

Comment

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FOR ANY invention or idea to succeed, several elements must be available—and though each may not have equal weight, each can compensate for the other in some manner. The idea or invention in this case is hybrid corn. The ingredients include the proper promoter, the circumstances, and the time. There is little doubt, as this symposium will amply illustrate, that the proper promoter was Henry A. Wallace. The circumstances include a fertile land ready to be used to exploit this idea by struggling farmers. The time was the period when the proper promoter was at an age and maturity when the emerging idea was ready for its proper exploitation. It is my purpose here to review the ingredients that catapulted the hybrid corn discovery into the prominent position that it plays in our lives today.¹

Throughout his career and even after he was encumbered by the Washington political scene that he joined in 1933, Henry Agard Wallace expressed the characteristic curiosity and interest that he gained when he first became exposed to the wonder of plants by G. W. Carver and by his own immediate family. This early exposure and sympathetic tutoring must have aroused his insatiable appetite for knowledge that persisted even through his retirement on his farm, Favue, in Westchester

1. *Report of the 1982 Plant Breeding Research Forum*, August 11-13, 1982, Des Moines, Iowa.

County, New York.² Wallace is characterized as the "proper" promoter because he had "hands-on" experience with the product he was promoting. Without that self-conviction in the concept of hybrid corn that he cultivated, his tenure in the hybrid corn venture might have been short-lived.

As illustrated in Dr. Brown's presentation, profits were minimal. Return in investment was not appreciable. As late as 1929, no hybrids were on Iowa State College Experiment Station's list of recommended strains and varieties for the different regions of Iowa.³ Yet, Wallace was able to convince his supporters and colleagues of the potential fruitfulness of hybrid corn. Despite a minimal number of positive signs and numerous negative ones (low profits, slow farmer acceptance, low corn prices), he forged ahead by forming a company, hiring salaried employees, establishing a breeding farm, and setting a standard for the proper approach to this plant breeding venture.

His exposure in his early youth to growing corn and to following carefully individual plants and their progeny provided him with an unusually intimate picture and feeling for this plant. This experience along with his far-sighted vision of its future convinced him that with proper methodology, the heredity of these plants could be manipulated readily. Dr. Brown quotes many instances of his close intimacy to these plants.

Though he probably had an emotional attachment to these inbred lines that he carefully nurtured he was certainly ahead of his time in applying a critical judgment to their value as suitable parents in developing hybrids. No longer was he satisfied with corn ears stacked on corn trays in the traditional corn shows. Nor did he think that the careful examination of corn ears that students in the Farm Crops course were exposed to was the answer to performance. Nor was he satisfied to observe the piles of corn ears at the end of a row in a field yield trial. That he was interested in a more objective appraisal of the potential performance of hybrids, separated from an emotional attachment to

2. William L. Brown, "H. A. Wallace and the Development of Hybrid Corn," above.

3. H. D. Hughes, Joe L. Robinson, and A. A. Bryan, "High Yielding Strains and Varieties of Corn for Iowa," *Iowa Agricultural Experiment Station Research Bulletin #265*, (Ames, 1929).

parents carefully nurtured in breeding nurseries, is evident in his instrumental role in helping found the Iowa State Statistical Laboratory in 1933. From his frequent experiences with yield trials and with breeders holding strong biases that influenced a clear definition of performance, he must have been convinced that some objective vehicle for judgement was needed. This could be provided by proper statistical procedures that were necessary in order to resolve the performance of hybrids in competitive yield trials. This could come only from a strong conviction and faith in the product (hybrid corn) and this from his personal experience of handling corn since his early youth.

Wallace continued to maintain the broad picture. When he found the right corn breeder—Raymond Baker—to handle those operations, he willingly left those decisions to him. He pursued the same course with production (Field, Garst and Thomas) as well as with legal and financial affairs.⁴ He quickly assembled a strong team so that he was free to go to Washington by 1933.

It is difficult to judge what role "imprinting" in early childhood plays in one's future behavior. With Henry Wallace there is a consistent pattern calling for social justice. This, coupled with his knowledge of what could be done by manipulating corn, prompted him to better the farmer's plight with improved hybrids and then with promotion of this conviction through the vehicle of *Wallaces' Farmer* and finally in his role of secretary of agriculture, with the development of farmer-oriented farm programs.

