The Establishment of Agricultural Research

Agricultural Science and the Quest for Legitimacy. Farmers, Agricultural Colleges, and Experiment Stations, 1870–1890. ALAN I. MARCUS. Iowa State University Press, Ames, 1985. x, 269 pp. $22.50. Henry A. Wallace Series on Agricultural History and Rural Studies.

During the decades after 1870 the rise of big business and big government in the United States signaled the transformation of a mainly rural, localized society into the world's leading industrial and financial power. Among the changes that accompanied this transformation was a growing recognition of the importance of science. For its enthusiasts, "science" had more than one meaning, however, and varying interpretations given the idea produced conflict because each had direct and very different implications concerning resource allocation and expected results. In this book Alan I. Marcus deals with one instance of these conflicts, the conflict among farmers, agricultural schools, and agricultural scientists at the end of the 19th century.

By the 1870's, few doubted the need for scientific agriculture or the value of creating what became known as experiment stations. But as soon as anyone attempted to put this generally accepted idea into practice furious debate began. Scientists themselves divided on the value of field experiments. Some insisted that true scientific research required laboratory conditions where variables could be controlled and research replicated. Others argued that scientific research in agriculture could have little meaning unless it was conducted under real field conditions, with variables to be assessed by comparison of many field experiments under varying conditions.

Farmers disagreed with the scientists and among themselves as well. Most supported the advocates of fieldwork, but they divided over the meaning of scientific agriculture and therefore over what fieldwork should attempt to do. For some, science meant simply system; farmers should be taught the best means to conduct their business, and therefore fieldwork should be primarily demonstration. Others insisted that fieldwork be devoted primarily to testing scientific discoveries to determine which could be of practical use for the working farmer.

Still other disagreements surfaced in the debates over laboratory versus field and science versus system. Many farmers distrusted the new agricultural colleges, which they felt should teach young people how to be successful farmers but instead were teaching science, conducting experiments, and, worse, providing an academic education. Many agricultural college professors, on the other hand, although willing to drop many elements of a classical education, defended their programs as the only means to advance agriculture and insisted that future farmers could learn practical farming techniques on the job. State agricultural societies, state departments or bureaus of agriculture, boards of trustees of the agricultural colleges, and members of legislatures representing farming constituents regularly disagreed among themselves on program, emphasis, expenditures, and facilities location. When many states established the office of state chemist with the primary responsibility of testing and evaluating fertilizers, the chemists themselves could not agree on uniform testing and evaluation procedures, causing fertilizer producers, often with their own chemist authorities, to complain of unfair treatment and seek redress from the legislatures.

Conflicts inevitably became political, and the disputants—as many other groups were coming to do—recognized the importance of organization to advance their causes. Many were already organized; others created a variety of new organizations to increase their political influence. Although initially the various factions concentrated their attention on individual states, they increasingly looked to the national government, seeking reform of the United States Department of Agriculture and cabinet status for its head, the Commissioner of Agriculture. The national emphasis renewed the old conflicts and created some new ones as well. Some wanted national, USDA-run experiment stations; others wanted federal financing but state control, the question of who would exercise that control—the colleges, the legislature, the agricultural societies, or independent state agencies—becoming a subject of further controversy.

Given these disagreements, it is a wonder that any experiment stations ever appeared. But, as Marcus carefully shows, a few politically astute leaders managed to work out compromises that settled, or at least papered over, major differences, leading to the success of a few stations, mainly in the Northeast and the Midwest. Finally, compromise reached the national level, and in 1887 Congress passed the Hatch Act, which provided every state with a $15,000 annual appropriation to fund an agricultural experiment station. Although the new law did not completely satisfy everyone and did not end the old debates, it tipped the balance in favor of the laboratory scientists and the agricultural colleges.

Marcus has provided a valuable discussion of the early history of agricultural science and of the efforts of scientists to become professionals who would, through their scientific endeavors, provide leadership and direction to the nation's farmers. Although he recounts in great detail the oppostion the scientists faced in their task to legitimize their efforts, what is remarkable about the story he tells is how quickly the scientists won their point despite that opposition. Additional comparative studies of efforts by economists, business managers, and others who fought analogous battles would immeasurably increase our understanding of the role of science in the creation of modern America.

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An Educational Nexus

The School and the University. An International Perspective. BURTON R. CLARK, Ed. University of California Press, Berkeley, 1985. xii, 338 pp. $32.50. Based on a seminar, Los Angeles, July 1983.

The relationship between secondary and higher education, falling as it does between two specializations with different research agendas, has received relatively little scholarly attention. Yet this relationship governs the allocation of strategic educational opportunities and for that reason alone is a key factor in the way educational systems operate. This collection of papers addresses the subject at a timely moment as American secondary education is being berated in widely publicized reports for its academic failings. The collection provides, among other things, a chance to assess our educational system in comparison with those of other societies.

The contributions cover, in addition to the United States, Britain, France, West Germany, Sweden, and Japan—postindustrial countries facing similar problems in providing advanced education to a high proportion of young people—and Africa, China, and Latin America—developing societies where (especially in the first two cases) availability of educational institutions is a limiting factor. All the papers address a common set of issues, thereby facilitating comparison; rather than occasional pieces, the authors have provided factual accounts that elucidate basic characteristics of the