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SOME PERSONAL REFLECTIONS ON A HALF CENTURY OF NUTRITION SCIENCE: 1930s–1980s

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PROLOGUE: THE FORTUITOUS SETTING OF A CAREER DIRECTION

In 1927 the flood waters of the Arkansas River filled the streets of North Little Rock, Arkansas, rising to within a few inches of our small home; the hit tune was "My Blue Heaven"; pellagra reached an all time peak in the South; Joseph

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Goldberger, Surgeon, USPHS, was touring the Mississippi Valley and promoting the distribution of brewer's yeast by the Red Cross and other measures to combat pellagra. Students at the University of Arkansas Medical School were sent into the field to assist with the health emergencies (infectious diseases, typhoid, diarrheal diseases, pellagra, and emergency feeding) created by the flood. My future mentor, Paul L. Day, received his doctoral degree at Columbia University; his thesis concerned the relative stability of vitamin A activity from plant and animal sources. His major professor was Henry C. Sherman. Dr. Day promptly was appointed Head of the Department of Physiological Chemistry in the University of Arkansas Medical School, where he established a beachhead of research (20), the spirit of which successfully penetrated the bastions of complacency toward research that had reigned in the school during the previous fifty years (2).

In 1930 it was my good fortune to fall under the influence of Paul Day as a consequence of the Great Depression that followed the stock market crash of 1929. The economic depression forced individuals and institutions to survive at subsistence levels. Jobs were virtually nonexistent for my 1930 high school graduating class (my first post–high school job was selling Fuller brushes) and in many families finances were destroyed by bank failures and unemployment. My high school chemistry teacher, Miss Ora Park, encountering me in the school hall in the autumn of 1930 exclaimed, "I thought you were at the University of Arkansas entering Chemical Engineering!" She understood immediately, however, why I was seeking a job instead and told me that she had just had a telephone call from a Dr. Paul Day at the medical school who was seeking a high school graduate to help with animal work and cleaning in the laboratory. This fortuitous coincidence effectually launched my life-time career in nutrition science.

THE MILIEU OF THE 1930s

The academic milieu was considerably different in the 1930s. The professor personally gave all (at least a vast majority) of the series of 55–60 lectures and participated actively in the 120 hours of laboratory sessions that comprised "Physiological Chemistry." Dr. Day personally supervised the laboratory sessions and conducted at least one quiz session weekly. There were no NIH or NSF grants. Hence, an investigator personally conducted such mundane operations as preparation of experimental diets, the weighing and feeding of supplements, and daily examinations of experimental animals. At Arkansas he even constructed his own cages, routinely distilled water and laboratory solvents used in his research, and personally carried out all chemical analyses. Writing of research reports was limited to preparation of manuscripts for publication or preparation for the one (not more than two) national scientific meeting(s)

attended annually, attendance at which was largely or entirely the personal expense of the scientist. No doubt this contributed to the relatively small size of these meetings, where it was possible for several scientific societies to meet simultaneously in concurrent sections of the different societies (not concurrent sections of a single society). This resulted in good interchange at FASEB meetings between the physiological chemists, nutritionists, experimental pathologists, and physiologists. Discussion was critical and strictly scientific.

The close association between faculty, participating students, and the laboratory assistants fostered by this milieu was exemplified by the encouragement that Drs. Day and W. C. Langston gave me to pursue a premedical curriculum part-time in a local college and then enter medical school, which I did, completing my M.D. degree in 1937. During these years I was meaningfully involved alongside of Dr. Day in all of the nutrition research underway in the Department of Physiological Chemistry. He generously made me a co-investigator and introduced me to scientists at annual FASEB meetings. He instilled in all who worked with him the necessity of disciplined study of the scientific literature including the critical examination and discussion of original reports and the reading and abstracting of earliest landmark papers. The superb lectures and graduate seminars of Howard B. Lewis, my major professor during my subsequent graduate studies at the University of Michigan, Ann Arbor, were punctuated also with assigned reading of landmark reports of nutrition research. These reports were to be abstracted by the student and reviewed by Dr. Lewis. The substance of these reports and personal anecdotes pertaining to investigators introduced by Dr. Lewis and others at Michigan (particularly Dr. Harry Newburgh) provided an appreciation of our rich scientific heritage and sharpened the student's insight into the scientific method. The then small universe of biological scientists is strikingly illustrated by the fact that Dr. Lewis operated, from his departmental office in Ann Arbor, the placement service of the FASEB, and personally met each applicant seeking employment in any one of the disciplines.

NEW ESSENTIAL NUTRIENTS

The excitement of new discovery was intense in the 1930s and 1940s, created not only by that which occurred in one's own laboratory, but by rapidly growing evidence and identification of new essential nutrients and related metabolic phenomena (water-soluble vitamins, fat-soluble vitamins, essential amino acids, trace elements, and emerging metabolic cycles and biologic phenomena relating food and nutrition to human disease). The *experimental* nature of the evidence was such as to make for rapid resolution of discrepancies or controversies in contrast to the inconclusive nature of so much of the evidence offered today. I refer to evidence based upon association of phe-

nomena observed in epidemiologic studies, the interpretation of which is compounded by complexities of time, uncontrollable events, inappropriate dietary methodology, and confusion between "statistical significance" and physiologic importance. Table 1 presents a chronology of selected developments in nutrition during this half century.

NUTRITION SCIENCE IN THE UNIVERSITY

In the early 1930s the loci of nutrition science in universities were schools of agriculture and the associated experiment stations, departments of home economics and dietetics, schools of medicine and of public health, and a few university departments of chemistry (17). The orientation of and focus on nutrition by these groups were influenced by the perspective of the faculty, but all academic groups viewed nutrition science as the chemistry of foods and their use in metabolism. Emphasis was placed upon material "susceptible of scientific proof" (14), which material constitutes "the scientific substratum upon which rests present day knowledge of nutrition both in health and in disease." Indeed, Graham Lusk introduced the first chapter of his book *The Science of Nutrition* with the quotation

> Blessed is he that maketh due proofe . . .,
> With due proofe and with discreet assaye
> Wise men may learn new things everyday.
>
> Thomas Norton (b. 1493)
> in *Ordinall of Alkimy*

NUTRITION IN THE MEDICAL CURRICULUM

In medical schools the scientific substratum of nutrition was a major portion of the course in physiological chemistry (now biochemistry) and in physiology. Perusal of textbooks and journals of the 1930 era reveals the remarkable degree to which nutrition pervaded these subjects. Turning to the clinical years of medical school, the scientific substratum of pediatrics treated the nutrient needs of infants and children for growth, maintenance of health, and disease; deficiency diseases of the young child (scurvy, rickets, infantile beriberi, xerophthalmia); it reviewed, extended, and interpreted nutrition information for practical application in pediatrics. Pediatricians devoted interest and time to nutritional aspects of their subject, not only in didactic teaching, but at the bedside, in rounds, and in the out-patient clinics.

