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OF

MARGARET FLOY WASHBURN

1871—1939

BY

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Margaret Flegg Washburn,

MARGARET FLOY WASHBURN

1871-1939

BY ROBERT S. WOODWORTH

The Harlem district of New York City, in 1871, still had the characteristics of a roomy residential suburb. "Both sides of 125th Street from Fifth Avenue to the Hudson River were occupied by white-painted frame mansions set in gardens." A house near Fifth Avenue stood in a large garden, part of a tract of several acres which had been acquired about 1800 by Michael Floy. This English-born great-grandfather of Margaret Floy Washburn was the last of her ancestors to arrive in this country, the others—Dutch, Flemish, English, Welsh, Scottish—having previously settled in New York, Maryland, Virginia and Connecticut. Michael Floy built up in Harlem a profitable business as florist and nurseryman. Others of her ancestors and senior relatives were druggists, teachers, clergymen, and one woman physician. Literary and musical tastes were shown by many in this large family group, though not professionally.

Dr. Washburn looked back with affection on her Harlem birthplace and childhood home. "It seems to me that my intellectual life began with my fifth birthday. I remember a few moments when I was walking in the garden; I felt that I had now reached an age of some importance, and the thought was agreeable. Thinking about myself was so new an experience that I have never forgotten the moment." Her father was in business at this time but a little later became an Episcopal minister serving parishes upstate in Walden and Kingston. He was a man of intellectual tastes but uncertain temper. Her mother's nature, she said privately, was perfectly balanced with natural strength and sweetness of character, a fine mind and musical talent. Her own early schooling was anything but regular. She learned to read at home at an early age and read a great deal, "enjoying the blessed privilege of an only child to be undisturbed when at leisure." She attended small private schools for three or four years, and a public school for a year

or more before entering high school at the age of twelve. She entered Vassar College at the age of sixteen. Her love for literature she continued to foster by private reading, while her intensive college work was in chemistry, biology, and philosophy. She graduated from Vassar in 1891.

“At the end of my senior year I had two dominant intellectual interests, science and philosophy. They seemed to be combined in what I heard of the wonderful new science of experimental psychology. Learning of the psychological laboratory just established at Columbia by Dr. Cattell, who had come . . . from the fountain-head, the Leipzig laboratory, I determined to be his pupil. . . . But Columbia had never admitted a woman graduate student: the most I could hope for was to be tolerated as a ‘hearer.’ . . . Dr. Cattell treated me as a regular student and required of me all that he required of the men. . . . At the end of the year . . . he advised me to apply for a graduate scholarship at . . . Cornell. I feel an affectionate gratitude to him, as my first teacher, which in these later years I have courage to express; in earlier times I stood too much in awe of him. While I was thus being initiated into Cattell’s objective version of the Leipzig doctrine, the influence of William James’s *Principles* was strong. . . . I went in the fall of 1892 to Cornell, where Titchener had just arrived from Oxford and Leipzig.”¹

During her first year at Cornell she was Titchener’s only major graduate student. The second year she was joined by Walter B. Pillsbury. Titchener, while ably representing Wundt’s introspective experimental psychology, had not yet worked out his own rigidly “structural” or “existential” point of view, to which indeed these two earliest students of his never subscribed though they fully believed in the value of introspective methods. Pillsbury (2) “remembers Miss Washburn well from the Cornell period. . . . She was a brilliant conversationalist, inclined to be rather acid in her comments on men and things. Her keen sense of humor was fully developed at this time. . . . Titchener had not formulated his structuralism. . . . His main aim was to establish psychology as a science. . . . When the more rigid system developed, Miss Washburn

¹This and the other quotations so far are from Dr. Washburn’s autobiography (1932).

