NUTRITION AND SCIENCE

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The unifying theme of this meeting on human development is nutrition. Some of you may wonder about my credentials for being here to introduce a symposium on nutrition. With some effort I can think of a few.

First, as a medical student at the University of Rochester I took a course in nutrition which may have been unique even then in medical school curricula. It was entitled Vital Economics. It was given by John Murlin. This course provided a more systematic and rational exposure to the elements of nutrition than any medical school course we have given for the past sixteen years at Stanford.

Second, I spent the first three years of my research career studying rat nutrition in a laboratory in which I trace a direct lineage to Joseph Goldberger. I had completed an internship in internal medicine in 1942 and entered military service as a commissioned officer of the U. S. Public Health Service. I was on sea duty as a ship's doctor but was transferred with the eager concurrence of a captain exasperated by my inattention to naval etiquette. I was transferred to the National Institutes of Health (NIH) and assigned to the nutrition laboratory, which had been founded by Joseph Goldberger.

I would like to talk briefly about Joseph Goldberger, who is one of my favorites among microbe hunters and hunger fighters. He grew up in New York's lower East Side.
Despite poverty he managed to go to City College and get medical training at Bellevue Hospital Medical College, now New York University Medical School. He joined the United States Public Health Service in 1899 for adventure. For the next ten years he made important contributions to the understanding and control of several infectious diseases, including yellow fever and dengue fever, each of which nearly killed him.

In 1914 he was sent to the southern United States to find the organism pellagra. Epidemics of this disease afflicted hundreds of thousands of people each year. They had skin lesions, weakness, diarrhea, and mental derangements. Many were committed to asylums. The economic effect of the disease was widespread on the cotton plantations where the workers were afflicted.

Goldberger observed that in institutions with severe epidemics, inmates were affected, but the staff people were not. This was a remarkable disparity for a contagious disease. He noted too, that whereas inmates ate corn bread, grits, molasses, and fat back, the staff ate meat, milk, and vegetables. When he fed the inmates' diet to dogs, the dogs developed blacktongue, a canine analogue of pellagra. Pellagra patients placed on good diets were miraculously cured; and hopelessly insane people were well enough to leave the asylums.

Goldberger proved by controlled experiments that pellagra is a dietary deficiency disease. This landmark discovery of a nutritional deficiency led him to intensive assays of foods for their antipellagra value. Nutritional research was a novel departure for the Hygienic Laboratory (as the NIH was then called), a laboratory which had been oriented to infectious diseases. Goldberger's discovery of blacktongue in dogs led directly to the finding in 1937, eight years after his death, that nicotinic acid is the antipellagra vitamin.

The Nutrition Section at the NIH, which I joined in 1942, was directed by W. H. (Henry) Sebrell; my immediate adviser was Floyd S. Daft. The L. casei factor was close to being isolated and identified as folic acid. We tested precious samples of liver concentrates and crystalline preparations of this new vitamin, sent to us by other