Similarly taught in internal medicine were the nutritional metabolic considerations pertaining to dietary deficiency diseases (e.g. scurvy, pellagra,

Table 1 Illustrative chronology of selected developments in nutrition: 1928–1980[a]

1928	*Journal of Nutrition* began publication
1929	Essential fatty acid deficiency described Role of extrinsic and intrinsic factors in pernicious anemia elucidated
1930	Conversion in vivo of carotene to vitamin A demonstrated
1931	Essentiality for the rat of Mn and Mg demonstrated Mottled enamel identified with high fluoride content of water
1932	Vitamin C isolated from lemon juice Crystalline vitamin D prepared Flavoprotein discovered
1933	Pantothenic acid and riboflavin identified as members of B_2 complex AIN becomes a national society
1934	Vitamin K discovered Zinc found to be essential in rats
1935	Threonine discovered as an essential amino acid Curative effect of Co in sheep demonstrated First coenzyme identified as NAD
1936	Synthesis of thiamine published Vitamin E isolated from wheat germ oil and named tocopherol
1937	Nicotinic acid identified as anti–black tongue factor
1938	Vitamin B_6 crystallized Riboflavin deficiency in man described Vitamin M (folic acid) demonstrated as essential for the monkey
1939	Choline shown to be lipotropic factor Structure of vitamin B_6 determined Microbiologic estimation of vitamins introduced
1940	AIN admitted to membership in FASEB Sequence of clinical events developing in experimental scurvy described in man
1941	Folic acid proposed as name for growth factor for bacteria British Nutrition Society inaugurated First RDAs adopted; first standards adopted for enrichment of flour in US The Nutrition Foundation incorporated
1942	Biotin synthesized *Nutrition Reviews* began publication
1945	Pteroylglutamic acid (PGA) synthesized Response of cases of sprue and of nutritional macrocytic anemia to treatment with PGA (Vitamin M) reported
1946	National Vitamin Foundation established
1947	Vitamin B_{12} identified *British Journal of Nutrition* began publication
1948–49	Isolation of crystalline vitamin B_{12} and identification of Co in the molecule
1949	The Framingham Study initiated
1953	Essentiality of pyridoxin (vitamin B_6) for infants established
1955	Zinc deficiency in swine described Structure of vitamin B_{12} determined ICNND organized

Table 1 *(continued)*

1957	Se reported to be essential in experimental animal studies
1960	American Society for Clinical Nutrition incorporated
1963	Zinc deficiency established as a cause for syndrome of dwarfism and sexual infantilism in adolescent boys
1964	Pyridoxine deficiency in adults described
1966–74	Role of dietary "fiber" in so-called saccharine disease postulated
1968	Ten-State Nutrition Survey launched Report of successful maintenance of young child by total parenteral nutrition (TPN) 25-OH cholicalciferol identified as an active metabolic form of vitamin D_3
1969	First case treated with home TPN
1970	Nutrition Canada National Survey launched
1971	1,25-dihydroxycholecalciferol identified as an active hormonal form of vitamin D_3
1973	Deficiency of carnitine associated with syndrome of lipid storage myopathy
1979	Se in prevention of Keshan disease reported
1980	Publication of first volume of *Annual Reviews of Nutrition,* marking the 50th anniversary year of Annual Reviews, Inc.

[a]Based in part on E. Neige Todhunter 1976. Chronology of some events in the development and application of nutrition sciences. *Nutr. Rev.* 34:353-65 (Ref. 19).

beriberi, starvation, iodine-deficiency or endemic goiter); secondary or conditioned deficiencies (e.g. iron-deficiency anemia, pernicious anemia, sprue, adult osteomalacia, hypoproteinemia, or hypoalbuminemia); dietary management of metabolic disorders (especially diabetes, gout), as well as the nutritional aspects of acute and chronic diseases of various organs and systems, and of infectious diseases.

These aspects of nutrition were taught in medicine, but maintenance of nutriture and rehabilitation of the surgical patient also was taught in surgery. Vividly I recall one surgeon's impressive underscoring of the importance of maintaining the protein nutriture of patients. Early in my junior year in medical school Dr. George V. Lewis, Professor of Surgery, abruptly asked, "Darby, you are in biochemistry. Now tell me about protein deficiency." After I stuttered out in response a standard explanation of protein-deficiency hypoalbuminemia he commented abruptly, "Don't you ever read the *JAMA?* You had better read the paper by Dr. Youmans." Knowing that I definitely had better read it by the next session with him, immediately I sought out and digested the paper (22) by a Vanderbilt University Professor of Medicine, Dr. John B. Youmans entitled, "Endemic Edema." Not only did I learn from it a great deal about clinical protein deficiency and was introduced to the concept of chronic moderate deficiency syndromes (so-called subclinical), but I also became aware of one of the remarkable men who subsequently enormously influenced my career and became my warm friend and demanding mentor.

Teaching in preventive medicine and public health incorporated the epidemiology of nutritional conditions such as endemic goiter; cretinism; endemic deficiency diseases, especially pellagra; and public health controls, standards and regulatory responsibilities concerning the quality and safety of foods and problems of food-borne diseases.

The curriculum of few medical schools included a separate course labeled "Nutrition" during the 1930s, but the subject obviously received appreciable attention. At Vanderbilt University a course in Nutrition was initiated in the 1920s by Drs. John B. Youmans, Professor of Medicine, and C. S. Robinson, Professor of Biochemistry. It was a "required elective" during the second semester of the second-year for Vanderbilt medical students throughout the 1930s and through the 1950s, later as an elective. Curricular emphasis on nutrition in teaching institutions depended then as now upon the presence of strong leadership with a keen interest in the subject and established collaboration between members of preclinical and clinical departments.