showed a lack of sympathy with the more extreme tenets." Her research in both the Columbia and the Cornell laboratories was devoted to the perception of distances and directions on the skin, with an added original emphasis on the part played by visualization in these cutaneous perceptions. Her dissertation on this problem had the honor (at the time a distinct honor) of being accepted by Wundt for publication along with the output of his own laboratory (1895). Her studies at Cornell were in philosophy as well as psychology, and on obtaining the Ph.D. degree in 1894 she "gladly accepted the Chair of Psychology, Philosophy, and Ethics (not to mention Logic)" at Wells College, where she remained six years. With two additional years back at Cornell as "warden" of a students' residence hall and (incidentally) lecturer on social and animal psychology, she passed in all ten years in the neighborhood, making much use of the Cornell laboratories and libraries, and keeping in touch with the philosophers as well as the psychologists. The position of warden with its time-consuming social functions and its responsibility for the behavior of the girl students proved to be highly uncongenial, and she was glad to obtain a position at the University of Cincinnati as assistant professor in full charge of psychology. She was still more pleased a year later, in 1903, to receive a call to a similar position at her alma mater, Vassar College, where she remained the rest of her life.

Professor Washburn was eminently successful as a teacher and administrator. She soon built up one of the strongest undergraduate departments of psychology in the country. "Her lectures were brilliant, exact, clear, with such a wealth of references and citing of original sources as almost to overwhelm a student as yet unable to appreciate the breadth of the scholarship and the painstaking labor involved in the construction of a single lecture" (8). She was not merely an ardent and thorough scientist; she was a vivid personality with great influence on her students, colleagues and fellow psychologists. "The key to her personality was a unique attitude, in which were combined a detached objective devotion to experimental science and a passionate joy of living. She practiced with keen appreciation the arts of painting, music, the theater, and the dance.

Her studies of the animal mind were inspired by the quality of temperament expressed in her last words spoken in health, 'I love every living thing.' In especial, she loved and stimulated her pupils" (7). Many of her students went on to graduate study in various universities and to careers in psychology. She never attempted to develop graduate study at Vassar, since she deprecated such study for women at any but coeducational universities.

A very successful educational venture which she introduced at the beginning of her teaching at Vassar consisted in collaborating with her major students in compact and well-defined pieces of research.

"In order to give the senior students in psychology a glimpse of research methods, a few simple experimental problems were devised each year, whose results, if they worked out successfully, appeared in the *American Journal of Psychology* as 'Studies from the Psychological Laboratory of Vassar College.' The problem and method of a study having been determined by me, the experimenting was done by the students, who also formulated the results; the interpretation and writing of the reports fell to me and the paper was published under our joint names" (6).

Her bibliography (4, 5) contains nearly seventy of these joint papers. They are brief and to the point but many of them are substantial scientific contributions. Considered as a device for continued productive research by a busy teacher, the plan worked out very well. Though quite a variety of problems were attacked, the research as a whole cannot be called scattered, since it revolved about a few persistent problems of the major investigator.

Spatial perception by the different senses was one recurring problem in her experimental work and that of her students. Early work of this kind on the skin sense was followed later by studies of the perception of the third dimension by the eye, with special reference to binocular rivalry and other forms of fluctuating perception. After-images were a related field of work.

Memory for hand movements and other movements in space was a topic of interest. And memory for emotional experiences

was especially interesting to her students. When a person was asked to revive as strongly as possible some past experience of fear or anger or joy, it was found that joy was more strongly and also more quickly brought back than fear or anger. "Anger is frequently felt, but . . . reluctantly recalled."

Experimental esthetics was one major enterprise of the Vassar laboratory. A simple but effective rating method was employed in a large variety of studies on the esthetic effect of pictures, music, colors, and speech sounds. Of the vowels, the sound of *u* as in *mud* was rated the least pleasant, while *e* as in *get* and *a* as in *father* were the most pleasant vowels though less pleasant than *l*, *m* and *n*. These preferences were traceable partly but not wholly to associations. More pronounced were color preferences. The pleasure of a color combination was found to be due only in part to the pleasantness of the colors individually, since two pleasant colors placed side by side might make an unpleasant impression, and even a pair of unpleasant colors might give a pleasant effect. There were many other relevant findings on fatigue, fluctuation, habituation, suggestion, and voluntary control of one's likes and dislikes. The law of "affective contrast"—that moderately pleasant colors, for example, become more pleasant when interspersed with unpleasant colors, less pleasant when interspersed with very pleasant ones—was first demonstrated in the Vassar laboratory.

