

5) M. Rose suggested a means of avoiding one difficulty which besets the correlation of successive radiations. The difficulty is that the nucleus may be randomly disoriented by external effects in the stage between the successive radiations. He suggests using the ratio of the gamma-gamma correlations, to correlations between one gamma ray and an atomic electron kicked out by the second. Both types of correlations are identically affected by the nuclear disorientation.

6) Rose also discussed the very sensitive method of correlating the *direction* of one gamma ray with the *polarization* orientation of the other. He laid down the general rules for interpreting such measurements.

A more comprehensive report of the above proceedings has been prepared. A limited number of copies are available at the Indiana University Physics Department.



Walter T. Swingle: 1871—1952

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WALTER T. SWINGLE was one of the most inspiring men who ever entered my life, and the lives of many others. Personally, I owe to him my first lesson in botany at the age of 7, my first job, in the Department of Agriculture, at the age of 17, and my first knowledge of the fact that science is more than experimentation.

David Fairchild recently reminded me of the little intellectual sanctuary which I claimed as my own, beneath the seminar table in my childhood home. There, ensconced, refusing to come out at my mother's command, I heard Dr. Swingle tell of the date palm which he hoped to introduce into America, and later did; of the Chinese trifoliate orange which he thought would be excellent stock for the grafting of the sweet orange, as it was; of the mangosteen, "fruit of the gods" he called it; and I took a solemn vow to taste of it, and 40 years later did so; of Java coffee, Egyptian cotton, and bacteria—for Swingle was as much a plant pathologist as he was a horticulturist. The discussions at the seminar table under which I sat had often to do with plant diseases, Merton White taking the side of the fungi and Erwin Smith holding out for the bacteria, the argument having to do with the cause of pear blight. "Willie," Dr. Swingle said to me, "every particle of dust in the air is covered with bacteria." Dr. Fairchild has said that he, too, first heard of bacteria from Dr. Swingle. The isolation of anthrax and immunity through inoculation had been accomplished only ten years previously by Pasteur. What, I am sure, was the first culture transfer room ever to be constructed in America was made by Swingle and Fairchild in 1890 at the Kansas State Agricultural College, where they were students together. It was an old piano box lined with cotton cloth soaked in a solution of corrosive sublimate. Into this supposedly septic box these two alternately crawled.

Among his many plant interests those of the orange and the date occupied most of Swingle's time. I recall with pleasure one citrus hybrid, the citrange, for I was then the only American boy who had had citrange-ade. The citrange was a cross between the sweet orange and the trifoliate orange. Better known is the hybrid between the tangerine and the grapefruit, which yielded the tangelo, now extensively grown in Florida. It should be remembered that in Swingle's earliest years the orange, date, and fig were mere names in America. In writing to Fairchild from Florida about 1892, Swingle described the orange tree as "something like an oak with bright yellow fruits hanging from its branches." Swingle's work on citrus not only took him on many long journeys in the Orient, but on another pleasant journey, that of marriage with Maude Kellerman, who had demonstrated the practicability of keeping pollen viable long enough to ship halfway around the world (before the days of air mail!), thus bridging the time between flowering periods of different species.

Swingle's work with the date and his treatise on date culture, which is a classic, have so overshadowed his other work that most of it is unknown except to his closest friends. His comparative studies in ecology in Algeria, Arizona, and California, and his introduction of the fig insect, *Blastophaga*, from Algeria into California, which made possible the successful culture of the Smyrna fig, are widely known, but who has heard of his interest in optics which resulted in his persuading Zeiss to make a lens of diamond based solely on Swingle's calculations? And who knows of his work in ultraviolet photography, in which I had a hand? He had me set up a complete equipment of which the cytologist, Yamaguchi, was to have charge, but Yamaguchi never got farther east than Chamberlain's laboratory in Chicago.

Swingle saw the applicability of every brand of science that would conceivably throw light on a bio-

logical problem. The mitotic figure in dividing cells he thought might be a magnetic field. Today we still recognize the superficial resemblance. And so he persuaded Lyman J. Briggs to join him in subjecting dividing animal eggs to a high electromagnetic field. Swingle had the rare quality of giving a research problem to others if he thought they would do it better. He sent me to work with Dr. Briggs so that the findings of Sir Oliver Lodge could be tested. Lodge claimed a great increase in yield from plants subjected to high-voltage static electricity. During three years we stimulated everything, but only Dr. Briggs and a government mule were visibly affected.

The amount of work that Swingle accomplished was phenomenal. One of his undertakings has resulted in the Library of Congress possessing the largest and richest collection of Chinese books outside the Orient. This one activity alone, involving the acquisition of over 100,000 volumes and the active participation of ambassadors, ministers, eminent orientalists, and the Empress Dowager of China, would have been a lifetime occupation for the average scholar but was merely incidental to Swingle's major work.

I presume the world at large will remember him because of his contributions to science and oriental literature, but for me he will always remain what the Germans call "ein grosser Geist"—greater than a scholar and more human than a genius. Swingle managed to convey not only the joy of scientific research but also the mental satisfaction to be derived from pure observation. As Swingle said many years ago, "Look and look again and again. Experiments are not necessary in order to learn, and experimental work without observation can leave one woefully ignorant."

He would not have studied the chromosome picture of a plant, or have cross-pollinated it, or isolated a protein from it, or have analyzed the soil where it grows, without first knowing the plant. He was the very antithesis of the "uneducated expert."

So brimful of ideas was he that at the Department of Agriculture it was said, "As long as Swingle is here, there will be no dearth of ideas." Though he was creative by nature, I believe his years in Europe helped for they made a lasting impression. He spent a year with Strassburger at Bonn in 1895 and a year

with Pfeffer at Leipzig in 1897. His association with Strassburger resulted in work at the Naples Marine Laboratory and the publication, with Strassburger, Fairchild, and others, of articles which filled an entire volume of Pringheim's *Jahrbücher für wissenschaftliche Botanik*. He never lost contact with European and North African laboratories and experimental stations.

Much is said these days about the integration of knowledge, and much is attempted in the way of international good will through mutual scientific interests. I have been associated with several such undertakings and have wondered if Swingle did not embody the qualities necessary for them to a greater degree than any two dozen men who have attempted to achieve them. He knew the meaning of intellectual good will. He was of an affectionate nature and felt deeply and warmly toward all people, and he often assumed their welfare to be a personal responsibility. To meet him was a delightful experience. He made you feel as if you were the only person in the world who mattered at the moment, and he meant it. His concern for others was often dramatic in its intensity. He once told me that, given the chance, he could save China from famine. He had developed a drought-resistant cereal, which, he said, would grow on upland Chinese deserts. The Department of Agriculture was often put to it to decide whether to hold Swingle's enthusiasm in check or let him have his way at the risk of a fiasco. Few things annoyed me more in connection with the Department than this check on him. For me he *was* the Department of Agriculture, and those who kept him in check are today unknown.

To be told when and where he was born, at Canaan, Pennsylvania, in 1871, and when and where he died, January 1952, in Washington, D. C., is of less importance than to know that he lived and inspired more agricultural botanists than any other one man. To have known him as a man and as a scientist was a great privilege. He was as kindly as he was brilliant. I never saw a photograph that did not show him with a smile and a little twinkle in his eye. It's good that he lived when he did, when the world of science needed men of his enthusiasm. The present Department of Agriculture and the world at large are foreign to his temperament. More callous characters than his are needed to cope with those forces which hold so many in check today.