SCIENTIFIC ORGANIZATIONS WITH PRIMARY FOCUS ON NUTRITION

Out of national emergencies have come many significant developments in medicine and in nutrition. Faced with the demands of hospitals and of war needs at home and abroad in 1917, 98 persons attended a dietitians' conference in Cleveland and there organized the American Dietetic Association (3). Thirty-nine charter members organized the first annual meeting of the association in conjunction with that of the American Hospital Association. Professor E. V. McCollum, Ph.D., from the Johns Hopkins University, reported at this first meeting recent developments with the then new vitamins A, B, and C. Shortly thereafter the rapidly growing membership of the ADA embraced such outstanding nutrition authorities as Lafayette B. Mendel, E. V. McCollum, and Mary Swartz Rose.

It was a decade later, 1928, before the initial organizational phase of the American Institute of Nutrition (AIN) occurred (11) around the *Journal of Nutrition*. The eleven founders (see Table 2) represented diverse disciplines, from which emerged the nutrition sciences. I recall the modest surprise that Paul Day expressed at being invited in 1933 to become a charter member of the American Institute of Nutrition and his obvious enthusiasm upon attending in 1934 the first annual meeting at Cornell University Medical College. In retrospect it is easy for me to appreciate his feelings because of similar ones I experienced when I was involved in the founding of the American Society for Clinical Nutrition. The colleagues involved included Bob Goodhart, Ted Van Itallie, Norm Jolliffe, Maury Shils, Michael Wohl, Bob Olson, Bob Hodges, Bill Krehl, Bill Bean, S. O. Waife (who edited the *American Journal of*

Clinical Nutrition), Grace Goldsmith, and D. W. Woolley representing the AIN. Establishment of the new society was not without travail. Many were seriously troubled that the new organization threatened the AIN. Some were especially critical of the sometimes inferior quality of papers that had appeared in early issues of the *American Journal of Clinical Nutrition,* and some feared the potential of an undue influence of the pharmaceutical industry. Despite the *sturm und drang* the two societies now are much alive and their respective journals are internationally prestigious. These societies and their publications, along with similar national groups (e.g. the British Nutrition Society, the Canadian Nutrition Society, and the Latin American Society of Nutrition, SLAN), exemplify the world-wide scientific interest that now constitutes the "nutritional community" which has emerged during the last half century.

Consolidation of the world-wide interest was symbolized in the establishment and positioning of the International Union of Nutritional Sciences, the formation of which was succinctly summarized by Dr. Charles Glen King (13):

> The International Union of Nutritional Sciences (IUNS) had grown substantially in terms of international congresses, held at three-year intervals since the formal organization was established, as suggested at the London meeting in 1946, followed by formal action at a London meeting in 1948. However, there had been very little organizational activity during the periods between congresses, except through the offices of the President, Dr. E. J.

Table 2 The founders of The American Institute of Nutrition

Eugene Floyd DuBois, M.D., Pathological physiology.
June 4, 1882–February 12, 1959.
Herbert McLean Evans, M.D., Anatomy.
September 23, 1882–March 6, 1971.
Ernest Browning Forbes, Ph.D., Animal nutrition.
November 3, 1876–September 8, 1966.
Graham Lusk, Ph.D., Physiology.
February 15, 1866–July 18, 1932.
Elmer Verner McCollum, Ph.D., Nutrition.
March 3, 1879–November 15, 1967.
Lafayette Benedict Mendel, Ph.D., Physiological chemistry.
February 5, 1872–December 9, 1935.
Harold Hanson Mitchell, Ph.D., Biochemistry, Nutrition.
January 22, 1886–March 28, 1966.
John Raymond Murlin, Ph.D., Physiology, Nutrition.
April 30, 1874–March 17, 1960.
Mary Swartz Rose (Mrs. Anton R.). Ph.D., Biochemistry.
October 31, 1874–February 1, 1941.
Henry Clapp Sherman, Ph.D., Chemistry.
October 16, 1875–October 7, 1955.
Harry Steenbock, Ph.D., Agricultural chemistry.
August 16, 1886–December 25, 1967.

Bigwood in Belgium and the Secretary, Dr. L. J. Harris at Cambridge University. Many of the active scientists recognized this situation and urged action to meet the need for a more vigorous and continuous program.

As a member of the National Academy of Sciences and the Society of Biological Chemists, I was aware of the very constructive work being done by the international unions in chemistry, biology, physics, biochemistry, physiology and other sciences. Soon after Sir David Cuthbertson, Director of the Rowett Institute in Scotland, was elected President of the IUNS at the general assembly meeting in Paris (1957) he asked me to serve as a committee-of-one to prepare recommendations for a revision of the By-Laws along with recommendations for changes in the structure and activities of the organization.

Edmund Rowan in the Foreign Secretary's office at the National Academy of Sciences was most helpful and generous of his time and advice in preparing a report that would reflect the experience and best practices among other international unions. The recommendations were adopted practically *in toto* at the next General Assembly of the IUNS (1960) in Hamburg, and the traditional fate of a committee chairman followed—my election as President of the IUNS, with an implied: "Now make it work!"

Grants from The Nutrition Foundation and the Research Corporation made it possible for me as a Lecturer at the Institute of Nutritional Sciences, School of Public Health, Columbia University, to have essential secretarial and office facilities.

A Council and appropriate officers were proposed within the IUNS to provide broader and more efficient administration. Increased and regular dues were proposed on a scale related to resources available within the national societies.

Working commissions and committees were proposed to study and report on: ". . . a variety of subjects including nomenclature, procedures and standards; operational programs; human nutrition with special reference to the preschool child; genetic patterns of special nutritional importance; nutritional education and training; nutrition of agricultural animals and fish.

. . . .

Developments of this nature in addition to the congresses made it possible for the IUNS to be of greater service and to accelerate both pure and applied research in the science of nutrition.

The national societies that constitute the adhering bodies of the IUNS are not the only important scientific and professional organizations that have emerged to further nutrition research, education, and application. Especially important in the United States has been the more recent establishment of the American Society for Parenteral and Enteral Nutrition (ASPEN) with its journal and the medical-practice-oriented American College of Nutrition, as well as a variety of more narrowly focussed organizations devoted to particular nutritional conditions like obesity.