The detection and measurement of individual differences constituted another major enterprise. Tests of freshmen for predicting scholarship in college were tried out and some good ones identified. A simple test for retaining spatial relationships was fairly indicative of aptitude for geometry. In the difficult field of emotional and temperamental traits Dr. Washburn did much pioneering. Was it possible by laboratory methods to distinguish the excitable from the phlegmatic individual, or the optimistic from the pessimistic? Promising leads were opened up though conditions were not favorable for the large-scale sampling required in the standardization of such tests for general use.

Finally, a few of these Vassar Studies dealt with problems of animal psychology. Color vision, i.e., the ability to distinguish between light of different wave lengths, was demonstrated in certain fishes and disproved in the rabbit. This problem is much more difficult than it seems but she was aware of the pitfalls and her conclusions have held good. Other animal studies were concerned with problems of motivation and orientation.

Her interest in animal psychology was rooted in an intense love for animals. She wished to learn as much as possible about their conscious experience and not merely about their external behavior. Admitting that no logical demonstration of conscious experience in animals was possible, she still believed it worth while to consider the nature and limitations of such experience, provided it was present at all. For example, since the rabbit shows no power of discriminating red from green, we may safely draw the negative conclusion that these color sensations are absent from this animal. Since some fishes do discriminate in their behavior between light of different wave lengths, we may safely infer that they get different sensations from the different wave lengths—provided, that is, we assume the fish to have any sensations at all. This inference is somewhat weakened, to be sure, by the absence from the fish's brain of a cerebral cortex which in man appears to be necessary for conscious experience. The more similar the anatomical structure, as well as the behavior, of an animal to man, the more confident we feel in assuming conscious experience in the animal.

“Our acquaintance with the mind of animals rests upon the same basis as our acquaintance with the mind of our fellow man; both are derived by inference from observed behavior. The actions of our fellow men resemble our own, and we therefore infer in them like subjective states to ours: the actions of animals resemble ours less completely, but the difference is one of degree, not of kind. . . . The mental processes in other minds, animal or human, cannot indeed be objectively ascertained facts; the facts are those of human and animal behavior; but the mental processes are as justifiable inferences as any others with which science deals. . . . We know not where

consciousness begins in the animal world. We know where it surely resides—in ourselves; we know where it exists beyond a reasonable doubt—in those animals of structure resembling ours which rapidly adapt themselves to the lessons of experience. Beyond this point, for all we know, it may exist in simpler and simpler forms until we reach the very lowest of living beings.”²

The point of view thus clearly expressed in 1908 in the first edition of Dr. Washburn's book, *The Animal Mind*, was maintained in the later editions of 1917, 1926, and 1936. Meanwhile, beginning about 1912, the radically different “behavioristic” point of view became prominent and influential. The behaviorists argued that since “the facts are those of human and animal behavior,” the theories also should remain at the behavior level, and that the whole of psychology should treat of behavior only with no reference to conscious experience. She regarded this scrapping of the extensive knowledge gained by introspective methods in the study of human sensory processes as a wasteful and essentially stupid procedure and as one which would rob animal psychology of most of its interest and fruitfulness. For it is by reference to our own experience that we are able to interpret animal behavior in a meaningful way, and it is by use of our own experience that we can formulate fruitful hypotheses to be put to the necessary behavioral test of experiment. Such visual phenomena as after-images and flicker are known at first hand in our own sensory experience and can be used for setting up hypotheses to be tested in animal behavior. Even John B. Watson's famous theory of human thinking as consisting of minute speech movements was probably suggested by the everyday *introspective observation of silent speech in thinking*. Such was Dr. Washburn's argument in her presidential address before the American Psychological Association in 1921. A dualism of physical and mental processes seemed to her inescapable, no matter how strongly one might prefer a monism. Red as a physical stimulus has a certain wave length, but the sensation of red has no wave length. Heat as a physical stimulus is a mode of motion, but the sensation of warmth is something

² From M. F. Washburn: *The Animal Mind*. Copyright, 1908, by The Macmillan Company and used with their permission.

entirely different from motion. In their zeal for a physical monism the behaviorists were proposing to deny the existence of sensations or at least to regard them as of no possible scientific interest. Miss Washburn regarded sensations and other conscious experiences as both real and important for science.

