

WHAT MADE ME SUCCEED IN AMERICA?

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Panel: Scientists Who Made the Difference

When I was invited by the organizers of the 2002 World Congress of the SVU in Plzeň, Czech Republic, to give a short talk on what made me succeed in America, I was taken by surprise: I considered myself more lucky than successful.

With my wife, we escaped from Czechoslovakia in the spring of 1950. We both had already completed our university studies, my wife in English language teaching and I in physics, therefore I felt reasonably confident that we should be a valuable asset to somebody, somewhere, sooner or later. Then, while in Germany, we met an unbelievable American couple who offered to sponsor us, lent us money for the trans Atlantic passage, then accepted us in their home as if we were their family members, then helped me get my first job, (I was a stationary clerk with the Kellogg Cornflakes Co.) and later advised me how to write my application for a position with Gulf Research and Development Company, the laboratory of a major American petroleum corporation. I got accepted and stayed with that company for six years working on problems in geophysical petroleum exploration.

In the meantime, space exploration was budding and I was offered a position with the Boeing Company in Seattle, Washington, to work on the recently discovered “radiation belt of the Earth.” The problems were fascinating: Where do the particles in the belt come from? How many particles can the Earth’s magnetic field hold? What will happen to radio communications if we, or our enemy, create a new radiation belt by detonating a nuclear bomb above the atmosphere, but within the Earth’s magnetic field? But before we got to the point of really understanding the belt, new problems were popping up in the physics of elementary particles, electric discharges, ionized gasses, shock waves, general relativity, turbulent flow, and little by little, we realized that the mathematical methods that we used were not good enough for what we were exploring. Of course, there were computers: but they were hopelessly slow, and whenever the problem was too complicated or too big for the slide rule, it was also way too big for the memory of those computers. So we did not get very far: we wrote impressive reports, but, usually, the conclusion called for additional work and more precise calculations.

At that time, a tragedy took the life of a promising young professor of geophysics and I was offered his position. The salary was considerably lower than my income at Boeing, but I could not resist the temptation to work with young people, see them grow, guide them in their research and, at the same time, share with them my experiences with various ideologies that, invariably, look very noble on the surface, but hide a hook and barb under the fancy plumage.

It was at that time that I made two surprising observations.

First, both my students and my colleagues somehow believed that I was an unusually well educated person. I have overheard comments such as “a renaissance man,” “a polyhistor,” and my opinion was requested in matters of which I felt absolutely ignorant. This situation made me feel rather uneasy: nobody was aware of my deficiencies as acutely as was I myself, but my protests were taken as manifestations of undue humility.

Second, and much more alarming, was my discovery that my students were very, very poorly prepared for university studies. Their historical perspective was something like: “At the beginning, God created this world. Shortly thereafter, Columbus sailed west to bring spices...” Their knowledge of geography, or lack of it, was revealed when they were presented with a map of Europe with boundaries of various countries, but without their names; those were to be filled in by the students. Great Britain, Spain, Italy, Greece and the Soviet Union fared well; but Ireland and Iceland were interchanged, so were Sweden and Norway, Austria and Switzerland, and God help the Hungarians, Bulgarians and their neighbors! But that was not all: even a blank map of the United States was a problem!

Foreign language? – “Yes, there was a semester of Spanish, but that was way back!” - How far back? – “Two years ago! I don’t remember any of it. Anyway, if English was good enough for Jesus, it’s good enough for me.”

Structure of a sentence? Noun, verb, adjective? Subject, predicate, direct object, indirect object? – Blank.

Solving a system of two equations in two unknowns? – Same story: way back, in the prehistory of their high school junior year, there was something of that sort, but why bother with it now, two years after the true–false test had been passed?

Physics? Chemistry? Mineralogy? Geology? – “No, I took biology.” – OK, so the conversation turns to something pertaining to zoology. And behold! The student is amazed that crabs are closer relatives to butterflies than to fish. Don’t crabs and fish live in water, while butterflies live in the air?

In general, the student (and, sometimes, the instructor) seemed to view education as a set of hurdles, not unlike a set of hoops through which the leopard has to leap in order to get his reward: a piece of leopard food, or a diploma. In either case, once that hoop has been cleared, it may be forgotten.

And soon, I realized that I had not built my fame and reputation on my university education, but on the solid, systematic, old fashion Czechoslovak primary and secondary school. My university education was no better than theirs, but my primary and secondary schools made me a reasonably educated person, whereas they have been cheated: they went to a fancy school house, their school band had brand new uniforms,

they won the football game or the baseball game, and they were given a pile of bits of information without any structure and system. And they forgot those bits of information and have been feeling much better ever since.

So what's the moral?

It is twofold. One is for the Americans, the other for the Czechs and Slovaks.

America is crying about the miserable state of their secondary schools, but the proposed corrections are superficial, expensive and counterproductive. There are two faults in American secondary education, neither of which will be solved with dollars and cents: The education needs system. And American public must learn that education is not a necessary evil, which has to be endured in order to get a well paid swivel chair job.

Education has to be structured in such a way that what the student has learned this year is a needed prerequisite for next year's study. Taking a semester of German and never needing it again is folly, while learning German grammar and developing vocabulary this year opens the gates toward reading excerpts from Thomas Mann and Kafka next year, and may pave the way to the whole spectrum from Hildebrandslied and Walter von der Vogelweide to Goethe and Brecht. And it would not cost millions of dollars to restructure the system: it would require a team of wise persons who can distinguish between education and training for a job.

It would be a lot harder to convince the American public that education is not means toward a goal, but the goal itself. And that education is not for everybody. Just as not everybody will be a professional football player, a prima ballerina, figure skater, violinist or film star, not everybody will be an educated person. This maxim seems to be perfectly understood by the athletic coach, but not by the teachers of academic subjects or by the students, nor by their parents. The coach knows that a hundred pound co-ed is poor timber for a quarter back; if he didn't, the student, the parents, the principal, the faculty and the school board would immediately come to their senses and a new coach would embark on a new carrier. But a teacher of history or math or any other academic subject will have students who have neither the interest, nor the desire, nor the ability to learn, yet the student has to stay in the class and the teacher has to teach him or her anyway. This is supposed to have something to do with our democratic system. When I asked why democracy should work for academic subjects, yet can be dispensed with in football, acrobatics or music, I never got a satisfactory answer.

The message to the Czechoslovakians is simple, and their task elementary: **DO NOT MONKEY WITH WHAT YOU'VE GOT!** Your traditional educational system is second to none. You cannot improve on it. If you make it similar to the American system, you will achieve American results. Is that your aim?

And that is what I have to say about my success in America: It was not my success, it is the success of our teachers, our schools, our educational system. To them, I owe my thanks. Without them, today, I would not read Herodotus and Tacitus for fun. I would not

play viola in the local orchestra. I would have never read the Upanishads and the Koran (in translation!). And I may not know the difference between Beethoven's ninth and rock-and-roll.