Nutrient Pioneers

Foreword by *Dr. A. Hoffer*

Between 1930 and 1950 most of the vitamins were discovered and their chemical structures determined. This was the golden age of vitamin discovery. Some of the excitement even filtered into our medical schools, but it was effectively quenched after 1950 by a number of events such as the discovery of antibiotics and the wonder drugs (steroids). Physicians lost interest in nutrition and turned it over to biochemists and non-clinical nutritionists. Medical schools happily turned to medicine, surgery, psychiatry and the minor specialties. Away from patients, nutritionists lost the incentive which moves physicians to make discoveries — patients who do not get well. Biochemists have no responsibility for patients, nor do hospital dietitians or nutritionists. Nor can these professional people inspire a student as well as a clinical nutritionist can who has seen patients recover by nutritional therapy. We all, patients and public, have been the losers.

We must not forget the scientists, physicians and biochemists who have discovered vitamins, their properties and their clinical uses. We can not remember them all, but there are a smaller number of outstanding scientists such as F.G. Hopkins, Casimir Funk, A. Szent-Gyorgi, C. Elvehjem, and others. Without the work of these scientists, nutritional therapy would have remained very primitive, and Orthomolecular therapy, solidified under Dr. Linus Pauling's excellent term, would not have arisen.

Recently, I had the great pleasure of meeting Prof. A.R. Patton, a specialist in nutrition, now retired. Through his own interests and study he has concluded that Orthomolecular practices are very important. When I learned that Prof. Patton had known many of these scientists personally, I invited him to prepare brief reviews and vignettes of all the men he had known reasonably well. These will be published in this journal so that our readers will know whom to honor when they use their vitamins.

Prof. A.R. Patton described his history of research and teaching in a recent letter to me.

Dear Doctor Hoffer:

I was always interested in fundamental nutrition research, in discovery. I was never interested in poultry nutrition per se. Chicks are a first-class research tool, and I could find employment in this field. I became interested in human Orthomolecular nutrition quite recently, due to dissatisfaction with my medical treatment, and due to reading a number of recent books on the subject. I have been most influenced by books by yourself, and by Roger Williams. I

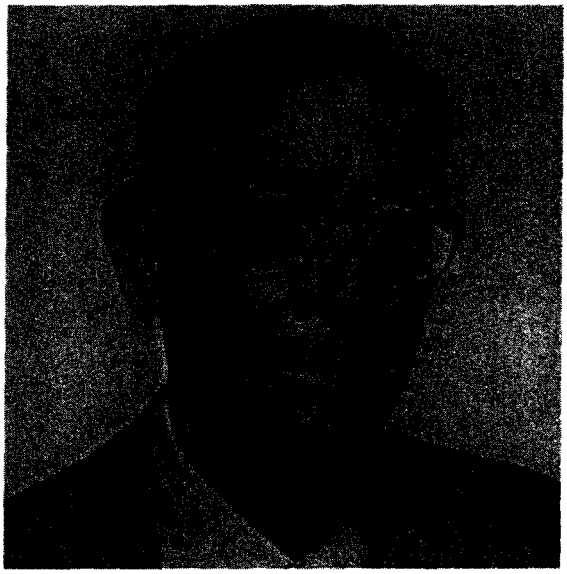
continue studying because I'm intensely interested. It has developed into my major retirement activity. I'm now called a "nutrition nut."

My major was nutrition from the beginning. I first investigated a reported relation of glycine to chondrodystrophy, but my real incentive was a report by Alvarez of glycine therapy for myasthenia gravis. In Arkansas I investigated a possible relation of silicon to wool production. In Montana I studied the nutritive value of range grasses, and found a widespread phosphate deficiency, improving beef production by feeding monosodium phosphate. In Colorado I did fundamental research on the iodine requirements of poultry, and on manganese absorption in chicks.