In *The Animal Mind* the problem of consciousness in animals recurs in relation to the different senses, space perception, memory, problem solution, etc., but does not by any means dominate the book. The book is, rather, a comprehensive survey of animal behavior, based on a critical analysis of the literature which even in 1908 demanded a bibliography of 476 titles, increasing from edition to edition up to a total of 1683 titles. This pioneer treatment of the subject was influential in the development of animal psychology. In its successive editions can be found many judicious interpretations and ingenious suggestions, some of which are still awaiting the attention they deserve. How do ideas, as distinct from sense perceptions, first arise? Her suggestion (1908, p. 273) was that they probably arose as anticipations of what was about to happen rather than as memories of what had happened. When is the drive toward a goal strongest? She suggested (1936, p. 379) that it reached its peak just as the goal was on the point of being attained, so that the successful act which reaches the goal is done with the strongest drive and therefore becomes most strongly associated with the drive. Here we have the germ of a possible future theory of learning, a theory which would apparently avoid most of the pitfalls of existing theories.

One of her theories which she worked out most thoroughly was a motor theory of ideas and of perceptions as well. In the presence of an object we have a sensory impression of it; we get the look of it, the sound of it, or the feel of it. In the absence of the object we may be able to revive this sensory impression so as to remember how it looks, sounds, or feels. According to the older theory, our idea of an object consists of these revived sensory impressions. But we are motor creatures as well as sensory. There is something more to a perception than a sensory impression; there is an incipient movement, a readiness to approach and manipulate the object, or per-

haps to avoid it. Different objects are manipulated differently, and the motor theory holds that each perceptibly different object awakens a different motor readiness. Similarly, the idea of an object is more than a revived sensory impression, for it involves an incipient movement, a readiness to manipulate the object in the characteristic way. Motor readiness can easily be demonstrated in animals—as in the dog ready to chase a ball as soon as you throw it—but whether animals have the power of reviving sensory impressions is very doubtful. So it would seem that the motor element in an idea is more primitive and fundamental than the sensory element. The power of reviving sensory impressions may well be a derivative of the power of making anticipatory movements. Motor anticipation may give rise to sensory anticipation. Consider an animal ready to execute a certain movement but forced to wait for a starting signal—to wait for the ball to be thrown—nerve energy may overflow from the motor to the sensory cortical areas and produce a sensory experience, an idea of what is about to happen. Ideas would arise, then, when motor activity is partially blocked.

Learning, according to this theory, is primarily a motor affair and consists in the association of movements into regular series and simultaneous combinations, the association taking place by way of the muscle-sense stimuli produced by the contraction of the muscles. When two movements are made in quick succession, the muscle-sense stimuli produced by the first movement reach the brain in time to play a part in the innervation of the second movement, and thus the two movements become chained into an integrated sequence, as in the pronouncing of a two-syllable word. Much more elaborate movement systems are developed by an extension of this process. Ideas, being in part motor affairs, are associated in the same way. A group of ideas becomes an organized system by the integration of their motor components. Incompatible ideas are such as demand incompatible movements. The enormous number and variety of human ideas are provided for by the variety of possible movements of the hands, eyes and speech organs. Meanwhile the large muscles of the trunk and limbs play their part in thinking, for it is they that assume the postures of ex-

pectancy, doubt, questioning, acceptance or rejection, and persistent purposive activity.

This motor theory was foreshadowed in some of her early papers, worked out with great care in her book of 1916, clearly and briefly presented in her two papers of 1928, and outlined in her contribution to the collection, *Psychologies of 1930*. As she explains in this last article, some such physiological theory seems to be demanded by the nature of scientific thought (p. 81) :

“So far as we can comprehend it, the world involves two types of processes: (a) material processes . . . and (b) mental processes. . . . The material world is a sum of movements, but no sensation quality can ever be identified with a movement. Blue may be caused by movement of a certain frequency, but it is not itself a movement. . . . The world of qualities or conscious processes never affects the world of movements or material processes causally. . . . It is only a movement or material process that can cause or in any way influence another material process.”