COUNCILS, COMMITTEES, AND BOARDS

The period of the 1930s to 1960s was marked by the establishment in the United States of a remarkably productive series of councils, committees, and boards concerned with assessing scientific knowledge in nutrition and utilizing that knowledge for the improvement of health and welfare of mankind. These

organizations served to identify gaps in our knowledge and understanding of nutrition science and to promote research to fill these gaps. They generally interfaced well with each other and maintained liaison with federal agencies that have responsibilities for nutrition programs as well as with responsible segments of the food and food-related industries. They were comprised primarily of recognized leading scientists from the academic community. They maintained an independence that assured objective assessments and recommendations free of self-serving bias. The members served without compensation. The public attitude was receptive to constructive, objectively drawn, scientifically based, apolitical guidance. In that period these committees were not subject to attacks by organized, politically motivated activists operating under the guise of "public interest groups." Some examples of these councils, committees, and boards and their accomplishments are worthy of note.

The Council on Foods and Nutrition of the American Medical Association

Initially organized as a subcommittee on foods of the Council on Pharmacy and Therapeutics of the American Medical Association, this council was comprised of leading scientists (biochemists, home economists, physicians, physiologists, nutritionists), provided with an outstanding executive secretary (Dr. Franklin Bing), and was funded by the American Medical Association. It was responsible for initiating and monitoring the vitamin D fortification of milk, a major factor in the disappearance of infantile rickets; it was a moving, active force in promotion of iodinization of salt, of enrichment of flour, fortification of margarine with vitamin A and similar programs devised to improve the nutritive value of foodstuffs in the United States. This included establishing principles and guidelines for honest educational advertising of foods and continuous control of advertising content through award of the "AMA seal of approval," which conveyed to the public and professionals assurance that the scientific statements pertaining to a given product in advertising were in fact sound and in keeping with current knowledge (4).

Particularly noteworthy was its work with the infant food industry, which resulted in developing and marketing nutritionally sound and tested products and the appropriate promotion of these, i.e. the formulas to the profession and informative educational information concerning products to the public. The Council, for example, set levels of vitamin C content to be retained in juices sold for infant foods and sequential analytical values were required in reports to the Council to assure compliance. The Council obtained authoritative review articles and statements that were periodically published in the *Journal of the American Medical Association* and also compiled books that became widely used classic reference works such as the *Handbook of Nutrition* (5, 6) published by the AMA at a low price so that it received wide distribution. The Council

served further as an instrument for convening workshops to assess questions or developments and help provide scientific efforts to obtain needed information. It initiated the Western Hemisphere Nutrition Congresses and thereby extended its influence not only throughout this hemisphere but throughout the world. Many of these important and highly beneficial activities of the Council were reduced when the American Medical Association abandoned the seal of approval program because growing legalities encroached upon the ability of individuals and organizations to state scientific positions and assessments. Other activities were reduced or ceased when in 1974 the American Medical Association discontinued its several scientific councils.

The Food and Nutrition Board

In view of the imminence of the entry of the US into the Second World War, the government turned to the National Academy of Sciences for advice on "all problems related to the food and nutrition of the people" (15). An obvious initial consideration was the nutrient needs of the armed forces and civilians. The Academy responded by setting up a Committee on Nutrition, soon restructured as the Food and Nutrition Board (FNB) under the chairmanship of Dr. Russell M. Wilder of the Mayo Clinic. The initial Committee responded with the first draft of a table of recommended dietary allowances (RDAs) that were presented to and adopted by the National Nutrition Conference called by President Franklin D. Roosevelt, May 1941. These RDAs served as useful guidelines for the planning of feeding programs during World War II. Initially derived by the reasoned judgment of highly competent scientists knowledgeable concerning the soundest scientific evidence then available, the need for periodic revision was recognized to accommodate the rapidly expanding body of knowledge of new essential dietary factors, of nutritional biochemistry and physiology, of food science, and of increasingly quantitative evidence pertaining to requirements. Each of the approximately quinquennial revisions of the RDAs has been the product of some five years of subsequent committees' continuous assessment of new information and reappraisal of older data. The composition of membership on the Committee on Dietary Allowances has differed during each of the revisions. The ninth revision was published in 1980; currently a new committee is preparing the tenth revision. All controversy aside, and despite many evident misuses or misinterpretation of the RDAs, these allowances have served well to advance the use of nutrition science in public policy, in planning the feeding of groups and individuals, and even in assessing national levels of food sufficiency. They have catalyzed and broadly influenced the generation by other nations, as well as by international agencies, of standards or recommended levels of nutrient needs.

Recent unjustified politically motivated attacks upon the validity of the RDAs and other authoritative statements by reputable nutrition scientists reflect

the changed political milieu that has emerged in the United States. Politicians and self-appointed, self-serving "public advocates" with their creed of antiscience, antiestablishment, anti-industry have found nutrition and food to be sensitive public issues. Unfortunately even some nutritionists have blurred the boundaries between science and advocacy, thereby creating additional confusion in the public mind. Elsewhere (7, 10) I have dealt with this and related problems arising from actions of those whom Maurice Arthus (1) termed "Theoreticians . . . (who) elevate themselves above the materiality of science and float in the sphere of ideas." He considered "the Theoreticians" extremely dangerous individuals who, in performing an act of faith become ". . .like the attorney who defends a client in spite of the evidence of his crime, like the politician who exalts his party even for its mistakes and vile actions which he proclaims to be acts of virtue and of courage . . . and has recourse to all means, honorable or not, in order to defend it. . . ." By "honorable or not" methods, the activists or Theoreticians stage "an irresponsible effort to impugn the reputation of public servants, scientists, scholarly institutions, and societies through innuendoes, through implication that does not exist among one or another group of scientists." They deliberately make misleading and false statements in Congressional hearings and other situations where a "good press" may be obtained. This behavior has aptly been termed "scientific McCarthyism."

There must evolve some effective means of exposing those members of the scientific community who so behave, those who fail to maintain a responsible level of interpretation of scientific evidence, or who, for self-aggrandizement unjustifiably make public claims that unduly alarm or mislead the public. Similarly, there is urgent need for protection of the individual, responsible, competent scientist who suffers these defamatory attacks from politicians and from self-appointed activists under their guise of representing or protecting the public, using as a shield some respectable-sounding institutional name. The efforts of politicians and some members of the scientific community to impugn the integrity of individual members of the Committee on Dietary Allowances, and even the scientific basis of the allowances, is to be deprecated. The necessity of contending with public defamation deters many responsible, knowledgeable, and conscientious scientists from serving on important national advisory committees.

