
In Memoriam

I am writing to communicate to all members of the American Society for Clinical Nutrition (ASCN) and to the nutrition community in general the sad news of the death of Dr Charles Edwin Butterworth Jr—former ASCN President, professor emeritus, and founding chair of the Department of Nutrition Sciences of the University of Alabama at Birmingham (UAB). He died of cancer at his home in Birmingham, AL, on Monday, August 3, 1998. He was 75 y old.

“Ted,” as Dr Butterworth was affectionately known by his many friends, was a native of Lynchburg, VA. He completed his undergraduate education at the University of Virginia and in 1948 received his medical degree from the school of medicine of that university. In that same year, he came to Birmingham as a newly graduated physician with his first-born son, Charles Edwin III, and his bride Joyce Craig to do his internship and residency at the School of Medicine of the University of Alabama. It must have been difficult for Ted to distance himself from his alma mater, the University of Virginia, where he, a life-long admirer of Thomas Jefferson, could feel his spiritual proximity.

In 1950, Ted completed a fellowship in hematology—the medical specialty that would soon feel the full impact of the momentous discoveries in the late 1940s of the vitamin folic acid and of its antagonist

aminopterin. He participated in early studies on the treatment of acute leukemia with aminopterin, one of the first drugs in the history of medicine to bring about remissions of a malignant disease. He also witnessed the miraculous effects that a few milligrams of folic acid had on anemia during pregnancy and, later, on the often lethal malabsorption and megaloblastic anemia of tropical sprue. These dramatic early experiences drew Butterworth to the study of folic acid, which remained the focus of his research for the rest of his life.

In that same year, the Korean War turned him from budding investigator into Battalion Surgeon of the 328th Ordnance Battalion, the first doctor from Alabama to be called for service in

the Korean conflict. In 1951, he returned to Birmingham to resume his training in internal medicine under the inspiring guidance of Dr Tinsley Harrison. In 1953, having completed his residency, he resumed military life, moving his family, which now included a daughter, Jane Craig, to Fort Benning, GA, where the Butterworth's youngest son, Hugh Craig, was born in 1954.



From 1955 to 1957, while still in the military, he resumed his scientific research. Ted was assigned to the US Army Tropical Research Medical Laboratory in San Juan, Puerto Rico, to study tropical sprue, a disease responsible for one-sixth of all casualties sustained by the Allied forces in India and Southeast Asia during World War II. Butterworth worked in Puerto Rico under another outstanding mentor, Lt Col Dr William H Crosby, a distinguished hematologist who conducted pioneering studies on iron metabolism and invented the intestinal biopsy capsule that bears his name. It was thus that Ted Butterworth was among the first to perform peroral biopsies of the small intestine in patients with sprue and the first to describe the pathologic lesions of this disease.

There is no doubt that Ted's involvement in the research efforts to understand the pathogenesis of tropical sprue had a crucial formative influence on his future choice of career objectives. Sprue patients had been

dying from severe malnutrition resulting from the gamut of nutritional deficiencies, but were miraculously saved by tiny amounts of the recently discovered but poorly understood essential nutrient, folic acid. Butterworth recognized that nutrition occupied a key position among the basic medical disciplines and that much remained to be done to fully comprehend its multiple roles in disease causation and therapy.

In 1958, Butterworth committed himself to academic medicine; he resigned from the Army at the rank of Major and returned to Birmingham as an instructor in the Department of Medicine at the School of Medicine of the UAB. Promotions to Assistant and Associate Professor of Medicine followed rapidly

(1963). He was still identified primarily as a hematologist and pathologist, but, because of his interest in folic acid, he was put in charge by Dr Walter B Frommeyer, then Chairman of Medicine, of a section of the Hematology Division that dealt with nutritional anemia. In this somewhat circuitous way Butterworth's distinguished career in nutrition began.

Always focusing on folic acid, Butterworth proceeded to recruit two biochemists (who had trained in the same laboratory and under the same advisor working on the pathway of microbial biosynthesis of this vitamin), Dr Charles M Baugh in 1966 and myself, Carlos L Krumdieck, in 1967. Ted was interested in the naturally occurring forms of folic acid, the so-called folyl-polyglutamates. Precious little was known about the biological role of these peculiar peptide derivatives of the vitamin, but Ted, with his remarkable scientific intuition, foresaw that in this obscure area of nutritional biochemistry lay hidden important nuggets of knowledge. He encouraged Baugh and myself to pursue the chemical synthesis of these molecules and, later, made use of them to conduct pioneering human and animal studies on the digestion and absorption of dietary folates. During this time, Butterworth's group published numerous articles on the chemistry and biological role of the polyglutamate derivatives of folic acid and discovered that the anticancer folate antagonist, methotrexate, was itself converted in the body to a polyglutamate derivative, a finding that was to change dramatically the understanding of the mechanisms of action and the pharmacology of antifolates.