In the DuPont nutrition lab I did trouble-shooting concerned with vitamin D3 stability; originated their production of lysine (wheat deficiency) and methionine (soy bean deficiency). I researched soy bean oil meal supplementation with methionine and an unknown factor which others later found to be vitamin B12. I was the first to demonstrate a relation of vitamin B12 to transmethylation. I was also involved in research trying to isolate folic acid.

When lysine is condensed in a polypeptide (protein), it still has an epsilon-amino group exposed. This is subject to processing destruction, due to interaction with reducing substances such as glucose (and I suspect, ascorbate). I studied this reaction for several years. One spinoff was a patent on the control of potato chip discoloration, by a method of extraction of free amino acids and sugars before frying. While not directly responsible, it was of interest that Quaker Oats sued General Mills for labelling a breakfast food *Cheerioats,* because this product contains protein thus heat damaged. General Mills was forced to change the name to Cheerios.

Following the elucidation of vitamin B12, I concluded that the era of discovery was about at an end, and that the future of nutrition lay in more subtle areas of interrelationships. I had no inkling of megadoses. I decided to turn to teaching biochemistry, which I did with great joy for nearly twenty years, because I love teaching and being with people.



Alva Rae Patton

There gradually developed a concern that many institutions were still turning out graduates who are wet behind the ears so far as science is concerned. Bumbling, stupid statements about science had become commonplace in high places. I felt this endangered the basic right of a free people to govern themselves. I taught a course to hundreds using my text *Science for the Non-scientist,* which went through seven printings. I wrote a column entitled *Understanding Science,* printed weekly in 26 newspapers. I wrote a series printed by the *Minneapolis Tribune,* used as a text in 3000 high schools in the middle west of the U.S. In 1970, I was called to be a visiting professor on a two-year NATO Treaty fellowship at the University of Victoria, to teach this material in a course they called *Chemistry for Poets.* I also taught a course on *Chemicals in Life,* which expanded the environment to include not only that part we eat, but also soil, water, and air pollution.

Retiring from Victoria, we moved to Port Townsend (32 miles away from Brotchie Ledge), where we spent eight years cruising in a sailboat. Our present interests are fun, travel, exercise, nutrition, reading. Avis plays the piano. Rae formerly played the trumpet, timpani, all percussion instruments, but now the fipple flute, sometimes called a penny whistle.

Warmly,

Alva Rae Patton

1. Conrad Elvehjem
Discover]; of Nicotinic Acid

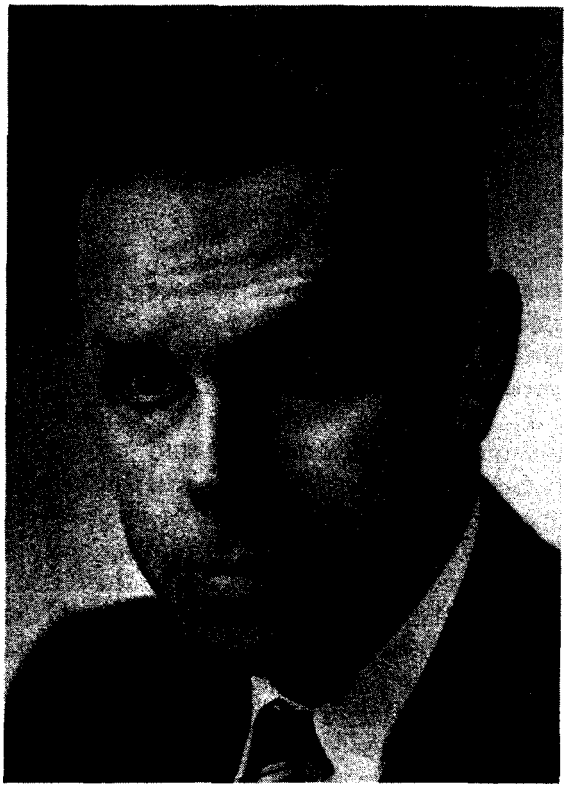
I suppose quite a few people have a mental image of what a scientist looks like. I never thought Connie Elvehjem fit the mold. He looked and acted more like a certain movie star. His first name was Conrad, but everyone I knew called him Connie. People disputed how his last name should be pronounced, but I heard him pronounce it two ways, sometimes with a "j" sound and sometimes with a "y."