The Food Protection Committee

Following a recommendation of the National Health Assembly, May 1948, the FNB appointed an *ad hoc* committee to examine the extent to which pesticides or other toxic substances occurred in foods and to develop a plan by which the safety of chemicals used in foods could be assessed (15). The *ad hoc* committee recommended establishing a permanent committee to serve in all aspects of the

problems. This followed a National Conference in December 1949 encompassing representation from government, public health, agriculture, manufacturing chemists, food manufacturers, and academic and private research organizations. The board acted in May 1950 (eleven years prior to Rachel Carson's *Silent Spring* of 1961, which nowhere acknowledged these responsible actions of government, scientists, and industry in the public interest) to establish the Food Protection Committee (FPC), on which I served as a member from 1950 until 1971, and as chairman from 1954 to 1971.

The reports of the FPC were evolved by critical study of all available scientific evidence, objectively assessing it, then following with recommendations of general or specific nature; the sole objective was to attain maximal public benefit with minimal risks. The Committee early recognized the principle that the concept of absolute safety is invalid and set down guiding principles concerning the use or exclusion of food ingredients or additives. These principles have repeatedly been revalidated by numerous national and international bodies, including Expert Committees of the World Health Organization. In the early 1950s there existed no complete list of substances employed as food additives. Compilation and publication of such a list was promptly undertaken by the FPC, encountering considerable opposition on the part of certain interests. I remember the strong support for this effort given by a number of the leaders in the food industry on the part of the FPC. At one meeting a particularly forceful vice president of the Quaker Oats Company, Dr. F. C. Peters, vigorously pointed to industrial colleagues and stated: "Every collaboration must be given to this effort by the FPC to prepare and make public a listing of additives in foods. If any food company is putting into foods anything they are ashamed of, they damn well better stop. The public must know about it!" It was with such responsible support that the Food Protection Committee was able to give not only national but international leadership over three decades, elaborating general principles, responding to needs to evaluate the safety of specific categories of substances such as surfactants and sweeteners, publishing two classical monographs on naturally occurring toxic materials inextricably present in foodstuffs, and producing the *Food Chemicals Codex,* which not only is the first official codex of food chemicals in the United States but has been adopted by many of the major countries of the world. This codex is as basic to the field of foods as are pharmacopoeias to medicine.

Despite years of study and assessment of potential carcinogenic properties of long-used substances, even some essential nutrients, there arose irrational demands for exclusion of traditional intentional and incidental additives generally regarded as safe (GRAS). These demands were accompanied by unrealistic clamor for mandatory testing of thousands of ingredients and additives. This testing would have created an impossible demand for personnel and resources, which was totally unjustified in view of rational priorities for scientific study of

materials or environmental chemicals. Accordingly the FPC prepared and the National Academy of Science published guidelines for judging when evidence or use was inconsequential and, hence, further extensive study deemed unnecessary.

This report was misconstrued by certain members of the press and seemingly deliberately by a limited number of members of the scientific community who vigorously attacked both the individual members of the Food Protection Committee and the National Academy of Science and its president. The ugly side of the politics of science emerged. At the request of the president of the Academy, Dr. Philip Handler, members of the FPC and the adversaries met in the Academy building to resolve the differences of understanding and interpretation of the report. One of the adversaries promptly wrote a statement that resolved this difference. It was unanimously adopted by those present and transmitted verbatim to the president of the Academy. In a subsequent budgetary hearing before the Congress concerning funding for oncology, one of the involved adversaries stated that he had never seen the statement and he disagreed with it! This disavowal occurred despite unanimous concurrence with the statement prepared by his colleague and agreed to by him at the earlier meeting. Fortunately I had filed the original copy in the handwriting of this adversary. It was given to Dr. Handler and was identical with the previously transmitted typed statement summarizing our meeting. No news report nor public statement from our adversary ever corrected the untrue "testimony" in the hearing.

I cite this instance now over a decade old as an example of the continuous emotionally charged wrangling pertaining to nutrition and cancer and the lack of integrity of those who subjugate science to politics in order to take a public position, even at sacrifice of veracity. It was precisely such actions that led to Maurice Arthus' warning that Theoreticians would take ". . . recourse to all means, honorable or not . . ." to defend their positions because "the daily newspapers, magazines of the most different kind entertain their readers with them in glowing language. Lecturers talk about them to their audiences in high tones. Government authorities give formal approval. . . . The Theoreticians find themselves in the limelight of publicity. How could they change their opinion without losing face?" (1).

The Interdepartmental Committee on Nutrition for National Defense (Development)

Personally rewarding, uniquely scientifically productive, and of remarkable humanitarian benefit appropriately describes almost two decades of work and association with the Interdepartmental Committee on Nutrition for National Defense (Development) (ICNND) (12). This novel committee resulted from an astute observation by Ambassador Lodge concerning night blindness in a

Korean servant, which aroused his suspicion that endemic malnutrition might be reflected in the Korean armed forces. These events led President Dwight Eisenhower to dispatch in 1953 two officers, Harold R. Sandstead and C. J. Koehn, to assess and report on the nutritional status and the messing in the armed forces of Korea. Their findings promptly led the President to establish as an interagency committee the ICNND with Dr. Harold Sandstead of USPHS as Executive Director. The ICNND, organized in 1955, had as its primary objective assisting developing countries to assess their nutritional status, defining problems of malnutrition, and identifying means for solving these problems by taking advantage of the country's own resources. Immediately prior to assuming the executive directorship of the ICNND, Dr. Harold ("Sandy") Sandstead had been assigned to the Vanderbilt Nutrition Program by Dr. W. H. Sebrell, Jr. and was investigating the potential nutritional significance of certain chronic oral lesions and the effect of nutrient supplementation. These studies were planned in cooperation with Dr. Russell Wilder of the Mayo Clinic.

Dr. Sandstead promptly organized the headquarters of the new committee in Stonehouse at the NIH with the highly efficient and loyal support of two remarkable associates, Mrs. Harriet Martin, Administrator, and Dr. Arnold E. Schaefer, Deputy Executive Director. Initial participation and support of the Committee came from the Armed Forces, the US Public Health Service, the US Department of Agriculture, the State Department, and cooperating universities. Support soon was extended by USAID, the Atomic Energy Commission, the Department of Interior, the Food and Drug Administration, and other agencies. Subsequently liaison members were added from Food for Peace, the Pan American Health Organization, United Nations Children's Fund, Food and Agriculture Organization, and World Health Organization of the UN.