What would hybrid corn have been without the promotion provided by Henry Wallace? Unquestionably, it would have eventually succeeded. Though his early experiments in 1913 at the age of twenty-five were done five years after the scientific basis of hybrid corn was established, many problems of seed development, plot techniques, rigorous criteria of evaluation, production methods, and others had to be solved.⁵ It is no wonder that farmer acceptance was delayed despite regular suc-

4. Interview with Raymond E. Baker, Des Moines, Iowa, May 1983.

5. George H. Shull, "The Composition of a Field of Maize," *Proceedings of the American Breeders' Association* 4 (1908), 296-301; Shull, "A Pure Line Method of Corn Breeding," *Proceedings of the American Breeders' Association* 5 (1909), 51-59.

cesses of his hybrids in yield trials. This delay was short-lived: Iowa farmers universally accepted the concept by the late 1930s.⁶

Wallace's commercial venture began in 1926 and in less than ten years Iowa hybrids were outyielding the best open-pollinated strains by ten bushels to the acre.⁷ (This date was only eighteen years after the hybrid corn idea was scientifically established.) Ten years after this (late 1930s), there was universal acceptance by Iowa farmers. Such a time gap is relatively rapid for a new idea. But there was a rapid dissemination of the advantages of hybrid corn via *Wallaces' Farmer*. This time scale compares favorably with other applicable uses between initial discovery and final application. The discovery of isotope labeling in 1935, so useful that it is obligatory today in many biological experiments, did not find common usage for approximately fifteen years. A similar time lag occurred with the prime ingredient in today's bioengineering. The initial discovery of enzymes that cut DNA (an essential feature in DNA manipulation) in 1962 took nearly fifteen years to assume final usage.⁹ And in a final example, the discovery of the movement of DNA in unconventional means in the early 1950s did not find ready acceptance and final investigative appeal for usage for thirty years.¹⁰

So, in reviewing Henry A. Wallace's role in hybrid corn, it is possible to see the fateful events take shape beginning with Grandfather "Uncle Henry" Wallace's departure from Pennsylvania to Iowa. His support and enthusiasm for the education of his son, Henry C., sent the younger Wallace to Ames as a student and later to serve on the staff and began a series of events

6. Bryce Ryan and Neal Gross, "Acceptance and Diffusion of Hybrid Corn Seed in Two Iowa Communities," *Iowa Agricultural Experiment Station Research Bulletin #372*, (Ames, 1950).

7. A. A. Bryan and R. W. Jugenheimer, "Hybrid Corn," *Iowa Agricultural Experiment Station Research Bulletin #366* (Ames, 1937).

8. O. Chiewitz and G. Hevesy, "Radioactive Indicators in the Study of Phosphorus N219 Metabolism in Rats," *Nature* (London) 136 (1935), 754.

9. D. Dussoix and W. Arber, "First Specificity of DNA Reduced by *Escherichia Coli* II," *Journal of Molecular Biology* 22 (1962), 183; W. Arber, "Specificites biologiques de l'acide desoxyribonucleique," *Pathologia et Microbiologia* (Lausanne), 25:668.

10. Barbara McClintock, "Chromosome Organization and Genetic Expression," *Cold Spring Harbor Symposia in Quantitative Biology* 16 (1951), 13-47.

that led to the setting for the development of the person we are concerned with today. It was the right time and circumstances for the role he was to play. With the early introduction to plants from his tutor G. W. Carver, he was ready when he was exposed to the Farm Crops courses at Iowa State College of Agriculture and Mechanic Arts. Further, his questioning attitude—his unwillingness to accept the validity of corn plants' potential performance from the traditional observation on the corn tray—led him to do his own experimenting which raised more questions. He repeatedly confronted new problems to solve. Thus this intuitive questioning attitude attributed to his family atmosphere (activist father and grandfather) and his very early hands-on experience with the product that he promoted and eventually began to sell, prompted Henry A. Wallace to play the prominent role that he did in the development of hybrid corn. The legacy he left behind, the company that he founded, clearly shows the earmarks of his own unique characteristic of always questioning to promote progress.

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