Of probably greater importance was Ted's increasing involvement with clinical nutrition and his realization that there was a high prevalence of severe nutritional disorders in hospitalized patients. He set out to correct this and for years fought an uphill battle to improve the nutritional support of patients, to eliminate long-established hospital practices conducive to poor nutrition, and to strengthen nutrition education in medical schools. In 1974, his article "The Skeleton in the Hospital Closet" shook the medical establishment with dramatically documented observations of what became known as "hospital malnutrition" and led to a profoundly favorable change in attitude toward nutrition in clinical medicine. The introduction of nutrition support teams, considered today to be indispensable for good patient care, can be traced to Butterworth's recommendations in this classic article.

In 1977, Butterworth accepted the position of chairman of a new university-wide department at the UAB. The name he selected for his newly founded department was Department of Nutrition Sciences, with the plural word sciences to emphasize his multidisciplinary vision of nutrition. He gathered around him a core of scientists trained in many disciplines but with a unifying interest in nutrition. Among them were two outstanding nutrition educators: Carol B Craig, a research dietitian who had already developed a successful dietetic internship program at the UAB, and Roland L Weinsier MD, a young physician committed to clinical nutrition whom Butterworth entrusted with the teaching of nutrition in the School of Medicine. The wisdom of this decision became apparent when the department assumed the position of leadership that it maintains nationwide in the area of nutrition education of medical students.

Ted's interest in hospital malnutrition had led to the development of a laboratory for the biochemical assessment of nutritional status that preceded the establishment of the department. This laboratory had been directed since its inception in the early 1970s by another member of the original core, Dr Philip E Cornwell, himself a microbiologist interested in folate biosynthesis. Butterworth also attracted Dr Juan M Navia, a senior scientist of the Dental Research Institute of the National Institutes of Health, which at the time had a branch at the UAB, whose pioneering studies on nutrition and oral health added an important dimension to the research efforts of the new department.

Under Butterworth's leadership, the department grew to become one of the best in the nation: the first to be awarded a Clinical Nutrition Research Unit grant supported by the National Cancer Institute of the National Institutes of Health to pursue investigations of the role of nutritional deficiencies, particularly of folic acid, as risk factors for cancer. His efforts were recognized early with a generous donation by Mr Charles B Webb Jr honoring the memory of his late wife, Susan Mott Webb, which made possible the construction of the six-story building that the Department of Nutrition Sciences has occupied since 1983.

In addition, Butterworth pioneered research in other areas; one that commanded his interest in recent years was the notion that greater interactions between the health sciences and agriculture are essential for the betterment of humankind and for the eventual solution of the growing problem of the world's food supply.

He was a great supporter and friend of many young investigators who are proud to recognize him as their mentor. Among them is the Editor-in-Chief of this journal, Dr Charles H Halsted, whose well-recognized studies on the absorption of folyl-polyglutamates were initiated under the guidance of Dr Butterworth some 25 y ago.

Ted Butterworth served on many national and international committees; he directed the American Board of Nutrition, chaired the American Medical Association Council on Foods and Nutrition, and presided over the American Society for Clinical Nutrition in 1974. His contributions earned him numerous awards, among them the American Medical Association Goldberger Award in Clinical Nutrition in 1976, the McCollum Award of the ASCN in 1977, honorary membership in the American Dietetic Association in 1978, the American Institute of Nutrition Lederle Award in 1983, induction as a Fellow of the American Institute of Nutrition in 1990, and the American College of Nutrition Award in 1992. In 1986, his university honored him with the highest distinction it grants to its professors by naming him Distinguished Faculty Lecturer for that year. In 1989, he was named General Foods Professor in Nutrition Sciences.

A true renaissance man, Ted Butterworth was an accomplished tenor, a poet, and a talented sculptor who gained his inspiration while tending his beloved gardenias and bonsai trees. He was a loving husband, father, grandfather, and a friend who will be missed.

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