In 1906 an English chemist, F.G. Hopkins, fed rats a corn diet and they died. Then he isolated a substance from milk which he named tryptophane (later the "e" was dropped). He added this to the corn diet, and the rats lived. Food had always been thought of as a source of energy. Hopkins was the first to think there are tiny amounts of undetected chemicals in some natural foods, which are necessary for life. He called them accessory food factors. He didn't know, of course, that tryptophan in the body can make niacin.

From cumulative research of many bio-chemists and nutritionists, the mounting pressure of converging evidence finally erupted like a volcano into a fountain of knowledge. In one brief moment of history, roughly from 1930 to 1950, the chemical nature of most of the essential nutrients was elucidated.

This was also the time of my greatest activity in nutrition research; hence I was a not entirely innocent bystander. To be asked to reminisce about those exciting days, about events and experiences and people so long ago, is entirely a happy assignment for an old man.

Connie Elvehjem and his students made many discoveries, but the most unusual is the way he discovered nicotinic acid, the long-sought cure for pellagra. At one time called the P-P factor (pellagra preventive), I first knew it as vitamin G (for Goldberger), and it is now known as vitamin B3. It was Goldberger who had proved that pellagra was not an infection but due to lack of something not present in the traditional diet of "spoon bread, sow belly, and long sweetening."



Conrad Elvehjem

Serendipity is an over-worked word. But something prompted Connie to reach up on the shelf, and take down a bottle of a simple, inexpensive chemical compound, known since 1867; namely, nicotinic acid. He mixed a tiny bit of it in the food for his dogs, and it cured their black tongue disease. Vitamin B3 is nicotinic acid. He discovered it in 1937.

Tom Spies (pronounced speez) was a young unmarried physician when I first encountered him in 1944. He was spending much of his off-duty time, at his own expense, travelling among the hill folk of the South he knew so well, with a bottle of nicotinic acid in his pocket. It was common knowledge that all this while, a rival for his girl friend kept trying to get him drafted into the Army and out of the way.

Tom roamed the hills looking for dogs with black tongues. The first warning he would have that he was coming to a log cabin in the woods was when the hounds began to bark. This would bring a woman to the cabin door, wiping her hands on her apron, shy children clinging to her skirt.

"Ma'am," he would begin, "I see these here hound dogs of yours got black tongues;

they're sick dogs. But I got here in my pocket some medicine that can fix them up real good."

"Well, tell you what. You can try it out first on my old man. If it don't kill him, then you can go ahead on the dogs."

This was what he was after. He knew that mostly the dogs got the table scraps, so if they had black tongues, chances were the people in the cabin were coming down with pellagra. Tom Spies did great pioneer work, proving the practical power of nicotinic acid. He spread it among the hill people like Johnny Appleseed once planted trees.

Spies also made the rounds of the mental institutions. I heard him tell of many cases he helped. Here is one I recall: "I'd found this young woman, violently insane they said. They had to keep her tied down. What had happened, back home she had suddenly grabbed the axe and tried to kill her husband; would've, too, if he hadn't been too fast for her. Just to think, I've sent people like this home, well and happy, all with fifteen cents worth of nicotinic acid."

When added nicotinic acid was listed on bread labels, there was so much confusion with nicotine that the name was changed to niacin. The derivative nicotinamide thus became niacinamide.

I've always wondered how the Indians, including those in Mexico and Central America, where corn (maize) was first developed from teosinte, knew to soak the kernels in limewater until they were soft, before wet milling. If the Europeans who first settled the South had followed this practice, instead of dry milling, they would have got sufficient niacin to prevent pellagra, and there never would have been the fourteen Government hospitals full of pellagra victims, suffering and dying from lack of the "4 D vitamin," meaning, dermatitis, diarrhea, delirium, and death.

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