The experience during World War II of nutrition officers and of clinical nutrition teams both in military and civilian areas plus the laboratory expertise centered at Vanderbilt University and in the US Army Nutrition Laboratory made it possible rapidly to design the broad survey of food production, processing, and use and the clinical and biochemical assessment of nutriture that was to provide data for guiding national nutrition improvements in the many host countries around the world. Shortly before the departure of the first US team to the host countries, Iran and Pakistan, Dr. Harold Sandstead died tragically as a passenger in the first bombed civilian plane; the plane was over the Grand Canyon en route from Denver. Dr. Arnold E. Schaefer was appointed to fill Dr. Sandstead's post. Dr. John B. Youmans, who during the Second World War was in charge of the Army Nutrition Program and who had but recently been appointed Dean of the Vanderbilt School of Medicine, responded to the emergency and directed the surveys in these two initial countries. A continuing panel of consultants from governmental agencies and

the academic community counseled on technical aspects of methodology and survey findings.

Over a 15-year period, surveys were completed in 32 nations, in several of which repeated or continuous evaluations were made. Most of these latter were conducted entirely or in major part by national personnel who had worked with the US teams during the initial survey and not infrequently some of those personnel subsequently had pursued advanced scientific studies in US universities under the tutelage of faculty members who had served on the respective nation's initial survey team. Through follow-up visits by academic members of the teams as well as by government scientists there was invariably maintained a close interpersonal and scientific collaboration between participants. This helped catalyze action on recommendations developed jointly by host country and US scientists and it provided continuing educational opportunities and material resources. The resulting enormous widening of nutrition understanding by faculties and students in the participating US institutions created a reservoir of knowledgeable nutritionists that likely has been unparalleled in any country and a richness of scientific research themes that if continuously explored would have immeasureably advanced the science and application of nutrition throughout the world. The scientist-to-scientist, university-to-university, and university-to-agency relationships so established were unique. It is regrettable that administrative and political leadership has failed to see the opportunities and rich national rewards of this quite modestly costing program with its very high yield/cost ratio not only in health benefits to mankind, but also in great scientific and cultural returns.

In retrospect it appears to this observer that a major force in the demise of the ICNND was the use for political reasons of (or misuse of) findings and claims concerning domestic nutritional problems. A Congressional Committee instructed the Executive Director of the ICNND to conduct a similar survey in the United States and to report back to that Committee. This was at the height of much political attention and speculation concerning the extent and severity of malnutrition in the US. Adequate funding for a domestic study was not forthcoming, which further compromised the efforts to carry out the instruction of the Committee. Despite these difficulties a remarkable series of nutrition assessments were made in ten states (the so-called Ten-State Nutrition Survey) albeit the sampling was limited by socioeconomic factors, a limitation that favored misinterpretation and misuse of data. The database so acquired continues, however, to serve for meaningful scientific analyses. The visible efforts of the survey likely influenced the more orderly Nutrition Survey of Canada. The residue of these programs in the US is the National Health and Nutrition Examination Survey (NHANES) (18), which, although continuing, unfortunately has not provided the consolidated descriptions needed for national guidance of the food, food use, nutriture, and health of populations by socioeconomic, ethnic, and regional samples. By contrast with the ICNND

program, the organization of the NHANES program fails to involve meaningfully the academic nutrition community and students in the manner that was accomplished by the ICNND and during the Ten-State Survey.

The Vanderbilt-NAMRU-3 Nutrition Study (Cairo)

One spin-off of the ICNND activities was 25 years of nutrition research in the Middle East based on personnel and resources at Vanderbilt University and NAMRU-3 (Naval Medical Research Unit Number 3) in Cairo. This development served as the site of an unpredictably varied and productive series of researches, and 20 years ago attracted a group of young investigators who today are senior leaders in their respective areas of nutrition science throughout the United States and in the Middle East. It evolved in this manner: As early as 1949 I had served a tour in Egypt as a consultant on pellagra for the World Health Organization. This experience led to subsequent investigations there of pellagra and anemia participated in by Dr. Richard Vilter and members of his laboratory. During these studies we established contact with personnel at NAMRU-3 as well as nutrition scientists in Cairo and Alexandria. As plans were formalized for an ICNND study in Ethiopia it was logical to enlist the more sophisticated resources and some personnel from the Cairo-based NAMRU-3. Scheduled studies in Ethiopia coincided with WHO-sponsored nutrition events in Egypt and I was invited to participate in these while serving as Director of the ICNND nutrition survey in Ethiopia. Dr. John Seale, Commanding Officer of NAMRU-3, suggested a continuing collaboration between that unit and the nutrition program at Vanderbilt University to enhance the capabilities of NAMRU-3 for addressing malnutrition, a major problem of the region.

The resulting cooperative program with its access to ambulatory patients, the wards at NAMRU-3, field investigations, laboratories both at NAMRU-3 and Vanderbilt University, and a remarkable degree of cooperation with institutions in Egypt and elsewhere in the Middle East afforded a nearly unparalleled spectrum of nutritional challenges. Initial studies of severe endemic iron deficiency anemia and the availability of iron from foods led to recognition and elucidation of the clinical syndrome of dwarfism and sexual infantilism due to zinc deficiency. This exciting finding served to trigger not only diverse studies of zinc deficiency and metabolism of humans but also interest in the role of other trace elements in man, especially selenium deficiency in malnourished infants and copper and chromium deficiencies.

The panmalnutrition of kwashiorkor was documented and cooperative regional studies clearly demonstrated that in protein calorie malnutrition there were associated differing types of anemias that resulted from deficiencies of different hemopoietic factors—iron, folic acid, tocopherol, and possibly other essentials. The dominant deficiency varied from one geographic area to another

within the Middle East (from Turkey to Lebanon, Jordan, and Egypt). Active collaboration was readily established with competent scientists throughout the region, in large measure because of the ICNND studies and followup that had taken place in country after country in the region plus the high regard in which the NAMRU-3 organization was held. The presence on the Vanderbilt University project of the distinguished nutrition scientist Dr. V. N. Patwardhan, then recently retired as chief of the nutrition program for the World Health Organization, further enhanced the prestige of this activity and facilitated cooperative research.