To which may be added a sentence from 1928 (p. 104) :

“While consciousness exists and is not a form of movement, it has as its indispensable basis certain motor processes, and . . . the only sense in which we can explain conscious processes is by studying the laws governing these underlying motor phenomena.”

In spite of her persistent labors on this theory Miss Washburn was at heart an experimentalist. “The results of experimental work,” she said in her autobiography, “if it is successful at all, bring more lasting satisfaction than the development of theories.” She was an active member of the Society of Experimental Psychologists, whose custom it is to get together in informal round-table discussions of research in progress. With a Vassar colleague she won the Edison prize for an experimental study of “the emotional effects of instrumental music.” Her long list of experimental studies has already been mentioned.

She also took an active part in organizational matters, being an excellent collaborator and committee member. Many honors and responsibilities came to her from her psychological colleagues. She served at different times as President of the

American Psychological Association, as President of the New York Branch of that association, and as Vice-President of the American Association for the Advancement of Science and chairman of its psychological section (Section I). Twice, in 1919-1920 and again in 1925-1928, she was a member of the Division of Anthropology and Psychology of the National Research Council. As chairman of an American Psychological Association committee and of a National Research Council committee she played a leading role in inaugurating the valuable journal, *Psychological Abstracts*. She carried editorial responsibilities in several journals, especially the *American Journal of Psychology* which she served for thirty-six years. Her colleagues on the journals, in recognition of her eminent services, joined in 1927 in presenting to her a Commemorative Volume of the *American Journal of Psychology*. A woman of great personal charm she also possessed in high degree the desire and ability to collaborate on terms of perfect equality with all colleagues, male and female, young and old. For three decades an active and productive member of the scientific fraternity, she well deserved the honor of membership in the National Academy of Sciences.

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MARGARET FLOY WASHBURN: VITA

Born in New York City, July 25, 1871. Died in Poughkeepsie, N. Y., October 29, 1939.

Vassar College: A.B., 1891; A.M., 1893. Cornell University: Ph.D., 1894. Wittenberg College: D.Sc., 1927.

Wells College: Professor of Psychology, Philosophy and Ethics, 1894-1900.

Cornell University: Warden of Sage College, 1900-1902; Lecturer in Psychology, 1901-1902.

University of Cincinnati: Assistant Professor in charge of Psychology, 1902-1903.

Vassar College: Associate Professor in charge of Psychology, 1903-1908; Professor of Psychology, 1908-1937; Professor Emeritus, 1937-1939.

American Psychological Association: Member of Council, 1912-1914; President, 1921.

American Association for the Advancement of Science: Vice-president and Chairman of Section I, 1926.

National Research Council, Division of Anthropology and Psychology: Member, 1919-20, 1925-1928.

National Academy of Sciences: Member, 1931-1939.

New York Branch of the American Psychological Association: President, 1931-1932.

Society of Experimental Psychologists: Chairman, 1931.

International Congress of Psychology: Member National Committee, 1929; Member International Committee, 1929-1939.

National Institute of Psychology.

New York Academy of Sciences.

American Philosophical Society.

Phi Beta Kappa.

Sigma Xi.

American Journal of Psychology: Cooperating Editor, 1903-1925; Co-editor, 1926-1939.

Psychological Bulletin: Cooperating Editor, 1909-1915.

Psychological Review: Advisory Editor, 1916-1930.

Journal of Animal Behavior: Associate Editor, 1911-1917.

Journal of Comparative Psychology: Associate Editor, 1921-1935.

Dictionary of Psychology: Advisory Board, 1934.

KEY TO ABBREVIATIONS

Amer. J. Psychol. = American Journal of Psychology.

J. Animal Behav. = Journal of Animal Behavior.

J. comp. Neurol. Psychol. = Journal of Comparative Neurology and Psychology.

J. comp. Psychol. = Journal of Comparative Psychology.

J. Phil. = Journal of Philosophy, Psychology and Scientific Methods.

Phil. Rev. = Philosophical Review.

Phil. Stud. = Philosophische Studien.

Proc. Nat. Acad. Sci. = Proceedings of the National Academy of Sciences.

Psychol. Bull. = Psychological Bulletin.

Psychol. Rev. = Psychological Review.

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