



ANNUAL REVIEW OF PHYTOPATHOLOGY

VOLUME 34, 1996

HISTORICAL PERSPECTIVES
DIAGNOSIS AND APPRAISAL OF PLANT
DISEASE
FUNGI, BACTERIA, MOLLICUTES,
NEMATODES, AND VIRUSES AS
PLANT PATHOGENS
ABIOTIC STRESS FACTORS
MORPHOLOGY, ANATOMY, AND
PHYSIOLOGY
BIOCHEMISTRY AND MOLECULAR
BIOLOGY
ECOLOGY AND EPIDEMIOLOGY
BREEDING FOR RESISTANCE
BIOLOGICAL, PHYSICAL, AND CHEMICAL
CONTROL



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TRIBUTE TO KENNETH F. BAKER (1908–1996)

Kenneth F. Baker made major contributions for over 60 years to the science of plant pathology. These have been in two principal areas: his original and extensive publications on the biology and control of plant diseases, especially diseases caused by soilborne plant pathogens; and his invaluable service and contributions to the *Annual Review of Phytopathology*.

Ken's research specialties were diseases of nursery and ornamental crops, seed pathology, steam-air treatment of soil and plant propagules, biological control of plant pathogens, and history of plant pathology. His book, *The UC System for Healthy Container-Grown Plants*, published in 1957, set the stage for the permanent success of the ornamentals and nursery industries, and is still used today. His 1965 book with WC Snyder, *Ecology of Soil-Borne Plant Pathogens—Prelude to Biological Control*, representing the proceedings of the famous 1963 Berkeley Symposium, remains unquestionably to this day the definitive base book in this area. This was followed by his two books with R James Cook on biological control of plant pathogens, creating the scientific framework in place today for this area of science and practice.

It is through *Annual Review of Phytopathology* that Ken has made one of his most lasting contributions. Ken's service to the *Annual Review of Phytopathology* began with his appointment to the first Editorial Committee in 1962, when this series was launched with James G Horsfall as Editor. Ken served as Editor with great dedication and distinction from 1972 to 1977. Ken was a scholar of the scientific literature, and remained a friend and close associate of *Annual Reviews*. Then in 1991, together with Katharine, his wife of nearly 50 years and a plant scientist herself, Ken provided an endowment known as "The Baker Gift." The purpose was "to promote the field of plant pathology through the *Annual Review of Phytopathology*," as stated by then editor R James Cook in the Preface to Volume 32.

This gift has made it possible to provide each new volume of *Annual Review of Phytopathology* on a continuing basis to a wide range of libraries that serve plant pathologists and nematologists in developing countries as well as on a one-time basis to each new PhD in North America whose dissertation was on a plant disease. The gift has also provided funds to include color and other high-quality illustrations in the *Annual Review of Phytopathology*.

In 1994 and 1995 the Baker Gift was used to launch *Annual Reviews* into the electronic age of publications, with *Annual Review of Phytopathology* as the first to be produced on CD ROM, including volumes back to 1985. Ken was an innovator and his work was both first class and timeless. This new medium

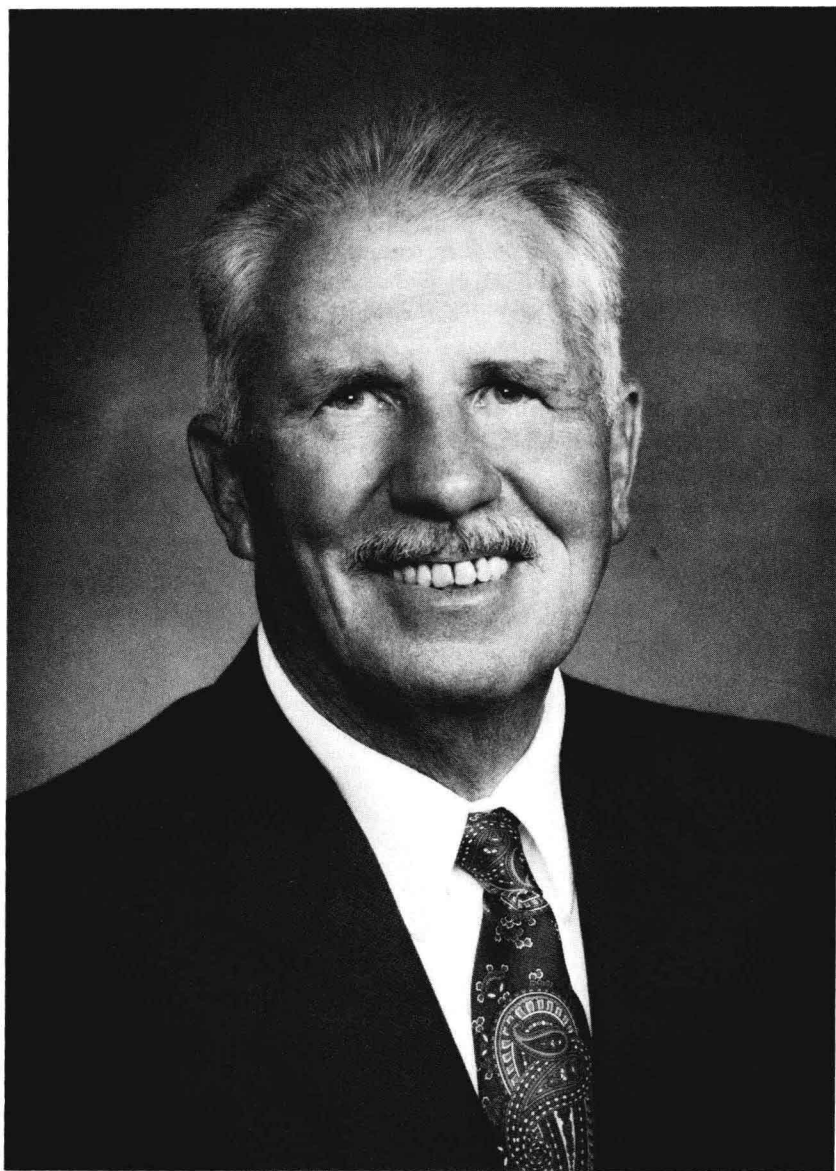
of publication of his cherished *Annual Review of Phytopathology* is therefore a fitting and lasting memorial for Ken Baker in the field of plant pathology.