In order to assure successful execution of field studies in villages, we recruited a young anthropologist, Louis Grivetti, who now holds a joint appointment in the Departments of Nutrition and of Cultural Geography in the University of California. His presence not only greatly facilitated the studies in villages but immeasurably strengthened bonds with the Egyptian Ministry of Antiquities and the historical section of the Ministry of Agriculture of Egypt. A tangible result of his effectiveness was the unlimited access permitted us to monuments and museums as we delved into the rich heritage of the ancient Egyptian civilization in preparation of the two volume monograph *Food: The Gift of Osiris* by Paul Ghalioungui, an Egyptian authority on Pharonic medicine, Louis Grivetti, and me (9). The accumulation of the material summarized in this work, the travels incident to it, and the personal acquisition and study of literally hundreds of beautiful, romantic volumes on history, travels, religion, folklore, sciences (medicine, botany, agriculture, archaeology, Egyptology), military expeditions and other aspects of culture opened unimagined vistas that I never could have viewed except through the guidance of incredibly generous colleagues and scholars—Egyptian, American, Swedish, Greek, French, Lebanese, Jordanian, Indian, German, English, and so forth.

The 15 years during which these volumes were being assembled permanently fixed my long-existing interest in history of food, food science, and nutrition that had been initiated by teachings of Paul Day and Howard B. Lewis. During these years I became an avid bibliophile of such compulsiveness that the syndrome is best described as that of a "bookaholic." Another especially gratifying facet of this period was the stimulating opportunities for learning from young associates whom I continue to watch with pride and satisfaction as their contributions extend the frontiers of nutrition science and its applications.

Institute of Nutrition of Central America and Panama

Some of the successful strategies employed in those international cooperative ventures in nutrition with which I have been associated were adopted from the experiences of the Institute of Nutrition for Central America and Panama (INCAP). Founded in 1948, its initial role was seen basically as that of a food laboratory, but this organization matured to become a major world resource in

food and nutrition science. The insistence of its first director, Dr. Nevin Scrimshaw, upon developing a staff of highly competent regional scientists with laboratories, library, and other scholarly resources conducive to creative scientific research was a strong factor in modernization of not only nutrition but medicine and university education throughout Central and South America. INCAP became a leading influence in international nutrition and a base for research and training of personnel from all over the world. This is attributable in part to the reciprocal exchange and effective communication established with leading institutions and organizations world-wide. Its personnel and programs have served as examples for other nutrition centers that have emerged during the past three to four decades in other areas of the world, e.g. Mexico, Chile, Brazil, the Philippines, India, Thailand, Indonesia.

Other productive or highly promising centers have lost their momentum and in some instances have fallen into oblivion. Such has occurred in Uganda, Ethiopia, Iran, and in the former Belgian Congo. The demise of these centers and of others that could be so identified is attributable to the disruptive force of political upheavals and instability. It is evident that a politically stable environment is essential not only for nurture of the population but also for the nourishment of science. The health and well-being of the science of nutrition in both industrialized and developing countries seems inextricably linked to and influenced by the political milieu. Despite this fact of survival it is fatal to permit the essence of science in any manner to be twisted by political considerations or for scientists to prostitute objectivity, integrity, or veracity for political favor.

THE ROLE OF FOUNDATIONS

Those organized philanthropies, foundations, devoted to public good possess an autonomy of organization that permits flexibility of action without the constraints inherent in the university or governmental agencies. They are primarily a product of the present century. Their beneficial influences on scientific development, medical knowledge and health care, humanities, arts and human relations, agriculture and food production, education, and improvement of the quality of life are evident nationally and internationally. Farsighted support by foundations has contributed to every significant nutrition advance during the five decades described in this essay and to much before.

In the late 1930s the International Health Division of The Rockefeller Foundation sponsored the development of methodologies and studies of nutrition of populations and initiated a series of Special Fellowships to develop medical personnel for needed leadership in nutrition in public health and medicine as then envisioned by the Foundation. This program was launched in the very early 1940s; I had the good fortune of being selected as one to benefit

from it. Dr. John Youmans of Vanderbilt was sent to France by The Rockefeller Foundation to assess the food and nutrition needs there in the early phases of World War II. It also was support from The Rockefeller Foundation that established the important Typhus Commission in Cairo during this period. Upon completing its mission of successfully developing control methods for this crucially important disease in the Allied military, The Rockefeller Foundation turned over its laboratory resources to the US Navy and thereby established NAMRU-3. Another foundation, the W. K. Kellogg Foundation, was intrigued by a concept put forward by Dr. Robert Harris of MIT, a concept that involved the need to determine the nutritive value of numerous foodstuffs available in the Central American region and thereby better plan the utilization of these for the benefit of nutritional health. INCAP was founded with Dr. Harris' assistance, the organizational and financial aid of the Kellogg Foundation, and participation of the governments of Central America and Panama and the then Pan American Sanitary Bureau.

Three foundations—the Milbank Fund, the Williams-Waterman Fund, and The Nutrition Foundation—made long-term grants to the Food and Nutrition Board to maintain "a core budget from independent sources instead of being dependent on a single government agency or industry" for the first three decades of the Board's existence. The Rockefeller Foundation generously supported a far-reaching international research program on the suitability of unconventional sources of protein for infant and child feeding, which program was administered by the Food and Nutrition Board.

For more than four decades the Williams-Waterman Fund (21) made grants to support a wide variety of basic nutrition research in universities and countries throughout the world. These supported studies of analytical methodology, the biosynthesis of vitamins, fats, enzyme metabolism, physiology, proteins and amino acids, human requirements, education and training, nutrition surveys, clinical nutrition, and cereal enrichment. Its leadership in the latter area was an outstanding commitment to the stated purpose of the Fund "for the combat of dietary diseases." Since this fund administered by the Research Corporation is no longer active it is particularly important to record that it was established through an agreement in 1935 between the three inventors of the process for synthesis of thiamin, R. R. Williams, R. E. Waterman, and E. R. Buchman, and the Research Corporation; and it was funded from the proceeds of the inventors' patent. By agreement, 25% of all net proceeds went to the Research Corporation to support research in that corporation's field of choice, 50% of all net proceeds were placed by the corporation in a special fund, "Williams-Waterman Fund for Combat of Dietary Diseases." It is difficult to perceive of a more beneficial, unselfish use of patent proceeds than this! A similar use of proceeds from the patent on vitamin D served to estab-

lish the Wisconsin Alumni Research Foundation. The direct recipient of this latter funding, however, was research and related programs at the University of Wisconsin.

