Mark Baldwin he founded the *Psychological Review* in 1894. He was also a founder of the *Archives of Psychology* and the *Journal of Philosophy, Psychology and Scientific Methods.* His success with SCIENCE led him to take over in 1900 the ownership and editorial supervision of the *Popular Science Monthly,* which had been established by E. L. Youmans in 1872 and which was in need of rejuvenation; its title was changed in 1915 to *The Scientific Monthly.* In 1907 he assumed control of *The American Naturalist,* which had been in active operation since 1867, but which was in danger of passing out of existence. In 1915 he founded the weekly journal *School and Society,* and conducted it as one of the leading journals of education until it was sold to the Society for the Advancement of Education, W. C. Bagley, editor, in recent years. He was a trustee of Science Service from its foundation until his death and was president of its board of trustees from 1928 to 1937. In 1906 he published the first edition of "American Men of Science," which was followed by second, third, fourth, fifth and sixth editions in 1910, 1921, 1927, 1933 and 1938. A seventh edition is now ready for the press. A companion directory entitled "Leaders in Education" was published in 1932 and a second edition in 1941. All these publications were issued from The Science Press Printing Company, Lancaster, Pa., which Cattell established in 1923 and of which he was president.

He was the responsible editor of all these publications while they were under his management, but in many of them he had an active board of associate editors, and always a silent but potent partner in his wife, Josephine Owen Cattell, while some of his children were associated with him in this work in his later years. In the Cattell home or office certain days in every week were devoted to this editorial work, one or more days being sacred to SCIENCE, others to *School and Society,* etc. Even in vacation this routine could not be relaxed, as many persons at Woods Hole found during the two summers the Cattells spent there.

Dr. Cattell was not only a great organizer of scientific publications and societies but he was also a great democrat and a bold and unyielding fighter for the rights of the common man. His organizations were based on democratic principles and he was unsparing in his criticisms of organizations and foundations that were handed down to the workers in science, education or society in general. He held that the rights of workers must be secured and safeguarded by the organization of the workers themselves. He regarded this democratic organization of scientific men as one of the greatest needs of the age. "There is scarcely any group," he said, "that has been so

backward in democratic organization as men of science; there is no other in which conditions make the right kind of organization more necessary. . . . Science has not only supplied the economic basis for our civilization; it has not only made economic slavery wanton and intolerable; it has freed us from superstition and unreason; it is in itself the most perfect art and the best religion, the force not ourselves that makes for truth and righteousness."

He maintained that the workers in science should share in the profits of their own discoveries and he strongly favored the taking out of patents on scientific discoveries, so that profit might go for the promotion of research rather than for the enrichment of capitalists. In 1921 he organized the Psychological Corporation for the purpose of selling the services of psychology and psychologists to the public—all income and profits to be used for the promotion of psychological research. He always stood firmly for the rights of the workers in any field and against those persons and agencies that would exploit the workers.

His criticisms of university organizations which placed great power over professors in the hands of deans, presidents and trustees was unsparing. He wrote, "The department or group should name its head and those to be added to it. The teachers or professors should name their deans and their president should be responsible to them. The trustees should be trustees, not regents or directors." In 1912, 1913 and again in 1914 he proposed that there be organized "an American Association of University Professors, similar to the medical and bar associations, which would be an influential force in improving the conditions under which our work is done," and he later took an active part in founding and promoting this association.

He feared "the Greeks bearing gifts and then taking them away," and he did not hesitate to criticise severely the policy of the Carnegie Foundation for the Advancement of Teaching, pointing out that the income of that Foundation would not be sufficient to pension, on the plan first proposed, the retiring professors in a single large university at the end of forty years. His estimates were later found to be much more nearly accurate than those of the actuaries who had advised the Foundation.

He always had the courage of his convictions and did not hesitate to advocate any action he considered right or to condemn any he thought wrong, however unpopular his position might be. This quality sometimes got him into trouble with university or public authorities, but he was so generally right that he usually won his fight in the end. He occupied a unique position among American men of science and he did more than any other man of his generation to bring about the organization of science in America.

CONTRIBUTIONS TO PSYCHOLOGY AND EDUCATION

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CATTELL graduated from college in 1880. From then until 1894, when he became editor of SCIENCE, his life was devoted exclusively to study, teaching and research in psychology. In those years he made and published important contributions on psycho-physics, reaction time, perception and association. Much of his work during this period consisted in doing what other psychologists had done, but with more ingenuity, precision and wisdom. He was notably successful in exposing artificialities, pedantries and loose thinking in the work of others and avoiding them in his own. He also opened up new lines of psychological investigation. Among these was the adequate treatment of individual differences in mental abilities, propensities and forms of behavior. Galton had already shown the importance of such differences, but psychologists still tended in general to hide human diversities in averages or even to discard them before computing the averages. In his very first published research, Cattell exemplified the proper treatment of them. In his paper of 1890 on "Mental Tests and Measurements" and in the systematic collection of measurements of individuals begun at Pennsylvania and continued at Columbia, he led the way in what has become a very large part of psychology. His abilities and achievements won early recognition in the form of a professorship in the University of Pennsylvania at the age of twenty-eight, the headship of the department of psychology at Columbia at thirty-one, and the presidency of the American Psychological Association at thirty-five.

In the ten years after his assumption of editorial and financial responsibility for SCIENCE, Cattell was a thorough student of psychology and a competent guide to investigators in the Columbia laboratory; but he relaxed his own investigations and his original contributions were limited to two reports: "On Relations of Time and Space in Vision" in 1900 and "The Time of Perception as a Measure of Differences in Intensity" in 1902. From 1905 on he was increasingly a man of