Ken Baker's interest in the arts was legendary, including especially grand opera and classical music. His home always had the ultimate in sound and visual systems.

Ken's Prefatory Chapter in the 1982 volume of *Annual Review of Phytopathology* is a classic and a fine example of his capabilities in writing and thinking. That chapter should be required reading for all graduate students in plant pathology, as well as in other agricultural and biological sciences.

Ken received his PhD from Washington State University, with FD Heald in 1934. Most of his professional career was as Professor of Plant Pathology at the University of California, first at UCLA and then at Berkeley, with his final position as Courtesy Professor at Oregon State University and Collaborator at the U.S. Department of Agriculture, Agricultural Research Service at Corvallis, Oregon, until his death there April 16, 1996. Ken received many awards and honors and several Florists and Nursery Associations honored him for his outstanding contributions.

R JAMES COOK
GEORGE A ZENTMYER



A. H. Weinfeld



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PLANT PATHOLOGY: A Discipline at a Crossroads

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KEY WORDS: plant pathology, management of plant disease, problem-solving research, reorganization, graduate education

ABSTRACT

The Department of Plant Pathology at the University of California at Berkeley was destroyed as a consequence of a contentious reorganization. The circumstances that led to the reorganization provide some insight into the challenges facing the discipline of plant pathology. The underlying basis for plant pathology as a science is to address problems of plant disease. This requires a balance between disciplinary and problem-solving research and a continuum from achieving fundamental advances in knowledge to the development and implementation of problem-solving approaches. Changes in colleges and universities have placed extreme stress on this essential structure. The dilemma that must be addressed is how to reestablish the problem-solving continuum where it has been broken and strengthen it where it has been weakened. Plants are essential for life, and they will always be affected by disease. The understanding and management of these diseases is the responsibility and the challenge of plant pathology today and in the future.

INTRODUCTION

I am pleased to present some thoughts and, I hope, useful perceptions on the current status of plant pathology and on challenges for the future. I do not claim any unique insight into what the years ahead will bring to plant pathology and related disciplines, other than the benefit of an involvement with plant pathology that spans over four decades. My views are naturally influenced by my activities within our Society and by a career in a land-grant institution. During my career I have observed, and attempted to address, problems facing departments in the agricultural sciences from the perspective of a faculty mem-

ber and department chair. I also served as Acting Dean of our college and was on a special assignment in the office of the Vice President for Agriculture and Natural Resources.

The career I have outlined is not appreciably different from that of many of my colleagues throughout the country, except in one respect: I witnessed, and struggled against the dissolution of several nationally ranked agricultural science departments, including plant pathology, at the University of California at Berkeley. This difficult period brought into focus the challenges plant pathology and related disciplines must face and the obstacles that must be overcome. It is significant that similar events have occurred in departments in other states, but none perhaps as drastic as at Berkeley.

At the outset let me state that I am not pessimistic. Plant pathology will survive and, I believe, prosper. Food and fiber are essential for life, and plant diseases will always be a significant factor in feeding an expanding world population. Some of the important questions are: In what form will plant pathology survive?; to what extent will it prosper?; and will it have the organizational structure to effectively address the problems of food and fiber production and the maintenance of our forests and wildlands?