Unparallelled properly describes the ferment at work during the ten years from 1935 to 1945 to promote advances in the science and application of nutrition. A conversation during lunch in 1938 between the president of General Foods Corporation, Mr. Clarence Francis, and the General Council of the Associated Grocery Manufacturers of America (GMA), Charles Wesley Dunn, initiated planning by leaders of the food industry for the establishment of The Nutrition Foundation, officially incorporated on Christmas Eve of 1941 (13). Its first scientific director and full-time president, Dr. Charles Glenn King, had isolated from lemon juice and identified vitamin C in 1932. Dr. King's remarkable leadership marked by impeccable integrity, broad appreciation of the science and application of nutrition, and keen sensitivity to the needs of mankind set the pattern of the general policies of the Foundation. He was fully supported by unselfish, philanthropic members of the board of trustees, who were chief executive officers of supporting companies. The board of trustees was presided over by the president of MIT, Dr. Karl T. Compton. The Scientific Advisory Committee was a true "Who's Who" of nutrition scientists from universities, government, and industry. The history of The Nutrition Foundation (13), prepared by Dr. King, has been described as "a veritable record of the progress of the science and application of nutrition during the . . . three and a half decades" from 1941 to 1976. These decades encompass an era of rapid and widespread nutritional changes that permanently affected human health throughout the world.

Subsequent developments supported by The Nutrition Foundation in the decade of my presidency (1971–1982) were summarized in a special 40th anniversary issue of *Nutrition Reviews* (16), the influential, critical scientific review journal founded by the Foundation and initially edited by Dr. Frederick J. Stare. Support of investigators through research grants was an especially noteworthy feature of the program of The Nutrition Foundation because at that time there were no project-type federal grant programs available for support of research in biochemistry, nutrition, or other areas. The first of the categorical research institutes of the NIH, the National Cancer Institute, came into being in 1937. The meager funds it provided were primarily for instruction and education concerning cancer. It was not until 1948 and onward that project-type research grants in an increasing number of fields became available, and not until 1950 was the National Science Foundation authorized. Recognizing this, one well can appreciate the key importance of those grants from The Nutrition Foundation made early in the career of then young scientists including Carl and Gerty Cori, George W. Beadle, Edward C. Tatum, Fritz Lipmann, Vincent Du

Vigneaud, and Konrad Bloch, all of whom subsequently became Nobel Laureates.

An important force in promoting good clinical research in nutrition during the exciting years of the 1940s and 1950s was the National Vitamin Foundation under the directorship of Robert S. Goodhart, M.D. Established in 1946 by producers and distributors of vitamins and related products, its stated objective was promoting and supporting research on vitamins and nutrition in order to improve the health and welfare of mankind. Its grants, symposia, fellowships, and other contributions greatly advanced clinical investigations on a broad front. Dr. Goodhart's encouragement and support was especially helpful in establishing the *American Journal of Clinical Nutrition* and organizing the American Society of Clinical Nutrition. Some of the members of the nonmedical nutrition community were unjustly apprehensive concerning the consolidation of a new, strong, clinical force in the field that received support from the pharmaceutical sources. The integrity and scientific quality of advisors, grantees, and of the Foundation's leadership by Bob Goodhart minimized such undue concerns. In the dissolution of the National Vitamin Foundation in the early 1960s an important nutrition resource was lost.

The outburst of support for nutrition in this period was a matter of timeliness. There was still an impressive awareness of the scourge of the endemic deficiency diseases, goiter, scurvy, pellagra, and other B-vitamin deficiencies, in the United States; the excitement of and fascination with newly discovered, dramatically effective, essential nutrients was everywhere evident; World War II was creating a public concern for food shortages; medical science was exhiliratingly successful in developing chemotherapeutic agents and ushering in the promising new antibiotics. Two decades later the success of these and other scientific developments served greatly to alter the priority that had existed for nutrition education in the medical curriculum in most institutions. In recognition of the inadequacy of attention given to the subject the Council on Foods and Nutrition of the American Medical Association, with assistance from The Nutrition Foundation, convened a national conference of representatives of medical schools throughout the US to address the needs for nutrition teaching in 1962. Despite forceful arguments concerning the importance of and need for intensified teaching on nutrition and despite the evident identification of its placement in medicine, there followed during the next ten years little apparent improvement in the national situation.

The same two organizations cooperated again in a similar conference at Williamsburg in 1972, since which there has been a virtual rennaissance of interest in nutrition (8) and its role in medicine in a majority of the medical schools in this country and in many abroad. This development reflects several influences: increasing awareness of the gravity of malnutrition and hunger in the developing world, an enhanced concern of students and young physicians

for societal problems, availability of laboratory diagnostic tests for objectively assessing nutriture, and professional recognition that many new therapeutic advances have but limited application unless accompanied by sustained nutritional support. Despite early efforts of the surgeon Robert Elman in the late 1930s to utilize parenteral protein hydrolysates and/or amino acid mixtures, and despite intensive investigations of the feasibility of parenteral lipids during and after the Second World War, it was the Philadelphia group's success in 1968–1969 with the technique of administering hypertonic dextrose and amino acids solutions through intravenous catheters in the superior vena cava that sharply focused attention of surgeons and other physicians on meeting short-term (and now very long-term) nutrient requirements. Simultaneously, the clinical importance of trace elements was being recognized. Greater understanding of and interest in the seemingly endless variety of more recently recognized inborn errors of metabolism and the potential of nutritional manipulation for alleviating harmful effects of these genetic disorders have underscored anew the importance of nutrition in medical practice and research. Since the Williamsburg meeting there have been countless national, international, regional, state, and institutional symposia and conferences on nutrition education in medicine and health sciences. It is safe to predict that this concern will be effectively expressed in the reassessment of medical education and curricular content that now is expected to follow the 1984 report on the medical school curriculum from the Association of American Medical Colleges.

EPILOGUE

These semi-autobiographical reflections reveal some portion of philosophic interpretations of past events that may or may not foreshadow the future. They are incomplete both as to personal experiences and historical happenings. I feel more secure in interpreting causative influences such as those that created The Nutrition Foundation or those that modified interest in nutrition in the medical curriculum than I do in identifying the basic reasons for demise of institutions or movements. One can hope that like the legendary phoenix some of the important species now reduced to ashes may rise again in future youthful vigor—perhaps that is the phenomenon we are observing in regard to medical nutrition. I am less optimistic, however, for several of the organizations with which I have had rewardingly productive associations. Despite my concern for some, I am confident that this *Annual Review of Nutrition,* which I helped to initiate five years ago, will increasingly serve as a force in identifying the scope of nutrition science and critiquing its progress. Bob Olson, my successor, and I long have held common values and shared scientific experiences. We both appreciate the firmness of the scientific foundations of nutrition science and deprecate the efforts of those "theoreticians," politicians, and activists who would shake these foundations.

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Note Added in Proof

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