First, I would like to recount some of the events that led to the demise of the UC Berkeley Department of Plant Pathology. It provides insight into some of the attitudes of administrators and colleagues that plant pathology departments and agricultural sciences as a whole are faced with in meeting the challenges of the future.

THE BERKELEY EXPERIENCE

Historical Background

The University of California at Berkeley was one of the first land-grant institutions in the country, and the College of Agriculture was one of the initial colleges at the University. The Department of Plant Pathology was established in 1907. Later, the University of California at Davis, which began as a farm for Berkeley field research, grew, and units from Berkeley were transferred to Davis. Transfer of positions, resources, and entire programs generally focused on elements considered to be too applied and not compatible with traditional Berkeley interests. By the 1960s, there was great pressure to justify the existence of the College of Agricultural Sciences and its role on the Berkeley campus, stemming, in part, from a lack of appreciation among our colleagues for the mission of the Agricultural Experiment Station (AES) and the problem-solving responsibilities that accompany an AES appointment. Faculty members from other departments tended to view 11-month appointments, AES support, and lower teaching workloads as a sinecure.

Repeated inquiries both from campus administration and from outside the University regarding the function of the agricultural sciences at Berkeley led to a reorganization in 1972. The College of Agricultural Sciences and the School of Forestry and Conservation were combined to form a College of Natural Resources. By eliminating the words "agriculture" and "forestry," many thought that the old prejudices might disappear. In the final analysis this did not occur; about all that changed was the name of the college and the shift of forestry from a school to a department. Just how a focus on natural resources was to develop and how it was to relate to California's problems was not clear then, and today the issue is still unresolved. Until recently, departments in the College, such as plant pathology and entomology, continued to function effectively, participated in statewide programs, and engaged in cooperative research with colleagues at Davis and Riverside.

However, after the 1972 reorganization a long time trend became apparent, and there was a steady shift in research focus as a result of promotion and appointment requirements of the Berkeley campus, loss of purchasing power of AES funds, and the need for extramural grant funds to maintain programs. Some individuals in the College continued to maintain programs with a balance between mission-oriented and fundamental research. Overall, however, the need for publications in prestigious, refereed journals and for projects that would attract grant funds took precedence over the quest for solutions to the many problems facing California's agricultural industry and its forests and wildlands.

Reorganization of the College of Natural Resources

What I view as the beginning of the end occurred over a period from the early to mid-1980s. The emergence of recombinant DNA technology and the associated modern molecular biology provided the impetus for a major and ultimately successful effort to obtain new facilities for biology at Berkeley: Two new buildings were constructed and the antiquated Life Sciences Building was completely renovated. The increased emphasis on molecular biology and the availability of modern laboratories provided the stimulus for a major reorganization of biological sciences at Berkeley. The College of Natural Resources (CNR) resisted major involvement in this reorganization on the basis that its disciplines and structure were well suited for serving the mission of the Experiment Station and for meeting the needs of the Berkeley programs. However, this delay was only temporary as departmental restructuring of biological science units outside of CNR and a major change in philosophy regarding biological sciences ultimately had a significant impact on the makeup and structure of the college. An important element was the effort to better coordinate the biological sciences on campus through the formation of the Chancellor's Advisory Council on Biology. Prior to this, departments in CNR were free to set priorities and develop programs with a minimum of external interference. This autonomy is

highly important because when deliberating critical issues such as filling open faculty positions, AES departments must give some consideration to the need for faculty with interest and ability to conduct research in critical problem areas related to the statewide agricultural research mission. Non-AES departments exist in a much less structured environment.

Other aspects of the reorganization affected the College, if not most of the departments. A new Department of Plant Biology was established in CNR, with faculty composed of plant biologists in the College who had previously been members of such other departments as genetics and cell physiology. About one half of the faculty came from the Botany Department, which was dissolved in the reorganization. Positions were thus transferred from the School of Letters and Sciences to CNR. If changes had stopped at this point, agricultural science departments such as plant pathology probably could have survived. Unfortunately, this was not the case.

A new Dean of CNR was appointed in 1987, and within two years the campus administration announced that there would be a review of the College. Significantly, the review committee appointed by the Provost did not include a representative of the AES office, even though the distribution of faculty appointments in the College averaged 33% I&R (teaching and research) and 67% OR (organized research). Organized research funds are from the AES, and programmatic responsibility resides with the Systemwide Vice President for Agriculture and Natural Resources. At a forum to initiate the review, there were representatives from various areas of the College and the campus at large but no one from the Vice President's office to represent the role and responsibilities of the AES.

The review officially began on March 1, 1990, and the committee, termed the Internal Review Committee, immediately changed its charge from "review the college" to "reorganize the college." The process of committee deliberations, reports, faculty reaction, additional iterations, etc, occupied one year. The Committee's final report, submitted in March 1991, proposed that faculty in existing departments be redistributed into five new departments. Plant pathologists would have been separated into three of these departments. The plan received very little faculty support. Consequently, a new committee, termed the "Drafting Committee," was appointed. Its report, submitted in October 1991, was less disruptive than that of the Internal Review Committee but it did break up both plant pathology and entomology. Again, there was very mixed faculty support. Some faculty considered the Drafting Committee proposal too conservative and they prepared an addendum. Both plans were presented for evaluation to an External Review Committee, which presented its report in February 1992. The Drafting Committee then reconvened and developed what was termed the "final plan." This plan did not follow the recommendations of the External Review

Committee, but rather called for three departments: Environmental Sciences, Resource Biology, and Economics and Policy, with Divisions to somewhat accommodate existing disciplines. This final plan probably had less support than any of the previous proposals. There were some themes recurring throughout all of the plans. These included proposals for a department to focus on environmental issues, variously called Applied Ecology, Ecological Science, and Environmental Sciences, and a department of Plant or Resource Biology. Plant pathology did not emerge as an intact department in any of the plans.

At this point, after two years of turmoil, there was, understandably, an atmosphere throughout the College of frustration and confusion, and for many a distrust of the administration, and, worse, the dramatically divergent views among faculty regarding the reorganization resulted in severe faculty polarization. Numerous letters of protest from faculty groups were sent to both campus administration and to the President of the University, but were either ignored or received a perfunctory acknowledgment. The stage was set, therefore, for a bizarre series of events. On April 9, 1992, the Dean submitted a document to the campus administration termed the CNR Final Plan. This can only be thought of as the "Dean's Plan." It was submitted by the Dean, and although it followed the proposal from the Drafting Committee in most respects, it did not have their approval because some significant changes had been introduced. The names of the Drafting Committee members do not appear anywhere on the document. Instead of the three departments outlined by the Drafting Committee, the Dean's Plan proposed four departments. Three were essentially the same as existing units: Plant Biology, Nutritional Sciences, and Agricultural and Resource Economics. The fourth department, Environmental Science, Policy and Management (ESPM), was composed of faculty members from Conservation and Resource Studies, Entomological Sciences, Soil Science, Forestry and Resource Management, and Plant Pathology. This megadepartment contained over half of the faculty in the College. After considerable debate, the Dean's Plan was approved by a faculty vote. Although many faculty approved of ESPM, for very different reasons, there is little doubt that the plan would not have been approved without the Dean's acceding to the request from Plant Biology and Nutritional Sciences that they retain their departmental status. Influential factors in the final vote for approval were the fear by some groups that their continued existence depended on the reorganization and the notion by other groups that they would receive favored treatment in the new organization. At no time during the reorganization process was there an explanation of the rationale for dissolving departments such as plant pathology and entomology.

Assessment of the Reorganization

Several conclusions can be drawn from the process that deprived a significant number of faculty members of their disciplinary identity, despite repeated and vigorous protests. First, in my view, the reorganization was in response to a decision by the campus administration to redirect AES funds from programs related to agriculture to address environmental issues and to support basic biology. I certainly do not question the importance of environmental issues or the potential embodied in modern biology. My concern is that the reorganization was unilateral and narrowly focused. There was little, if any, assessment of the role of the proposed Berkeley programs in the Systemwide Division of Agriculture and Natural Resources (DANR). For example, do they complement or duplicate activities at Davis and Riverside? Unfortunately, the office of the Vice President, who serves as Director of the Experiment Station and Cooperative Extension, was essentially excluded from participating in deliberations over reorganization. The various plans were sent to the Vice President for comment, but neither he nor his representatives had any part in their development. In fact, two letters, one from the Associate Vice President, in response to the first plan, and one from the Vice President, in response to the final plan, were sent to the Dean. Both expressed serious concern about the lack of consideration for AES and Extension programs. These letters were disregarded.

In regard to the relation between the campus and the Vice President's office, I wish to call attention to a situation that is probably unique to California. Many years ago, as part of decentralization of authority from the President's office to the campuses, the process of allocating AES funds was changed. These funds are now allocated directly to the campuses instead of to the Vice President for reallocation to the various units within DANR. I would urge other institutions to avoid such a situation, because serious administrative and leadership problems arise when the office with programmatic responsibility lacks allocation authority.

Additional deficiencies can be identified in the planning process. There was little recognition that strong disciplines are essential to promote the advances in knowledge necessary for devising new approaches to problem solution. There also was a great rush to embrace the term "environmental research," but with little recognition of the disciplines needed to support such research. Finally, there was minimal recognition of the need for balance between fundamental and applied research, as well as the existence of a structure to provide for the evaluation and application of potential solutions.

Another aspect of the College plan reflecting the erosion of the academic-AES split appointment is illustrated by this statement from the plan: "All professorial appointees in the College, regardless of their IR/OR split, will be held accountable for equivalent contributions to the College's teaching pro-